UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Science Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

SUBJECT: **Potentially Responsible Party Reports that have not been approved by EPA**

FROM: Robert T Wallace, Remedial Project Manager Central Chemical OU2

TO: Reviewers of USGS Scientific Investigations Report

EPA concurs with the data collected in this report; however, EPA does not necessarily concur with the interpretations and presentation of the data.

Operable Unit 2
Remedial Investigation Report

Central Chemical Site
Hagerstown, Maryland

Prepared on behalf of:
Central Chemical Superfund Site
Participating Parties

Prepared by:
Amec Foster Wheeler
751 Arbor Way, Hillcrest 1
Suite 180
Blue Bell, Pennsylvania 19422

Project Number: 7772170038
Date: April 2, 2018

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April 2, 2018

Mr. Robert Wallace
USEPA Region III
Environmental Science Center
701 Mapes Road
Fort Meade, MD 20755

Subject: Submittal of Draft Central Chemical Superfund Site Operable Unit 2 (OU-2) Remedial Investigation Report

Dear Mr. Wallace:

On behalf of the Central Chemical Respondents Group (Respondents) and Amec Foster Wheeler, please accept the submittal of the *Draft Central Chemical Superfund Site Operable Unit 2 Remedial Investigation* for your review. This deliverable includes the following items requested by USEPA:

- Draft Central Chemical Superfund Site Operable Unit 2 Remedial Investigation Report;
- Letter of response to USEPA comments dated January 18, 2018 on the Draft Central Chemical Superfund Site Operable Unit 2 Part 1 Remedial Investigation Report;
- Draft OU-2 Remedial Investigation/Feasibility Study Schedule;
- Copies of all field log books from drilling and well installation; and,
- Copies of all geophysical logs.

Please note, as agreed to by USEPA, the Risk Assessment Guidance for Superfund (RAGS) Tables 1 and 4 will be submitted under a separate cover on April 13, 2018.

In addition to the enclosed electronic files, hard copies of all the above documents except the field log books and geophysical logs (these will be provided as electronic files on CD) will follow via overnight courier.

If you have any questions regarding this report, please contact me at (781) 347-1135.

Sincerely,

Donald G. Gunster, M.E.M.
Project Manager

cc: Mr. Jeff Tuttle, USEPA Region III, Philadelphia, PA (two copies)
Mr. Jeff Harp, Maryland Department of the Environment (one copy)
Mr. Brett Brodersen, HydroGeoLogic, Inc. (one copy)
Central Chemical Respondent Group

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Executive Summary

This Central Chemical Site (the Site) Operable Unit (OU) 2 Remedial Investigation (RI) Report for OU-2 presents the Site description and history, Site setting, RI work performed and analytical results, fate and transport analysis of specific contaminants, the Hydrogeological Conceptual Site Model (HCSM), identified areas of uncertainty associated with the RI data, and conclusions and recommendations. The OU-2 RI was performed between 2011 and 2017 in general accordance with Administrative Order on Consent Number 97-105-DC (Consent Order) dated September 12, 1997, executed between the Central Chemical Respondents Group (Respondents) and the United States Environmental Protection Agency Region III (EPA). The overall objectives of the OU-2 RI, as described in the approved Work Plan (URS, Feb. 2012), are as follows:

- Define the nature and extent of Constituents of Concern (COCs) in groundwater based on current (November 2017) EPA Regional Screening Levels (RSLs).
- Evaluate risk to human health and the environment posed by COCs in groundwater and as potential vapor phase constituents.
- Identify the areas potentially impacted by COCs based on EPA's cumulative excess lifetime cancer risk range (1×10^{-6} - 1×10^{-4}) threshold for multiple carcinogens, and non-cancer effects compared to a hazard index (HI) of 1.0.
- Assess the fate and transport of COCs from the Site and evaluate potential receptors of groundwater COCs.
- Obtain the necessary geologic and hydrogeologic data to evaluate remedial alternatives[1] as part of the OU-2 Feasibility Study (FS).

The Site is comprised of 19.02 acres located on Mitchell Avenue within the city limits of Hagerstown in Washington County, Maryland. It is situated in an area of mixed industrial, commercial, residential, and agricultural uses. Building structures associated with the former operations were demolished in 2005; building foundations/slabs were removed, crushed, and stockpiled (except for Building 14 and 15) in 2017 as part of ongoing OU-1 remedial actions; and the Site is currently undeveloped. Adjacent to the Site on the northwest is the Brighton Manor residential sub-division, and to the northeast of the Site is a residential development consisting of townhouses.

Central Chemical Corporation engaged in pesticide blending and fertilizer blending and packaging operations between the 1930s and 1984. The sources of contamination include the former Waste Management Area (WMA), located in the northern portion of the Site, and soils throughout the Site. The former WMA and Site soils are subject to ongoing remediation under the September 2009 Operable Unit (OU) 1 Record of Decision (ROD).

The Site is underlain by a thin veneer of overburden and epikarst over the Conococheague Limestone Formation which has been extensively deformed by folding and faulting. Karstic

[1] EPA policies related to groundwater restoration are provided in OSWER Directive 9283.1-33 Summary of Key Existing EPA CERCLA Policies for Groundwater Restoration (EPA, 2009a).

solution widened fractures and joints are present, primarily at depths less than 100 feet below ground surface (bgs). These features have created tertiary porosity which plays a role in groundwater flow, particularly in the shallow epikarst unit. The resulting upper surface of the bedrock is uneven with sharp elevation changes over short distances. This bedrock structural deformation has created joints and fractures, in addition to bedding planes that create secondary and tertiary porosity.

The OU-2 RI field work included the following tasks:

- Monitoring well installations to greater depths and further off-Site;
- Off-Site private well evaluations;
- Sub-slab vapor intrusion evaluation;
- Surface water and sediment sampling in the Bester Long Quarry; and,
- Comprehensive groundwater sampling events (one in 2014 and quarterly in 2016-2017).

In addition, EPA conducted a dye tracer study that included sampling of springs, surface water and sediment.

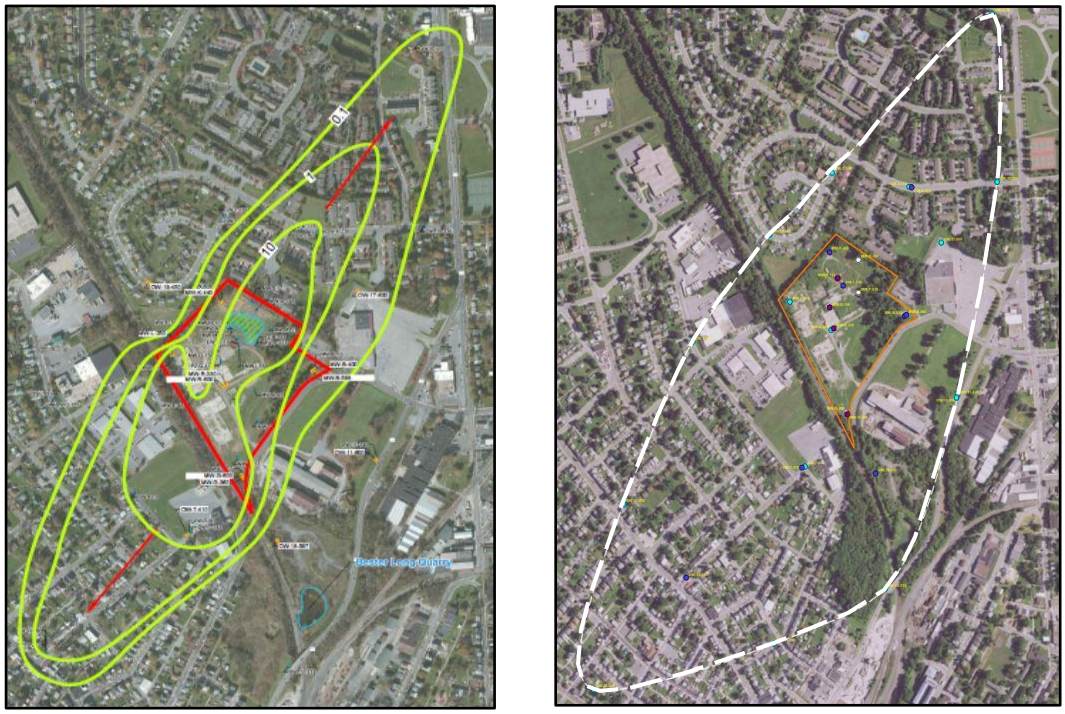
The groundwater COC were identified in Table 12 of the September 2009 OU-1 ROD. The COCs included several volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals and a number of pesticide compounds.

Remedial investigation results are summarized as follows:

- Shallow (<100 feet below ground surface (bgs)) groundwater flow is from a persistent groundwater mound centered beneath the western portion of the Site. The mound is consistently elongated, with the long axis oriented parallel to both the bedrock strike and structure that has been mapped beneath the Site. Groundwater flow occurs in all directions away from the mound in this depth interval.
- Groundwater flow within the deeper bedrock aquifer (>100 feet bgs) is more complex, due to the folding and thrust faults. There is a consistent trend in hydraulic head levels being generally higher northwest of the Site and lower southeast of the Site which correlates to the regional flow toward surface water discharge boundaries.
- Groundwater sampling over five separate events delineated the groundwater plume horizontally to approximately 2,200 feet northeast, 2,700 feet southwest, 800 feet southeast and 400 feet northwest and vertically to 600 feet bgs. Groundwater impacts appear to originate from the on-Site source areas, migrating to off-Site locations. The plume size and orientation is essentially unchanged from the 2009 Groundwater RI Addendum.

Total BHC Distribution – Bedrock Aquifer

November 2007 July – August 2017



- Five comprehensive groundwater sampling events have been conducted since 2014. Overall the concentrations of COCs have not increased over time and in multiple on-Site wells, the concentrations of COCs such as benzene, pentachlorophenol, aldrin, heptachlor epoxide, and DDx have generally decreased.
- Analysis of non-potable groundwater samples collected in 2014-2015 from six private wells located at residences between one and 1.5 miles northeast of the Site and one well located at the Fountain Head Country Club (FHCC) golf course identified dieldrin and heptachlor epoxide at concentrations exceeding their respective Regional Screening Levels (RSLs). During the five comprehensive groundwater sampling events, heptachlor epoxide was typically only detected above the RSL in select on-Site wells and off-Site wells located to the south of the Site. In the most recent groundwater sampling event (July-August 2017), dieldrin was non-detect and/or below the RSL in monitoring wells located to the north-northeast of the Site (between the Site and these private wells). Therefore, it is not likely that these detections are related to the Site.
- Several COCs were identified at very low concentrations in surface water samples collected from the Bester Long Quarry, which is the closest surface water body and groundwater discharge boundary to the Site located approximately 650 feet south of the Site.
- A dye tracer study was conducted by EPA to evaluate tertiary (karst) porosity as a potential pathway for COCs migration from the Site to surrounding areas. The tracer study results presented by EPA indicate the existence of preferential flowpaths which appear to connect dye injection points on the Site and various dye sampling locations with varying degrees of uncertainty. Some of the dye sampling points are located well

beyond the 2,000 to 2,700-foot distance from the Site where COCs were observed in off-Site groundwater.

- Sediment samples collected during the RI at Bester Long Quarry and the EPA tracer study identified constituents including arsenic, manganese, thallium, dieldrin, alpha-chlordane, heptachlor epoxide, 4,4-DDT, 2,4-DDD, 2,4-DDE, 4,4-DDD, 4,4-DDE, and beta-BHC. Their origin is uncertain.
- Samples of spring water collected from local springs during the RI and by EPA during its tracer study detected pesticides such as dieldrin, 4,4-DDT, alpha-chlordane, and heptachlor epoxide. However, a key indicator parameter, benzene hexachloride and its four isomers (alpha-, beta-, delta-, and gamma-BHC [BHC]), was absent from all results.
- Surface water samples collected by EPA during its tracer study identified dieldrin at concentrations below the Maryland Fresh Water Acute and Chronic standards. BHC, a key indicator parameter, was absent from all results.
- Sub-slab soil vapor data from four properties immediately adjacent to the northeast Site property boundary did not identify COCs at concentrations exceeding the current allowable Threshold Carcinogenic Risk and Threshold Hazard Quotient.
- Residuum soil thickness ranges from 0-foot, where epikarst bedrock outcrops, to very localized area of over 40-feet thickness where karst processes resulted in complete weathering of limestone. This unconsolidated overburden is underlain by an irregular surface of highly weathered epikarst limestone. Tertiary porosity features (voids) were observed during drilling activities in a limited number of wells and there appeared to be limited connectivity of voids and dissolutionally enlarged fractures.
- Hydraulic testing data support an interpretation that secondary and tertiary porosity are poorly interconnected.
    - Hydraulic testing in the bedrock monitoring wells at multiple depths result in hydraulic conductivity values indicative a poor network of interconnected secondary porosity; tertiary porosity was not indicated in hydraulic testing results in the bedrock aquifer wells.
    - Bedrock well pumping yields are quite low (>80% of the packer test well intervals yielded less than 5 gallons per minute (gpm)) and yields appear to diminish with depth of the well.
    - Hydraulic heads recorded by pressure transducers following rain events depict a limited ability of the bedrock fracture network to transmit pressure changes. Typical example of the overall hydraulic behavior of the bedrock aquifer is illustrated by the piezometer cluster PZ-4 the water level change at both depths is virtually instantaneous (within a day) after the highest recorded rainfall of 2.5 inches on July 29, 2017. Similar response is also evident for other significant rainfall events. At the same time, the hydrograph peaks for both shallow and deep screen intervals at this and other monitored locations are followed by recession periods that typically last longer than a week or two when there is no major rainfall. This indicates that groundwater flow in the bedrock is predominantly through the secondary porosity and limited by the ability of the fracture network to quickly transmit groundwater flow. If the flow were dominated by a karst conduit network for example, the “draining” of the conduits would have to be much faster given the low matrix porosity of the bedrock which does not supply much water to the conduits.

- Several lines of evidence illustrate that secondary porosity is the dominant bedrock flow and COC migration pathway.
    - Groundwater impacts are delineated in the plume far closer to the Site than off-Site spring locations.
    - Dieldrin was detected in surface water and spring samples; however, a significantly more mobile indicator parameter, BHC, is absent.
    - The shallow groundwater mound at the Site is persistent over time. If tertiary porosity were well interconnected in this vicinity, drainage to the tertiary features would likely prevent development of the observed hydraulic high.
    - The pattern of shallow groundwater flow as interpreted in groundwater contours appears to be controlled predominantly by bedrock structure.
- Evaluation of COC fate and transport was evaluated using BHC as a surrogate. Analytical modeling predicts that concentrations of total BHCs are expected to be well below the combined RSL of the four BHC isomers (0.0000992 mg/L) 100 years into the future using conservative published half-life values and observed attenuation (represented as decay constant calculated from Site data) for both the downgradient well locations and beyond. This indicates that the overall total BHCs plume is expected to shrink from its current extent and eventually dissipate.

Future on-Site land use will remain commercial/light industrial, while the surrounding area is expected to remain a mixture of commercial, industrial and residential. A deed restriction prevents future on-Site residential use or on-Site use of groundwater. Given this setting, the following potential receptors might be exposed to COCs and complete exposure pathways are of concern:

- Human Receptors:
    - Future on-Site construction/utility worker incidental dermal contact with perched groundwater during dewatering activities for development, and inhalation of vapor-phase chemicals released from the subsurface to indoor air (vapor intrusion).
    - Future on-Site commercial/industrial worker inhalation of vapor-phase chemicals released from the subsurface (vapor intrusion).
    - Current/future off-Site resident (Adult/ Adolescent/Child) incidental ingestion of and dermal contact with well water; incidental ingestion via consumption of home grown produce; and, inhalation of vapor-phase chemicals released from the subsurface to indoor air (vapor intrusion).
    - Current/future off-Site commercial/industrial worker incidental ingestion of and dermal contact with groundwater used for irrigation by a golf course maintenance worker; inhalation of vapor-phase chemicals released from the subsurface to indoor air or other confined space (excavation or trench).
    - Current/future off-Site recreational user (Adult/Adolescent/Child) incidental ingestion and dermal contact with surface water, sediment and spring water while wading or swimming in off-Site streams, and consumption of fish caught from off-Site surface water features.

- Ecologic Receptor Communities:
  - Offsite benthic invertebrate community by direct contact/absorption with surface water, bulk sediment and sediment porewater within the biologically active zone, and secondarily direct/incidental ingestion.
  - Offsite fish community by direct contact/absorption with surface water, bulk sediment and suspended particulates within surface water, or ingestion of prey items.
  - Offsite piscivorous/omnivorous birds and mammal ingestion of fishes containing pesticide residues, and the incidental ingestion of surface water, and bulk sediment.

Several uncertainties were identified in the RI data. These included:

- Karst migration pathway. In general, the physical and hydraulic characteristics of individual bedrock fractures and the degree of interconnection within fracture networks is not precisely determinable. Diversion of groundwater flow in the karst conduits may result in significant migration to surface water, but may not be sufficient to distort the measured distribution in groundwater. Sampling of the springs did not demonstrate this to be a contaminant migration pathway. However, karst conduits may transmit COCs only intermittently. A passive sampling program will be implemented through which a "time-integrated" sample can be collected continuously over a six-month period in order to address this uncertainty regarding intermittent transport to springs (if such transport occurs).

- Background conditions in soil and groundwater. Publicly available agricultural records have confirmed wide-spread historical agricultural usage of pesticides throughout the county over decades. Dieldrin is detected in the absence of other key indicator COCs in springs, surface water and sediment as well as groundwater over a large area, and concentrations are observed exceeding those in monitoring wells near the Site that would appear to delineate impacts in groundwater. In addition, metals identified as COCs, including arsenic, aluminum, beryllium, iron, manganese, and thallium, are known to be naturally occurring. A statistical-based background study should be conducted to evaluate background concentrations of COC pesticides and metals in soil and groundwater.

- COC delineation. Groundwater data collected since 2011 demonstrates COC plume stability. Vertically, several COCs have been detected above the respective RSLs in the deepest screened wells (down to 600 feet). Horizontally, the COCs have been delineated, with the exception of dieldrin (in wells less than 100 feet deep) and arsenic. These gaps do not impede the ability to conduct a Feasibility Study.

- EPA's Tracer Study. Key uncertainties in the tracer study are associated with the interpretation of background concentrations of similar dye sources and limitations related to mass recovery. Tracer-like substances with fluorescence responses similar to fluorescein dye were detected as a background condition prior to tracer study initiation. Background concentration data were erratic and were reduced to single mean background concentration for each location. This could have led to a false interpretation of post-injection spikes as an actual appearance of the tracer. The wide range of mass recovery could introduce further uncertainties regarding the conclusions.

The remedy for OU-1 was initiated in 2017 with completion scheduled in 2019 will minimize any ongoing loading of COCs from on-Site contaminant sources to groundwater. The empirical RI data indicate that groundwater impacts originate due to releases from the former WMA and Site soils throughout. The most significant contaminant source is the former WMA. The OU-1 remedial action began with demolition and consolidation of former building slabs and installation of groundwater extraction and treatment system (GETS) wells and conveyance lines. Later in 2018, the principal threat waste in the WMA area will be treated down to bedrock with in-situ solidification/ stabilization (ISS). During 2019, all impacted soils where concentrations exceed RSLs will be excavated and consolidated in the ISS area. The excavations will be backfilled with clean soil and graded. The soils consolidated in the ISS area will be covered with a multi-layer membrane cover system that will prevent the infiltration of precipitation and consequent leaching of COCs into groundwater. In addition, construction of the GETS is ongoing and operation is scheduled to begin during 2018. Operation of the GETS will minimize any ongoing loading of COCs from the former WMA to groundwater.

The OU-2 RI has been comprehensive and provides a large body of data and observations on which remedial decisions will be based. While some uncertainties have been identified, the characterization of the conditions associated with the Site is sufficient to proceed with Risk Assessment and Feasibility Study.

1.0 Introduction

This report is the Remedial Investigation (RI) report for Operable Unit (OU) 2 at the Central Chemical Site (the Site) located in Hagerstown, Washington County, Maryland (**Figure 1-1**). The OU-2 RI field data collection activities were performed between 2013 and 2017 under the general requirements of the Administrative Order on Consent Number 97-105-DC (Consent Order) dated September 12, 1997, executed between the Central Chemical Respondents Group (Respondents) and the United States Environmental Protection Agency Region III (EPA). The investigation was conducted in general accordance with the Operable Unit 2 Remedial Investigation Work Plan (URS, 2012), as revised February 2013, and approved by the EPA on May 29, 2013. On June 30, 2017, Amec Foster Wheeler Environment & Infrastructure, Inc. assumed the role of environmental consultant on the project for the Respondents.

1.1 RI/FS Purpose and Objectives

The purpose of the OU-2 RI, as defined in EPA guidance (EPA, 1988a; 1988b), is the development of data and analyses needed to: (1) characterize Site hydrogeology; (2) determine the nature and extent of groundwater impacted by the Site; and (3) assess risk to human health and the environment from constituents of concern (COCs). In addition, the overall objectives of the OU-2 RI, as described in the approved Work Plan (URS, Feb. 2012), are as follows:

- Define the nature and extent of potentially COCs in groundwater based on current (November 2017) EPA Regional Screening Levels (RSLs).
- Evaluate risk to human health and the environment posed by COCs in groundwater and as potential vapor phase constituents.
- Identify the areas potentially impacted by COCs based on EPA's cumulative risk threshold for multiple carcinogens of one in ten thousand (1×10^{-4}), one in one hundred thousand (1×10^{-5}), and one-in-one million (1×10^{-6}); and non-cancer effects compared to a hazard index (HI) of 1.0.
- Assess the fate and transport of COCs from the Site and evaluate potential receptors of groundwater COCs.
- Obtain the necessary geologic and hydrogeologic data to evaluate remedial alternatives[2] as part of the OU-2 Feasibility Study (FS).

1.2 Report Organization

This report presents the procedures and results from the OU-2 RI activities. Each task and phase was iterative in nature and designed to build on results of the previous investigations and data screening/evaluations to ensure that the Site is characterized to meet the overall objectives of the OU-2 RI in EPA's 2012 SOW. The following sections are included in this report:

- Section 1.0 Introduction - Presents the purpose, objectives, and organization.
- Section 2.0 Site Background and Physical Setting - Presents a description of the facility, and its regional geologic, hydrogeologic and environmental setting.

[2] EPA policies related to groundwater restoration are provided in OSWER Directive 9283.1-33 Summary of Key Existing EPA CERCLA Policies for Groundwater Restoration (EPA, 2009a).

- Section 3.0 Methods of Investigation - Presents a detailed description of the procedures and methods utilized to collect the samples and data during the various tasks performed for the OU-2 RI.
- Section 4.0 Hydrogeologic Conceptual Site Model (HCSM) - Presents a summary of OU-2 RI hydrogeologic data and interpretations of the structural and hydrogeologic characteristics of fractured bedrock groundwater flow, and discusses potentially complete exposure pathways and receptors as a basis for a Baseline Human Health Risk Assessment and a Screening Level Ecologic Risk Assessment.
- Section 5.0 Remedial Investigation Results – This section presents tabular summaries of all data collected during the RI relevant to groundwater quality conditions on and off of the Site, and provides statistical summaries of the data, describes groundwater flow direction, and distribution of COCs in groundwater.
- Section 6.0 Fate and Transport – This section discusses environmental and physicochemical factors that affect the fate and transport of COCs in the environment, and presents analyses of the data relevant to migration of COCs via groundwater to springs, surface water and sediment.
- Section 7.0 Uncertainties – Identifies areas of uncertainty associated with the investigation data, factors that potentially contribute to uncertainty, potentially erroneous conclusions, and/or limitations of the data assessment.
- Section 8.0 Conclusions – The section summarizes the findings and conclusions of the RI report.
- Section 9.0 Recommendations – The section provides recommendations for future activities to reduce uncertainties identified in Section 7.0.

2.0 Site History and Description

2.1 Site Description

The Site is located on Mitchell Avenue and encompasses an area of approximately 19.02 acres within the city limits of Hagerstown in Washington County, Maryland. Coordinates for the Site, which is located on the Hagerstown, Maryland-Pennsylvania United States Geological Survey (USGS) quadrangle, are 39°, 39', 23" north latitude and 77°, 43', 27" west longitude. The Maryland Grid coordinates for the Site are 596,400 feet east by 665,033 feet north (MDE, 1994).

The Site is situated in an area of mixed industrial, commercial, residential, and agricultural uses. About one-half of the Site is vegetated. The other half of the Site consisted of buildings associated with the former fertilizer and pesticide blending and packaging operations (**Figure 2-1**) that were demolished in 2005, with the foundations/slabs removed and crushed in 2017 (except for Building 14 and 15). The remaining slabs and footings are to be demolished as part of the OU-1 ROD remediation scheduled to be completed in 2019. A fence encloses the property and two gates are located along Mitchell Avenue to allow access to the Site.

As shown on **Figures 1-1** and **2-1**, Mitchell Avenue borders the eastern and southeast perimeter of the Site and the Maryland Metals building is located on the east side of this street. The Site is bordered on the south and southwest by railroad tracks, beyond which are commercial properties. Northwest of the Site is the Brighton Manor residential sub-division. To the northeast of the Site, a residential development consisting of townhouses is referred to as West Irvin Heights. An electrical substation, owned by the City of Hagerstown, is in the northeast corner of the property. Farther east of the Site, adjacent to Highway 11, is a strip mall that includes a supermarket (currently vacant), a drug store, and other shops.

2.2 Site History and Development

Central Chemical Corporation owned the property for approximately 100 years; operations ceased in 1984. A detailed discussion of historical operations was presented previously in the RI/FS Work Plan (URS, 2002). In brief, the original structure was constructed in the 1930s. Fertilizer blending and packaging operations occurred between the 1930s and 1984, and pesticide blending operations occurred between the mid-1940s and the mid-1960s.

The only known area of historic on-Site waste management and a potential source of groundwater impacts is a former Waste Management Area (WMA) located in the northern portion of the Site (**Figure 2-1**). Based on archive records, the former WMA was excavated to receive lime sulfur slurry, and was later expanded to receive the waste acid from the fertilizer plant. These materials were usually pumped from the processing building to the former WMA. If the material was solidified, it was transported by truck to the former WMA for disposal.

A drainage swale was constructed along the eastern side of the Site (**Figure 2-1**). This drainage swale, which still exists, intercepts surface runoff from the northeast. According to Maryland Water Pollution Control Commission correspondence and field reports obtained from the Maryland Archives, the drainage swale was constructed in the early 1950s "to carry surface waters to the drain and thereby prevent flooding of the former WMA." Soils along the drainage swale were characterized as part of the Phase II Remedial Investigation (URS, 2005).

Other potential source areas identified in the 2008 Remedial Investigation (URS, 2008) and Operable Unit 1 Pre-Remedial Design Investigation Report (URS, 2015) include soils associated with the Liquid Pesticide Building and the D1H08A area both located near the northwest corner of the Site. The D1H08A area is located near former Building 6 (Grinding and

Packaging) and Buildings 5 and 7 (Warehouses). In addition, the OU-1 RI identified areas of impacted soils across the Site that are a potential source for groundwater impacts as well.

Following a plant fire in 1965, pesticide operations were significantly curtailed and ceased altogether within the next two years. All chemical operations at the Site ceased in 1984. The Site remained vacant for several years and was then leased to tenants who either used the buildings for storage or operated small businesses such as automobile repair. All tenants vacated the Site shortly before the demolition of the buildings in 2005.

All of the sources identified above are being remediated under the OU-1 ROD, and the remediation should halt or substantially reduce the loading of COCs to groundwater. The OU-1 remediation activities were initiated in 2017 with completion scheduled in 2019 to address on-Site contaminant sources. Remedial action began with demolition and consolidation of former building slabs and installation of groundwater extraction and treatment system (GETS) wells and conveyance lines. During 2018, the principal threat waste in the WMA area will be treated down to bedrock with in-situ solidification/ stabilization (ISS). During 2019, all impacted soils where concentrations exceed RSLs will be excavated and consolidated in the ISS area. The excavations will be backfilled with clean soil and graded. The soils consolidated in the ISS area will be covered with a multi-layer membrane cover system that will prevent the infiltration of precipitation and consequent leaching of COCs into groundwater. In addition, construction of the GETS plant is ongoing and operation is scheduled to begin during 2018 prior to the start of the ISS work. Operation of the GETS will minimize any ongoing loading of COCs from the former WMA to groundwater.

2.2.1 Topography

The Site is situated within the “Hagerstown Valley” a Valley and Ridge Physiographic Province (**Figure 2-2**). The uplands on either side of the Hagerstown Valley rise to elevations exceeding 700 feet. The Hagerstown Valley is within the drainage basin of the Potomac River located approximately 6 miles southwest of the Site at Williamsport, MD. The topographic elevation of the Site ranges from 633 feet mean seal level (MSL) along the northern boundary to 596 feet MSL along the southern boundary.

The major local tributaries of the Potomac River include Antietam Creek and Conococheague Creek that drain southerly along the regional northeast-southwest trending bedrock structural grain (**Figure 2-3**) into the Potomac River. Conococheague Creek is approximately 5 miles to the west of the Site. The meander patterns of Conococheague Creek and the smaller Antietam Creek follow the local northeast-southwest structural grain with elongated stream segments that parallel fractures striking northwest-southeast cutting across the regional structural grain (bedrock strike). In like manner, the smaller Antietam Creek, which is located approximately 2 miles east of the Site, displays the same bedrock structural control as that observed in the Conococheague Creek.

2.2.2 Regional Geology Overview

Geologically, the Site is located in the Great Valley (locally the Hagerstown Valley) of the Valley and Ridge physiographic province (Maryland Department of the Environment [MDE], 1994). The Valley and Ridge Province is underlain by folded sedimentary rocks, with the more erosion-resistant rocks (sandstones) forming ridges and the less resistant rocks (limestones and shales) forming valleys. The ridges and valleys are aligned in a northeast-southwest orientation, consistent with the general structural trend of the Appalachian Mountains.

The Hagerstown Valley is underlain predominantly by Cambrian and Ordovician Age carbonate rocks (limestones and dolomites) (Maryland Geological Survey [MGS], 2001). There are three

carbonate formations in the immediate Site vicinity: the Conococheague, Stonehenge, and Rockdale Run Formations (see regional geologic map of **Figure 2-4**). These carbonates form part of the karst belt of the Hagerstown Valley (MGS, 2001). “Karst” refers to landforms and hydrology that are affected by dissolution of the underlying bedrock.

The Site is underlain by, the Conococheague Formation Limestone (Cambrian System) which is comprised of Upper, Middle and Lower members. The Middle and Upper Members are the predominant rock units underlying the Site area, and exhibit karst development – particularly at depths less than 100 feet below ground surface (bgs). In the Site area, the Stonehenge Limestone (Ordovician System) overlies the Conococheague Formation.

The Stonehenge Formation, is composed of a lower, massively bedded algal limestone and an upper, thin- bedded, coarse-grained oolitic limestone with flat pebble conglomerate (MGS, 1978). The Stonehenge is overlain by the Rockdale Run Formation (also Ordovician). The Rockdale Run includes a basal chert unit overlain by stromatolitic silty limestones and dolomites.

Lithologic Character of the Conococheague Formation

Based on geologic field mapping/reconnaissance, borehole logs, and published literature, the main body of the Conococheague Formation is composed of cyclical, light to dark-blue and grey, closely banded limestones. The banding is usually one-half to one-inch in width and is caused by the alternation of thin, wavy, argillaceous (shaly), and arenaceous (silty and sandy) limestone laminae with thin layers of purer dark grey limestone rock. The arenaceous laminae are inconspicuous in the freshly fractured rock, although close examination reveals the alternation of the dark blue-gray, argillaceous/shaly, and purer and gray limestone bands. These features are readily observable in outcrops along the railroad cut adjacent to the Site.

Upon weathering, the siliceous laminae appear as yellowish sandy streaks separating light-blue or medium to dark gray bands of limestone. Further weathering causes the siliceous laminae to stand out in relief as more or less parallel ribs as seen in bedrock outcrops. Finally, where the rock has undergone a high level of weathering or dissolution, these laminae are left in the soil as thin, hard, siliceous plates. Strata of this nature can be found in most outcrops of the Conococheague Formation, over much of the OU-2 area.

Karstic solution widened fractures and joints are present in these limestones, primarily at depths less than 100 feet bgs. Boring and geophysical logs recorded during the RI indicate the presence of these features decreases with increasing depth, as would be expected. The resulting upper surface of the bedrock is uneven with sharp elevation changes over short distances. Tertiary porosity formed by solution widening of joints and fractures is present.

Inter-bedded with the banded limestones described above are various other limestone lithologies. Of these, the most striking are the beds of “edgewise” conglomerate which alternate frequently with the usual banded limestone. This conglomerate is composed of slender fragments of limestone tilted at all angles in a matrix of limestone distinctly different in composition. In addition, the Middle Member of the Conococheague (see **Figure 2-4**) that underlies much of the Site are mappable massively-bedded horizon(s) of thrombolitic limestones. These thrombolitic limestones have also been noted along the railroad cut and elsewhere.

The cyclical nature of the Conococheague Formation stratigraphy has allowed consolidation of the geologic units into simpler units such as argillaceous/shale limestone, arenaceous limestone and light-grey massive bedded limestone as shown in the geologic cross sections of the Site presented in later sections of this report.

Because of deformation, karst development in the upper 100 feet, and the discontinuous and dispersed bedrock outcrop exposures, the thickness of the Conococheague Formation is difficult to determine (Cloos, 1951; Stose, 1909). Published literature (Brezinski 2013 and 2014; Stose 1909; Harlow and others, 2005; Fitcher, et al., 2010) suggests a cumulative formational thickness of 1,650 feet for the Conococheague Formation. Only the upper and middle members of the Conococheague Formation underlie the OU-2 area with a cumulative thickness of these two members ranging from about 700 feet to 1,000 feet. A complete stratigraphic section of the middle and upper members of the Conococheague Formation is not likely present at the Site due to structural deformation and erosion at the ground surface.

Folds

The regional area is characterized by significant deformation of the bedrock structure due to folding and faulting (**Figure 2-5**). The OU-2 study area is underlain by a regional-scale, asymmetric anticline that is tilted to the northwest. The shorter, northwestern limb of this anticline begins close to the surface as a northwest dipping short limb. Progressively with depth as seen in outcrop and boreholes, this limb is largely overturned and therefore dips to the southeast. On the flanks (limbs) of this regional anticline, numerous meso-scale (smaller scale) folds have formed as the limbs contracted during westward thrusting and tectonism. Several such smaller-scale anticline-syncline pairs are mapped at the Site.

As presented in regional geologic plan view (**Figure 2-4**), the Site is located adjacent to the axial trace of the overturned anticline structure. Its hinge zone is present in an outcrop along the railroad right of way. The Geologic Map of Washington County (MGS, 1978) depicts a northeast-striking high-angle (reverse) fault located approximately 0.25 mile to the northwest of the Site. Bedding planes near this fault have near-vertical dips or are overturned as can be readily observed along the Norfolk-Southern Railroad cuts south and southwest of the Site.

Vergence

Vergence is a term used to indicate the movement and rotation that occurred during deformation. Vergence of an asymmetric fold is defined as the horizontal direction of movement of the upper component of a fold measured in profile (or vertical cross section). At the Site, the regional anticline is a northwest-verging fold (i.e., it is inclined to the northwest) with a shorter, steeply dipping northwest limb that then is rotated into an overturned limb. The upright, non-overturned part of the folds form a longer, gently dipping, upright limb that dips to the southeast.

Cleavage

The term cleavage generally refers to the tendency of a rock to break along a secondary plane of weakness. Different types of cleavage are classified by:

- Spacing of the weakness planes; and,
- Relationship to pre-existing rock layering (or bedding in this case).

Cleavage spacing reflects the pervasiveness of weakness planes. Penetrative or continuous cleavage describes cleavage that is observable at all scales. Spaced or non-continuous cleavage is recognized by observable sections of un-cleaved rock called microlithons separated by cleavage domains. Cleavage that cross-cuts original rock layering is termed disjunctive, while crenulation cleavage deforms preexisting layering. Crenulation cleavage occurs frequently at the core of the regional anticlinal hinge zone as seen in outcrop along the railroad cut west of the Site.

Cleavage to Bedding Relationships

In regional and smaller scale folds, the geometric relationship between cleavage orientation and bedding can be used to define where a particular outcrop is situated in the overall structure. In the overturned limb of an asymmetric fold, such as the regional fold in the Site area, bedding plane dip is steeper than cleavage dip. In the upright limb (the long, southeasterly dipping limb of the regional fold, and meso-scale folds therein), cleavage dips more steeply than bedding. At the fold hinge, cleavage and bedding depict a perpendicular cross cutting relationship.

Cleavage refraction is a result of shear in the fine-grained, argillaceous/shaly limestones which accommodated bedding slip between the more competent arenaceous (sandy), light to medium grey limestone beds. The latter acts as a layer parallel to shear zones parallel with the bedding plane. Cleavages which are perpendicular to bedding in beds of relatively horizontal horizons are refracted into a more penetrative cleavage in layers of less competent, dark grey argillaceous/shaly limestones. The refracted cleavage is not normally parallel to the shear plane (bedding) but may approach parallelism in extremely thin shear zones or in sharply overturned beds as observed along the railroad cuts in the Site area.

In regional and smaller scale folds, the geometric relationship between cleavage orientation and bedding can be used to define where a particular outcrop is situated in the overall structure. In the overturned limb of an asymmetric fold, such as the regional fold near the OU-2 area, bedding plane dip is steeper than cleavage dip. In the up-right limb (the long, southeasterly dipping limb of the regional fold, and meso-scale folds therein), cleavage dips more steeply than bedding. At the fold hinge, cleavage and bedding depict a perpendicular cross cutting relationship.

2.2.3 Regional Hydrogeology

The Site is located approximately 0.5 mile southeast of the regional groundwater divide that demarcates flow toward the local groundwater discharge boundaries represented by Antietam Creek (to the southeast) and flow toward Conococheague Creek (to the west and southwest). The Maryland Geological Survey (MGS, 2001) presented a water table contour map that infers a regional groundwater flow direction at the Site and vicinity to the southeast towards Antietam Creek (approximately 2.1 miles SE of the Site). This flow direction is consistent with MDE's observation that "groundwater probably flows east towards Antietam Creek but may also flow to the south towards the Potomac River" (MDE, 1994).

Most surface water drainage from the Site enters a storm drain and storm sewer along Mitchell Ave with subsequent discharge to Marsh Run 2. Marsh Run 2 discharges to Antietam Creek, a tributary to the Potomac River. Springs are present in multiple directions surrounding the Site (**Figure 2-6**).

"The rocks underlying the Hagerstown Valley are well indurated and have little intergranular, or primary porosity." (Maryland Geological Survey, 2001, page 18). Consequently, groundwater flow in these carbonate rocks is controlled by the interconnection of bedrock fractures (secondary porosity), and by the extent to which fractures are enlarged by solution processes (tertiary or karst porosity).

*"*Geologic structure is the dominant control on groundwater flow of the Hagerstown Valley*"* (MGS, 2001). Joints, faults, and bedding plane partings provide the framework for the groundwater flow path in the carbonate bedrock beneath the Site. In the Hagerstown Valley, there are three to six joint sets, of which two are generally dominant. The joint set parallel to the strike of the bedding (bedding plane partings) [NNE - SSW in the Hagerstown Area, (MGS, 2001)] seems to be most important in controlling flow direction. A second prominent joint set

(WNW) is oriented approximately perpendicular to bedding strike, as evidenced by the alignment of stream segments at Hamilton Run and Marsh Run. The intersection of northeast-striking bedding plane partings with high-angle joints could create a stepwise flow pattern oblique and down-dip to strike.

The Maryland Geological Survey Report of Investigations No. 73 Karst Hydrogeology of the Hagerstown Valley, Maryland (MGS, 2001) defines the weathered zone of carbonate bedrock above the water table as the "epikarst." Epikarst includes the following key features: (1) steeply dipping bedrock; (2) irregular weathering of the bedrock surface resulting in pinnacles (bedrock highs) and grikes (soil-filled depressions); and (3) solution voids in the bedrock, sometimes originating below grikes. "Grikes can confine groundwater flow to a direction parallel to strike, with cross flows occurring where the pinnacles are fractured" (MGS, 2001).

2.2.4 Summary of Groundwater Investigations Prior to the OU-2 RI

A detailed discussion of historical groundwater investigations (prior to the OU-1 RI) was presented in Section 2.1.5 of the RI / FS Work Plan (URS, 2002). The Remedial Investigation Addendum Report (URS, 2009) presented the findings of the OU-1 RI of Site groundwater. That report concluded that the nature, extent, fate, and transport of Site-impacted groundwater is a complex function of multiple factors including:

- Subsurface bedrock structural control of groundwater flow;
- Preferential orientation of groundwater flow along bedrock strike (NE-SW);
- Gentle and steeply dipping asymmetric folded beds;
- NNE-striking bedding plane partings with WNW high angle joints create the potential for a "stair-step" flow pattern oblique to strike;
- Hydraulic head and gradient varies across short distances due to variable hydraulic conductivity;
- Shallow karst bedrock features (e.g., irregular weathering of the bedrock surface within the epikarst zone);
- A group of potential COCs were delineated in groundwater; principally pesticides, but including several VOCs, SVOCs, herbicides, and metals;
- The former WMA as a source of COC concentrations in groundwater at the Site (**Figure 2-1**);
- Major precipitation events appear to induce pulses of infiltration through source materials that are detected in sample results;
- COC characteristics affect transport (e.g., solubility, retardation, degradation, etc.).

A total of 54 monitoring wells (29 on-Site wells and 25 off-Site wells) have been installed (see **Figure 2-7**). The screened intervals for these wells were selected based on the results of down-hole geophysical logging and depth-discrete packer sampling of groundwater quality. The rationale for placement of wells installed from 2003 to 2012 and a summary of well construction details are presented in **Tables 2-1** and **2-2**, respectively. The comprehensive groundwater

monitoring results were presented in the Groundwater Remedial Investigation Report dated March 2009 (URS, 2009) and provided to the EPA.

In September 2009, EPA formally issued a ROD for OU-1 soils and created OU-2 for groundwater. In correspondence dated August 2, 2011, EPA directed that additional investigation activities be conducted to achieve vertical delineation of on-Site and lateral delineation off-Site of impacted groundwater along the bedrock strike. In February 2013, AECOM submitted a revised RI Work Plan, based on October 2012 comments from EPA. The revised Work Plan incorporated a proposed Scope of Work (SOW) prepared by EPA (June 2012) and additional comments provided by EPA in October 2012. The EPA approved the RI Work Plan on May 29, 2013. The RI was performed from 2013 through 2017.

A Site-wide groundwater sampling event was completed by AECOM in October 2011. As part of the pre-design investigation for the OU-1 hydraulic control system, four well boreholes were drilled in the 4th quarter of 2011, with performance of geophysical logging and packer testing at these boreholes. As specified in the Pre-Remedial Design Investigation (PDI) Work Plan (URS, 2011), an aquifer test was performed between January 14 and February 4, 2013, using extraction well EW-1-110 and 26 monitoring wells.

Several additional OU-2 RI tasks completed through 2013 and 2014 were previously documented in a series of technical memoranda, and the OU-2 Interim Report (URS, 2015) was submitted to the EPA in January 2015. These activities include: bedrock drilling, geophysical logging, and discrete packer testing of eight boreholes in July 2013 to July 2014; surface water and sediment sampling from the Bester Long Quarry in 2013; sub-slab vapor sampling at four nearby residences in 2014; a comprehensive Site monitoring well sampling event in April 2014; and sampling of off-Site private wells in 2014.

In February 2015, the Respondents agreed to perform additional investigative activities requested by the EPA based on the results of the work performed in 2013 and 2014.

2.2.5 OU-1 Pre-Remedial Design Investigation Summary

An OU-1 Pre-Remedial Design Investigation (PDI) Work Plan (URS, 2011) was approved by EPA and implemented during 2011. In addition, four well boreholes (EW-1, MW-O, MW-P, and MW-Q, (see **Figure 2-7**) were drilled during the 4th quarter of 2011 as part of the PDI for the OU-1 hydraulic control system. The rationale for well placement and a summary of well construction details are presented in **Tables 2-1** and **2-2**.

Geophysical logging, packer testing and sampling at these boreholes was performed to assist in selection of completion intervals for each PDI well. The packer test sampling program included analysis for pesticides in shallow test zones and for the complete list of COCs in the deepest packer test zone. Packer test samples contained concentrations of pesticides and specific VOCs (benzene and chlorobenzene) which exceeded EPA RSLs at each location to the deepest depth evaluated (approximately 150 feet at MW-O, MW-Q, and EW-1, and 235 feet at MW-P). Upon EPA approval, the four boreholes were completed as follows:

Summary of Well Screen Interval Depths (PDI)	
Well Number	**Well Screen Interval (feet bgs)**
EW-1-110	60 to 110
MW-O-145	125 to 145
MW-Q-150	98 to 118* and 135 to 150
MW-P-235	62 to 100**, 150 to 165*, and 195.5 to 235.5

* Indicates 1-inch diameter piezometer for monitoring groundwater elevation.
** Indicates open hole segment to allow water level measurements.

A 72-hour constant rate aquifer test was performed between January 14 and February 4, 2013, in extraction well EW-1-110. Step tests indicated that 4 gallons per minute (gpm) was the sustainable pumping rate at EW-1-110. This low yield was unexpected for a well with 50 feet of 4-in diameter screen positioned within the shallow karst limestone at depths less than 110 feet; suggesting a lack of interconnected secondary and tertiary porosity in the immediate area of EW-1-110.

The PDI yielded the following results relevant to the objectives of OU-2 RI Work Plan (URS, 2013):

- Excavation of test pits and trenches did not discover any source of buried pesticide waste (i.e., powders, pastes, and sludges, as defined by the OU-1 ROD) at the Site except that which has been delineated within the former WMA.
- Detailed drilling confirmed that the soil/bedrock interface under the former WMA is irregular, and contains sets of bedrock pinnacles and soil-filled grikes as would be expected with a karst limestone. Bedrock was encountered at the former WMA at widely varying depths ranging from 8.8 to 59.7 feet bgs, with an average depth to bedrock of 24 feet bgs. In general, the shallowest depth to bedrock is in the east-northeast corner of the former WMA, while the greatest depth of bedrock occurs in the southern corner of the former WMA.

Water level measurements from piezometers installed at the former WMA indicate that (at least seasonally) lower portions of the waste layer may become saturated, and that groundwater occurs in the soil-filled grikes. It is not known whether these saturated zones occur year-round.

2.2.6 Groundwater Well Inventory

The source of potable water in the vicinity of the Site is the Hagerstown/Williamsport Municipal System. The system, which serves a total of approximately 75,000 persons, draws water from an intake located on the Potomac River northwest of Williamsport, Maryland, upstream from the confluence of Antietam Creek. The service area of the municipal supply system extends beyond a 3-mile radius from the Site (MDE, 1989).

A well search was performed in 2002, prior to the OU-1 RI and in 2006, to identify wells located within a 2-mile radius of the Site, and a 1-mile radius search of the MDE database and review of the Washington County Department of Health well permit files was conducted. Based on the well search and interviews with well owners, no wells connected to household plumbing for potable usage were identified within a 1-mile radius of the Site. Several active general use wells near Fountain Head Country Club (FHCC) are located approximately 1 mile north-northeast of the Site. Well permits obtained from the Washington County Department of Health indicate these wells are permitted for domestic potable supply and residential irrigation. Some of the property owners were contacted in 2006 and they confirmed that the wells were used to supply lawn sprinkler systems and were not connected to the household water system. The results of the well search were submitted to EPA in 2006.

In 2017, AECOM performed an additional well search to identify wells installed within a 2-mile radius of the Site, which Amec Foster Wheeler then reviewed and updated with available information in 2018. Amec Foster Wheeler requested information for wells that were permitted and/or installed within a 2-mile radius of the Site from the following sources: MDE, Washington County Department of Health, and Environmental Data Resources (EDR). Review of the EDR GeoCheck ® Report identified a total of 479 wells within a two-mile radius of the Site. This

includes 54 USGS wells installed at the USGS Maryland Water Science Center, 40 wells listed on the federal public water supply well database, and 385 wells listed on the Maryland state well database. A Washington County Department of Health representative stated that well information is not maintained in a GIS database and therefore a radius search cannot be conducted. The Washington County Department of Health can only identify well records by street address and property owner at the time of well construction. The MDE well search identified a total of 472 permitted wells (includes wells identified as test, domestic, closed-loop geothermal, irrigation, and farming use) within a 2-mile radius of the Site. Based on a review of the information from EDR and MDE regarding usage and well status, Amec Foster Wheeler identified a total of 108 domestic wells, 19 farming wells, 11 irrigation wells, and four public supply wells within a 2-mile radius of the Site. None of the public supply wells were identified within a 1-mile radius of the Site. Nine of these wells (five domestic and four farming wells) were identified within a 1-mile radius of the Site, and property owners were identified for seven of these nine wells; however, the presence and potential use of all wells within the two-mile radius has not been confirmed. **Appendix A** summarizes the information obtained by this well search.

2.3 Pesticide Use in Washington County, Maryland

NewFields has conducted extensive research of publicly available records of Washington County, Maryland and other publications to assess the historical use of pesticides in the county. The results of this research are presented in **Appendix B**.

The records reviewed by NewFields confirmed the general wide-spread historical agricultural usage of pesticides (including some observed in on-Site groundwater) throughout the county over decades. Many of the pesticides identified in public records are the same pesticides handled by blending operations at the Site. These records are not empirical data, but demonstrate that Maryland State Extension Service recommendations and multiple local vendors promoted agricultural use of various pesticide COCs over the entire county. This information suggests the potential for background concentrations of pesticide compounds in soils, surface waters, sediments and springs in the area. These potential background conditions are currently an uncertainty that is recommended for further evaluation.

3.0 OU-2 Remedial Investigation Work Performed

In August 2011, EPA (EPA letter of August 2, 2011) requested additional investigation activities, including:

- Delineation of the vertical extent of impacted groundwater on-Site.
- Delineation of the lateral extent of impacted groundwater off-Site along bedrock strike.

The OU-2 RI work plan (URS, February 2012, revised February 2013) proposed several tasks to achieve these objectives:

- Additional monitoring well installations to greater depths and further off-Site;
- An evaluation of private wells;
- A sub-slab vapor intrusion evaluation;
- Sampling of surface water and sediment in the Bester Long Quarry; and,
- A comprehensive groundwater sampling event.

3.1 Task 1 - Additional Wells

From 2013 to 2016, eight new borehole well locations were drilled at locations approved by EPA. Five of the new well boreholes (MW-B, MW-G, MW-K, MW-L, and MW-R) are located on-Site, and three (OW-7, OW-16, and OW-17) are located off-Site. Two proposed off-Site locations were modified due to traffic constraints (OW-16) and property owner access (OW-17).

Borehole MW-L was drilled to 250 feet bgs and OW-7 drilled to 410 feet bgs. With EPA's approval, they were completed as monitoring wells MW-L-250 and OW-7-410.

Full horizontal and vertical delineation of groundwater impacts was not achieved at depths between 350 and 400 feet at on-Site locations MW-B and MW-G, and off-Site location OW-7. In February 2015, EPA required additional drilling activities. This additional drilling scope included:

- MW-K was deepened from 250 to 450 feet bgs and completed as MW-K-440.
- OW-16 was deepened from 300 to 600 feet bgs and complete as OW-16-448.
- OW-17 was deepened from 350 to 600 feet bgs and completed as OW-17-600.
- MW-B cluster was completed as MW-B-400 and MW-B-598.
- MW-G cluster completed as MW-G-360 and MW-G-600.
- MW-R cluster was completed as MW-R-330 and MW-R-600
- Installation of a well west/northwest of the Site in the Brighton Manor development to 450 feet bgs; subsequently completed as well OW-19-450;
- Installation of a well east of the Site, clustered with existing monitoring well OW-11-240 to 600 feet bgs; subsequently completed as well OW-11-600;
- Installation of a well on the Bester Long property southeast of the Site and completed as well OW-18-597.

EPA-approved borehole locations and corresponding monitoring well locations installed from 2013 to 2016 are shown on **Figure 3-1**. The rationale for well placement and summary of well construction details (wells installed 2013 to 2016) is presented in **Tables 3-1 and 3-2**, respectively.

3.1.1 Well Drilling Procedures

At each step in the well drilling procedure, from well location to screen placement, EPA approval was obtained. Well boreholes were drilled by Eichelbergers, Inc. (Eichelbergers), of Mechanicsburg, Pennsylvania, a Maryland licensed well driller. All boreholes were drilled using air rotary methods. Well installation procedures specified in the Work Plan were implemented to limit the potential for vertical cross-contamination. Drilling procedures generally consisted of the following:

Drill Zone 1:

- A 6-inch diameter pilot hole was drilled to the drill zone 1 target depth and borehole testing was performed (see Section 3.1.2).
- The pilot hole was then over-drilled with a larger (15-inch) diameter drill bit and a 10-inch diameter permanent steel casing was installed and pressure grouted in-place.
- An inner 6-inch diameter temporary centering casing was then installed to the base of drill zone 1 with a bentonite seal.

Drill Zone 2:

- A 5-5/8-inch diameter bit was placed through the drill zone 1 temporary casing and the pilot hole was drilled to the drill zone 2 target depth.
- Drill zone 2 borehole testing was then performed.
- The drill zone 1 temporary casing was then removed and drill zone 2 was over-drilled using a 10-inch diameter bit.
- An inner 6-inch diameter temporary centering casing was then installed through zones 1 and 2 to the base of drill zone 2 with a bentonite seal. Inner temporary casings were grouted in-place and converted to permanent casings during well installation.

Drill Zone 3:

- A 5-5/8-inch diameter bit was placed through the drill zones 1 and 2 temporary casing and the pilot hole was drilled to the drill zone 3 target depth.
- Drill zone 3 borehole testing was then performed[3].

A geologist was present during all phases of drilling activities. Borehole lithologic logs, and other relevant observations (e.g., drilling rate, bedrock hardness, depth, and estimated flow rate of water-bearing zones) were recorded in a bound project notebook. Drilling logs for monitoring wells installed from 2013 to 2016 are included in **Appendix C.**

Investigative derived waste (IDW), including drill cuttings and return water, was contained in roll-off boxes and frac tanks for subsequent appropriate disposal as a non-hazardous waste. The 2013 and 2014 drilling water was disposed at the Pottstown Waste Water Treatment Plant (WWTP), in Pottstown, Pennsylvania. The 2015 and 2016 drilling water was transported for treatment and disposal by Spirit Services, Inc., in Williamsport, Maryland. Soil cuttings were transported for disposal at Republic Environmental Services, Inc., in Hatfield, Pennsylvania. Waste manifests are provided in **Appendix D.**

[3] Only two zones were drilled at locations OW-7, OW-16, OW-18, and OW-19.

3.1.2 Borehole Testing

Upon completion of each pilot hole (prior to casing installation), downhole geophysical logging was conducted to identify the depth and orientation of potential water-bearing fracture zones for evaluation by subsequent packer testing. Borehole geophysical logging was performed by Earth Data Northeast, Inc. (EarthData) of Exton, Pennsylvania. The geophysical logging suite included the following tools: caliper, natural gamma, fluid temperature/conductivity, spontaneous potential (SP)/resistivity, and acoustic televiewer.

Based on the results of the geophysical logging and discussion/concurrence with the EPA and the MDE, intervals were selected for packer testing. Packer testing yielded depth-discrete information on yield and COC concentrations in groundwater at all borehole locations. Except as noted, packer tests were conducted using a dual straddle packer assembly, generally with a 10 to 20-foot separation between the packers (test interval). In cases where the bottom of the borehole was included as part of the test interval, the bottom packer was not inflated. Water level (head) pressure data were continuously collected during test zone pumping using pressure transducers with internal data loggers situated above, within, and below the test zone.

Test intervals were pumped until one of the following occurred: (1) the test interval was pumped "dry"; (2) a maximum of 4 hours elapsed; or (3) a minimum of 1 test interval volume was purged. A summary of packer test data is provided in **Table 3-3**.

Exceptions to the procedures described above included the OW-16 and OW-11 boreholes as follows:

- Borehole instability and sidewall collapse at approximately 60 to 73 feet bgs at OW-16 required sampling without a packer assembly and transducers. Water level data was recorded manually.
- At OW-11, borehole instability required testing as one interval with the bottom packer not inflated from approximately 495 to 600 feet bgs. The section was subsequently retested without packers at discreet intervals of 496, 515, and 558 feet bgs using a high-pressure nitrogen/air-driven dual-valve pump withdrawing groundwater at between 200 to 300 milliliters per minute (ml/min). Depth discreet samples were collected after purging the discharge tubing. The deepest discreet sample (between 595 to 600 feet bgs) could not be collected due to a borehole obstruction. Water level data were not recorded during discreet sample collection.

Groundwater samples from the deepest packer test interval of each borehole drill zone were analyzed for parameters in **Table 3-4** (based on Table 12 of the OU-1 ROD). Samples from shallower test intervals were analyzed only for the pesticide compounds listed in **Table 3-4**. Laboratory sample analysis was performed by TestAmerica Inc., Pittsburgh, Pennsylvania (TestAmerica) using the EPA SW-846 methods.

3.1.3 Monitoring Well Installation

The monitoring wells were constructed in the boreholes following testing. Well casing and screen intervals were selected based on testing results and in consultation with and approval by EPA. Each phase of monitoring well installation was observed and documented by an AECOM geologist. A summary of well construction details is provided in **Table 2-2** and well construction logs are presented in **Appendix C.** The following section summarizes the well installation procedures.

The monitoring wells were constructed using 2-inch diameter, flush-joint Schedule 40 PVC casing, and 2 x 3-inch diameter U-pack/pre-pack 0.010-inch slot PVC well screen (2-inch inner

diameter PVC screen surrounded by 3-inch outer diameter PVC screen with the annulus between filled with filter sand prior to borehole installation). Due to the diminished effective borehole diameter resulting from the highly irregular borehole sidewalls, well OW-11-600 was constructed using a conventional 2-inch diameter PVC screen.

A well-sorted silica filter sand was added to fill the annular space around the outside of the well screen and extended to several feet above the top of the screen. At a minimum, a 2-foot thick bentonite pellet seal was installed above the filter sand. The remaining annular space was sealed with a bentonite grout slurry installed with a tremie line. Well surface completion consisted of either a locking cap and steel stick-up or flush mount casing to protect the well.

Wells were developed no sooner than 24-hours after installation using high pressure nitrogen air-lift method. Wells were developed until a sediment-free discharge was obtained, or for a maximum of 1 hour.

The wells were surveyed by an AECOM licensed Maryland surveyor using the horizontal and vertical datum used during previous AECOM site investigations (NAD83 and NAVD 1988, respectively) and control points established for the existing Site base map.

3.2 Task 2 - Private Well Evaluation

The well search conducted by MDE in 2012 identified a total of 31 private wells located within 2 miles of the Site. Following evaluation of the usage of these wells, the EPA selected and contacted a group of 17 well owners and requested access to collect samples from the wells. A total of seven of the well owners actually provided written authorization to the EPA to allow access for sampling. The seven wells (six located at private residences and one located at the FHCC golf course) are classified in MDE records as category “D” which indicates “Domestic or Residential Irrigation.” They are located approximately 1 mile or more northeast of the Site. Private well locations are shown on **Figure 3-2.**

Sampling of the private general use wells was performed by AECOM on May 5 and 6, 2014. A summary memorandum describing the sampling methods and results was provided to the EPA on June 17, 2014.

In October 2015, the EPA requested another round of samples from four of the seven private general use well locations sampled in 2014 that contained detectable COC concentrations. Additional sampling was performed on October 21 and November 4, 2015 from three of the four locations. One of the private residences declined permission for sample collection.

3.2.1 Private Well Sampling

Following receipt of a written access agreement between the EPA and the property owner, AECOM contacted each property owner to discuss well construction details, well usage, and sampling accessibility. Each well owner confirmed to AECOM that their well at that time was only used for irrigation purposes intermittently during a portion of the year.

Based on the State of Maryland well completion reports, the depths of these wells range from 125 feet to 255 feet bgs. Sampling was conducted in general accordance with the procedures described in the EPA Region 4 Science and Ecosystem Support Division Operating Procedures for Potable Water Supply Sampling (SESD Operating Procedure - Potable Water Supply Sampling, EPA, May 30, 2013). During the 2014 sampling event, AECOM collected split samples and provided one split from each of the seven locations for independent analysis by EPA.

Five wells were sampled from discharge spigots connected directly in line with the irrigation well head. Two locations (18942 Preston Road and 12918 Fountain Head Road) were sampled from holding tank discharge piping spigots located closest to the holding tank (50-gallons or less). At each location, purging and sampling was conducted using a garden hose connector attached to the discharge spigot and dedicated polyethylene discharge tubing with a PVC ball valve (primary valve) connected to the end of the dedicated tubing. A plastic T-barb diverter (primary diverter), situated between the garden hose attachment and the ball valve, was connected to the tubing. A segment of dedicated tubing was attached to the diverter with a second PVC ball valve (secondary valve) attached at the end. From the secondary valve, an additional section of dedicated tubing was attached with a plastic T-barb diverter (secondary diverter) connected at the end allowing for simultaneous split sample collection.

During purging, the primary valve was opened, and the secondary valve was closed. During sampling, the primary valve was closed, and the secondary valve was opened. Garden hose attachments, valves, and diverters were all decontaminated between sampling locations. Water quality parameters were measured during purging using a Horiba U-50 water quality parameter meter and flow-through cell. Water quality parameter field measurements included temperature, pH, specific conductivity, dissolved oxygen, oxidation-reduction potential, and turbidity (see **Appendix E**).

Pumping rates were manually measured using a calibrated 5-gallon bucket and ranged from 3 to 4 gpm, with the exception of the FHCC well. The FHCC well pump discharge is regulated via a control panel within the pump house of the sprinkler system and was pumped at the lowest rate attainable (20 to 21 gpm). All wells were purged a minimum of one well volume including holding tank volume, where applicable, and sampled after the water quality parameter measurements were observed to stabilize. Purge water was contained for subsequent off-Site disposal.

Samples were submitted to Test America for analysis of Target Compound List (TCL) pesticides by EPA Method 8081A Low Level (LL) and diphenamid by 8270C LL. All sampling activities were observed by HGL personnel. HGL split samples were submitted to the EPA Environmental Science Center, Fort Meade, Maryland laboratory for TCL pesticide analysis only (excluding diphenamid). Both laboratories analyzed a performance evaluation (PE) sample, which is an artificial sample created to evaluate relative performance of both laboratories.

The private well sampling field parameter measurements and analytical data from this event is presented in Section 5.2 of this report.

3.3 Task 3 - Vapor Intrusion Sub-Slab Sampling

Data collected during the OU-1 RI indicated the presence of selected VOCs in Site groundwater proximal to the former WMA area in the northernmost section of the Site. EPA requested sub-slab vapor sampling at four properties on Matthew Court located immediately adjacent to the northeast Site property boundary to evaluate potential vapors emitted from groundwater to enter nearby residences. Therefore, sub-slab vapor sampling was performed at these properties.

3.3.1 Sub-Slab Vapor Probe Installation

EPA secured access to the four properties on Matthew Court (1017, 1019, 1022, and 1028 Matthew Court) immediately adjacent to the northeast Site property boundary (**Figure 3-3**). On January 30, 2014, AECOM visited these properties and conducted a preliminary survey to evaluate building construction details and identify sub-slab sampling locations.

On February 18 and 19, 2014, AECOM conducted sub-slab vapor sampling at the residences. Vapor sample probes were installed in general accordance with the Scientific Engineering Response and Analytical Services (SERAS) Standard Operating Procedures (SOP) No. 2082, dated March 29, 2007. Prior notification (February 12, 2014 email from AECOM) was provided to the EPA describing the sub-slab vapor probe installation and sampling procedures.

Sub-slab vapor probes were installed using AMS Inc., tamper resistant sub-slab Gas Vapor Probe (GVP) kits as follows:

- A 2-inch diameter masonry core bit with an inner 7/16-inch diameter pilot core bit was advanced ¼-inch into the townhouse concrete floor slab.
- A 1-inch diameter core bit hole was then advanced through the floor slab and floor slab cuttings were removed from the floor slab pilot hole via a vacuum.
- An AMS vapor probe implant consisting of a 3-inch long x ¼-inch diameter stainless steel screen with an approximate 1-foot length of ¼-inch stainless steel extension tubing was then installed in the floor slab gravel substrate. The substrate was found to extend to approximately 6-inches below the concrete foundation slab at each residence. The extension tubing was precut to allow the permanent probe to be flush with the top of the floor slab. A rubber plug was placed onto the extension tubing, immediately above the screen, to prevent grout seepage below during probe surface completion.
- Vapor probes were then permanently sealed into the floor using quick drying cement and finished flush with the floor surface with a tamper resistant cap.

3.3.2 Sub-Slab Sampling Procedures

Sub-slab vapor samples were collected in general accordance with the EPA Region 3 Hazardous Site Cleanup Division's (HSCD's) Vapor Intrusion Framework (June 2009) and other guidance sources for sampling procedures (EPA, 2004; EPRI, 2005). Samples were collected as follows:

- Prior to sampling, the cement used during probe installation was allowed to cure.
- An approximately ¼-inch diameter by 1-foot length of Teflon™ sample tubing was attached to the surface extension of the vapor probe.
- A photoionization detector (PID) was connected to the sample tubing and screening for any potential VOCs within the sub-slab was conducted. Additionally, a methane gas meter was then attached to the sample tubing and screening was performed for methane levels that might interfere with the subsequent sampling system helium tracer leak test. Instantaneous total organic vapor readings at the moment of connection to the sampling tube ranged from 3.9 to 43.4 parts per million (ppm), although instrument interference due to sub-slab moisture and concrete dust from the floor slab corehole drilling is a common occurrence in this type of screening. No methane concentrations were detected.
- A leak test was then performed on the probe and sample port fittings (sample collection system) whereby a shroud was placed over the sample collection system and helium tracer gas with a target concentration of between 10 to 20 percent was released into the shroud. A Tedlar® bag was then used to collect a sample from the sample tubing and was analyzed with an MGD-2002 helium detector meter. A Tedlar bag sample helium concentration greater than 10 percent of the concentration within

the shroud was considered a system leak. No leakage was observed during any of the sample collection system leak checks. The shroud was then removed.

- Prior to sampling, a calculated three volumes of ambient air (approximately 9.65 cubic centimeters (cc) per volume) were purged from the sample probe using a 60-cc syringe.
- The sample collection system was then attached to an evacuated 6-liter stainless-steel Summa® canister. The Summa samples were collected over a 24-hour time period. Each canister was evacuated to approximately -29 inches Hg and calibrated to a flow rate of approximately 3.2 to 3.4 ml/min by TestAmerica to allow for the 24-hour sample duration.
- One ambient outdoor air sample was collected concurrently with the sub-slab vapor sampling. The ambient outdoor air sample was collected over a 24-hour sample period with the Summa canister placed outside of the 1028 Matthew Court townhouse location, at a breathing zone height (3 to 5 feet) above the ground surface, and in an area selected to avoid potential background contamination (vehicle exhaust, house chimneys or vents).

Samples were submitted to TestAmerica and analyzed for VOCs by EPA Method TO-15. Subslab soil vapor and ambient air analytical data from this event is presented in Section 5.3 of this report.

3.4 Task 4 - Bester Long Quarry

The Bester Long Quarry is the closest surface water body to the Site (see **Figure 3-1**) and comprises an area of approximately 0.93 acres. In August 2013, AECOM was granted permission by the owner to access the property and collect samples with the owner's stipulation that sample analysis would be limited to chemicals associated with the Site (**Table 3-5**). In accordance with the access agreement, quarry surface water and sediment samples were analyzed for the pesticide and herbicide compounds specified in Table 12 (Interim Ground Water Remediation Standards) of the ROD for OU-1 of the Site.

Quarry surface water and sediment samples were collected on October 15, 2013 by AECOM using a boat to access the locations. Prior to sample collection, a bathymetry survey was conducted using a weighted tape measure at approximated evenly spaced grid locations to determine the depth of water in the quarry. The pond was divided into two approximately equal quadrants in which one surface water and sediment sample location were selected (BLQ-1 and BLQ-2). Sample collection locations were recorded using a GPS unit. At each sample location, the depth to the bottom was measured and a profile of water quality through the water column was performed at 2-foot depth increments using an YSI Model 556 water quality meter. In-situ water quality profile data collected included: dissolved oxygen, pH, oxidation-reduction potential (ORP), temperature, and conductivity. Sediment sample field parameter measurements included temperature, ORP, pH, and color.

Two discrete water samples and one bottom sediment sample were collected at each location. One water sample at each location was collected from approximately 3 feet below the water surface (shallow water sample), and one water sample was collected from approximately 1 foot above the bottom of the quarry (deep water sample). Discrete water samples were collected using a peristaltic pump and dedicated polyethylene tubing. After completing water sample collection, quarry bottom sediment samples were collected using a petite Ponar sampler. An aliquot of each water and sediment sample was collected by AECOM and provided to the EPA's subcontractor as a split sample for laboratory analysis by the EPA.

All quarry water and sediment samples were submitted for laboratory chemical analysis for pesticide and herbicide compounds, and total organic carbon (TOC). Additional laboratory analysis for surface water samples included total suspended solids (TSS), total dissolved solids (TDS), alkalinity, and hardness. Additional laboratory analysis for sediment samples included grain size, percent moisture, and percent solids. Aliquots from each of the water and sediment samples were also collected for OU-1 ROD Table 12 metals (arsenic, manganese, and thallium) and held in custody at the laboratory pending evaluation of the pesticide and herbicide results.

Surface water and sediment sampling field parameter measurements and analytical data from this event is presented in Section 5.5 of this report.

3.5 Task 5a - April 2014 Groundwater Sampling

A groundwater sampling event was conducted for the existing 19 on-Site and 18 off-Site monitoring wells. Groundwater sampling was performed between April 21 and April 30, 2014. Groundwater sampling at each well was performed using low-flow sampling techniques consistent with sampling previously performed during the OU-1 RI. Prior to initiating purging and sampling activities, the static groundwater level was measured at each well using an electronic water level indicator.

To minimize sample turbidity, groundwater purging and sampling was conducted using the low-flow (minimal drawdown) sampling procedures described in EPA/540/S-95/504 (Puls and Barcelona, April 1996). During purging, depth-to-water and water quality parameter measurements [temperature, DO, pH, turbidity, specific conductivity, and ORP] were collected at 3 to 5-minute intervals. Purging was performed for a minimum of 1 hour and until the water quality parameters had stabilized (3 successive readings within the following ranges: ± 3% for temperature and conductivity; ± 10% for DO and turbidity; ± 0.1 for pH; and ± 10 for ORP), or at the lowest achievable purge rate of 100 ml/min until the continuous water level drawdown approached asymptotic conditions and parameters had stabilized, or for a maximum of 4 hours at the lowest pumping rate. Upon stabilization of field parameters, the discharge tubing was disconnected from the flow-through cell, and the sample was collected directly from the discharge tubing.

Monitoring well groundwater samples were submitted to TestAmerica for analysis of the following: TCL VOCs; TCL SVOCs; TAL metals; TCL pesticides and diphenamid; herbicides (2,4-D and 2,4,5-T); and natural attenuation (NA) parameters (alkalinity/carbonate/bicarbonate/chloride/nitrate/sulfate) by SW-846 Methodologies. Samples for VOCs, SVOCs, pesticides, and diphenamid were analyzed using low level detection methods.

The April 2014 groundwater sampling results along with field parameter measurements is presented in Section 5.7.1 of this report.

3.6 Task 5b - October 2016 Groundwater Sampling

The first of four Quarterly Groundwater Sampling Events under the OU-2 RI Work Plan was performed between October 24 and November 11, 2016. A total of 19 existing and 8 newly installed (27 total) on-Site and 18 existing and 6 newly installed (24 total) off-Site monitoring wells were sampled. Groundwater sampling at each well was performed using low-flow sampling techniques consistent with sampling previously performed during the OU-1 RI. Prior to initiating purging and sampling activities, the static groundwater level was measured at each well using an electronic water level indicator.

To minimize sample turbidity, groundwater purging and sampling was conducted as described above during the April 2014 event. Groundwater samples were submitted to TestAmerica for analysis of the same parameters mentioned above in the April 2014 sampling event. Additionally, samples collected from monitoring wells installed from 2013 to 2016 were analyzed for the first five tentatively identified VOCs and SVOCs.

The October 2016 groundwater sampling results along with field parameter measurements is presented in Section 5.7.2 of this report.

3.7 Task 5c - January 2017 Groundwater Sampling

The second of four quarterly groundwater sampling events under the OU-2 RI Work Plan was performed between January 23 and February 8, 2017. At total of 51 existing monitoring wells were sampled; 24 off-Site wells and 27 on-Site wells. Prior to initiating purging and sampling activities, the static groundwater level was measured at each well using an electronic water level indicator. Monitoring well purging and sampling methodologies were consistent with those followed during the October 2016 event. Groundwater samples were submitted to TestAmerica for the same suite of analysis as prior quarterly event.

Groundwater sampling field parameter measurements and analytical data from this event is presented in Section 5.7.3 of this report.

3.8 Task 5d - April 2017 Groundwater Sampling

The third of four quarterly groundwater sampling events under the OU-2 RI Work Plan was performed between April 24 and May 10, 2017. At total of 51 existing monitoring wells and one off-Site private well (FHCC well) were sampled. Prior to initiating purging and sampling activities, the static groundwater level was measured at each well using an electronic water level indicator. Monitoring well purging and sampling methodologies were consistent with those followed during the October 2016 event. Groundwater samples were submitted to TestAmerica for the same suite of analysis as prior quarterly events.

Groundwater sampling field parameter measurements and analytical data from this event is presented in Section 5.7.4 of this report.

3.9 Task 5e - July 2017 Groundwater Sampling

The fourth and last of four quarterly groundwater sampling events under the OU-2 RI Work Plan was performed between July 31 and August 18, 2017. At total of 51 existing monitoring wells were sampled. Prior to initiating purging and sampling activities, the static groundwater level was measured at each well using an electronic water level indicator. Monitoring well purging and sampling methodologies were consistent with those followed during the October 2016 event. Groundwater samples were submitted to TestAmerica for the same suite of analysis as prior quarterly events.

Groundwater sampling field parameter measurements and analytical data from this event is presented in Section 5.7.5 of this report.

4.0 Hydrogeologic Conceptual Site Model (HCSM)

This section presents the hydrogeologic and transport evaluations that inform the HCSM. The HSCM presented herein is based upon:

- Detailed borehole drilling logs collected during the investigation;
- Downhole geophysical logging (see **Appendix F through H**);
- Evaluation of packer test data (**Appendix I**); and
- Additional field geologic mapping.

4.1 Shallow Site Hydrogeology

The surficial materials at the Site are characterized as silty-clays to clayey-silts. These unconsolidated silty-clay to clayey-silts (residuum or overburden) are of highly variable thickness due to the erratic weathering and dissolution of the underlying limestone bedrock. The combined residuum sediments and the weathered upper portion of the limestone are further referred to as epikarst. Small sinkholes have been observed occasionally across the Site where infiltrating precipitation has caused dissolutional widening of bedrock fractures, joints and bedding planes resulting in voids into which residuum soils have collapsed.

Residuum soil thicknesses range from 0-foot thickness, where epikarstic bedrock outcrops, to very localized areas of over 40-feet thickness where karst processes resulted in complete weathering of limestone. In the former WMA, 110 direct-push characterization borings were completed as part of the OU-1 Pre-Remedial Design Investigation (URS, 2015) in a closely spaced grid pattern. Overburden thicknesses of 8.8 to 59.7 feet bgs were observed, with an average depth to refusal in these former WMA borings of 24 feet bgs, and with approximately 70% of borings encountering consolidated bedrock at less than 30 feet bgs. Notably, none of the borings encountered voids within the unconsolidated sediments such as those that may be created by bridging of plastic clays over cavities in underlying weathered limestone.

Groundwater flow within the unconsolidated overburden and infiltrating precipitation occurs primarily via primary porosity within the soil pore spaces. However, precipitation can enter the subsurface and move directly into the underlying bedrock where limestone outcrops at the land surface.

The unconsolidated overburden is underlain by an irregular surface of highly weathered epikarst limestone, which with depth transitions into competent limestone. The highly heterogeneous epikarst zone is characterized by pinnacles and solution widened voids, fractures, joints and bedding planes, partially or completely filled with the unconsolidated residuum sediments. Interpretations of borehole geophysical data (discussed later in this report) from several borings suggest that the epikarst zone is present generally at depths down to around 100 feet bgs.

During drilling both on-Site and off-Site groundwater monitoring wells, tertiary porosity features (solutionally widened secondary porosity discontinuities) were observed within the epikarst in a limited number of wells. Voids which form tertiary porosity within the epikarst were identified at the following well locations and depths:

- MW-1 open cavern from 26 to 43 feet bgs;
- MW-2 void space/weather zone from 15 to 25 feet and mud-filled void from 28 to 32 feet bgs;
- MW-4 mud-filled void from 18 to 20 and 27 to 42 feet bgs;

- MW-mud-filled void from 27 to 32 feet bgs;
- MW-7 mud-filled void from 24 to 27.5 feet bgs and soft mud zone from 95 to 97 feet bgs.
- MW-A-51 – mud-filled void from 50 to 51 feet bgs;
- MW-J-71 – mud-filled void from 64-67 feet bgs;
- MW-N-83 – mud-filled void from 74.5 to 79.5 feet bgs;
- MW-N-113 – mud-filled void from 104 to 105 and void from 105.5 to 106 feet bgs
- MW-O-145 – extremely soft mud from 65.5 to 68.5 and 78.5 to 80 feet bgs;
- OW-5-90 – possible loss of return water from 79 to 92 feet bgs.

Groundwater flow within the epikarst zone can be described as “diffuse” through primary and secondary porosity (i.e., pore spaces of the rock matrix, the unconsolidated sediments and mud including when infilling karst voids, and discontinuities created by folding and fracturing) and “preferential” via tertiary porosity created by karst processes. Diffuse groundwater movement is typified by relatively low hydraulic conductivity and low velocity groundwater flow, and is generally dominant in bedrock deeper than 100 feet bgs. Preferential groundwater movement via tertiary porosity appears to be occurring within the epikarst and is typified by higher velocities. The EPA conducted a tracer study that potentially illustrated preferential groundwater flow pathway within the epikarst via tertiary porosity. EPA injected a dry tracer at on-Site locations and monitored the appearance of the dye at a number spring and surface water locations. Their tracer study indicates apparent connections between dye injection points and five off-Site discharge locations. Transport velocities ranged from approximately 16 to 66 feet/day.

Boring logs from monitoring wells located near each other were compared to evaluate the connectivity of epikarst features such as voids and dissolutionally enlarged fractures. Wells MW-J-71 and MW-O-145, located within approximately 60 feet of each other, both had void-type features between 64 and 68.5 feet. A mud-filled void was encountered at 28 to 32 feet bgs in MW-2, and approximately 100 feet northwest at well MW-P-235 soft clay mud returns were noted from 32 to 36 feet bgs. No other between-well correlations of significant epikarst features were identified.

As discussed later in this report, hydraulic testing conducted to evaluate the hydraulic properties of the epikarst water-bearing zones did not suggest a high degree of interconnectivity between the tertiary and secondary porosity. None of these results from slug tests and borehole packer testing approach the values that would be expected in hydraulically well interconnected karst features (i.e., 10^2 to 10^5 feet/day)[4]. One of several possible explanations is the presence of mud sediments in most of the voids encountered during drilling of borings and monitoring wells at the Site.

4.2 Bedrock Geologic Data From the OU-2 Study Area

The geology of the study area is based on the published geologic maps in the Maryland Geological Survey Report of Investigations No. 73 and the Maryland Geological Survey Bulletin 36, geophysical logging, packer testing, and field mapping at the Site and surrounding area. Understanding of the geologic fabric of the study area is key for interpreting the underlying hydrogeology, including groundwater flow patterns and directions. Discontinuities within this

[4] U.S. Bureau of Reclamation, 1977. Ground Water Manual. U.S. Department of the Interior, Bureau of Reclamation, Washington, D.C., 480p.

fabric such as secondary porosity are the precursors for development of tertiary porosity and the various karst features within the bedrock created by carbonate dissolution processes. As was discussed in Section 2, the Hagerstown area generally and the Site location specifically is underlain by shallow karstic unit (generally at depths less than 100 feet bgs) and deeper folded limestone bedrock unit (generally at depths greater than 100 feet bgs) with fracturing and bedding planes providing the secondary porosity needed for groundwater flow. The EPA tracer study also demonstrated that preferential groundwater flow occurs within the epikarst via tertiary porosity. This section will discuss observations and data describing bedrock structural features identified at and around the Site that are controlling the direction of groundwater flow.

4.2.1 Cleavage to Bedding Relationships

Rock cleavage is well developed near the OU-2 area. The cleavage transects bedding planes and is present both in the beds that are upright (easterly portion of the OU-2 area) and in the overturned beds west of the Site. Cleavage transection is pronounced at the fold closure points where bedding turns, but cleavage planes continue along the same trend. Such is the case where the regional fold closes near OW-15, OW-14, and OW-13. In structural geologic mapping, the relationship of cleavage to bedding is critical to determine those beds that are overturned and those beds that are upright. **Figure 4-1** provides a stylized depiction of the evolution of these bedrock structures within folds as has occurred in the Hagerstown Valley. **Appendix J**, excerpted from presentations given at a field visit and meeting with EPA in March 2013, contains images of field outcrops illustrated this cleavage to bedding relationship. In addition, this relationship was observed in the rock core collected from MW-N.

Cleavage refraction is a result of shear in the fine-grained, argillaceous/shaly limestones which accommodated bedding slip between the more competent arenaceous (sandy), light to medium grey limestone beds. The latter acts as a layer parallel to shear zones parallel with the bedding plane. These zones have been observed in the rock core samples from MW-N. Cleavages which are perpendicular to bedding in beds of relatively horizontal horizons are refracted into a more penetrative cleavage in layers of less competent, dark grey argillaceous/shaly limestones. The refracted cleavage is not normally parallel to the shear plane (bedding) but may approach parallelism in extremely thin shear zones or in sharply overturned beds as observed along the railroad cuts in the Site area.

The cleavage and bedding relationships seen in outcrop have been integrated with planar discontinuity relationships observed in the downhole geophysical logs to develop the geologic cross sections described below. In general terms, cleavage at depth is not confidently discernable on the geophysical logs, but the orientations of planar elements that correspond to the geometric relationships outlined above are recognizable. However, relationship between bedding planes and cleavage has allowed the interpretation of the structure in the deeper portions of the geologic sections and structures as presented in the cross sections.

4.2.2 Stratigraphic Orientation

Field mapping observations and boring data were used to determine stratigraphic orientation, and to identify and interpret overturned and asymmetric anticlines and synclines in the OU-2 area. From these interpretations, geologic structure was extrapolated both in the down-dip as well as along strike directions.

Whether the bedding within a fold is upright or overturned can be determined based on sedimentological characteristics (ripple marks, and gradational bedding etc.), as well as structural characteristics that include bedding to cleavage intersections and their geometric disposition. For example, identification of bedding orientation can be extrapolated from the rock

cores collected from MW-N (see images within **Appendix J**), where the bedding plane is offset by spaced cleavage “microlithons”. Such offsets are also noted in outcrops in the vicinity of the Site.

The overturned, asymmetric geometry of the folds mapped in the OU-2 area suggests that a majority of the rock discontinuities (bedding planes in general, cleavage planes, including numerous other discontinuities) would dip to the southeast. The cleavage dips to the southeast in the upright limbs, and in the overturned limbs, cleavage dips to the northwest or is sub-horizontal depending on where it is on the overturned limb.

4.2.3 Downhole Geophysical Logging

A high-resolution borehole acoustic tele-viewer (ATV) was used during the study to evaluate the orientations of planar features within the bedrock. Magnetometer and inclinometer instrumentation are included as components of the ATV probe. These instruments collect data on boring orientation and deviation from vertical. The received signals are then presented as an “unwrapped” 360° image referenced to Magnetic North. Under ideal borehole conditions, using the magnetic declination of the Site, strike and dip of the borehole features (fractures, bedding planes, etc.) are obtained.

These large data sets have been interpreted to reconstruct the subsurface architecture of the folds and faults (data interpretations are included in **Appendix F** and associated data sets are included in **Appendix G** and **H**). Generally, these data indicate that most of the planar discontinuities seen in the deeper portions of the ATV data obtained from the boreholes dip to the southeast. However, in the near-surface, generally down to about 100 feet beneath the ground surface, epikarstic, and other weathering phenomena result in a number of planar features that dip in varying directions.

The ATV data were also used to identify broad lithological changes and the nature of fractures (rock discontinuities) and solution widened fractures in the deep boreholes. These surveys, along with the geologist’s borehole logging observations provided valuable information for the selection of packer test intervals within the boreholes by allowing more accurate depth interpretations of geological structures and fractures compared to traditional rock core interpretations.

In summary, the stereographic projections constructed from the ATV data support and strengthen the conceptual site model that includes a series of small, northwest verging meso-scale folds (e.g.: Mitchell Avenue Anticline, Drainage Swale Syncline, etc.) superimposed on the regional southeastern dipping limb of the Regional Anticline that is also asymmetric and verges northwest. The orientations of the strike of the borehole planar elements as well as the vectors of strike directions and dip direction support the geologic structural interpretation shown in the generalized form-lines extrapolated from dispersed field outcrops. These stereographic projections and detailed borehole analysis were utilized to create representative geologic sections illustrating how bedrock cleavage, bedding relationships, and fracture zones control groundwater flow within the bedrock aquifer.

4.2.4 Geologic Form-Line Map and Form-Surface Cross Sections

Field investigations conducted during the OU-1 and OU-2 RI as well as additional geologic mapping performed from 2012 to 2016 by Dr. Ramesh Venkatakrishnan informed detailed revision of the geologic structure depicted in base geologic map for the Hagerstown Quadrangle

(Brezinski, 2013). Dr. Venkatakrishnan's field mapping combined with downhole data from Site boreholes was used to modify and adjust geologic map boundaries and add details regarding bedding, cleavage, and their stratigraphic relationship as observed at outcrops in the immediate vicinity of the Site.

In areas with dispersed and/or limited outcrops, the general "grain" of the underlying geologic structures can be displayed by form lines that parallel bedrock strike/foliation and other planar elements. In **Figure 2-4**, lines that represent the strike of the bedrock outcrops are depicted as dotted red lines. The map also shows the orientations of the major structures throughout the OU-2 area. **Figure 4-2** depicts the orientation detail of the major structures beneath the Site. Care was exercised during field mapping to assess whether the bedrock at each outcrop location was upright (stratigraphic facing up) or overturned (stratigraphic facing down). Therefore, **Figure 2-4 and Figure 4-2** include indications of upright or overturned bedding planes by way of the routine strike and dip symbols used in standard structural geologic practice.

4.2.5 Stereographic Projection Data

A three-dimensional plane or surface in a rock mass such as fractures, faults, joints, foliation, and bedding planes may be represented in two dimensions as a stereographic projection. Stereographic projections are used to identify preferred directions of geometry of the structures, fracturing and other discontinuities in a rock mass. Stereographic projection[5] mapping projects a sphere onto a plane. Both the upper hemisphere and lower hemisphere can be plotted separately onto the planar projection(s). Typically, the lower hemisphere is used in structural geologic evaluations because the geological features in question lie below the Earth's surface. For analysis of planar features, a projection of poles to the planes is used. In simplistic terms, the pole of a plane is a line that is perpendicular to the plane and passes through the center of the stereo net. Where the pole intersects the lower hemisphere, a single point is used to represent the point of intersection. This point documents the strike and dip (both angle and direction) of the plane that is being projected. The single point is plotted on the two-dimensional disk. As many planar features are plotted on the stereo net, the cluster of points representing the poles to the planes can be contoured and used to illustrate the variability of plane orientations. **Figure 4-3** illustrates the basic procedures of projecting planar features in a stereo net. An example for this Site, **Figure 4-4,** illustrates and describes the stereo nets for two locations at the Site, and explains the interpretation of the geologic structure in these two locations.

Stereographic plots of the structures at the Site based on ATV results from each of the boreholes and contoured for discrete depth intervals are presented on **Figure 4-5**, with dip direction rose diagrams presented on **Figure 4-6**. Where available, the stereographic data has been "stacked" vertically to show the variations with depth in the geologic structure in each of the boreholes[6]. In the 10 most-recent OU-2 boreholes, (MW-B, MW-K, MW-L, MW-R, OW-G, OW-11, MW-16, MW-17, MW-18, MW-19), the contour plots were constructed use the statistical Kamb contouring method that assumes all poles plotted belong to a random distribution and then contours the poles in standard deviations of sigma 2 intervals over the area of the pole distribution. In the eight remaining plots (i.e., OW-7 through OW-14), the contouring package used percentage plots on the equal area net, and not the Kamb contouring statistic. Despite

[5] Stereographic projections are often referred to as equal-angle lower-hemisphere projections (Wulff Net) or equal-area lower-hemisphere projections defined by the Lambert azimuthal equal-area projection (Schmidt Net).

[6] Some apparent differences in interpretation of the contour plots are apparent over time due to use of different software packages.

these differences in statistical analysis, the basic geometry of the structures is preserved and hence, successfully interpretable.

4.3 Geologic Cross Sections

A total of six detailed geologic cross-section interpretations have been constructed (**Figure 4-7 through Figure 4-10**). Sections A-A', B-B', C-C', D-D', and E-E' are dip sections in that they are oriented parallel with the direction of bedrock dip that is to the southeast. Sections F-F' and G-G' are strike sections in that they are oriented parallel to the average strike direction (i.e., NE to SW) of the underlying bedrock. All the above sections form a tight fence across and beneath the Site and extend to areas beyond the property boundary of the Site. The cross sections are not vertically exaggerated (i.e., vertical and horizontal scales are the same), being presented at 1 inch = 100 feet.

Not all boreholes occur directly on the line of the cross-sections; boreholes lying outside the straight line have been projected onto the plane of the cross-section utilizing routine practice in constructing geologic sections where boreholes are not aligned on a rectilinear grid. Apparent dip calculations were performed when the section was not parallel with the dip direction. The legend embedded in the cross-sectional figures explains how the lithologic units/horizons were subdivided, correlated between boreholes, and the section drawings also include various notes as to the local structures encountered in the boreholes. These structures include fracture zones, broken rock zones, lithologic boundaries etc. as mapped by the ATV and other correlative details obtained from the drilling logs of the boreholes. Included in the cross-sections are the axial traces of the meso-scale folds that transect the Site. Three primary lithologic units/ horizons have been incorporated into the cross sections based on the borehole data. These are the medium to dark-grey argillaceous/shaly limestone, the light-grey medium to massive bedded limestone, and the arenaceous limestone. These lithologic differentiations have been used to interpolate between boreholes. The fold geometry drawn on the cross-sections reflects field observations of folds and standard structural analysis convention (conserving the stratigraphic volume/thickness between interpolations).

Because of the distances between off-Site boreholes and the Site, the cross-sections that extend beyond the Site boundaries are extrapolated and interpretive. However, the lithologic and structural elements collected in the off-Site borings do correlate with those identified within the Site boundaries.

4.4 Bedrock Controls of Groundwater Flow

The structural deformation in the Valley and Ridge has created structures, fractures, joints and cleavages (some of which have been solution widened by karst processes) in the Conococheague Formation that are of hydraulic significance. These features create pathways for groundwater movement.

4.4.1 Bedrock Porosity

Bedrock at the Site is generally located from zero (at outcrops) to an average of 30 feet bgs. For the bedrock beneath the Site area, the terms of "diffuse" and "preferential" as defined by Kresic (2013) can be used to describe components of groundwater flow. Groundwater movement occurring through pore spaces of the rock matrix and minute fissures can be described as "diffuse," and is typified by low velocity groundwater flow. "Preferential" flow occurs through localized portions of the bedrock that are dominated by secondary porosity features (i.e., fractures and bedding plane partings), and through hydraulically interconnected tertiary porosity features (karst) if applicable. Depending on the aperture of the fractures/secondary porosity

features and groundwater flow conditions, the initial opening (discontinuity) may either be enlarged by rock dissolution, creating tertiary or karst porosity, or reduced (or even closed) by carbonate precipitation or clay/mud infilling. Similarly, initial karst voids/features may be subsequently filled with mineral precipitate and/or unconsolidated sediment ("mud") as noted in several of the boring logs for the Site.

It is well known and documented in published literature of the Great Valley Physiographic Province in northern Virginia, West Virginia and Maryland underlain by the Conococheague Formation that primary porosity is a negligible component contributing to groundwater flow. They have been compacted by tectonism, low-grade metamorphism and in-filling (Cloos, 1951; Yager et al. 2008) and have therefore lost a significant portion of their primary porosity over geologic time. It has also been well documented that a major groundwater flow component in the Hagerstown Valley is through secondary porosity that consists of a three-dimensional network of fractures formed by bedding planes, cleavage planes faults and joints (see **Figure 4-11** and **Figure 4-12**). An additional groundwater flow component is through solution widened secondary porosity, also interchangeably referred to as tertiary or karst porosity as indicated by the EPA tracer study.

In the former WMA, 110 characterization borings were completed as part of the OU-1 PDI (URS, 2015). In each of the borings with the exception of one, refusal (limestone bedrock) was encountered at depths ranging from 8.8 to 59.7 feet bgs. The average depth to bedrock in these former WMA borings was 24 feet bgs, with approximately 70% of borings encountering bedrock at less than 30 feet bgs. In general, the shallowest depth to bedrock is in the east-northeast corner of the former WMA, while the greatest depth to bedrock is in the southern corner of the former lagoon area.

Tertiary porosity exists at the Site, primarily at depths less than 100 feet bgs. However, the empirical data from spring and surface water sampling (discussed later in this report) suggest uncertainty as to whether tertiary porosity is a significant pathway for migration of Site related COCs. Hydraulic conductivity data, packer testing data, and water levels observed in the monitoring wells (discussed in Section 4.3.3 and 4.3.4 below) do not exhibit hydraulic conductivity values consistent with a network of interconnected tertiary porosity (i.e., 10^2-10^5 ft/day) that would transmit significant groundwater at higher velocities, or significant interconnection with secondary porosity. Based on the totality of empirical data collected, groundwater flow through secondary porosity does appear to be dominant in bedrock at the Site. This is consistent with the conclusions of the Maryland Geological Survey Report of Investigations No. 73 Karst Hydrogeology of the Hagerstown Valley, Maryland (MGS, 2001). During drilling both on-Site and off-Site groundwater monitoring wells, tertiary porosity features such as voids and mud-filled cavities were observed in a limited number of wells within the epikarst. These features were identified due to either the loss of fluid circulation, slight drops in the drill stem, or increases in groundwater production. From the data collected, including packer testing and borehole geophysics, it appears that once groundwater flow breaches the epikarst zone, the secondary porosity features, i.e., bedrock fractures and bedding planes, dominate groundwater flow.

EPA conducted a dye tracer study to further evaluate tertiary (karst) porosity as a potential pathway for migration of COCs from the Site to surrounding areas and presented their findings in a report (EPA Final Tracer Test Report, 2017). EPA injected a dry tracer at on-Site locations in three events and monitored dye concentrations at fourteen spring locations and four surface water locations. The tracer study identified apparent connections between dye injection points on the Site and Bester Long Quarry immediately southeast of the Site, Antietam Creek and Antietam Falls approximately two miles southeast of the Site, and two springs (Troupe Spring 1 & 2) located approximately three miles northwest of the Site. Possible connections between the

Site and monitoring points were identified at Hagers Crossing Spring, Hamilton Run, Pangborn Park Spring, and Rest Haven South Spring, whereas connections to the remaining monitored locations were considered inconclusive. Transport velocities ranged from approximately 16 to 66 feet/day^{-1}, which EPA noted as somewhat slow velocities in comparison to other karst aquifers.

Notably, various uncertainties associated with the tracer test results and their interpretations were described in the EPA Report. Typical examples of similar and other uncertainties are the cases where the analyzed background concentrations of the tracer prior to a test had multiple peaks higher than the peaks observed at sampling locations after the tracer injection (e.g., case of Rest Haven N Spring). Some locations such as Bester Long Quarry show background tracer concentrations, prior to any tracer injection at the Site, in form of a typical breakthrough curve with a well-defined peak. These and other examples indicate other possible sources of tracer-like substances detected by the EPA as part of this study.

As explained earlier, the COC pesticides were not detected at any dye sampling location significantly far away from the Site, i.e., well beyond the 2,000 to 2,700-foot distance observed in the off-Site groundwater samples. At the same time, some pesticide concentrations were detected in the surface water and sediment samples collected at greater distances from the Site during this study, well beyond the 2,000 to 2,700-foot distance observed in groundwater. However, as described in Appendix B, there is considerable evidence of historical sales and use of pesticides throughout Washington County, Maryland that suggest these detections of certain pesticides are more likely due to background conditions than to transport via groundwater through secondary and/or tertiary porosity. These detections may not be related to groundwater migration from the Site.

4.4.2 Fractures, Bedding-Plane Partings, Joints,

The OU-2 investigation of bedrock structural features identified overturned folds that tilted to the northwest and are interspersed with layer-parallel fault surfaces, intensely fractured fold hinge zones and a pervasive network of joints, cleavage and bedding planes. Groundwater flow appears to take place preferentially along the fault planes, fractures, and bedding planes, and is always in the direction of decreasing hydraulic head.

Joint (fractures), bedding, and foliations are discontinuities in the bedrock that facilitate movement of water (and, consequently contaminant migration). A well-developed, hydraulically interconnected system can distribute fluids along both vertical and horizontal axes of geologic structures. At least four types of joints (fractures) and their associated orientations in the folded rocks; these are dip, oblique, strike, and tension joints (**Figure 4-11**). Extension in the least principal stress direction (northeast-southwest) caused dip joints to form perpendicular to fold axes that strike northwest-southeast. Strike joints (NE to SW) form parallel to fold axes, whereas tension joints form parallel with fold hinges. Conjugate sets of oblique joints formed as the rocks were sheared. In addition to these fractures, ductile deformation in the tightly folded cores of folds (see **Figure 4-11 through Figure 4-13**) resulted in rock that may impede but not prevent cross-structural groundwater flow northwest of the Site, as well as downward across the shear plane or fault. This can be observed in the groundwater analytical results for monitoring well OW-19-450 located to the northwest of the Site and in which concentrations of pesticide COCs, including 2,4-DDE, 4,4-DDD, alpha-BHC, beta-BHC, delta-BHC, and dieldrin, are non-detect or an order of magnitude or more below concentrations in on-Site wells MW-F-70, MW-L-250, MW-K-80 and MW-K-440. The tightly folded core of the Western Boundary Fold and the Regional Fold are interpreted to present a constraint on groundwater flows westward and northwestward from the Site, while potential layer-parallel faults dipping southeast may also

constrain downward groundwater flow. The groundwater flow direction has therefore preferentially been toward the south and southeast along bedding plane partings both in the strike and dip direction.

The optical and ATV logs from wells (**Appendix G and Appendix H**) were used to identify and measure the occurrence and frequency of dipping fractures, these include both high- (greater than 30 degrees) and low-angle fractures. Azimuthal rose diagrams displaying the directional frequency of these fractures plotted along their dip direction is shown in **Figure 4-6**. The data set has not been corrected for the typical under-representation of high-angle fracture frequency in vertical wells. Water-bearing fractures within the total population of fractures were identified by changes in the temperature and (or) specific conductance of water in the wellbores or by measurement of changes in upward or downward flow within wellbores. Often, large caliper log spikes along with the above geophysical deflection tended to be water-bearing fractures; these spikes are not necessarily evidence of tertiary porosity. This dataset provided information on the occurrence of water-bearing fractures, but did not indicate the productivity of individual fractures.

Characteristics of the occurrence of bedrock fracturing and water-bearing fractures can be summarized as follows:

- Low-angle fractures (less than 30 degrees, mostly bedding partings, and a few bedding parallel fracture zones) are the dominant water-bearing fracture/discontinuity type in the Conococheague and Stonehenge lithologic units intercepted by the boreholes.
- Coarse-grained units (many of them dolomitic limestones) in the bedrock beneath the Site area differ from the other rock units such as fine-grained limestones, argillaceous and shaly limestones in the dominance of low-angle fractures.
- Fracture intensity is greater across a lithologic change when coarser-grained units are juxtaposed adjacent to finer-grained units. In general, southeast dipping, low-angle fractures accounted for approximately 70 percent of all fractures and greater than 90 percent of water-bearing fractures.
- High-angle fractures are most common in areas adjacent to fold hinges and faults /faulting. These faults and fold zones have been illustrated conceptually in **Figure 4-1** and as interpreted from the Site data in the geologic cross section in **Figure 4-7 through Figure 4-10**.
- A high count of fractures in certain intervals of the boreholes suggests that these fractured intervals are related to fractures zones and not in general correlative with void intervals as seen in the available ATV data.

4.4.3 Hydraulic Properties of the Epikarst and Bedrock

4.4.3.1 Epikarst Hydrogeology

RI activities conducted by Weston in 1989 identified caverns and/or voids in the following well locations:

- MW-1 (located northwest of the former WMA near MW-K) – open cavern from 26 to 43 feet bgs;
- MW-2 (located south of former WMA near MW-P) – void space/weathered zone (cuttings are moist brown clay) from 15 to 25 feet and void space/mud-filled cavity from 28 to 32 feet bgs;

- MW-4 (located south of the former WMA near MW-M – mud-filled void from 18 to 20 feet and 27 to 42 feet bgs;
- MW-6 (located northeast of MW-E) – mud-filled void from 27 to 32 feet bgs;
- MW-7 (located near MW-L) – mud-filled void from 24 to 27.5 feet bgs and soft mud from 95 to 97 feet bgs.

No caverns/voids were identified in well logs for MW-3 and MW-5. Monitoring wells installed since 2003 as part of the OU2 Investigation have also identified void features:

- MW-A-51 – mud-filled void from 50 to 51 feet bgs;
- MW-J-71 – mud-filled void from 64-67 feet bgs;
- MW-N-83 – mud-filled void from 74.5 to 79.5 feet bgs;
- MW-N-113 – mud-filled void from 104 to 105 and void from 105.5 to 106 feet bgs
- MW-O-145 – extremely soft mud from 65.5 to 68.5 and 78.5 to 80 feet bgs;
- OW-5-90 – possible loss of return water from 79 to 92 feet bgs.

Comparing wells MW-J-71 and MW-O-145, located within approximately 60 feet of each other, both wells had void-type features between 64 and 68.5 feet. A mud-filled void was encountered at 28 to 32 feet bgs in MW-2, and approximately 100 feet northwest at well MW-P-235 soft clay mud returns were noted from 32 to 36 feet bgs. No other between-well correlations of significant void/mud features were identified. Packer testing was not performed on these wells; however, slug tests were performed in 2003-2004 on wells MW-A-51 and MW-J-71, and as further discussed below marginally higher falling head and rising head hydraulic conductivity results (9.9 and 11.34 feet/day), were observed in MW-J-71 compared to other on-Site test locations. Weston performed slug tests in the former wells MW-2, MW-3, and MW-5, with a hydraulic conductivity result in MW-2 of 0.18 feet/day (falling head) and 0.198 feet/day (rising head), similar to nearby wells MW-A and MW-B (URS, 2008). MW-1 and MW-4 were not tested due to the cavern and mud-filled void spaces, respectively, and MW-6 and MW-7 could not be tested due to slumping in the wells. None of these test results approach the values that would be expected by interconnected tertiary porosity

Hydraulic testing was conducted to evaluate the hydraulic properties of the epikarst water-bearing zones sufficiently to design an effective hydraulic control system at the former WMA area and prevent migration of impacted groundwater/residual leachate beyond the boundary of the consolidation area. A step-drawdown test was performed at EW-1-110 in January 2013 to identify the optimum pumping rate to be used for the 72-hour constant rate pumping test. In addition, a 72-hour constant rate pumping test was performed on well EW-1-110 (AECOM, June 2017.)

As presented in the February 3, 2015 Final Pre-Remedial Design Investigation Report (accepted by EPA on May 11, 2015), effective hydraulic control of groundwater in the WMA was possible. The hydraulic conductivity of the tested epikarst interval based on the 72-hour pumping test produced a yield of 4 gpm for the remedial extraction wells. The rather low well yields observed in the epikarst testing are inconsistent with high-conductance interconnected network of tertiary porosity.

Falling-head and rising-head slug tests were also performed previous to the OU-2 RI at 11 wells screened in shallow (less than 100 feet bgs) bedrock, with eight wells having valid results (URS, 2006). The slug test results are provided in **Appendix K**. The hydraulic conductivity estimated from the test results varied between 0.03 feet/day (at wells MW-B-55 and MW-F-70) and 16.4 feet/day (MW-I-55). The geometric mean of the hydraulic conductivity for all wells was 0.59

feet/day, suggesting secondary porosity is dominant within the screened intervals of the tested bedrock wells, although minor tertiary porosity may be evident at MW-I.

A zone of higher conductivity values was identified from north to south in the central portion of the Site, and zones of lower conductivity values were identified along the northwest and southeast boundaries of the Site. However, none of these values approaches those that would be expected where interconnected tertiary porosity (karst network freely transmitting water) is present.

4.4.3.2 Bedrock Hydrogeology

Out of 133 packer intervals tested in 11 wells during the OU-2 RI (**Table 3-3**), 115 (86%) have sustained flow rates equal or less than 5 gpm. These intervals are at widely varying depths between different wells and, similarly to packer testing results, do not indicate the presence of an extensive interconnected network of empty karst conduits transmitting significant quantities of groundwater along preferential flowpaths. Only one interval, 372-400 feet in well MW-B-598, had a sustained flow rate greater than 10 gpm. In many of the shallow bedrock aquifer zone ("epikarst") and in deeper bedrock intervals, very low pumping rates (equal or less than 0.5 gpm) exceeded the sustainable yield (44 such intervals or 33% of the all tested bedrock intervals). Again, none of these interval yields approaches those that would be expected where interconnected tertiary porosity is present. The summary reports on the results of the packer testing performed on the 11 wells can be found in **Appendix I**.

As presented in **Appendices G and H**, some bedrock geophysical logs showed small "classic" karst voids (e.g., MW-K at 60 and 280 feet bgs; MW-L at 202-204; OW-19 at 55 feet bgs; OW-19 at 160 feet bgs). There are also few discrete fracture/bedding plane sub-zones possibly enlarged by dissolution and separated by intervals of competent intervals deeper in the bedrock (MW-R at 487-530; OW-11 at 495-520 and 555-560; OW-16 at 385-390; OW-17 at 485-505). Each of these intervals had sustained flow rates between 6 and 9 gpm in the packer testing. Again, none of these interval yields approaches those that would be expected where interconnected tertiary porosity is present.

TEST INTERVALS WITH SUSTAINED PUMPING RATES EQUAL TO OR GREATER THAN 5 GALLONS PER MINUTE (gpm)											
MW-B-XX		MW-G-XX		MW-K-XX		MW-L-XX		MW-R-XX		OW-7-XX	
Interval	Pump Rate (gpm)	Interval	Pump Rate (gpm)	Interval	Pump Rate (gpm)	Interval	Pump Rate (gpm)	Interval	Pump Rate (gpm)	Interval	Pump Rate (gpm)
372-400	22	425-440	5	415-450	5.5	229-250	6	390-410	6	386-410	8
541-556	6	581-602	5					437-600	9		
574-600	5										
OW-11-XX		OW-16-XX		OW-17-XX		OW-18-XX		OW-19-XX			
Interval	Pump Rate (gpm)	Interval	Pump Rate (gpm)	Interval	Pump Rate (gpm)	Interval	Pump Rate (gpm)	Interval	Pump Rate (gpm)		
434-450	5	40-73	6.5	484-509	6	306-327	8	418-450	9		
473-600	6	104-124	6	585-600	8	349-370	5				
		285-300	5			394-415	8				
		368-392	8			563-600	8				
		396-420	5								
		570-600	6								

4.4.4 Piezometric Data and General Groundwater Flow Observations

Tables 4-1 through 4-5 present groundwater elevation data collected during the April 2014 sampling event and the four quarterly OU-2 groundwater sampling events (October 2016, January 2017, April 2017 and July 2017). Potentiometric surface maps for the upper epikarst zone (< 100 feet bgs), where the majority of monitoring wells are screened, and schematic groundwater flow direction maps for deeper intervals were constructed from the water level data collected during the four quarterly OU-2 groundwater sampling events. These maps are presented as **Figures 4-14 to 4-21**. Importantly, the contour lines and arrows shown on these maps are only an approximation of hydraulic gradients and groundwater flow directions since the fractured bedrock itself is highly heterogeneous both horizontally and vertically. The selected depth intervals roughly correspond to well screen depth groupings, but do not represent discrete or interconnected groundwater flow zones. Although there is generally a downward hydraulic gradient across much of the Site area and beneath the Site, upward hydraulic gradients have also been noted in several of the off-site well clusters.

The potentiometric surface maps for the upper epikarst zone indicate consistent groundwater flow directions over time (**Figures 4-14 to 4-17**). The flow pattern generally parallels the NE-SW bedrock strike and reflects the anisotropy of the underlying bedrock. In this epikarst zone (down to a depth of approximately 100 feet) a groundwater mound is located directly below the Site and groundwater flow gradients vary depending on the structural fabric of the bedrock. Notably, the gradients are the steepest to the northwest indicating less permeable material, including the effects of flow resistance created by the overturned anticline structure with thinly bedded overburden. Notably, the persistence of the mound including during dry season with very little or no recharge indicates that the upper epikarst zone underlying the Site does not act as a highly-permeable porous media that drains quickly vertically downward and/or laterally into some preferential flowpaths. If that were the case, the mound would not be persistent, and any

such features would have to manifest themselves in the water table potentiometric map in the form of discernable long linear sinks (depressions).

At depths greater than 100 feet and down to 600 feet, groundwater flow is anticipated to be preferentially to the southeast driven by the regional potentiometric heads that are higher to the northwest and lower to the southeast (**Figures 4-18 to 4-21**). Detailed downhole geophysical surveys show groundwater flow in these deeper zones occurs predominantly within bedrock discontinuities including bedding plane partings and fractures.

The closest likely discharge area for the Site bedrock groundwater at all monitored depths is Bester Long Quarry to the southeast, in the direction of the regional groundwater flow. The quarry is permanently filled with water which was at an elevation of approximately 545 feet above sea level (asl) at the time of bathymetric survey performed in 2013 by AECOM. The elevation of the deepest bottom of the quarry is 532.506 feet above sea level. Both elevations are lower than any water level elevation recorded at any of the monitoring wells, shallow and deep, located between the quarry and the Site, for all synoptic water level measurements performed. Notably, pesticide COCs were not detected in the surface water samples collected at Bester Long Quarry in 2016 to 2017 as part of the EPA tracer study.

4.4.5 Transducer Data

On November 16, 2016, transducers were placed in nine on-Site piezometers, 14 on-Site monitoring wells, and three off-Site monitoring wells and were removed during the 4th quarter groundwater sampling event in August 2017. Graphs of the recorded change in water level in each of the wells are presented in **Appendix L**. The response of water level in the piezometers/monitoring wells to major rainfall/recharge episodes is very similar in almost all cases illustrating confined conditions typical of aquifers with secondary and tertiary porosity where the bedrock is not exposed directly at the land surface – at the Site the bedrock is covered by the tens of feet thick layer of residuum sediments. The change in water levels during and immediately following major rainfall events is almost instantaneous due to the propagation of hydraulic pressure changes through pore spaces of the residuum sediments caused by the incoming infiltration front. This pressure front, to varying extent and depending on the bedrock properties, propagates downward into deeper bedrock intervals at almost all monitored locations. Another evidence of the confined conditions is frequent periodic smaller oscillation of the water level at all monitoring locations caused by the barometric pressure changes and unrelated to rainfall episodes.

Typical example of the overall hydraulic behavior of the bedrock aquifer is illustrated by the piezometer cluster PZ-4 (**Figure L-5 in Appendix L**): the water level change at both depths is virtually instantaneous (within a day) after the highest recorded rainfall of 2.5 inches on July 29, 2017. Similar response is also evident for other significant rainfall events. At the same time, the hydrograph peaks for both shallow and deep screen intervals at this and other monitored locations are followed by recession periods that typically last longer than a week or two when there is no major rainfall. This indicates that groundwater flow in the bedrock is predominantly through the secondary porosity and limited by the ability of the fracture network to quickly transmit groundwater flow. If the flow were dominated by a karst conduit network for example, the “draining” of the conduits would have to be much faster given the low matrix porosity of the bedrock which does not supply much water to the conduits.

4.5 Summary of the Hydrogeologic Conceptual Site Model

At the Site, precipitation infiltrates through the epikarst zone via matrix porosity of the overburden and through secondary and tertiary porosity of the epikarstic limestone. Once groundwater reaches competent bedrock, groundwater flows via the tensionally fractured hinge zones of the meso-scale anticlines that allows the infiltrating water to flow through the bedding planes and fractures that provide preferential flow paths into both limbs of the fold. In the steeper, northwest-dipping short limbs of these folds, the groundwater flow is down into the steep bedding planes and appears to be parallel with the bedrock strike but towards the synclinal core of the next anticline. Because the steeper, short limbs of these folds are also cut by joints that were rotated during the tectonic deformations, groundwater is driven towards the synclinal axial plane. The anticline-syncline pairings are anticipated to therefore form compartments of preferential groundwater flow. The synclinal axial zone also receives flow from the southeasterly dipping long limb of an adjacent anticline, and the steeper westerly dipping short limb. Together these major structural features serve to provide preferential groundwater flow paths within synclinal hinge zones. In this manner, localized groundwater flow in the fractured bedrock is structurally controlled and the dominant flow direction is parallel with the northeast-southwest structural grain of the bedrock.

Anisotropic hydraulic properties have been documented in tilted sedimentary strata that occur within the Mesozoic rift basins all along the east coast of North America and they also have been discussed at great length in the Shenandoah Valley in Virginia which is the southward continuation of the Hagerstown Valley Virginia (e.g.; Michalski and Britton, 1997; Fitcher and others, 2010; Lewis, 1992; Burton and others, 2002). The anisotropic properties of groundwater flow are a consequence of the orientation of bedding planes and fractures that provide preferential flow paths through bedrock, which generally have little primary permeability. In general, these studies concluded that bedding planes provide the principal flow paths in inclined bedrock. Fractures other than (bedding plane partings) provide hydraulic connection between adjacent bedding planes. The density and spacing of the joint sets determines the degree of cross-bedding anisotropy in the fracture network.

In the Shenandoah Valley, immediately south and on-strike with the Hagerstown Valley, the estimated values of horizontal anisotropy (ratio of strike-parallel to strike-perpendicular hydraulic conductivity) ranged from 2:1 to 11:1. Vertical anisotropy (ratio of strike-parallel to cross-bed hydraulic conductivity) was generally an insensitive parameter in model calibration and was set to values ranging from 1:1 to 24:1 (Fitcher and others, 2010). At the OU-2 study area, the direction of maximum hydraulic conductivity is therefore, oriented parallel with the bedding plane strike in general, NE to SW, and the direction of minimum hydraulic conductivity is perpendicular to the bedding in general, NW to SE similar to the Shenandoah Valley with which the Hagerstown Valley shares much lithologic (Conococheague Formations), geologic, and structural similarities as northwest-verging anticlinal and synclinal structures.

Figures 4-11, 4-12 and **Figure 4-13** are conceptual representations of the three-dimensional geologic structures in the Site area and groundwater within these folded structures. High-angle fractures provide some leakage through confining units, as well as voids and fractures enlarged by dissolution. The water bearing fractures generally appear to have low transmissivity, and these zones varied in depth between wells. However, the presence of voids and the results of the EPA tracer study identifying apparent connections between the Site and several surface water and spring features are indicative of tertiary porosity.

Groundwater flow in the shallow epikarst zone (<100 bgs) occurs via primary porosity of the overburden and secondary and tertiary porosity of the epikarst limestone. Groundwater within the competent bedrock preferentially moves through secondary porosity dominated by fractures

and bedding plane partings (**Figure 4-11** and **Figure 4-12**) which are separations between differing lithologic horizons in the Conococheague Formation, as described earlier and as shown in the cross sections. Combining the flow along strike with the other oriented joints and fractures that cut across the bedding plane partings, groundwater flow assumes a stair-step pattern of flow from areas of high hydraulic heads towards areas of low hydraulic heads. In the long, upright, southeast dipping limbs of the meso-scale folds at the Site, bedding plane partings and other joints predominate the geologic structure. Hence, hydraulic interconnection between the various joint types and bedding plane partings allows groundwater to flow more or less parallel with bedrock strike influenced by bedrock dip and the joint fractures, and the flow is dominated by the hydraulic gradient from higher heads in the north and west, to lower heads in the south and east, or towards the Potomac River, consistent with the previous observations made by Maryland Geological Survey (MGS, 2001) and Maryland Department of the Environment (MDE, 1994). The OU-1 2009 ROD also recognized that the groundwater contours indicate “flow radiating from central anticline; however, actual flow path of groundwater is parallel to the NE/SW strike only deviated to the SE and NE along fractures in a stair step type of flow pattern” and while noting that both vertical and horizontal control of contaminant migration is influenced by bedrock structure, “it appears that varying degrees of hydraulic interconnection exist between locally on a small scale between shallower and deeper hydraulic zones”.

The regional hydraulic gradient, as determined from regional and local studies, clearly shows high heads in the northwest of the Site and lower heads in the southeast of the Site. Because of the underlying geologic structure and localized mounding of groundwater in the epikarst zone, groundwater flow is generally anisotropic with head levels distributed in an elongated pattern aligned with bedrock strike (**Figures 4-14 to 4-17**). At depths greater than 100 feet and down to 600 feet, groundwater flow is anticipated to be preferentially to the southeast driven by the regional potentiometric heads that are higher to the northwest and lower to the southeast (**Figures 4-18 to 4-21**).

The dominant direction of groundwater flow is generally from elevated areas in the northwest and thence along the strike (NE to SW) of the bedrock. Groundwater flow along joint types (illustrated conceptually in **Figure 4-12**) is also topographically driven along the strike of the respective feature. In combination, the interaction of all the structural elements described above results in a regional conceptual groundwater flow direction to the south and southeast as shown in **Figure 4-13**.

In inclined (folded) rocks, the hydraulic conductivity tensor can be oriented horizontally along strike, but it is rotated in the downdip direction so that the direction of minimum hydraulic conductivity is oriented normal to the dip. Extensive fractures or faults which can cut through or parallel numerous bedding planes as shown in the geologic cross sections in this report may then serve as preferential flow paths, barriers to flow, or both. This is likely the hydrogeologic pathway pattern at the Site and the OU-2 area. A supporting observation to the scenario detailed above is that the water bearing fractures yielding greater than 1 gpm (see Section 3) were generally along such prominent bedrock discontinuities, parallel with bedding planes.

4.6 Site Conceptual Exposure Model Summary

The discussion above of the HCSM and the data collected during the RI indicate that COCs migrate through the epikarst zone and into bedrock where groundwater flow is predominantly along bedrock strike, via fractures and in bedding plane partings to locations beyond the Site boundaries. This movement could potentially result in receptor exposure to COCs due to:

- Vapor Intrusion (of VOCs) from the subsurface into the indoor air of occupied structures.
- Groundwater containing dissolved COCs that has migrated from beneath the source area in the vicinity of the former WMA and other potential source areas (Site soils, Liquid Pesticide Building and D1H08A area) at the Site to downgradient off-Site locations.

Pesticides (BHC isomers) have been detected in off-Site groundwater monitoring wells at distances of 2,700 feet southwest and 2,200 feet northeast, respectively, of the Site. As noted earlier, no potable wells have been identified in these areas.

Samples collected from local springs during the RI and by EPA during its tracer study identified pesticides such as dieldrin, 4,4-DDT, alpha-chlordane, and heptachlor epoxide; however, a key indicator parameter, BHC, was absent from all results. The only pesticide COCs identified in surface water samples collected by EPA during its tracer study was dieldrin. Conversely, a key indicator parameter, BHC, was absent from all results.

Sub-slab soil gas samples have been collected off-Site to evaluate the vapor intrusion migration pathway. A few volatiles (e.g. 1,2-dichloroethane, benzene, and chloroform) were detected above 2013 vapor intrusion screening levels in the off-Site data set; however, these constituents were attributed to other factors and URS concluded that a vapor intrusion pathway from the Site was not apparent and no further evaluation was warranted (URS, 2014). The sub-slab soil gas results are below current EPA VISL model screening levels; however, this migration pathway will be retained for further quantitative evaluation in the HHRA.

Site groundwater is also a potential migration pathway for constituents to off-Site aquatic habitats and biota.

Potential Human Receptors

Potential receptors are defined as human populations that are susceptible to contaminant exposure from OU-2 groundwater and associated off-Site groundwater transport pathways. Both current and future land- and water-use conditions were considered when determining potential exposure scenarios. Future on-Site land use will remain commercial/light industrial, while the surrounding area is expected to remain a mixture of commercial, industrial and residential. Therefore, the following potential receptors were identified given the Site setting and land uses at and adjacent to the Site:

Future On-Site Construction/Utility Worker - The Site is currently not used for any purpose. The construction worker receptor is intended to address on-Site exposure by workers who could be exposed to groundwater during future re-development activities. This includes utility workers who could potentially excavate soil while repairing existing utilities or installing new utilities.

Future On-Site Commercial/Industrial Worker - Commercial or light industrial use represents future use for the Site, consistent with deed restrictions. This receptor group is intended to represent workers who participate in light industrial or commercial activities on-Site, but who do not perform any intrusive activities (digging/excavation).

Current/Future Off-Site Resident (Adult/Adolescent/Child) – Residential neighborhoods are located adjacent to the Site to the northeast and northwest. The residential receptor is intended to address all residential areas located within the OU-2 groundwater plume and residential areas within 100 feet of the vapor intrusion screening level exceedances in groundwater.

Current/Future Off-Site Commercial/Industrial Worker – Commercial properties are located adjacent to the Site to the east, west and southwest. Includes maintenance workers at the off-Site golf course.

Current/Future Off-Site Recreational User (Adult/Adolescent/Child) of off-Site Surface Water Features (streams, sediment and springs).

Hypothetical future residential use of the Site is inconsistent with deed restrictions recorded for the Site[7].

4.6.1 Potentially Complete Exposure Pathways

Groundwater

Under current conditions, the potential for ingestion exposure to impacted groundwater is low since groundwater is not used on- or off-Site as a potable water source and is at a depth (greater than 25 feet bgs) where contact would not occur during future construction activities. The following are potentially complete exposure pathways for groundwater:

On-Site

- Future On-Site Commercial/Industrial Worker: inhalation of vapor-phase chemicals released from the subsurface (vapor intrusion).
- Future On-Site Construction/Utility Worker: Incidental dermal contact with perched groundwater during dewatering activities for development. Inhalation of vapor-phase chemicals released from the subsurface (vapor intrusion).

Off-Site

- Current/Future Off-Site Resident (Adult/Adolescent/Child): incidental ingestion of and dermal contact with well water[8] ; incidental ingestion via consumption of home grown produce; and, inhalation of vapor-phase chemicals released from the subsurface to indoor air (vapor intrusion).
- Current/Future Off-Site Commercial/Industrial Worker: incidental ingestion of and dermal contact with groundwater used for irrigation by a golf course maintenance worker; inhalation of vapor-phase chemicals released from the subsurface to indoor air or other confined space (excavation or trench).
- Future Off-Site Construction/Utility Worker: incidental dermal contact with perched groundwater during dewatering activities for development.

Surface Water and Sediment

The EPA tracer study identified apparent connections between dye injection points on the Site and Bester Long Quarry, Antietam Creek, Antietam Falls, and two springs northwest of the Site (Troupe Spring 1 & 2), suggesting the groundwater to surface water transport pathway may be complete. However, as discussed earlier, available analytical data raise some uncertainty as to whether this pathway is significant. Recreational use of potentially receiving off-Site surface water features, including bank fishing, hiking, walking, wading, and swimming could potentially result in a potentially complete exposure pathway. However, portions of the off-Site features are not suitable for swimming (i.e., water is too shallow).

[7] The 2009 HHRA quantitatively evaluated this hypothetical scenario to provide risk managers with relevant information to support future land use decisions and/or potential land use controls.
[8] Well water uses considered will include lawn or garden irrigation, car washing or playing under a sprinkler.

The human populations that could potentially utilize the off-Site surface water for recreational use include: children (age 0-6), adolescents (age 6-16 years) and adults (16+ years). All three age-defined populations may potentially be exposed by the same exposure pathways.

Therefore, for surface water and sediment, potentially complete exposure pathways may include the following:

- Current/Future Off-Site Recreational User (Adult/Adolescent/Child): incidental ingestion of and dermal contact with surface water and sediment while wading or swimming in off-Site streams and springs if these are impacted by COCs. Anglers who may catch and consume fish in off-Site surface water features.

4.6.2 Incomplete Exposure Pathways

Groundwater

Groundwater is not currently used at the Site for any purpose and deed restrictions prohibit its use in the future. In addition, the 2009 HHRA evaluated on-Site hypothetical drinking water use. Therefore, drinking water exposure pathways were considered incomplete for future on-Site receptors. Groundwater is not currently used off-Site for potable purposes and a municipal water supply is present; however, future off-Site potable use cannot be prevented.

Surface Water and Sediment

There are no surface water bodies on-Site; and, therefore, no potentially complete on-Site exposure pathways for surface water and sediment.

4.6.3 Potential Ecological Receptors and Exposure Routes

The potential discharge of Site groundwater to off-Site aquatic habitats is considered a potentially complete migration pathway, although current data raise some uncertainty as to whether COCs are migrating in groundwater to these discharge points. Based on fate/transport characteristics of the COCs, exposure pathways that are potentially complete and potentially significant for ecological receptors in off-site aquatic habitats include:

- Direct contact exposures to COCs in surface water, bulk sediment and sediment porewater;
- Incidental ingestion of surface water and bulk sediment by piscivorous and omnivorous birds and mammals; and
- The ingestion of prey items containing COC residues.

Given that direct contact and dietary exposure to COCs in surface water, bulk sediment and sediment porewater are the predominant exposure pathways/routes to ecological receptors, receptors of concern could include:

- Aquatic and semi-aquatic receptors (Aquatic Habitats):
  - Benthic invertebrate community
  - Fish Community
  - Piscivorous Birds and Mammals
  - Omnivorous Birds and Mammals

Benthic Invertebrates

Benthic invertebrates are the most susceptible to the effects of COCs because of their sedentary nature and direct exposure to surface water, bulk sediment (and sediment porewater). As a result of this exposure, benthic invertebrates are sensitive to both acute and chronic changes in sediment quality.

Potential exposure routes for benthic invertebrates include:

- Bulk sediment and sediment porewater: direct contact/absorption within the biologically active zone (BAZ); secondarily direct/incidental ingestion
- Surface water: direct contact/absorption

For benthic invertebrates, exposure occurs within the BAZ of sediment, from the sediment-surface water interface (SWI) to a depth of approximately 15.2 centimeters (cm) (6 inches) for freshwater sediment (EPA, 2015). This definition of the BAZ is consistent with the EPA guidance *Methods for the Collection, Storage, and Manipulation of Sediments for Chemical and Toxicological Analyses*, which recommends sampling in the 0 to 10-15 cm depth interval to represent biologically active sediment (EPA, 2001b).

Fish

Depending on feeding strategy, fish can potentially be exposed to COCs via the following exposure routes:

- Overlying water;
- Suspended particulates;
- Direct contact with bulk sediments;
- Incidental ingestion of bulk sediments while foraging; and
- Ingestion of prey items.

Piscivorous and Omnivorous Birds and Mammals

The potential chronic exposure of wildlife to COCs over a long period of time may result in chronic reproductive effects. Potentially contaminated periphyton, aquatic invertebrates, and fish are exposure routes of pesticides to higher trophic level consumers. The potential exposure of piscivorous wildlife to pesticides in off-Site aquatic habitats can occur through the ingestion of fishes containing pesticide residues, and the incidental ingestion of surface water, and to a lesser extent, bulk sediment.

Potential exposure of omnivorous wildlife to pesticides in off-Site aquatic habitats can occur through the ingestion of benthic invertebrates containing pesticide residues, and the incidental ingestion of surface water, and bulk sediment.

5.0 Remedial Investigation Results

The following sections present summary statistics of the analytical results of the OU-2 remedial investigation. These results include duplicate sample data. Original laboratory analytical reports are provided as **Appendix M**. All data has been validated in accordance with the project QAPP. Data validation reports for each data set are provided as **Appendix N**.

5.1 Constituents of Concern

The groundwater COCs at the Site were identified in Table 12 of the September 2009 ROD for the Site. The COCs are listed below with their respective current (November, 2017) EPA RSLs based on EPA's cumulative risk threshold for multiple carcinogens of one-in-one million (1×10^{-6}) and non-cancer effects compared to a hazard index (HI) of 1.0.

Central Chemical Site COCs	RSL (µg/L)
Benzene	0.46
Chloroform	0.22
Chlorobenzene	78
1,4-Dichlorobenzene	0.48
1,2-Dichloroethane	0.17
Tetrachloroethylene	11
1,2,4-Trichlorobenzene	1.2
Bis(2-ethylhexyl)phthalate	5.6
2,4-Dichlorophenol	46
Pentachlorophenol	0.041
2,4,6-Trichlorophenol	4.1
Atrazine	0.3
Aluminum	20,000
Arsenic	0.052
Beryllium	25
Iron	14,000
Manganese	430
Thallium	0.2
Vanadium	86
Zinc	6,000
2,4,5-T	160
2,4-D	170
Diphenamid	530
4,4-DDT	0.23
2,4-DDD	0.032
2,4-DDE	0.046
2,4-DDT	0.23
4,4-DDD	0.032
4,4-DDE	0.046
Aldrin	0.00092
Alpha-chlordane	0.02
Alpha-BHC	0.0072
Beta-BHC	0.025
Delta-BHC	0.025
Gamma-BHC (Lindane)	0.042
Dieldrin	0.0018
Endrin	2.3
Endrin ketone	---
Heptachlor	0.0014
Heptachlor epoxide	0.0014

Central Chemical Site COCs	RSL (µg/L)
Toxaphene	0.071

5.2 Private Well Sampling Results

On May 5 and 6, 2014, groundwater samples for laboratory analysis were collected from six wells located at private residences between one and 1.5 miles northeast of the Site and one well located at the FHCC golf course. On October 21 and November 4, 2015, following a request by EPA, samples were again collected from three of the seven private well locations sampled in 2014 that had contained detectable COC concentrations (the FHCC well, 13212 Woodbine Lane, and 12918 Fountain Head Road). EPA had request a fourth private well be resampled; however, the owner of well declined permission for sample collection. Private well locations are depicted on **Figure 3-2**. **Tables 5-1 and 5-2** summarize the field parameter measurements and analytical results, respectively. Summary statistics of the analytical results for the COCs sorted by number of detections exceeding the respective RSLs are presented in the table below.

PRIVATE WELL DATA GROUNDWATER COC DETECTION SUMMARY STATISTICS						
Central Chemical Site COCs Analyzed	EPA RSL	Number of Sample Results	Number of Detections	Minimum Conc. Detected (µg/L)	Maximum Conc. Detected (µg/L)	Number of Detections > RSL
Dieldrin	0.0018	10	10	0.0011	0.022	7
Heptachlor epoxide	0.0014	10	8	0.00094	0.0044	3
Endrin ketone	---	10	3	0.0018	0.0034	----
Diphenamid	530	10	0	ND	ND	0
4,4-DDT	0.23	10	2	0.00021	0.0027	0
2,4-DDD	0.032	10	0	ND	ND	0
2,4-DDE	0.046	10	9	0.0002	0.0032	0
2,4-DDT	0.23	10	3	0.00049	0.00064	0
4,4-DDD	0.032	10	0	ND	ND	0
4,4-DDE	0.046	10	1	0.00083	0.00086	0
Aldrin	0.00092	10	0	ND	ND	0
Alpha-chlordane	0.02	10	2	0.002	0.003	0
Alpha-BHC	0.0072	10	0	ND	ND	0
Beta-BHC	0.025	10	3	0.0015	0.0018	0
Delta-BHC	0.025	10	0	ND	ND	0
Gamma-BHC (Lindane)	0.042	10	0	ND	ND	0
Endrin	2.3	10	0	ND	ND	0
Heptachlor	0.0014	10	0	ND	ND	0
Toxaphene	0.071	10	0	ND	ND	0

Dieldrin and heptachlor epoxide were both detected above the respective RSLs in the samples collected from 13212 Woodbine Lane (both rounds of sampling) and from the FHCC well (October 2015; only dieldrin above the RSL in the first round sample). Dieldrin was also detected above the RSL in the samples collected from 12914 Fountain Head Road, 13011 Fountain Head Road, and 13238 Fountain Head Road. While the two private wells that did not have exceedances (18942 Preston Road and 12918 Fountain Head Road) are the southernmost wells (i.e. closest to the Site), the well located between them at 12914 Fountain Head Road had detected dieldrin at 0.022 ug/L.

5.3 Sub-Slab Soil Vapor Results

Sub-slab vapor sampling was conducted at four properties on Matthew Court to evaluate potential vapors emitted from groundwater to enter nearby residences. The four properties on Matthew Court (1017, 1019, 1022, and 1028 Matthew Court) are immediately adjacent to the northeast Site property boundary. The samples were collected on February 18 and 19, 2014. **Table 5-3** and **Figure 5-1** summarize the analytical results.

Summary statistics of the analytical results for the COCs are presented in the table below sorted by number of detections exceeding their respective VISL Threshold Carcinogenic Risk (TCR) of 1 x 10^{-6} or Threshold Hazard Quotient (THQ) of 1 that were applicable at that time. These results were reported to EPA in the April 2, 2014 OU-2 Vapor Intrusion Investigation Sub-Slab Vapor Sampling Results Memorandum.

SOIL VAPOR DATA SUMMARY STATISTICS						
Central Chemical Site COCs	**VISL Calculator Value Target Sub-Slab and Exterior Soil Gas Concentration @ TCR = 1E-06 or THQ = 1 (ug/m^3)**	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (ug/m^3)**	**Maximum Conc. Detected (ug/m^3)**	**Number of Detections > TCR or THQ**
Chloroform	1	6	3	0.41	2.6	2
Benzene	3.1	6	6	0.25	4.5	1
1,2-Dichloroethane	0.93	6	1	1.4	1.4	1
Chlorobenzene	521.4	6	0	ND	ND	0
1,4-Dichlorobenzene	2.2	6	0	ND	ND	0
Tetrachloroethylene	93.6	6	5	0.95	4.7	0
1,2,4-Trichlorobenzene	20.8	6	0	ND	ND	0

The current (2018) EPA VISL Model Screening levels for TCR of 1 x 10-6 and THQ of 1 have been revised since 2014. None of the detections reported above exceed the respective current VISL model threshold values.

5.4 Spring Sampling Results

In 2005, groundwater samples were collected from six groundwater springs located between one and two miles from the Site. Spring and seep locations (**Figure 5-2**) were identified based on a review of aerial photographs and reconnaissance survey performed by URS in 2002 (Phase I RI Report, URS), and at locations mapped by the Maryland Geological Survey. Samples were collected by one of the following methods:

- A hand-dip method whereby the analytical bottleware is slowly lowered beneath the water surface until the bottle is filled.
- Placement of the sampling container directly under an actively flowing spring.
- A stainless-steel tube inserted into the seep area and a glass funnel to direct discharge into sample bottleware.
- Excavation of a small pit lined which was then lined with a stainless-steel bowl at or beneath the seep orifice and allowed to fill with seep water. Samples were collected using the hand-dip methodology.

Samples were collected on July 12 and 13, 2005. **Tables 5-4 and 5-5** summarize the field parameter measurements and analytical results, respectively. Summary statistics of the analytical results for the COCs sorted by number of detections exceeding the respective RSLs are presented in the table below.

2005 SPRING SAMPLE DATA SUMMARY STATISTICS						
Central Chemical Site COCs	**EPA RSL**	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (µg/L)**	**Maximum Conc. Detected (µg/L)**	**Number of Detections > RSL**
Chloroform	0.22	6	3	2.9	3.1	3
Bis(2-ethylhexyl)phthalate	5.6	6	4	1.7	26	1
Iron (Dissolved)	14000	6	5	10.3	203	0
Benzene	0.46	6	0	ND	ND	0
Chlorobenzene	78	6	0	ND	ND	0
1,4-Dichlorobenzene	0.48	6	0	ND	ND	0
1,2-Dichloroethane	0.17	6	0	ND	ND	0
Tetrachloroethylene	11	6	0	ND	ND	0
1,2,4-Trichlorobenzene	1.2	6	0	ND	ND	0
2,4-Dichlorophenol	46	6	0	ND	ND	0
Pentachlorophenol	0.041	6	0	ND	ND	0
2,4,6-Trichlorophenol	4.1	6	0	ND	ND	0
Atrazine	0.3	6	0	ND	ND	0
Arsenic (Dissolved)	0.052	6	0	ND	ND	0
Diphenamid	530	6	0	ND	ND	0
4,4-DDT	0.23	6	0	ND	ND	0
2,4-DDD	0.032	6	0	ND	ND	0
2,4-DDE	0.046	6	0	ND	ND	0
2,4-DDT	0.23	6	0	ND	ND	0
4,4-DDD	0.032	6	0	ND	ND	0
4,4-DDE	0.046	6	0	ND	ND	0
Aldrin	0.00092	6	0	ND	ND	0
Alpha-chlordane	0.02	6	0	ND	ND	0
Alpha-BHC	0.0072	6	0	ND	ND	0
Beta-BHC	0.025	6	0	ND	ND	0
Delta-BHC	0.025	6	0	ND	ND	0
Gamma-BHC (Lindane)	0.042	6	0	ND	ND	0
Dieldrin	0.0018	6	0	ND	ND	0
Endrin	2.3	6	0	ND	ND	0
Endrin ketone	---	6	0	ND	ND	0
Heptachlor	0.0014	6	0	ND	ND	0
Heptachlor epoxide	0.0014	6	0	ND	ND	0
Toxaphene	0.071	6	0	ND	ND	0

5.5 Bester Long Quarry Sampling Results

The Bester Long Quarry is the closest surface water body and groundwater discharge boundary to the Site (see **Figure 5-3**), and comprises an area of approximately 0.93 acres. Surface water and sediment samples from the quarry were collected on October 15, 2013 and analyzed for the pesticide and herbicide compounds specified in Table 12 (Interim Ground Water Remediation Standards) of the Central Chemical Site OU-1 ROD.

5.5.1 Surface Water

Two locations were sampled and two samples were collected from each location. At sample location BLQ-1, samples were collected at three and 12 feet below water surface. At sample location BLQ-2, samples were collected at three and 7.5 feet below water surface. In-situ water quality data were collected and are summarized in **Table 5-6**. Sample analytical data are summarized in **Table 5-7**. Summary statistics of the analytical results for the COCs sorted by number of detections are presented in the table below.

BESTER LONG QUARRY SURFACE WATER DATA OCTOBER 2013
SUMMARY STATISTICS

Central Chemical Site COCs	MD Fresh Water Acute (µg/L)	MD Fresh Water Chronic (µg/L)	Number of Sample Results	Number of Detections	Minimum Concentration Detected (ug/L)	Maximum Concentration Detected (ug/L)
Manganese	NS	NS	4	4	33	240
Thallium	NS	NS	4	4	0.026	0.11
4,4-DDT	1.1	0.001	4	4	0.00081	0.00086
Arsenic (Dissolved)	340	150	4	3	0.32	0.44
2,4-DDD	NS	NS	4	3	0.00031	0.00044
4,4-DDD	NS	NS	4	1	0.0011	0.0011
Diphenamid	NS	NS	4	0	ND	ND
2,4-DDE	NS	NS	4	0	ND	ND
2,4-DDT	NS	NS	4	0	ND	ND
4,4-DDE	NS	NS	4	0	ND	ND
Aldrin	3	NS	4	0	ND	ND
Alpha-chlordane	NS	NS	4	0	ND	ND
Alpha-BHC	NS	NS	4	0	ND	ND
Beta-BHC	NS	NS	4	0	ND	ND
Delta-BHC	NS	NS	4	0	ND	ND
Gamma-BHC (Lindane)	0.95	NS	4	0	ND	ND
Dieldrin	0.24	0.056	4	0	ND	ND
Endrin	0.086	0.036	4	0	ND	ND
Endrin ketone	NS	NS	4	0	ND	ND
Heptachlor	0.52	0.0038	4	0	ND	ND
Heptachlor epoxide	0.52	0.0038	4	0	ND	ND
Toxaphene	0.73	0.002	4	0	ND	ND

NS – No standard

The surface water at the quarry was also sampled during EPA's tracer study in 2016 to 2017. Three samples were collected (June 2016, October 2016, and January 2017). Laboratory analysis was for pesticides only. All COC parameters analyzed were non-detect at their respective detection limits for each sample.

BESTER LONG QUARRY SURFACE WATER SAMPLING DATA - EPA TRACER STUDY 2016-2017 SUMMARY STATISTICS						
Central Chemical Site COCs	**MD Fresh Water Acute (µg/L)**	**MD Fresh Water Chronic (µg/L)**	**Number of Sample Results**	**Number of Detections**	**Minimum Concentration Detected (ug/L)**	**Maximum Concentration Detected (ug/L)**
4,4-DDT	1.1	0.001	3	0	ND	ND
4,4-DDD	NS	NS	3	0	ND	ND
4,4-DDE	NS	NS	3	0	ND	ND
Aldrin	3	NS	3	0	ND	ND
Alpha-chlordane	NS	NS	3	0	ND	ND
Alpha-BHC	NS	NS	3	0	ND	ND
Beta-BHC	NS	NS	3	0	ND	ND
Delta-BHC	NS	NS	3	0	ND	ND
Gamma-BHC (Lindane)	0.95	NS	3	0	ND	ND
Dieldrin	0.24	0.056	3	0	ND	ND
Endrin	0.086	0.036	3	0	ND	ND
Endrin ketone	NS	NS	3	0	ND	ND
Heptachlor	0.52	0.0038	3	0	ND	ND
Heptachlor epoxide	0.52	0.0038	3	0	ND	ND
Toxaphene	0.73	0.002	3	0	ND	ND

NS – No standard

5.5.2 Sediment

One sediment sample was collected from each of the two sampling locations. **Table 5-6** summarizes field parameter data collected during the sediment sample collection. **Table 5-8** summarizes analytical data for the sediment samples. **Table 5-9** summarizes various geotechnical data describing the physical character of the sediment. Summary statistics of the analytical results for the COCs sorted by number of detections are presented in the table below.

BESTER LONG QUARRY SEDIMENT DATA 2013 SUMMARY STATISTICS				
Central Chemical Site COCs	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (ug/kg)**	**Maximum Conc. Detected (ug/kg)**
Arsenic	2	2	2.5	3.6
Manganese	2	2	620	660
Thallium	2	2	0.085	0.13
4,4-DDT	2	2	3.9	13
2,4-DDD	2	2	8.8	9.9
2,4-DDE	2	2	2.3	2.5
4,4-DDD	2	2	43	45
4,4-DDE	2	2	32	78
Alpha-chlordane	2	1	2.5	2.5
2,4,5-T	2	0	ND	ND
2,4-D	2	0	ND	ND
Diphenamid	2	0	ND	ND
2,4-DDT	2	0	ND	ND

BESTER LONG QUARRY SEDIMENT DATA 2013 SUMMARY STATISTICS				
Central Chemical Site COCs	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (ug/kg)**	**Maximum Conc. Detected (ug/kg)**
Aldrin	2	0	ND	ND
Alpha-BHC	2	0	ND	ND
Beta-BHC	2	0	ND	ND
Delta-BHC	2	0	ND	ND
Gamma-BHC (Lindane)	2	0	ND	ND
Dieldrin	2	0	ND	ND
Endrin	2	0	ND	ND
Endrin ketone	2	0	ND	ND
Heptachlor	2	0	ND	ND
Heptachlor epoxide	2	0	ND	ND
Toxaphene	2	0	ND	ND

5.6 Other Spring/Surface Water/Sediment Data

Spring water, surface water and sediment were sampled during EPA's tracer study at a number of locations off-Site. Springs that were sampled by EPA included Fountain Head, Hager House, Hager Crossing, Hagerstown City Park, Hagerstown City Park Grotto, Herald Mail, Pangborn Park, Paradise Farms Spring, Rest Haven North, Rest Haven South, Troupe Spring 1, Troupe Spring 2, Saint James Run and Staley Park. Surface water sample locations included Antietam Creek, Antietam Falls, and Hamilton Run. Samples were collected from these locations in June 2016, October 2016, January 2017 and April 2017. Sediment samples were collected from all the above locations in June 2016. Laboratory analysis for all samples was for pesticides. These off-Site spring/surface water/sediment sampling locations are depicted on **Figure 5-4**. The resulting analytical data for springs, surface water and sediment are summarized in **Tables 5-10 and 5-11**. Summary statistics of the analytical results for the COCs sorted by number of detections are presented in the table below.

OTHER OFFSITE SPRING DATA EPA TRACER STUDY 2016-2017 SUMMARY STATISTICS						
Central Chemical Site COCs	**MD Fresh Water Acute (µg/L)**	**MD Fresh Water Chronic (µg/L)**	**Number of Sample Results**	**Number of Detections**	**Minimum Concentration Detected (ug/L)**	**Maximum Concentration Detected (ug/L)**
Dieldrin	0.24	0.056	63	26	0.00028	0.041
4,4-DDT	1.1	0.001	63	1	0.034	0.034
4,4-DDD	NS	NS	63	0	ND	ND
4,4-DDE	NS	NS	63	0	ND	ND
Aldrin	3	NS	63	0	ND	ND
Alpha-chlordane	NS	NS	63	1	0.0039	0.0039
Alpha-BHC	NS	NS	63	0	ND	ND
Beta-BHC	NS	NS	63	0	ND	ND
Delta-BHC	NS	NS	63	0	ND	ND
Gamma-BHC (Lindane)	0.95	NS	63	0	ND	ND

OTHER OFFSITE SPRING DATA EPA TRACER STUDY 2016-2017 SUMMARY STATISTICS						
Central Chemical Site COCs	**MD Fresh Water Acute (µg/L)**	**MD Fresh Water Chronic (µg/L)**	**Number of Sample Results**	**Number of Detections**	**Minimum Concentration Detected (ug/L)**	**Maximum Concentration Detected (ug/L)**
Endrin	0.086	0.036	63	0	ND	ND
Endrin ketone	NS	NS	63	0	ND	ND
Heptachlor	0.52	0.0038	63	0	ND	ND
Heptachlor epoxide	0.52	0.0038	63	1	0.0013	0.0013
Toxaphene	0.73	0.002	63	0	ND	ND

NS – No standard

OTHER OFF-SITE SURFACE WATER DATA EPA TRACER STUDY 2016-2017 SUMMARY STATISTICS				
Central Chemical Site COCs	**Number of Analytical Results**	**Number of Detections**	**Minimum Concentration Detected (µg/L)**	**Maximum Concentration Detected (µg/L)**
Dieldrin	17	6	0.00082	0.012
4,4-DDT	17	0	ND	ND
Alpha-chlordane	17	0	ND	ND
Heptachlor epoxide	17	0	ND	ND
4,4-DDD	17	0	ND	ND
4,4-DDE	17	0	ND	ND
Aldrin	17	0	ND	ND
Alpha-BHC	17	0	ND	ND
Beta-BHC	17	0	ND	ND
Delta-BHC	17	0	ND	ND
Gamma-BHC (Lindane)	17	0	ND	ND
Endrin	17	0	ND	ND
Endrin ketone	17	0	ND	ND
Heptachlor	17	0	ND	ND
Toxaphene	17	0	ND	ND

OTHER OFF-SITE SEDIMENT DATA EPA TRACER STUDY 2016-2017 SUMMARY STATISTICS				
Central Chemical Site COCs	**Number of Sample Results**	**Number of Detections**	**Minimum Concentration Detected (ug/kg)**	**Maximum Concentration Detected (ug/kg)**
4,4-DDT	39	10	0.62	14
Alpha-chlordane	39	7	0.26	2.3
4,4-DDD	39	5	0.49	5.3
4,4-DDE	39	5	1.2	10
Dieldrin	39	2	0.42	5.6
Beta-BHC	39	1	0.12	0.12
Heptachlor epoxide	39	1	0.26	0.26

OTHER OFF-SITE SEDIMENT DATA EPA TRACER STUDY 2016-2017 SUMMARY STATISTICS				
Central Chemical Site COCs	**Number of Sample Results**	**Number of Detections**	**Minimum Concentration Detected (ug/kg)**	**Maximum Concentration Detected (ug/kg)**
Aldrin	39	0	ND	ND
Alpha-BHC	39	0	ND	ND
Delta-BHC	39	0	ND	ND
Gamma-BHC (Lindane)	39	0	ND	ND
Endrin	39	0	ND	ND
Endrin ketone	39	0	ND	ND
Heptachlor	39	0	ND	ND
Toxaphene	39	0	ND	ND

5.7 Groundwater Sampling Results

Comprehensive groundwater sampling events were conducted in April 2014, October 2016, January 2017, April 2017 and July 2017. The later four events are quarterly sampling events. These events included sampling of on-Site and off-Site monitoring wells screened at depths zones ranging from epikarst zone (<100 feet bgs) to bedrock (>100 feet bgs). The later four events included monitoring wells screened at depths up to 600 feet bgs and the last two events included the well at FHCC. Monitoring well locations are shown on **Figure 2-7**, and well construction details are provided in **Table 2-2**.

5.7.1 April 2014 Sampling Event

The April 2014 groundwater sampling event collected samples from 19 on-Site and 18 off-Site monitoring wells. The groundwater sampling was conducted between April 21 and April 30, 2014. Prior to sampling any wells, a round of synoptic groundwater elevation measurements was completed at each well. The groundwater elevation data from this event are summarized in **Table 4-1**. The monitoring wells were purged prior to sampling and water quality measurements were collected. The pH of the groundwater in the monitoring wells ranged from 6.24 to 7.66, with the exception of MW-G-35 in which the pH was 4.19. The water quality data for each well at the time of stabilization are summarized in **Table 5-12**. The groundwater samples were submitted for laboratory analysis, and analytical results are summarized in **Table 5-13**.

Summary statistics of the analytical results for the COCs in on-Site wells sorted by number of detections exceeding the respective RSLs are presented in the table below.

APRIL 2014 GROUNDWATER SAMPLING EVENT ON-SITE MONITORING WELL GROUNDWATER DATA SUMMARY STATISTICS						
Central Chemical Site COCs	**EPA RSL**	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (µg/L)**	**Maximum Conc. Detected (µg/L)**	**Number of Detections > RSL**
Alpha-BHC	0.0072	19	18	0.013	17	18
Beta-BHC	0.025	19	19	0.0013	15	18
Arsenic	0.052	19	17	0.31	9.5	17
Aldrin	0.00092	19	17	0.0021	0.17	17
Delta-BHC	0.025	19	18	0.018	65	17
Benzene	0.46	19	13	0.47	68	13
Manganese	430	19	17	10	8,600	13

APRIL 2014 GROUNDWATER SAMPLING EVENT ON-SITE MONITORING WELL GROUNDWATER DATA SUMMARY STATISTICS						
Central Chemical Site COCs	**EPA RSL**	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (µg/L)**	**Maximum Conc. Detected (µg/L)**	**Number of Detections > RSL**
1,4-Dichlorobenzene	0.48	19	15	0.33	150	12
Dieldrin	0.0018	19	11	0.0058	0.96	11
Heptachlor epoxide	0.0014	19	11	0.014	0.3	11
2,4-DDE	0.046	19	18	0.0016	0.76	10
Chloroform	0.22	19	7	0.36	35	7
Chlorobenzene	78	19	15	1.1	910	7
Iron	14000	19	19	16	62,000	7
1,2,4-Trichlorobenzene	1.2	19	9	0.54	14	5
4,4-DDD	0.032	19	10	0.0043	0.21	5
Gamma-BHC (Lindane)	0.042	19	10	0.0028	10	5
Pentachlorophenol	0.041	19	4	0.2	290	4
Alpha-chlordane	0.02	19	11	0.0031	0.2	4
2,4-DDD	0.032	19	4	0.013	0.13	3
4,4-DDE	0.046	19	10	0.0034	0.091	2
Heptachlor	0.0014	19	2	0.14	0.15	2
1,2-Dichloroethane	0.17	19	1	0.49	0.49	1
2,4,6-Trichlorophenol	4.1	19	3	0.68	22	1
Aluminum	20000	19	17	7.2	220,000	1
Beryllium	25	19	11	0.091	40	1
Thallium	0.2	19	5	0.02	1	1
Tetrachloroethylene	11	19	0	ND	ND	0
Bis(2-ethylhexyl)phthalate	5.6	19	1	2.8	2.8	0
2,4-Dichlorophenol	46	19	11	0.23	4.9	0
Atrazine	0.3	19	0	ND	ND	0
Vanadium	86	19	17	0.31	32	0
Zinc	6000	19	16	1.4	970	0
2,4,5-T	160	19	5	0.14	0.67	0
2,4-D	170	19	6	0.45	6.1	0
Diphenamid	530	19	14	0.66	480	0
4,4-DDT	0.23	19	12	0.0025	0.19	0
2,4-DDT	0.23	19	9	0.00034	0.032	0
Endrin	2.3	19	8	0.0096	0.086	0
Endrin ketone	---	19	10	0.0026	0.23	---
Toxaphene	0.071	19	0	ND	ND	0

Summary statistics of the analytical results for the COCs in off-Site wells sorted by number of detections exceeding the respective RSLs are presented in the table below.

APRIL 2014 GROUNDWATER SAMPLING EVENT OFF-SITE MONITORING WELL GROUNDWATER DATA SUMMARY STATISTICS						
Central Chemical Site COCs	**EPA RSL**	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (µg/L)**	**Maximum Conc. Detected (µg/L)**	**Number of Detections > RSL**
Chloroform	0.22	18	11	0.18	6	10
Beta-BHC	0.025	18	11	0.0091	2.2	10
Alpha-BHC	0.0072	18	8	0.013	0.92	8
Delta-BHC	0.025	18	12	0.00049	3.8	8
Arsenic	0.052	18	7	0.3	14	7

APRIL 2014 GROUNDWATER SAMPLING EVENT OFF-SITE MONITORING WELL GROUNDWATER DATA SUMMARY STATISTICS						
Central Chemical Site COCs	**EPA RSL**	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (µg/L)**	**Maximum Conc. Detected (µg/L)**	**Number of Detections > RSL**
Aldrin	0.00092	18	6	0.012	0.09	6
Heptachlor epoxide	0.0014	18	6	0.0018	0.029	6
Dieldrin	0.0018	18	4	0.0023	0.11	4
1,2-Dichloroethane	0.17	18	3	0.48	0.92	3
Atrazine	0.3	18	3	1.1	2.5	3
Iron	14000	18	16	6.5	38000	3
Thallium	0.2	18	5	0.042	0.42	3
Gamma-BHC (Lindane)	0.042	18	5	0.0065	0.98	3
Heptachlor	0.0014	18	3	0.1	0.12	3
1,4-Dichlorobenzene	0.48	18	3	0.24	4.2	2
2,4-DDE	0.046	18	14	0.00024	0.14	2
Alpha-chlordane	0.02	18	5	0.0036	0.025	2
Chlorobenzene	78	18	3	0.18	80	1
Pentachlorophenol	0.041	18	1	0.61	0.61	1
Aluminum	20000	18	18	14	30000	1
Manganese	430	18	11	5.4	3100	1
4,4-DDT	0.23	18	10	0.001	0.26	1
4,4-DDD	0.032	18	11	0.0021	0.056	1
Endrin ketone	---	18	6	0.0013	0.067	----
Benzene	0.46	18	0	ND	ND	0
Tetrachloroethylene	11	18	3	0.24	2.8	0
1,2,4-Trichlorobenzene	1.2	18	0	ND	ND	0
Bis(2-ethylhexyl)phthalate	5.6	18	2	1.9	4.9	0
2,4-Dichlorophenol	46	18	1	0.12	0.12	0
2,4,6-Trichlorophenol	4.1	18	0	ND	ND	0
Beryllium	25	18	6	0.058	2.7	0
Vanadium	86	18	8	0.29	14	0
Zinc	6000	18	14	2	310	0
2,4,5-T	160	18	1	0.2	0.2	0
2,4-D	170	18	0	ND	ND	0
Diphenamid	530	18	5	1.8	24	0
2,4-DDD	0.032	18	7	0.00053	0.017	0
2,4-DDT	0.23	18	9	0.00097	0.028	0
4,4-DDE	0.046	18	5	0.0024	0.034	0
Endrin	2.3	18	4	0.0015	0.038	0
Toxaphene	0.071	18	0	ND	ND	0

5.7.2 October 2016 (Q1 2016) Sampling Event

The October 2016 groundwater sampling event was the first of four quarterly events. Samples were collected from 27 on-Site and 24 off-Site monitoring wells. The groundwater sampling was conducted between October 24 and November 11, 2016. Prior to sampling any wells, a round of synoptic groundwater elevation measurements was collected in each well. The groundwater elevation data from this event are summarized in **Table 4-2**. The monitoring wells were purged prior to sampling and water quality measurements were collected. The pH of the groundwater in the monitoring wells ranged from 6.29 to 8.60, with the exception of MW-G-35 in which the pH was 4.13. The water quality data for each well at the time of stabilization are summarized in **Table 5-14**. The groundwater samples were submitted for laboratory analysis, and analytical results are summarized in **Table 5-15**.

Summary statistics of the analytical results for the COCs in on-Site wells sorted by number of detections exceeding the respective RSLs are presented in the table below.

Q1 2016 GROUNDWATER SAMPLING EVENT ON-SITE MONITORING WELL GROUNDWATER DATA SUMMARY STATISTICS						
Central Chemical Site COCs	**EPA RSL**	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (µg/L)**	**Maximum Conc. Detected (µg/L)**	**Number of Detections > RSL**
Beta-BHC	0.025	28	28	0.06	7.5	28
Alpha-BHC	0.0072	28	25	0.0035	9.4	25
Delta-BHC	0.025	28	27	0.0031	72	24
Arsenic	0.052	28	19	0.14	22	19
1,4-Dichlorobenzene	0.48	28	18	0.55	100	18
Manganese	430	28	21	15	7400	16
Dieldrin	0.0018	28	15	0.001	0.98	13
Benzene	0.46	28	12	0.35	75	11
Chloroform	0.22	28	12	0.35	1	12
1,2-Dichloroethane	0.17	28	10	0.34	6.6	10
Iron	14000	28	23	17	67000	10
2,4-DDE	0.046	28	12	0.017	1.2	9
Chlorobenzene	78	28	20	0.25	1000	7
Gamma-BHC (Lindane)	0.042	28	12	0.002	3	6
Pentachlorophenol	0.041	28	5	0.15	210	5
Atrazine	0.3	28	8	0.13	1.7	5
1,2,4-Trichlorobenzene	1.2	28	6	0.52	6.4	4
4,4-DDD	0.032	28	7	0.001	0.15	4
Aldrin	0.00092	28	4	0.012	0.088	4
Thallium	0.2	28	6	0.075	1.7	3
2,4-DDD	0.032	28	5	0.004	0.33	2
2,4,6-Trichlorophenol	4.1	28	3	0.18	16	1
Aluminum	20000	28	13	8.4	180000	1
Beryllium	25	28	7	0.1	51	1
Diphenamid	530	28	19	0.43	890	1
Alpha-chlordane	0.02	28	1	0.037	0.037	1
Heptachlor	0.0014	28	1	0.13	0.13	1
Heptachlor epoxide	0.0014	28	1	0.0021	0.0021	1
Endrin ketone	---	28	9	0.0012	0.83	---
Tetrachloroethylene	11	28	0	ND	ND	0
Bis(2-ethylhexyl)phthalate	5.6	28	8	1.2	2.7	0
2,4-Dichlorophenol	46	28	10	0.086	3	0
Vanadium	86	28	8	0.34	8.7	0
Zinc	6000	28	22	2.7	1600	0
2,4,5-T	160	28	0	ND	ND	0
2,4-D	170	28	2	0.47	1.3	0
4,4-DDT	0.23	28	5	0.0016	0.014	0
2,4-DDT	0.23	28	1	0.01	0.01	0
4,4-DDE	0.046	28	2	0.0027	0.024	0
Endrin	2.3	28	3	0.0014	0.17	0
Toxaphene	0.071	28	0	ND	ND	0

Summary statistics of the analytical results for the COCs in off-Site wells sorted by number of detections exceeding the respective RSLs are presented in the table below.

Q1 2016 GROUNDWATER SAMPLING EVENT OFF-SITE MONITORING WELL GROUNDWATER DATA SUMMARY STATISTICS						
Central Chemical Site COCs	**EPA RSL**	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (µg/L)**	**Maximum Conc. Detected (µg/L)**	**Number of Detections > RSL**
Arsenic	0.052	26	16	0.12	7.8	16
Beta-BHC	0.025	26	18	0.00062	3	14
Alpha-BHC	0.0072	26	15	0.0049	2.1	13
Chloroform	0.22	26	12	0.32	4.2	12
Delta-BHC	0.025	26	15	0.0028	5.5	11
Aldrin	0.00092	26	5	0.0085	0.025	5
Dieldrin	0.0018	26	7	0.0015	0.093	5
1,2-Dichloroethane	0.17	26	4	0.47	8.4	4
1,4-Dichlorobenzene	0.48	26	3	2.6	15	3
Thallium	0.2	26	7	0.05	0.46	3
Gamma-BHC (Lindane)	0.042	26	9	0.0019	0.86	3
Pentachlorophenol	0.041	26	2	0.27	2	2
Atrazine	0.3	26	3	0.22	0.9	2
Iron	14000	26	17	8.6	23000	2
Manganese	430	26	18	6.6	3700	2
Chlorobenzene	78	26	4	0.2	210	1
Aluminum	20000	26	21	9	21000	1
Heptachlor	0.0014	26	1	0.16	0.16	1
Heptachlor epoxide	0.0014	26	2	0.00069	0.0019	1
Benzene	0.46	26	0	ND	ND	0
Tetrachloroethylene	11	26	2	0.36	1.8	0
1,2,4-Trichlorobenzene	1.2	26	1	0.49	0.49	0
Bis(2-ethylhexyl)phthalate	5.6	26	9	1.2	3.3	0
2,4-Dichlorophenol	46	26	1	0.16	0.16	0
2,4,6-Trichlorophenol	4.1	26	0	ND	ND	0
Beryllium	25	26	5	0.1	4.6	0
Vanadium	86	26	16	0.31	30	0
Zinc	6000	26	19	2.8	110	0
2,4,5-T	160	26	0	ND	ND	0
2,4-D	170	26	1	2.1	2.1	0
Diphenamid	530	26	6	0.22	35	0
4,4-DDT	0.23	26	10	0.00047	0.027	0
2,4-DDD	0.032	26	1	0.013	0.013	0
2,4-DDE	0.046	26	10	0.00082	0.035	0
2,4-DDT	0.23	26	3	0.00068	0.0053	0
4,4-DDD	0.032	26	3	0.00067	0.0088	0
4,4-DDE	0.046	26	3	0.00084	0.0043	0
Alpha-chlordane	0.02	26	2	0.00058	0.0023	0
Endrin	2.3	26	2	0.0085	0.042	0
Endrin ketone	---	26	7	0.001	0.11	0
Toxaphene	0.071	26	0	ND	ND	0

5.7.3 January 2017 (Q2 2017) Sampling Event

The January 2017 groundwater sampling event was the second of four quarterly events. Samples were collected from 27 on-Site and 23 off-Site monitoring wells (off-Site well OW-1-62 was not sampled due to low water levels insufficient for analysis). The groundwater sampling was conducted between January 23 and February 8, 2017. Prior to sampling any wells, a round

of synoptic groundwater elevation measurements was collected in each well. The groundwater elevation data from this event are summarized in **Table 4-3**. The monitoring wells were purged prior to sampling and water quality measurements were collected. The pH of the groundwater in the monitoring wells ranged from 6.31 to 7.27, with the exception of MW-G-35 in which the pH was 4.29. The water quality data for each well at the time of stabilization are summarized in **Table 5-16**. The groundwater samples were submitted for laboratory analysis, and analytical results are summarized in **Table 5-17**.

Summary statistics of the analytical results for the COCs in on-Site wells sorted by number of detections exceeding the respective RSLs are presented in the table below.

Q2 2017 GROUNDATER SAMPLING EVENT
ON-SITE MONITORING WELL GROUNDWATER DATA
SUMMARY STATISTICS

Central Chemical Site COCs	EPA RSL	Number of Sample Results	Number of Detections	Minimum Conc. Detected (µg/L)	Maximum Conc. Detected (µg/L)	Number of Detections > RSL
Beta-BHC	0.025	28	27	0.07	44	27
Alpha-BHC	0.0072	28	26	0.01	6	26
Delta-BHC	0.025	28	28	0.0068	27	25
Arsenic	0.052	28	19	0.25	14	19
1,4-Dichlorobenzene	0.48	28	21	0.33	48	17
Manganese	430	28	24	9.6	6,800	16
Benzene	0.46	28	14	0.58	52	14
Chloroform	0.22	28	15	0.31	28	13
1,2-Dichloroethane	0.17	28	11	0.25	4.7	11
2,4-DDE	0.046	28	21	0.0042	4.4	11
Dieldrin	0.0018	28	11	0.0029	1.1	11
Gamma-BHC (Lindane)	0.042	28	15	0.0043	6.2	8
Thallium	0.2	28	11	0.059	1.3	7
Pentachlorophenol	0.041	28	6	0.62	210	6
Aldrin	0.00092	28	6	0.021	0.19	6
Atrazine	0.3	28	6	0.15	2	5
Chlorobenzene	78	28	20	1.2	570	4
1,2,4-Trichlorobenzene	1.2	28	8	0.51	3.4	4
4,4-DDD	0.032	28	7	0.004	0.39	3
2,4,6-Trichlorophenol	4.1	28	2	0.49	21	1
Aluminum	20000	28	14	20	100,000	1
2,4-DDD	0.032	28	4	0.0012	0.25	1
Alpha-chlordane	0.02	28	1	0.051	0.051	1
Heptachlor epoxide	0.0014	28	1	0.003	0.003	1
Iron	14000	28	23	21	44,000	1
Endrin ketone	---	28	10	0.00089	3.5	---
Tetrachloroethylene	11	28	0	ND	ND	0
Bis(2-ethylhexyl)phthalate	5.6	28	1	1.3	1.3	0
2,4-Dichlorophenol	46	28	7	0.12	3	0
Beryllium	25	28	7	0.14	16	0
Vanadium	86	28	11	0.58	8.1	0
Zinc	6000	24	17	3.9	660	0
2,4,5-T	160	28	0	ND	ND	0
2,4-D	170	28	4	0.61	3.4	0
Diphenamid	530	28	20	0.3	320	0
4,4-DDT	0.23	28	5	0.0017	0.014	0
2,4-DDT	0.23	28	1	0.0055	0.0055	0
4,4-DDE	0.046	28	2	0.0036	0.0059	0
Endrin	2.3	28	3	0.0015	0.26	0

Q2 2017 GROUNDATER SAMPLING EVENT ON-SITE MONITORING WELL GROUNDWATER DATA SUMMARY STATISTICS						
Central Chemical Site COCs	**EPA RSL**	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (µg/L)**	**Maximum Conc. Detected (µg/L)**	**Number of Detections > RSL**
Heptachlor	0.0014	28	0	ND	ND	0
Toxaphene	0.071	28	0	ND	ND	0

Summary statistics of the analytical results for the COCs in off-Site wells sorted by number of detections exceeding the respective RSLs are presented in the table below.

Q2 2017 GROUNDATER SAMPLING EVENT OFF-SITE MONITORING WELL GROUNDWATER DATA SUMMARY STATISTICS						
Central Chemical Site COCs	**EPA RSL**	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (µg/L)**	**Maximum Conc. Detected (µg/L)**	**Number of Detections > RSL**
Beta-BHC	0.025	25	19	0.00085	3.4	13
Chloroform	0.22	25	12	0.29	3.7	12
Alpha-BHC	0.0072	25	17	0.00077	4.2	12
Arsenic	0.052	25	11	0.23	4.2	11
Delta-BHC	0.025	25	16	0.0021	7.5	10
1,4-Dichlorobenzene	0.48	25	5	0.28	9.2	4
Atrazine	0.3	25	4	0.65	1.2	4
Gamma-BHC (Lindane)	0.042	25	11	0.001	5.7	4
1,2-Dichloroethane	0.17	25	4	0.51	7	4
Dieldrin	0.0018	25	9	0.00083	0.16	3
Iron	14000	25	15	23	17,000	3
Pentachlorophenol	0.041	25	2	2.5	3	2
Manganese	430	25	17	1.6	3,300	2
Thallium	0.2	25	7	0.062	0.5	2
2,4-DDE	0.046	25	14	0.00086	0.11	2
Heptachlor	0.0014	25	3	0.00075	0.14	2
Chlorobenzene	78	25	5	0.22	120	1
Aldrin	0.00092	25	1	0.039	0.039	1
Benzene	0.46	25	1	0.24	0	0
Tetrachloroethylene	11	25	2	0.31	1.5	0
1,2,4-Trichlorobenzene	1.2	25	0	ND	ND	0
Bis(2-ethylhexyl)phthalate	5.6	25	0	ND	ND	0
2,4-Dichlorophenol	46	25	0	ND	ND	0
2,4,6-Trichlorophenol	4.1	25	0	ND	ND	0
Aluminum	20000	25	17	16	1,200	0
Beryllium	25	25	1	0.7	0.7	0
Vanadium	86	25	16	0.51	1.1	0
Zinc	6000	25	14	3.2	74	0
2,4,5-T	160	25	0	ND	ND	0
2,4-D	170	25	0	ND	ND	0
Diphenamid	530	25	6	2.5	33	0
4,4-DDT	0.23	25	6	0.00034	0.12	0
2,4-DDD	0.032	25	1	0.0072	0.0072	0
2,4-DDT	0.23	25	2	0.002	0.0088	0

Q2 2017 GROUNDATER SAMPLING EVENT OFF-SITE MONITORING WELL GROUNDWATER DATA SUMMARY STATISTICS						
Central Chemical Site COCs	**EPA RSL**	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (µg/L)**	**Maximum Conc. Detected (µg/L)**	**Number of Detections > RSL**
4,4-DDD	0.032	25	5	0.00066	0.0033	0
4,4-DDE	0.046	25	1	0.0014	0.0014	0
Alpha-chlordane	0.02	25	0	ND	ND	0
Endrin	2.3	25	1	0.0096	0.0096	0
Endrin ketone	---	25	5	0.0011	0.11	---
Heptachlor epoxide	0.0014	25	2	0.0007	0.001	0
Toxaphene	0.071	25	0	ND	ND	0

5.7.4 April 2017 (Q3 2017) Sampling Event

The April 2017 groundwater sampling event was the third of four quarterly events. Samples were collected from 27 on-Site and 25 off-Site wells (including OW-1-62 and the FHCC well). The groundwater sampling was conducted between April 24 and May 10, 2017. Prior to sampling any wells, a round of synoptic groundwater elevation measurements was collected in each well. The groundwater elevation data from this event are summarized in **Table 4-4**. The monitoring wells were purged prior to sampling and water quality measurements were collected. The pH of the groundwater in the monitoring wells ranged from 6.45 to 7.65, with the exception of MW-G-35 in which the pH was 4.23. The water quality data for each well at the time of stabilization are summarized in **Table 5-18**. The groundwater samples were submitted for laboratory analysis, and analytical results are summarized in **Table 5-19**.

Summary statistics of the analytical results for the COCs in on-Site wells sorted by number of detections exceeding the respective RSLs are presented in the table below.

Q3 2017 GROUNDWATER SAMPLING EVENT ON-SITE MONITORING WELL GROUNDWATER DATA SUMMARY STATISTICS						
Central Chemical Site COCs	**EPA RSL**	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (µg/L)**	**Maximum Conc. Detected (µg/L)**	**Number of Detections > RSL**
Arsenic	0.052	28	28	0.29	8.8	28
Beta-BHC	0.025	28	27	0.0036	24	26
Delta-BHC	0.025	28	27	0.0049	38	25
Alpha-BHC	0.0072	28	24	0.016	6.8	24
1,4-Dichlorobenzene	0.48	28	18	0.24	68	15
Manganese	430	28	26	1.4	6400	14
Chloroform	0.22	28	12	0.29	19	12
Aldrin	0.00092	28	11	0.0015	0.066	11
Dieldrin	0.0018	28	11	0.0014	0.63	10
Benzene	0.46	28	17	0.19	43	9
2,4-DDE	0.046	28	17	0.0045	2.6	9
Gamma-BHC (Lindane)	0.042	28	15	0.0056	8.2	9
1,2-Dichloroethane	0.17	28	8	0.3	5.2	8
Chlorobenzene	78	28	19	0.35	520	5
Pentachlorophenol	0.041	28	6	0.077	160	6
Atrazine	0.3	28	7	0.086	2	5

Q3 2017 GROUNDWATER SAMPLING EVENT ON-SITE MONITORING WELL GROUNDWATER DATA SUMMARY STATISTICS						
Central Chemical Site COCs	**EPA RSL**	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (µg/L)**	**Maximum Conc. Detected (µg/L)**	**Number of Detections > RSL**
Thallium	0.2	28	13	0.056	1.4	5
Iron	14000	28	20	52	36000	4
2,4-DDD	0.032	28	4	0.110	0.47	4
Alpha-chlordane	0.02	28	3	0.04	0.059	3
1,2,4-Trichlorobenzene	1.2	28	6	0.5	1.6	2
2,4,6-Trichlorophenol	4.1	28	2	0.19	17	1
Aluminum	20000	28	13	14	98000	1
4,4-DDD	0.032	28	4	0.00072	0.12	1
Endrin ketone	---	28	7	0.0018	2.1	---
Tetrachloroethylene	11	28	0	ND	ND	0
Bis(2-ethylhexyl)phthalate	5.6	28	2	2.8	3.6	0
2,4-Dichlorophenol	46	28	3	0.21	2.9	0
Beryllium	25	28	8	0.16	19	0
Vanadium	86	28	15	0.52	7.4	0
Zinc	6000	28	14	2.7	260	0
2,4,5-T	160	28	0	ND	ND	0
2,4-D	170	28	0	ND	ND	0
Diphenamid	530	28	20	0.22	280	0
4,4-DDT	0.23	28	7	0.001	0.022	0
2,4-DDT	0.23	28	1	0.0017	0.0017	0
4,4-DDE	0.046	28	1	0.038	0.038	0
Endrin	2.3	28	2	0.0069	0.34	0
Heptachlor	0.0014	28	0	ND	ND	0
Heptachlor epoxide	0.0014	28	1	0.0014	0.0014	0
Toxaphene	0.071	28	0	ND	ND	0

Summary statistics of the analytical results for the COCs in off-Site wells sorted by number of detections exceeding the respective RSLs are presented in the table below.

Q3 2017 GROUNDATER SAMPLING EVENT OFF-SITE MONITORING WELL GROUNDWATER DATA SUMMARY STATISTICS						
Central Chemical Site COCs	**EPA RSL**	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (µg/L)**	**Maximum Conc. Detected (µg/L)**	**Number of Detections > RSL**
Arsenic	0.052	27	24	0.25	3.7	24
Chloroform	0.22	27	14	0.27	4	14
Beta-BHC	0.025	27	17	0.001	2.8	12
Alpha-BHC	0.0072	27	15	0.0038	3.0	11
Delta-BHC	0.025	27	17	0.001	3.6	11
Dieldrin	0.0018	27	9	0.0015	0.13	7
1,2-Dichloroethane	0.17	27	6	0.34	8.0	6
Gamma-BHC (Lindane)	0.042	27	12	0.0015	1.2	4
1,4-Dichlorobenzene	0.48	27	4	3.1	10.0	4
Atrazine	0.3	27	5	0.27	1.4	4
Aldrin	0.00092	27	5	0.00052	0.071	4
Thallium	0.2	27	10	0.068	0.38	2

Q3 2017 GROUNDATER SAMPLING EVENT OFF-SITE MONITORING WELL GROUNDWATER DATA SUMMARY STATISTICS						
Central Chemical Site COCs	**EPA RSL**	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (µg/L)**	**Maximum Conc. Detected (µg/L)**	**Number of Detections > RSL**
2,4-DDE	0.046	27	11	0.0016	0.10	3
Heptachlor epoxide	0.0014	27	4	0.00094	0.0052	3
Iron	14000	27	20	39	17,000	1
Chlorobenzene	78	27	4	48	110	1
Pentachlorophenol	0.041	27	2	2.6	3.2	2
Manganese	430	27	20	1.6	3,400	1
Heptachlor	0.0014	27	1	0.065	0.065	1
Benzene	0.46	27	3	0.26	0.34	0
Tetrachloroethylene	11	27	1	1.2	1.2	0
1,2,4-Trichlorobenzene	1.2	27	0	ND	ND	0
Bis(2-ethylhexyl)phthalate	5.6	27	1	1.2	1.2	0
2,4-Dichlorophenol	46	27	1	0.041	0.041	0
2,4,6-Trichlorophenol	4.1	27	0	ND	ND	0
Aluminum	20000	27	18	16	780	0
Beryllium	25	27	2	0.15	0.67	0
Vanadium	86	27	23	0.55	3.4	0
Zinc	6000	27	17	2.7	75	0
2,4,5-T	160	27	0	ND	ND	0
2,4-D	170	27	0	ND	ND	0
Diphenamid	530	27	5	1.0	23	0
4,4-DDT	0.23	27	11	0.00036	0.052	0
2,4-DDD	0.032	27	0	ND	ND	0
2,4-DDT	0.23	27	1	0.0069	0.0069	0
4,4-DDD	0.032	27	3	0.00077	0.0089	0
4,4-DDE	0.046	27	0	ND	ND	0
Alpha-chlordane	0.02	27	3	0.00092	0.0024	0
Endrin	2.3	27	1	0.033	0.033	0
Endrin ketone	---	27	5	0.00099	0.086	---
Toxaphene	0.071	27	0	ND	ND	0

5.7.5 July 2017 (Q4 2017) Sampling Event

The July 2017 groundwater sampling event was the final of four quarterly events. Samples were collected from 27 on-Site and 25 off-Site wells (including OW-1-62 and the FHCC well). The groundwater sampling was conducted between July 31 and August 18, 2017. Prior to sampling any wells, a round of synoptic groundwater elevation measurements was collected in each well. The groundwater elevation data from this event are summarized in **Table 4-5**. The monitoring wells were purged prior to sampling and water quality measurements were collected. The pH of the groundwater in the monitoring wells ranged from 6.38 to 7.71, with the exception of MW-G-35 in which the pH was 4.28. The water quality data for each well at the time of stabilization are summarized in **Table 5-20**. The groundwater samples were submitted for laboratory analysis, and analytical results are summarized in **Table 5-21**.

Summary statistics of the analytical results for the COCs in on-Site wells sorted by number of detections exceeding the respective RSLs are presented in the table below.

Q4 2017 GROUNDATER SAMPLING EVENT ON-SITE MONITORING WELL GROUNDWATER DATA SUMMARY STATISTICS						
Central Chemical Site COCs	**EPA RSL**	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (µg/L)**	**Maximum Conc. Detected (µg/L)**	**Number of Detections > RSL**
Arsenic	0.052	28	27	0.22	11	28
Beta-BHC	0.025	28	28	0.035	30	28
Alpha-BHC	0.0072	28	25	0.0029	6	24
Delta-BHC	0.025	28	27	0.0028	13	23
Chloroform	0.22	28	16	0.33	93	16
1,4-Dichlorobenzene	0.48	28	16	0.27	60	12
Manganese	430	28	25	1.6	6800	13
2,4-DDE	0.046	28	22	0.0037	2.8	13
Benzene	0.46	28	9	0.74	50	9
1,2-Dichloroethane	0.17	28	8	0.34	5.2	8
Dieldrin	0.0018	28	14	0.00077	1.2	11
Gamma-BHC (Lindane)	0.042	28	12	0.003	6	6
1,2,4-Trichlorobenzene	1.2	28	8	0.59	5.7	5
Bis(2-ethylhexyl)phthalate	5.6	28	18	1.9	34	5
Atrazine	0.3	28	5	0.51	3.9	5
Iron	14000	28	22	23	29000	5
Chlorobenzene	78	28	20	0.17	660	4
Thallium	0.2	28	13	0.054	1.5	4
Heptachlor epoxide	0.0014	28	4	0.0022	0.13	4
Pentachlorophenol	0.041	28	3	3.2	150	3
4,4-DDD	0.032	28	5	0.0019	0.42	3
2,4,6-Trichlorophenol	4.1	28	3	0.15	24	1
Aluminum	20000	28	13	19	140000	1
Beryllium	25	28	8	0.13	28	1
2,4-DDD	0.032	28	2	0.005	0.25	1
Endrin ketone	---	28	9	0.00088	1.6	---
Tetrachloroethylene	11	28	0	ND	ND	0
2,4-Dichlorophenol	46	28	4	0.36	3.7	0
Vanadium	86	28	28	0.61	7.6	0
Zinc	6000	28	23	2.8	920	0
2,4,5-T	160	28	0	ND	ND	0
2,4-D	170	28	0	ND	ND	0
Diphenamid	530	28	13	1.8	260	0
4,4-DDT	0.23	28	7	0.00073	0.095	0
2,4-DDT	0.23	28	1	0.0039	0.0039	0
4,4-DDE	0.046	28	2	0.0021	0.027	0
Aldrin	0.00092	28	0	ND	ND	0
Alpha-chlordane	0.02	28	0	ND	ND	0
Endrin	2.3	28	3	0.00067	0.46	0
Heptachlor	0.0014	28	0	ND	ND	0
Toxaphene	0.071	28	0	ND	ND	0

Summary statistics of the analytical results for the COCs in off-Site wells sorted by number of detections exceeding the respective RSLs are presented in the table below.

Q4 2017 GROUNDATER SAMPLING EVENT OFF-SITE MONITORING WELL GROUNDWATER DATA SUMMARY STATISTICS						
Central Chemical Site COCs	**EPA RSL**	**Number of Sample Results**	**Number of Detections**	**Minimum Conc. Detected (µg/L)**	**Maximum Conc. Detected (µg/L)**	**Number of Detections > RSL**
Arsenic	0.052	27	24	0.22	3.5	24
Beta-BHC	0.025	27	16	0.011	3	14
Alpha-BHC	0.0072	27	16	0.0014	2.3	13
Chloroform	0.22	27	13	0.36	3.9	13
Delta-BHC	0.025	27	22	0.00083	3.6	11
Dieldrin	0.0018	27	14	0.00088	0.18	10
Bis(2-ethylhexyl)phthalate	5.6	27	16	2.5	18	6
1,2-Dichloroethane	0.17	27	5	0.34	8.2	5
Atrazine	0.3	27	4	0.4	2.2	4
2,4-DDE	0.046	27	17	0.0004	0.18	4
Heptachlor epoxide	0.0014	27	7	0.00064	0.021	4
1,4-Dichlorobenzene	0.48	27	3	2.9	8.3	3
Gamma-BHC (Lindane)	0.042	27	12	0.00091	0.87	3
Thallium	0.2	27	7	0.06	0.41	2
Pentachlorophenol	0.041	27	1	3.2	3.2	1
Iron	14000	27	14	20	16000	1
Manganese	430	27	13	2.8	3200	1
4,4-DDD	0.032	27	7	0.0007	0.051	1
Alpha-chlordane	0.02	27	1	0.027	0.027	1
Endrin ketone	---	27	7	0.0022	0.11	---
Benzene	0.46	27	1	0.23	0.23	0
Chlorobenzene	78	27	5	0.18	59	0
Tetrachloroethylene	11	27	0	ND	ND	0
1,2,4-Trichlorobenzene	1.2	27	1	0.51	0.51	0
2,4-Dichlorophenol	46	27	1	0.08	0.08	0
2,4,6-Trichlorophenol	4.1	27	0	ND	ND	0
Aluminum	20000	27	13	14	580	0
Beryllium	25	27	1	0.65	0.65	0
Vanadium	86	27	27	0.71	1.7	0
Zinc	6000	27	21	3.1	52	0
2,4,5-T	160	27	0	ND	ND	0
2,4-D	170	27	0	ND	ND	0
Diphenamid	530	27	6	0.67	26	0
4,4-DDT	0.23	27	10	0.0004	0.022	0
2,4-DDD	0.032	27	1	0.0021	0.0021	0
2,4-DDT	0.23	27	0	ND	ND	0
4,4-DDE	0.046	27	1	0.0029	0.0029	0
Aldrin	0.00092	27	0	ND	ND	0
Endrin	2.3	27	4	0.00089	0.062	0
Heptachlor	0.0014	27	0	ND	ND	0
Toxaphene	0.071	27	0	ND	ND	0

5.8 Groundwater Flow Direction

Groundwater elevation maps constructed from the data collected during the four quarterly monitoring events (**Tables 4-2 to 4-5)** are provided as **Figures 4-14 to 4-21**.

The quarterly groundwater elevation measurements show a persistent shallow (<100 feet bgs) groundwater mound centered beneath the western portion of the Site. This mound is depicted in **Figures 4-14 to 4-17** by groundwater contours constructed from quarterly data collected from shallow (<100 feet bgs) monitoring wells and is consistent with historical groundwater elevation interpretations. The mound's morphology is generally consistently elongate, with the long axis oriented parallel to both the bedrock strike and structure that has been mapped beneath the Site. Groundwater flow occurs in all directions away from the mound, although flow toward the west-northwest appears to be impeded (but not halted) by the regional fold axis just northwest of the Site as indicated by much steeper horizontal gradients in that direction for all four quarterly monitoring events.

Maps of groundwater elevation data for the deeper bedrock aquifer (>100 feet bgs) are less coherent due to the complex folding and thrust faults that have been identified beneath the Site (**Figures 4-18 to 4-21**). Monitoring wells screened in similar depth intervals exhibit dramatically different head levels suggesting screened intervals monitoring different bedding intervals in the dipping structure and a paucity of interconnected secondary or tertiary porosity over significant lateral distances. Consequently, there is little basis within the current data set to construct water level contours or grouping well screen in 100-foot depth intervals for that purpose as has been done by prior RI investigators. Notably however, there is a consistent trend in hydraulic head levels being generally higher toward the northwest of the Site and lower southeast of the Site. Thus, groundwater flow in the bedrock at depth is driven by a hydraulic head differential from the northwest toward the southeast. That flow direction correlates to the regional flow toward local surface water discharge boundaries and is consistent with the regional groundwater flow direction identified by the Maryland Geological Survey (MGS, 2001).

5.9 Distribution of Constituents of Concern

The COCs at the Site are primarily pesticide compounds. However, as surrogates representative of general COC distribution, a VOC (benzene), a SVOC (pentachlorophenol), a metal (arsenic), and three pesticides (dieldrin, BHCs, DDx) commonly detected at elevated concentration in monitoring wells on the Site were selected. The shallow and deep groundwater concentration data for these parameters from the 2014-2015 private well sampling event and the April 2014 sampling event are present on **Figures 5-5 through 5-9**. The shallow and deep groundwater concentration data for these parameters from the July-August 2017 (Q4 2017) sampling event are presented geographically on **Figures 5-8A to 5-9F.**

5.9.1 Benzene

Benzene is present in groundwater at the Site, and when detected is typically above the RSL of 0.46 µg/L, in on-Site monitoring wells. In the April 2014 and the four quarterly sampling events (2016-2017), benzene has been detected in between 10 and 16 on-Site wells. The highest concentrations of benzene have typically been in on-Site groundwater monitoring wells located in the northeast portion of the Site in and around the former WMA as presented in the table below.

BENZENE CONCENTRATIONS (µg/L)					
Monitoring Well ID	**April 2014**	**Q1 2016**	**Q2 2017**	**Q3 2017**	**Q4 2017**
MW-A-51	15	70	0.64	24	0.74 J
MW-J-71	57	57	17	19	44
MW-H-65	8.3	11	7.5	5.2	7

BENZENE CONCENTRATIONS (µg/L)					
Monitoring Well ID	**April 2014**	**Q1 2016**	**Q2 2017**	**Q3 2017**	**Q4 2017**
MW-O-145	68	75	52	43	50
MW-P-235	35	24	18	14	18
MW-N-113	17	1.2	0.58	0.83	4.2
EW-1-110	6.6	6.3	0.73	ND (< 5)	1.7

The concentrations of benzene in the above wells are also greater than the Maximum Contaminant Level (MCL) of 5 ug/L. Benzene concentrations generally decreased by an order of magnitude both laterally and vertically from this area. Laterally, benzene has been non-detect or below the RSL in each groundwater sampling event in wells MW-C-40, MW-E-46, and MW-B-55. In the Q1 2016 and Q4 2017 sampling events, benzene was not detected in any of the on-Site wells screened at depths deeper than MW-P-235 (195.5 to 235.5 feet). In the Q2 2017 sampling event, benzene was only detected in one well screened deeper that MW-P-235 (MW-R-330) above the RSL at a concentration of 0.71 µg/L.

In addition, benzene was not detected in any of the off-Site wells during the April 2014 and Q1 2017 sampling events, and benzene has only been detected below RSLS in off-site wells during the Q2 2017 through Q4 2017 sampling events. Benzene was also not detected in the six groundwater springs sampled between one and two miles from the Site in 2005. Benzene has not been analyzed in surface water investigations. Therefore, the distribution of benzene appears to be limited to on-Site monitoring wells, with the highest concentrations on the northeast portion of the Site at both shallow and deep depths, suggesting vertical flow of benzene contamination within this area. This is consistent with the conceptual site hydrogeologic model, which identified groundwater flow in the former WMA as vertically downwards into the underlying geologic structures.

Benzene was also detected in the four sub-slab vapor samples collected in the residences on Matthew Court at concentrations ranging from 0.42 to 4.5 ug/m^3, below current screening levels (**Figure 5-1**). Benzene was also detected in the background ambient air sample at 1028 Matthew Court at a concentration of 0.88 ug/m^3. These sample locations are located adjacent to the northeast boundary of the Site near MW-J-71.

5.9.2 Pentachlorophenol

Pentachlorophenol has a low RSL at 0.041 µg/L and the laboratory reporting limit for the groundwater sampling events was approximately 1 µg/L (with the exception of the Q4 2017 event in which the reporting limit was approximately 5 µg/L). Pentachlorophenol was detected in at least three of the groundwater sampling events (including April 2014) in the following wells: MW-A-51, MW-B-400, MW-G-360, MW-G-600, MW-H-65, OW-5-90, and OW-7-410. These wells are located on the eastern and southern portions of the Site, with OW-5-90 and OW-7-410 located in a cluster to the south of the Site. Pentachlorophenol was detected in April 2014 only in MW-F-70 and MW-Q-150. Pentachlorophenol has not been detected in the other off-Site and on-Site monitoring wells, and was not detected in six spring samples collected in 2005.

The greatest concentration of pentachlorophenol in each sampling event has consistently been at MW-H-65, between 150 and 290 µg/L. While pentachlorophenol was detected at 91 µg/L in MW-A-51 in the Q1 2016 event, other detections have been more than order of magnitude below those in MW-H-65.

Pentachlorophenol detections appear limited to the southern side of the Site (**Figures 5-8B and 5-9B)**. Vertically pentachlorophenol has been detected in MW-H-65, MW-G-360, and MW-G-600, it has not been detected in the wells located between these two areas (MW-C-40, MW-D-77, and MW-G-35).

5.9.3 Arsenic

Arsenic is present in groundwater in most of the monitoring wells above the RSL of 0.052 µg/L (**Figures 5-8C and 5-9C)**. Arsenic has been detected in most of the on-Site monitoring wells in all five monitoring events, and was detected in all on-Site monitoring wells during the most recent 3rd and 4th quarterly sampling events. The number of off-Site monitoring wells where arsenic is detected has increased since the 2014 event. This includes arsenic detected in the FHCC well, located more than one mile north of the Site.

PERCENT OF SAMPLES ARSENIC DETECTED IN OFF-SITE MONITORING WELLS				
April 2014	**Q1 2016**	**Q2 2017**	**Q3 2017**	**Q4 2017**
39%	58%	44%	89%	88%

ARSENIC CONCENTRATION IN 3RD AND 4TH QUARTERS (µg/L)					
Date	**Minimum Conc. Detected On-Site**	**Maximum Conc. Detected On-Site**	**Minimum Conc. Detected Off-Site**	**Maximum Conc. Detected Off-Site**	**FHCC Well Conc.**
April-May 2017	0.29	8.8	0.25	3.7	0.28
July-August 2017	0.22	11	0.22	3.5	0.33

Review of the most recent groundwater sampling event results indicates that the average arsenic concentration detected in on-Site wells is substantially higher than off-Site wells:

AVERAGE ARSENIC CONCENTRATION DETECTED (µg/L) - Q4 2017			
On-Site Shallow Wells (<100 feet)	**On-Site Deep Wells (>100 Feet**	**Off-Site Shallow Wells (<100 feet)**	**Off-Site Deep Wells (<100 Feet**
1.6235	1.102	0.28	0.68

However, this may be partially due to outliers, including MW-G-35 (11 µg/L), MW-E-46 (4 µg/L), and MW-Q-150 (7.7 µg/L). Generally, the highest concentrations of arsenic (> 1 µg/L) in all the quarterly sampling events have typically been detected in wells MW-C-40, MW-E-46, MW-G-35, MW-H-65, MW-N-113, and MW-Q-150, located on the central to southern portions of the Site. However, concentrations above 1 µg/L have also been detected in other off-Site deep wells, such as OW-7-242 and OW-12-232. In addition, 60% of all monitoring wells have had detections consistently between approximately 0.2 and 0.9 µg/L in all the quarterly monitoring events.

Based on the above information and as shown on **Figure 5-8C and 5-9C**, elevated concentrations of arsenic appear to be distributed on-Site and throughout the study area. As further discussed in Section 7.1, arsenic is a commonly occurring metal and publicly available records have identified wide-spread historical agricultural usage of pesticides throughout Washington County over decades; therefore, elevated concentrations of arsenic may be related to background conditions.

5.9.4 Dieldrin

Dieldrin was not detected in the six groundwater springs sampled between one and two miles from the Site in 2005, and was not detected in the Bester Long Quarry surface water samples collected in 2013 and 2016-2017. Dieldrin was also not detected in the sediment samples collected from Bester Long Quarry. However, at the springs sampled by EPA in 2016-2017, dieldrin was detected in 18 of 52 sample results, which includes sample locations throughout the Hagerstown vicinity.

Dieldrin has been detected at concentrations in groundwater above the RSL of 0.0018 µg/L for at least three groundwater sampling events at concentrations ranging from 0.0019 to 1.2 µg/L. Dieldrin has consistently been detected in each sampling event an order of magnitude higher (0.1 to 1 µg/L) in four shallow wells located in the central to northern portion of the Site: MW-E-46, MW-I-55, MW-L-48, and MW-M-50. With the exception of EW-1-110, which did have a detection of 0.21 µg/L in April 2014 and 0.1 µg/L in the 4th quarter, the deep wells within this same area of the Site (MW-R-330, MW-R-600, MW-L-250, and MW-Q-150) either did not have detections of dieldrin or they were at least an order of magnitude lower in each of the sampling events, suggesting limited vertical migration on-Site.

While dieldrin has not been detected in upgradient off-Site wells to the northeast of the Site (OW-1 and OW-2 cluster, OW-8-230, OW-9-125, and OW-10-250), dieldrin has been detected in OW-19-450, located to the north/northwest of the Site, and the FHCC well more than one mile north of the Site.

COMPARISON OF DIELDRIN DETECTIONS

Sampling Event	Number of Sample Results	Number of Detections	Minimum Conc. Detected (µg/L)	Maximum Conc. Detected (µg/L)
4Q 2017 On-Site Wells (MW-E-46, MW-I-55, MW-L-48, MW-M-50)	4	4	0.41	1.2
4Q 2017 Other On-Site Wells	24	10	0.00077	0.11
4Q 2017 Off-Site Wells	27	14	0.00088	0.18
EPA 2016-2017 Surface Water	80	32	0.00028	0.01
2014-2015 Private Wells	10	10	0.0011	0.022

The average dieldrin concentrations observed in the most recent groundwater sampling event reflect the limited vertical migration.

AVERAGE DIELDRIN CONCENTRATION DETECTED (µg/L) - Q4 2017

	On-Site Shallow Wells (<100 feet)	On-Site Deep Wells (>100 Feet	Off-Site Shallow Wells (<100 feet)	Off-Site Deep Wells (<100 Feet
Number of Detections	8/14	6/14	4/7	9/19
Average Conc.	0.433	0.0249	0.0817	0.0049

The highest detections of dieldrin above the RSL in off-Site monitoring wells in each of the sampling events have been in OW-4-70, OW-5-90, OW-14-96, and OW-14-235 (with the

exception of the 4th quarter which did not include OW-14-235)). These monitoring wells are all located to the southwest of the Site. Based on the above information and as shown on **Figures 5-8D and 5-9D**, dieldrin appears to be present primarily in shallow groundwater in the northern and central portions of the Site, with flow to the southwest primarily within shallow groundwater.

5.9.5 Total BHCs

BHCs are considered to be a soluble key indicator fingerprint COC at the Site because of their generally greater mobility compared to other COCs with elevated concentrations, such as DDx pesticides and dieldrin. They were not detected above the respective laboratory reporting limits in the 2005 spring samples, Bester Long Quarry surface water samples collected in 2013, or the spring and surface water samples collected by EPA in 2016-2017.

In each of the groundwater sampling events, alpha-BHC, beta-BHC, and delta-BHC have been detected above the respective RSLs in the majority of on-Site monitoring wells and approximately half of the off-Site wells. The table below summarizes the minimum and maximum detected sums of total BHC in the monitoring wells:

SUMMARY OF TOTAL BHC DETECTIONS IN GROUNDWATER (µg/L)

Sampling Event	On-Site Minimum Conc. Detected	On-Site Maximum Conc. Detected	Off-Site Minimum Conc. Detected	Off-Site Maximum Conc. Detected
April 2014	0.0351	107	0.02909	7.9
Q1 2016	0.0725	91.9	0.01022	11.46
Q2 2017	0.0911	83.2	0.00472	20.8
Q3 2017	0.0301	75.8	0.0073	10.6
Q4 2017	0.0472	55	0.01414	9.77

These data illustrate that concentrations of total BHC tend to be four to nine times higher on-Site than off-Site. Specifically, the highest concentrations of total BHC on-Site have been in MW-A-51, MW-J-71, MW-L-48, and MW-N-83, all located on the northern portion of the Site, followed by EW-1-110, MW-N-113, MW-G-35, and MW-Q-150, also located on the northern portion of the Site.

HIGHEST TOTAL BHC CONCENTRATIONS (µg/L)

Monitoring Well ID	April 2014 Conc.	Q4 2017 Conc.
Shallow Wells		
MW-A-51	99.6	37.19
MW-J-71	48.54	10.17
MW-L-48	47.6	23.12
MW-N-83	20.8028	24.4
MW-G-35	15.61	10.29

HIGHEST TOTAL BHC CONCENTRATIONS (µg/L)		
Monitoring Well ID	**April 2014 Conc.**	**Q4 2017 Conc.**
Deep Wells		
EW-1-110	20.7	9.73
MW-N-113	15.4075	15.8
MW-Q-150	12.3	15.2
MW-O-145	6.636	6.75
MW-R-330	---	20.86
MW-G-360	---	20.5

The deep wells with the highest concentration of total BHC in the most recent groundwater sampling event are MW-R-330 and MW-G-360, located on the central and southern sides of the Site. The concentration of total BHC are more than a magnitude of order lower in the deeper wells at each of these clusters at MW-R-600 (0.3396 µg/L) and MW-G-600 (0.582 µg/L). These data appear to reflect vertical migration of BHC to depths up to 600 feet bgs.

In the 4th quarter, total BHC was detected above 1 µg/L in 74% of on-Site monitoring wells and 20% of off-Site monitoring wells, again indicating the highest concentrations remain on-Site.

AVERAGE TOTAL BHC CONCENTRATION DETECTED (µg/L) - Q4 2017			
On-Site Shallow Wells (<100 feet)	**On-Site Deep Wells (>100 Feet**	**Off-Site Shallow Wells (<100 feet)**	**Off-Site Deep Wells (<100 Feet**
10.189	7.509	1.627	0.8315

However, the highest off-Site concentrations in the 4th quarter were not in one specific area, as they were located at OW-7-410 (7.07 µg/L), OW-4-70 (5.13 µg/L), and OW-5-90 (3.33 µg/L) located to the south/southwest of the Site, and OW-8-230 (3.999 µg/L) and OW-2-115 (2.335 µg/L) located to the north of the Site. These concentrations are more than an order of magnitude higher than neighboring deep wells.

Based on the above information and as shown on **Figures 5-8E and 5-9E**, elevated BHCs have been detected throughout the Site and surrounding area. The highest detections are concentrated in shallow groundwater on the northern portions of the Site, with contaminant migration vertically to the south in deeper bedrock intervals.

5.9.6 Total DDx

The distribution of DDx is evaluated here as the sum of the concentrations of several isomers. It should be noted that 4,4-DDE, 4,4-DDT, and 2,4-DDT have not been detected above the respective RSLs in any monitoring wells during the four quarterly sampling events, and 2,4-DDD has not been detected above the RSL in any off-Site monitoring wells during the four quarterly sampling events. In April 2014, 4,4-DDT and 2,4-DDT were not detected above the respective

RSL in the on-Site monitoring wells and 2,4-DDD, 4,4-DDE, and 2,4-DDT were not detected above the respective RSL in the off-Site monitoring wells.

Significant concentrations of total DDx have not been detected in spring and surface water samples. 4,4-DDT was detected in one spring sample collected by EPA in 2016-2017 at 0.034 µg/L. 4,4-DDD, 2,4-DDD, and 4,4-DDT were detected at concentrations below 0.01 µg/L in the 2013 Bester Long Quarry samples.

The DDx isomers have been detected above the RSL in less than half the on-Site monitoring wells and between zero and four off-Site monitoring wells depending on the sampling event. In the Q4 2017 event, a total of detected DDX isomer concentration was observed above 0.1 µg/L in approximately 44% of on-Site monitoring wells and 4% of off-Site monitoring wells, again indicating the highest concentrations remain on-Site.

AVERAGE TOTAL DDX CONCENTRATION DETECTED (µg/L) - Q4 2017			
On-Site Shallow Wells (<100 feet)	**On-Site Deep Wells (>100 Feet**	**Off-Site Shallow Wells (<100 feet)**	**Off-Site Deep Wells (<100 Feet**
0.4598	0.0915	0.0435	0.0175

Specifically, the highest concentrations of total DDx on-Site detected have been in MW-L-48, MW-E-46, and MW-A-51, located on the northern portion of the Site, and MW-G-35, located on the southern portion of the Site.

HIGHEST TOTAL DDX CONCENTRATIONS (µg/L)		
Monitoring Well ID	**April 2014 Conc.**	**Q4 2017 Conc.**
Shallow Wells		
MW-A-51	0.3527	0.84
MW-E-46	0.807	0.7
MW-G-35	0.1071	0.925
MW-L-48	0.6298	2.882
MW-M-50	0.54	0.382
MW-N-83	0.626	0.18
Deep Wells		
MW-N-113	0.4192	0.231
MW-O-145	0.012	0
MW-P-235	0.364	0
MW-Q-150	0.631	0.28
MW-R-330	---	0.22
OW-2-115	0.401	0.017

Vertical migration of DDX isomers in groundwater has occurred although with significant attenuation. While the highest concentrations were in the shallow wells MW-L-48, MW-E-46, MW-

A-51, and MW-G-35, the total DDx concentrations in deeper wells in this area of the Site were an order of magnitude or greater lower, at 0.056 µg/L (EW-1-110), 0.0038 µg/L (MW-L-250), 0.22 µg/L (MW-R-330), and 0.02 µg/L (MW-R-600), 0.19 µg/L (MW-G-360) and non-detect (MW-G-600 and MW-O-145) indicating minimal vertical migration of contaminants.

Based on the above information and as shown on **Figures 5-8F and 5-9F**, the distribution of DDx isomers is appears to be primarily in shallow wells on the northeast and central portions of the Site, with some on-Site vertical migration of contaminants on-Site.

6.0 Fate and Transport

Much of the information presented in this section is from EPA sources (2014a, 1996a, 1996b, 1986, 1979) and Clement Associates (1985), to which the reader is referred for more detailed discussions. The environmental fate and potential transport mechanisms of the COCs are driven by their physical properties and the Site conditions.

6.1 Constituents of Concern

Mobility is the tendency of a chemical to migrate through the environment. Mobility is controlled by both the physicochemical environment and the behavioral characteristics of individual COCs. Important factors controlling the physicochemical environment include the local climate, the configuration and nature of surface water bodies and groundwater, and the nature of underlying soils and bedrock. Factors that control the behavior of individual compounds include aqueous solubility, the susceptibility of a chemical to sorption, and volatility.

Persistence is the tendency of a COC to remain in the environment. Persistence is influenced by many of the factors affecting chemical mobility, such as solubility, sorption, and volatility, but also is a function of oxidation rates, hydrolytic and photolytic reactions, and biochemical processes, such as biodegradation and bioaccumulation.

Solubility is the measure of a chemical's ability to dissolve in a solvent and is expressed in units of chemical mass per unit volume of solvent (e.g., µg/L or mg/L). Aqueous solubility is an important determinant of chemical concentration and residence time in water. Highly soluble chemicals readily dissolve in water and remain in solution, whereas chemicals having low solubility tend to be unstable in solution. In addition, solubility often predicts the ease with which chemicals are leached from wastes and soils.

Sorption (adsorption/desorption) is the reversible binding of a chemical to a solid matrix. Both soluble nonpolar and insoluble chemicals usually adsorb strongly to sediments, suspended solids, and soils. Adsorption of these compounds to a solid phase limits the fraction available for other fate processes such as volatilization and hydrolysis. Although adsorption is generally modeled as a fully reversible process, there is evidence in published literature that there is a partially irreversible component related to the length of time that the material has been adsorbed. Generally, the less polar and less soluble the chemical, the greater the adsorption to the solid phase (i.e., soils, sediments, and suspended solids). Partition coefficients, which are important measures of sorptive characteristics, define the relative concentration of a given chemical in two phases or matrices.

Partition coefficients are expressed as concentration ratios; higher values indicate a greater tendency to associate with the non-aqueous phase. Partition coefficients useful in describing the environmental behavior of a compound include K_{ow}, K_d, and K_{oc}, and are defined:

K_{ow}: The octanol-water partition coefficient is the ratio of chemical concentration in octanol (an organic solvent) to that in water at steady-state conditions. Octanol serves as a surrogate for lipids or other organic phases. High K_{ow} values indicate an increased tendency of a compound to sorb to organic matter in soils or sediments, and are associated with elevated bioconcentration factors in biota.

K_d: The soil-water partition coefficient is the ratio of chemical concentration in aqueous and solid phases at steady-state conditions (usually applied to inorganic species). Small K_d values indicate the chemicals are more leachable and are not likely to be strongly bound to soil particles. High K_d values indicate a propensity to sorb onto soil particles.

K_{oc}: The organic carbon partition coefficient is the K_d normalized to the concentration of organic carbon in the soil. Soil organic carbon is a dominant sorbent for hydrophobic organic compounds. High K_{oc} values usually indicate a high tendency of a compound to sorb to organic matter in soils or sediments.

Volatilization describes the movement of a chemical from a liquid or solid matrix to a gas or vapor phase. Volatilization losses to air are correlated with chemical concentration, molecular weight, solubility, and ambient temperature. Volatilization from the liquid phase is measured by the Henry's Law Constant, which can be expressed as the quotient of the chemical's vapor pressure to its solubility at a specific temperature. Lyman et al. (1982) described compounds as readily, significantly, or limitedly volatilized based on the\values of their Henry's Law Constants. These values in atm-m^3/mol are$\geq 10^{-3}$, 10^{-3} to 10^{-5}, and $<10^{-5}$, respectively.

Bioconcentration is the accumulation of a chemical directly from the exposure medium or source material into an organism. For example, plants or animals associated with exposures to ambient water, soil, air, or sediment may bioconcentrate chemicals from these media via ingestion and/or direct absorption through the organisms' exposed surfaces. After entering the organism, contaminants may become concentrated within specific tissues as the result of metabolic pathways that yield the same chemical for storage within the organism, or via direct deposition of the contaminant in certain tissues without being metabolized and/or excreted.

Bioaccumulation is the accumulation and transport of a chemical from a specific media through both the food chain and bioconcentration. The potential for bioaccumulation may be quantified by equilibrium bioconcentration factors (BCFs) and biota-sediment accumulation factors (BSAFs), which define the ratio of a chemical concentration in animal or plant tissue to the concentrations of the same chemical in the environmental media of contact. Organic chemicals with high BCFs (such as pesticides) are typically insoluble and lipophilic (nonpolar) and, thus, tend to reside in animal fat tissue. Some heavy metals may also bioaccumulate. Literature values of BCFs most commonly pertain to fish species.

Biotransformation/biodegradation is the metabolic transformation of complex molecules into other compounds by microorganisms. Products of biotransformation/biodegradation may or may not be toxic to other organisms, and these products may undergo further biotransformation/ biodegradation. Biological transformation/degradation includes a variety of enzyme-catalyzed reactions such as oxidation and reduction.

Oxidation is a chemical reaction which involves the removal of electrons from an element or compound. Conversely, electrons are added to chemical substrates in **reduction** reactions. Both oxidation and reduction reactions are environmentally significant in that they influence the mobility and fate of chemicals in environmental matrices. Oxidized and reduced forms of the same element or compound often exhibit different chemical, ecological, and toxicological properties.

Hydrolysis is the reaction of a chemical with water or with hydrogen (H+) or hydroxyl (OH-) ions. These components of water interact with, or attack, sites of a chemical resulting in subsequent breakdown or modification in the environment. The extent of chemical hydrolytic reactivity depends on both pH (acidity/alkalinity) and molecular structure of the specific chemical.

Photolysis is a chemical decomposition process induced by radiant energy (sunlight). The rate of loss of a chemical from photochemical reactions depends on both its molecular structure and the proximity and character (i.e., wavelength) of the light source, and the presence of other reactive compounds.

Degradation is a general term referring to transformation of a COC to another constituent or constituents regardless of the actual chemical or biochemical process involved.

Diffusion is the net movement of contaminant molecules from a region of high concentration to a region of low concentration. Diffusive transport is typically only significant when groundwater velocity is very low, as it becomes a primary method of contaminant migration. In bedrock, diffusion may transfer contaminants from the secondary porosity to the rock matrix (primary porosity). The higher the diffusivity of one substance with respect to another (groundwater in this case), the faster they diffuse into each other. Diffusive transport is quantitatively described by the diffusion coefficient for a chemical species which is a proportionality constant between the molar flux due to molecular diffusion and the gradient in the concentration of the species. Diffusion in the porous media is referred to as effective diffusion which is obtained by multiplying the aqueous phase diffusion coefficient with the tortuosity factor of the porous media porosity.

6.2 COC Fate and Transport Characteristics

Chemical characteristics of specific COCs are provided in **Appendix O**. Included in this table where available are density, water solubility, vapor pressure and Henry's Law constants, adsorption factors (K_{oc} and/or log K_{ow}), diffusion coefficients in air and water, and photolytic, hydrolytic, biodegradation / biotransformation / bioaccumulation rates.

6.2.1 Volatile Organic Compounds

The VOCs of potential concern detected in groundwater during the RI may be segregated into halogenated and non-halogenated groups. Each of these classes will be discussed in the subsections that follow.

Halogenated Volatiles

Halogenated VOCs are characterized by an open-chain or ring structure that has undergone halogenation. Industrial uses of halogenated VOCs include as solvents, degreasers, dry-cleaning agents, refrigerants, and chemical intermediates. Widespread application of chlorinated organics in industrial processes result in their general presence in the environment, particularly in urban/industrial areas, originating from numerous point and nonpoint sources.

Halogenated VOCs are mobile in the environment, principally due to their high volatility (relative to other non-halogenated VOCs), low adsorption to soils, and aqueous solubility. Because of these characteristics, the fate and transport mechanisms affecting halogenated VOCs most often are volatilization into the air or soil vapor and migration in groundwater.

The halogenated VOCs can undergo degradation reactions in anaerobic and aerobic saturated soil. The most typical anaerobic degradation reactions involve the progressive loss of halogen ions from the molecular structure, resulting in stepwise dehalogenation. Aerobic degradation reactions involve opening the double bond structure, changing alkenes to alkanes. The biodegradation of halogenated volatiles, however, can be a slow process that is primarily

favored under anaerobic conditions. Degradation reactions can result in the production of mobile daughter compound(s) within environmental media.

Non-halogenated Volatiles

Non-halogenated VOCs are generally low molecular weight open-chain or single ring structures (i.e., benzene) that are widely utilized as industrial solvents, degreasers, and chemical intermediates. Their widespread application in fuels and many industrial processes results in their being common environmental contaminants originating from various point and non-point sources.

Groundwater transport of the non-halogenated VOCs is a principal environmental fate process. Compounds of this subclass generally are mobile in environmental matrices due to their high volatility, high water solubility, low adsorptive affinity to soils, and typically low bioaccumulation potential. The non-halogenated VOCs are generally subject to more rapid biodegradation/ biotransformation processes than the halogenated VOCs, contributing to a low persistence in the environment.

6.2.2 Semi-Volatile Organic Compounds

SVOCs are ubiquitous in industrial/urban environments, principally occurring as a result of various manufacturing processes, use in plastics (phthalates), fuel usage, and/or past utilization/disposal of products or raw materials containing these chemical constituents.

Base/neutral SVOCs are found in the list of COCs. The transport of base/neutral SVOCs is highly variable as a function of molecular structure, degree of aromaticity, and presence and type of functional groups attached to the parent molecule. Solubility is positively correlated with molecular polarity and negatively correlated with degree of aromaticity. Higher molecular weight also generally corresponds to a compound being more strongly sorbed to soils. Although some SVOCs can volatilize, this transport is limited and assessed to be of minor importance as an environmental fate process. For other fate processes, chlorinated benzenes have very low susceptibility to photolysis, hydrolysis, or oxidation and may be degraded slowly by typical microbial populations. Phthalate esters are slightly more susceptible to photolytic and hydrolytic reactions and undergo degradation and/or metabolism relatively rapidly under most conditions.

6.2.3 Pesticides

The pesticide COCs are man-made chemicals. Many pesticides are typically persistent chemicals that strongly adsorb to soils, sediments, and organic matter, and sorption is the dominant environmental process affecting the fate of pesticides. As such, soils and/or sediments typically serve as sinks for pesticide residuals.

The water solubility of pesticides governs surface water and/or groundwater transport to varying extent with more water-soluble compounds, such as delta-BHC, potentially migrating farther away from source zones. However, other fate and transport mechanisms such as adsorption generally exert stronger influence on COC migration in Site-specific conditions. Many pesticides exhibit bioaccumulation tendencies. The pesticide BCFs generally refer to fish in direct contact with pesticide-contaminated water.

6.2.4 Inorganics (Metals)

Metals are normal constituents of parental soil material and uncontaminated groundwater. Environmental fate data discussed herein pertains to those COC metals exhibiting atypical

environmental concentrations. The environmental behavior of individual naturally-occurring versus introduced metals is difficult to distinguish, particularly in the case of COCs such as aluminum (the most abundant substance on earth), iron and manganese. Many fate and transport mechanisms important for organic compounds have little influence on the metals. Volatilization is not a concern for the COC metals.

The most important factors controlling metal mobility, fate and transport are solubility, pH, redox behavior, aqueous speciation and complexes (e.g., metal sulfides versus metal sulfates), and sorption behavior, all of which are functions of the ambient geochemical environment. In general, metals are persistent and of limited mobility within environmental matrices under normal environmental conditions. This persistence is primarily related to recycling mechanisms within environmental matrices for some metals such as arsenic, and removal mechanisms such as precipitation, cationic exchange, adsorption, etc., which decrease mobility and generally result in the metals remaining within soil and/or sediment matrices. Chemical speciation of metals in the environment results in metals in both solid and aqueous media. However, the fate reactions and the behavior of these metals under Site geochemical conditions may lead to an increase or decrease in their concentrations in specific matrices.

Metals typically have a high adsorptive affinity for inorganic mineral surfaces and organic matter. Adsorption, for most metals, is highly pH-dependent, with desorption occurring at a low pH and sorption mechanisms occurring at higher pH conditions. However, the types of clays present and their surface charges, in relation to soil pH values, dictate whether sorption or desorption will occur. Chemical speciation may also determine the relative degree of adsorption and solubility among different species of a particular metal (e.g. arsenic).

In addition, metals are, to variable extents, subject to cation-exchange reactions with minerals present in the environment. The extent that cation-exchange occurs is dependent on the mineral species present and on pH, as well as on the characteristics of the individual metals.

6.3 Release Mechanisms and Potential Routes of Migration

Constituents may migrate from specific or multiple source areas through a variety of mechanisms. The importance of a given migration process is controlled by the specific physical, geochemical, geologic, hydrogeologic, and climatic conditions at the Site, as well as by the physiochemical characteristics of the constituent and the impacted media (unconsolidated soils, saprolite and bedrock). The complete migration and exposure pathways for groundwater impacted by COCs are discussed in Section 4.6 as the HCSM.

6.3.1 Migration of Contaminants from Potential Source Areas to Environmental Media

Disposal of waste and historical operations have resulted in impacts to soils and groundwater on and beneath the Site. Consequently, several sources of contamination exist on the property which are being addressed by the OU-1 remediation. COCs from these potential sources may migrate within and/or into the surrounding environment in several ways; however, by year-end 2019 implementation of the ROD remedies for OU-1 will be complete and will prevent the infiltration of precipitation and consequent leaching of COCs into groundwater. Site data indicate that groundwater impacts originate due to releases from the former WMA and leaching from other impacted soils. The 2008 Remedial Investigation and OU-1 Pre-Remedial Design Investigation Report also identified impacts to soils near the northwest corner of the Site in the area of the former Liquid Pesticide Building and Buildings 5, 6, and 7 (D1H08A Area). These sources are being remediated in 2018-2019 under the OU-1 ROD. The RI data indicate that

COCs are migrating both laterally and vertically downward in groundwater as a function of groundwater gradients.

Impacted soil areas contain COCs that were transported into underlying soils and groundwater by the percolation of rain, dissolution in groundwater, and/or gravity. Data from the OU-1 RI indicate the presence of pesticides and other COCs above screening criteria in the surface soils to depths of over 20 feet bgs at some locations. These COCs are prevalent within the former WMA at similar and greater depths. As part of the OU-1 remedy, the ROD requires implementation of a GETS to contain on-Site groundwater. Design and installation of the GETS is ongoing. In addition, the principal threat waste in the former WMA area will be treated down to bedrock with ISS, and impacted soils where concentrations exceed RSLs will be excavated and consolidated in the ISS area. The excavations will be backfilled with clean soil and graded. The soils consolidated in the ISS area will be covered with a multi-layer membrane cover system that will prevent the infiltration of precipitation and consequent leaching of COCs into groundwater. The OU-1 remediation commenced in 2017 with completion scheduled in 2019.

6.3.2 Percolation and Migration of Constituents into Groundwater

COCs in impacted soils at the former WMA and throughout the Site have migrated from land surface by the percolation of rainwater through the materials and have been carried into groundwater. Dissolved phase transport of COCs in groundwater occurs by direct dissolution of constituents from these materials and entry into groundwater. Other mechanisms may potentially include transport of very fine particulates, such as colloids, where chemical constituents are adsorbed.

Local shallow groundwater flow on the Site is from the central portion of the Site to its perimeter due to a groundwater mound below the topographic high where the Site is located. Beneath the Site, there is a generally a vertically downward hydraulic gradient that the data indicate supports movement of COCs vertically to 600 feet bgs. In bedrock, groundwater flow is generally to the south-southeast toward lower hydraulic head elevations as part of the regional flow regime. Constituents originating in source areas that enter groundwater will migrate within the groundwater to hydraulically downgradient areas (and depths) following the groundwater flow direction.

6.3.3 Migration of Impacted Groundwater Off-Site

Migration of COC in groundwater to off-Site areas is controlled principally by the following processes: advection, dispersion, sorption, and degradation. Advection is the process where dissolved constituents are transported by the bulk motion of groundwater flow. Dispersion is the spreading of dissolved constituents as they move with groundwater as a function of molecular diffusion and mechanical mixing in three principal directions of groundwater flow (longitudinal, transverse, and vertical). Contaminant retardation (adsorption) and degradation mechanisms, and for some VOCs limited volatilization from groundwater are also controlling factors.

Based on the general physiochemical characteristics of the COCs and the detected exceedances of COCs in monitoring wells, dissolved COCs have migrated via advection, diffusion, sorption, volatilization, dilution, and degradation in groundwater to off-Site areas. Based upon their fate and transport characteristics, pesticides are generally expected to potentially migrate farther away from source zones compared to other COCs such as VOCs/SVOCs. Based on the RI groundwater analytical data, pesticides are generally detected in off-Site wells at further distances from the Site than VOCs and SVOCs.

The analytical results indicate that COCs dissolved in groundwater were detected in off-Site monitoring wells approximately:

- 2,200 feet to the northeast;
- 2,700 feet to the southwest;
- 800 feet to the southeast; and,
- 400 feet to the northwest.

Groundwater sampling data from April 2014 and the four quarterly groundwater sampling events conducted in 2016-2017 show that fewer COCs were detected in off-Site monitoring wells exceeding their respective RSLs. In addition, maximum concentrations observed were typically lower in off-Site monitoring wells than in on-Site wells indicating significant retardation and/or degradation of COCs as they migrate farther off-Site. As summary statistics in Section 5.0 show, many COCs were not detected in off-Site wells.

COCs have migrated vertically to at least 600 feet bgs at off-Site locations. Analytical data show that BHC isomers are detected at 0.1489 µg/L (total BHCs) in OW-11-600 located just east of the Site and at 0.91 µg/L in OW-18-597 located just south of the Site.

Private well results indicate that three pesticides have been detected exceeding their respective RSLs at these locations. These COCs are 2,4-DDE, Dieldrin, and heptachlor epoxide. Dieldrin is found in some off-Site monitoring wells (OW-4, OW-5, OW-14, OW-19) at concentrations greater than its RSL. However, it was not detected in other off-Site monitoring wells further downgradient between the surface water sampling points and the Site (OW-13, OW-15, OW-16, OW-18). At Bester Long Quarry, the closest surface water body to the Site, dieldrin was non-detect in October 2013 and the EPA 2016-2017 samples. 2,4-DDE was detected in 9 of 10 private well samples at concentrations below the RSL. However, it is not detected in any spring sample or in Bester Long Quarry surface water samples. It is detected infrequently or not detected in off-Site monitoring wells. Similarly, heptachlor epoxide is not detected in any spring sample or in Bester Long Quarry surface water samples, yet is detected infrequently or not detected in off-Site monitoring wells. These data indicate that the three pesticides may be occurring as background associated with their wide spread uses.

6.3.4 Migration to Springs, Surface Runoff and Permanent Surface Water Bodies/Sediments

Potential impacts of the Site groundwater on springs, surface water and/or sediment off-Site have been evaluated based on available analytical data collected at on-Site and off-Site monitoring wells, as well as from springs, surface water bodies, and their sediments.

Springs

Potential constituent migration and groundwater discharge to springs was evaluated by sampling springs in the surrounding area. The data indicate that COCs, with the exception of dieldrin, are virtually absent in all spring samples. Notably, a key indicator compound, BHC, is absent from all spring sampling data and as noted above the groundwater plume has been delineated horizontally to approximately 2,200 feet northeast, 2,700 feet southwest, 800 feet southeast and 400 feet northwest (**Figure 6-1**). Chloroform and bis(2-ethylhexyl)phthalate were detected above their respective RSLs in the four springs sampled in 2005. The lowest spring detection of chloroform was 2.9 µg/L, while only one off-Site monitoring well (OW-16-44) was observed with chloroform at a concentration greater than 2.9 µg/L. This well is located far south

of the Site, and there are at least six off-Site wells between OW-16 and the Site with non-detect chloroform results. Consequently, these data appear to indicate no connection between the dieldrin detection in the spring and the Site.

The lowest 2005 spring result for bis(2-ethylhexyl) phthalate (sampling event which included SVOC analysis) is 1.7 µg/L. At least nine off-Site wells were observed to have bis(2-ethylhexyl)phthalate at concentrations greater than 1.7 µg/L. They are arrayed around the Site. The concentrations of bis(2-ethylhexyl)phthalate in groundwater above 1.7 µg/L have been variable over time, with three detections in April 2014, ten in the 1Q 2017, none in 2Q2017, two in 3Q 2017, and fourteen on-Site wells in 4Q2017. These analytical results suggest a potential laboratory equipment or sample contamination issue (bis(2-ethylhexyl)phthalate is a plasticizer and a common lab contaminant). There is no evidence that bis(2-ethylhexyl)phthalate detected in that spring is related to the Site.

At the springs sampled by EPA in 2016-2017, 4,4-DDT was detected in one sample (Fountain Head) exceeding the Maryland Fresh Water Chronic standard of 0.001 ug/L, but below the Maryland Fresh Water Acute standard of 1.1 ug/L. Dieldrin was detected in 26 of 63 sample results but at concentrations below the Fresh Water Acute and Chronic standards. No other COC is detected exceeding its respective Fresh Water Acute and Chronic standards, although at least several COCs should be as mobile or more mobile in the saturated zone than dieldrin. Dieldrin was found in some off-Site monitoring wells at concentrations greater than its RSL (OW-4, OW-5, OW-14, OW-19). However, it was not detected in other off-Site monitoring wells further downgradient from the Site (OW-13, OW-15, OW-16) suggesting that it has not migrated significant distances in groundwater. In Bester Long Quarry, the closest surface water body to the Site, dieldrin was non-detect. Dieldrin is known to have been used agriculturally over Washington County. The data strongly suggest uncertainty in attributing these detections of dieldrin to sources at the Site.

Surface Water

Most surface water drainage from the Site enters a storm drain and storm sewer along Mitchell Ave with subsequent discharge to Marsh Run 2 and to Antietam Creek, a tributary to the Potomac River. Surface water analytical results suggest some uncertainty whether COCs have migrated off-Site. For example, the October 2013 surface water data from Bester Long Quarry detected manganese, thallium, 4,4-DDT, arsenic, 2,4-DDD, and 4,4-DDD. All other COCs were non-detect. In comparison, the 2016-2017 EPA tracer study analytical data show that dieldrin was the only COC detected in surface water. The empirical data indicate that the migration of COCs from the Site to surface water bodies is not currently occurring for the following reasons:

- Dieldrin is found in four off-Site monitoring wells (OW-5, OW-5, OW-14, OW-19) at concentrations greater than its RSL; however, it was not detected in other off-Site monitoring wells (OW-13, OW-15, OW-16, OW-18) further downgradient between the Site and surface water sampling points. In Bester Long Quarry, the closest surface water body to the Site, dieldrin was non-detect in October 2013 and the EPA 2016-2017 samples.
- 4,4-DDT was not detected in any off-Site monitoring well at concentrations greater than its RSL. It was detected in the 2013 Bester Long Quarry samples, but not detected in the 2016-2017 EPA tracer study samples.

Sediment

The data suggest that sediment impacts are not readily associated with the Site. At Bester Long quarry in 2013, arsenic, manganese, thallium, 4,4-DDT, 2,4-DDD, 2,4-DDE, 4,4-DDD, and alpha chlordane were detected in sediment. However, these detections may not be Site related because groundwater concentrations in off-Site wells (including OW-18-597 located between the Site and Bester Long Quarry) for 4,4-DDT, 4,4-DDD or 2,4-DDD, 2-4-DDE, alpha chlordane, arsenic and thallium are sufficiently low that mass transfer to sediment via groundwater discharge is not the likely mechanism of sediment media impacts at this location.

In the 2016-2017 EPA tracer study sediment samples results, only one detection of beta-BHC and one of heptachlor epoxide was noted in 39 results. The absence of beta-BHC and heptachlor epoxide in corresponding surface water or spring sample results suggests that these are not Site related.

6.3.5 Migration of Constituents into Freshwater/Terrestrial Biota

Upland habitats and perennial aquatic habitats are present in the area within 1 mile of the Site. Once constituents impact these habitats, biota present therein may accumulate these constituents directly through bioconcentration or indirectly by bioaccumulation through the food chain. Migration of COCs into biota is considered a potential pathway. Sediment and surface data results discussed above suggest that a few metals and pesticides are detected in those media; however, there is uncertainty in concluding that they are Site related and background concentrations and lab contamination are potential explanations.

6.3.6 Migration of Constituents in Air

COCs may migrate into air via two distinct emission mechanisms: volatilization (primarily of organic compounds through diffusion) and mobilization of impacted particles by the wind (such as fugitive dust emissions with wind re-suspension and dispersion). VOCs can migrate into air from contaminated surface soil, or from contaminated shallow subsurface soils or groundwater. Volatilization from surface soil is essentially unrestricted, and as such, is governed only by the physicochemical characteristics of a given constituent under ambient conditions. Volatilization from subsurface media is more complex and is influenced by factors such as soil moisture and soil permeability. The extent of particulate entrainment at a Site is governed in large part by climatic and weather conditions, such as the frequency of dry, windy periods that are more conducive to surface soil entrainment than wet, quiescent conditions. Other factors that affect the entrainment of particulates include the activities that occur or have occurred on the Site, the extent of vegetated areas, and the grain size distribution of the surface soil.

The 2014 sub-slab vapor sampling conducted at Mathew court indicate that three VOCs (chloroform, benzene and 1,2-dichloroethane) have potentially migrated beyond the Site and are present in soil vapor. Analytical results compared to the November 2013 target sub-slab concentrations for risk level of $1x10^{-6}$ and hazard quotient of 1 are exceeded for these three compounds[9]. URS indicated that chloroform and bromodichloromethane were detected in one or more of the samples; however, these compounds are typically associated with treated drinking water supplies and the sub-slab samples were collected near the water mains within the residences (URS, 2014). In addition, benzene, toluene, ethylbenzene, and xylenes (BTEX)

[9] As noted above, the current EPA VISL Model threshold values have been revised. The observed concentrations of these VOCs do not exceed the current threshold values.

were detected in all samples including the ambient air sample. BTEX is commonly associated with gasoline, and the residences at which samples were collected either had attached garages or garages adjacent to the townhomes. Additional compounds detected in the samples below the respective VISL were acetone (typically found in nail polish remover), 1,1,2-trichloro-1,2,2-trifluoroethane (used in air conditioners), dichlorodifluoromethane, (Freon-12), trichlorofluoromethane (Freon-11), and methyl ethyl ketone (component of common household products). Other compounds detected in the samples below the respective VISL (1,1,1-TCA, 1,2-DCA, carbon tetrachloride, and trichloroethylene) were not detected in groundwater samples.

The soils and principal threat waste at the Site are being remediated under the OU-1 ROD. The remediation started in 2017 with completion scheduled for 2019. The principal threat waste in the former WMA area will be treated down to bedrock with ISS, and the impacted soils where concentrations exceed RSLs will be excavated and consolidated in the ISS area. The excavations will be backfilled with clean soil and graded. The soils consolidated in the ISS area will be covered with a multi-layer membrane cover system that will prevent the infiltration of precipitation and consequent leaching of COCs into groundwater.

6.4 Analysis of Contaminant Fate and Transport

Qualitative and quantitative analysis of BHC fate and transport was performed for representative groundwater flow paths between on-Site wells with elevated BHC concentrations and downgradient monitoring wells for the purpose of evaluating their fate and transport mechanisms. These pairs of wells are included in **Table 6.4-1** below and their locations are shown on **Figures 5-6 through 5-9**. BHCs were selected for this analysis because of their generally greater mobility compared to other COCs, such as DDx pesticides and dieldrin, as further discussed below.

Table 6.4-1 Monitoring Wells Along Select Groundwater Flow Paths

Well Completion Date	Wells Along Flow Path	Total BHC (µg/L) Q4 2017	Total BHC (µg/L) Highest Historic	Date
2003	MW-A-51 (upgradient)	37.19	251	11/8/2007
2003	MW-B-55 (downgradient)	0.0644	0.74	11/7/2007
2004	MW-I-55 (upgradient)	8.39	87	5/18/2007
2003	MW-F-70 (downgradient)	0.4997	0.931	5/14/2007
2004	MW-H-65 (upgradient)	7.5	10.97	6/8/2004
2003	MW-C-40 (downgradient)	1.3455	4.161	5/16/2007
2005	MW-N-83 (upgradient)	24.4	60.3	5/22/2007
2003	MW-F-70 (downgradient)	0.5832	0.931	5/14/2007
2005	OW-4-70 (upgradient)	5.13	11.2	11/9/2007
2007	OW-14-96 (downgradient)	0.891	1.102	5/17/2007
2016	MW-K-440 (upgradient)	0.2023	0.304	2/6/2017

Well Completion Date	Wells Along Flow Path	Total BHC (µg/L) Q4 2017	Total BHC (µg/L) Highest Historic	Date
2016	OW-19-450 (downgradient)	0.0031	0.0031	8/1/2017
2016	MW-B-598 (upgradient)	0.622	0.775	11/8/2016
2016	OW-11-600 (downgradient)	0.1489	0.1498	5/1/2017
2016	MW-G-600 (upgradient)	0.582	1.208	1/25/2017
2016	OW-18-597 (downgradient)	0.91	1.076	2/1/2017

As can be seen in **Table 6.4-1** and the referenced figures, as BHCs migrate away from the presumed source areas (monitoring wells with highest detected concentrations at the Site) and further downgradient and off-Site, their concentrations are significantly reduced, in some cases by an order of magnitude, due to various natural attenuation processes such as sorption, dispersion, and degradation. At the same time, the "source" wells themselves show a significant decrease in total BHC concentrations over the last decade or so.

The BHC isomers alpha, beta, delta, and gamma BHC (also known commercially as "lindane") are all susceptible to processes acting to reduce concentrations of these pesticides including biodegradation and/or hydrolysis (Cornell University, 2017; ATSDR, 2005). The various isomers are present in commercial grade lindane, but the gamma isomer is utilized the most in pesticide applications and is often considered the most important isomer for environmental effects because of its mobility and anthropogenic origin. Lindane (and other BHC isomers, except for alpha BHC in some cases) transformations are favored in biologically rich, anaerobic environments, which are expected in the shallow saturated zone at the Site. This includes the overburden and epikarst at the Site. Deeper bedrock is also expected to have anaerobic conditions favorable for degradation of lindane and other BHCs. The reported half-life of lindane in sandy loam soils is eight months and in silty clay soils is ten months (Cornell University, 2017). **Table 6.4-2** identifies BHC and DDx isomer half-life values from various literature sources including EPA.

Table 6.4-2 Degradation Half-Lives of Select COCs

Chemical	CAS Number	Soil Half-Life			
		Aerobic Minimum	Aerobic Maximum	Anaerobic Minimum	Anaerobic Maximum
2,4-DDD	53-19-0	---	---	160 days[a]	160 days[b]
2,4-DDE	3224-82-6	---	---	151 days[c]	271 days[c]
2,4-DDT	789-02-6	---	---	2 years[b]	30 years[c]
4,4-DDD	72-54-8	---	---	160 days[a]	160 days[b]
4,4-DDE	72-55-9	---	---	151 days[c]	271 days[c]
4,4-DDT	50-29-3	---	---	2 years[b]	30 years[c]
alpha-BHC	319-84-6	54.4 days[c]	56.1 days[c]	165 days[b]	1,454 days[b]
beta-BHC	319-85-7	184 days[c]	> 570 days[b]	100 days[c]	>280 days[b]

Chemical	CAS Number	Soil Half-Life			
		Aerobic Minimum	Aerobic Maximum	Anaerobic Minimum	Anaerobic Maximum
gamma-BHC (Lindane)	58-89-9	38 days[b]	107 days[c]	<15 days[b]	630 days[b]
delta-BHC	319-86-8	33.9 days[b]	< 570 days[b]	23.4 days[b]	Unavailable
BHCs	608-73-1	33.9 days[b]	184 days[b]	23.4 days[b]	100 days[b]
Dieldrin	60-57-1	2.5 years[c]	7 years[b]	> 6 months	Unavailable
Pentachlorophenol	87-86-5	1 days[c]	70 days[c]	10 days[c]	70 days[c]

[a]USGS, 2006. Description, Properties, and Degradation of Selected Volatile Organic Compounds Detected in Ground Water
[b]Toxnet, 2017. National Library of Medicine's TOXNET system (http://toxnet.nlm.nih.gov)
[c]ATSDR, 2017. Agency for Toxic Substances and Disease Registry, Toxicological Profiles (https://www.atsdr.cdc.gov/toxprofiles)

DDT has two isomeric forms (2,4'- and 4,4'-) which vary in the position of a chlorine atom in the molecule. DDT degrades in the environment to form the breakdown (daughter) products DDE and DDD. They also degrade quicker under anaerobic conditions (**Table 6.4-2**). DDT, DDE, and DDD can volatilize from soils and soil temperature plays a significant role in the rate of volatilization. Rates in tropical soils are much higher than those in temperate or colder climate soils (ATSDR, 2017).

Dieldrin, sometimes used as a pesticide itself, is also a product of the degradation of the pesticide aldrin. The half-life of dieldrin is generally higher than of BHC isomers (**Table 6.4-2**).

Lindane and other BHCs are readily adsorbed onto all types of soils. The rates of adsorption are related to soil adsorption capacity: soil bound residues are lower in sandy than loam soils, whereas presence of organic matter (carbon) in soil generally increases adsorption (Cornell University, 2017). Reported distribution coefficient of lindane in residuum-related soils, namely sandy loams, loams, and loamy sands, varies between 17.3 and 22.7 L/Kg (Cornell University, 2017). **Table 6.4-3** lists K_{oc} literature values for select Site COCs which can be used to estimate the distribution coefficient for a given fraction of soil organic carbon.

Table 6.4-3 Sorption Parameters of Select COCs

Chemical	CAS Number	log10 K_{oc} Range[a]		EPA Suite log10K_{oc} Estimate[a]		EPA Suite K_{oc} Experimental[a]
		Minimum	Maximum	From Molecular Fragments	From K_{ow}	
2,4 DDD	53-19-0	5.0789[a]	5.0942[a]	5.0789	5.0942	---
2,4 DDE	3224-82-6	5.0789[a]	5.0942[a]	5.0789	5.0942	---
2,4 DDT	789-02-6	5.2357[a]	5.8926[a]	5.2357	5.8926	---
4,4 DDD	72-54-8	4.7[a]	5.2244[a]	5.0701	5.2244	4.7 exp
4,4 DDE	72-55-9	4.42 [b]	5.6496[a]	5.0701	5.6496	4.82 exp
4,4 DDT	50-29-3	5.05[b]	5.9968[a]	5.2269	5.9968	5.31 exp
alpha BHC	319-84-6	3.25 [b]	3.5927[a]	3.4482	3.5927	---
beta BHC	319-85-7	3.25[b]	3.5927[a]	3.4482	3.5927	---

Chemical	CAS Number	log10 K_{oc} Range[a]		EPA Suite log10K_{oc} Estimate[a]		EPA Suite K_{oc} Experimental[a]
		Minimum	Maximum	From Molecular Fragments	From K_{ow}	
gamma BHC (Lindane)	58-89-9	1.664[b]	3.5927[a]	3.4482	3.5927	3.04 exp
delta BHC	319-86-8	2.845 [b]	3.5927 [a]	3.4482	3.5927	---
BHCs	608-73-1	2.60 [b]	3.5927 [a]	3.4482	3.5927	---
Dieldrin	60-57-1	3.2916 [b]	4.3675 [b]	4.303	3.7108	4.08 exp
Pentachlorophenol	87-86-5	pH dependent		3.6954	4.0684	3.7 exp
Benzene	71-43-2	1.75 [a]	2.1637 [a]	2.1637	1.8482	1.75 exp

[a]EPA, 2012. Estimation Programs Interface Suite™ for Microsoft® Windows, v 4.11]. United States Environmental Protection Agency, Washington, DC, USA.

[b]Toxnet, 2017. National Library of Medicine's TOXNET system(http://toxnet.nlm.nih.gov)

Dieldrin is significantly less mobile than BHCs as seen from its one order of magnitude higher Koc values (**Table 6.4-3**).

DDT, DDD, and DDE all have a higher Koc than either the BHCs or dieldrin by at least an order of magnitude (**Table 6.4-3**). Like dieldrin and the BHCs, DDT, DDD, and DDE are bound to soils, with increased adsorption with higher organic content soils (ATSDR, 2017).

Applying an equivalent porous media (EPM) approach for the bulk of the bedrock mass (matrix and secondary porosity combined), dissolved concentrations of any solutes downgradient of an assumed source can be estimated using a variety of analytical equations which solve the following general equation of contaminant fate and transport in one dimension (e.g., along horizontal *X* axis), known as advection-dispersion equation:

$$\frac{\partial C}{\partial t} = \frac{D_x}{R}\frac{\partial^2 C}{\partial x^2} - \frac{v_x}{R}\frac{\partial C}{\partial x} \pm Q_s \qquad (1)$$

Where *C* is dissolved contaminant concentration (kg/m^3, or mg/L); *t* is time (day); D_x is hydrodynamic dispersion in *x* direction (m^2/day); *R* is retardation coefficient (dimensionless); *x* is distance from the source along *X* axis (m); v_x is linear groundwater velocity in *X* direction (m/day); Q_s is general term for source or sink of contaminant, such as due to biodegradation (kg/m^3/dan). This term can also be expressed using the first-rate degradation constant, λ (1/day) which gives:

$$\frac{\partial C}{\partial t} = \frac{D_x}{R}\frac{\partial^2 C}{\partial x^2} - \frac{v_x}{R}\frac{\partial C}{\partial x} - \lambda C \qquad (2)$$

Equation (1) does not have an explicit solution and approximate solutions, based on simplifying assumptions, have been proposed by various authors.

As explained in Kresic (2007), one of the most popular analytical solutions of the advection-dispersion equation is the Domenico (1987) solution. This is an approximate three-dimensional (3D) solution that describes the fate and transport of a decaying contaminant plume evolving from a finite planar source. This solution was based on an approach previously published by Domenico and Robbins (1985) for modeling a non-decaying contaminant plume. Prior to this work, several authors presented exact solutions to the same or similar problems (Cleary and Ungs, 1978; Sagar, 1982; Wexler, 1992). However, these solutions are not closed form expressions since they involve numerical evaluation of a definite integral. This numerical integration step can be computationally demanding and can also introduce numerical errors (Srinivasan et al., 2007). The key advantage of the Domenico and Robbins (1985) approach is that it provides a closed form solution without involving numerical integration procedures. Due to this computational advantage, the Domenico solution has been widely used in several public domain design tools, including the EPA tools BIOCHLOR and BIOSCREEN (Newell et al. 1996; Aziz et al. 2000).

The analytical Domenico and Robbins (1985) solution for concentration of a semi-infinite contaminated parcel which moves in a homogeneous aquifer with a one-dimensional velocity in the positive *x* direction away from the continuous finite source, including three-dimensional dispersion, and no degradation, has the following form:

$$c(x,y,z,t) = \frac{c_o}{8} erfc\left[\frac{x-vt}{2(D_x t)^{1/2}}\right] \times \left\{ erf\left[\frac{y+\frac{Y}{2}}{2(D_y x/v)^{1/2}}\right] - erf\left[\frac{y-\frac{Y}{2}}{2(D_y x/v)^{1/2}}\right] \right\} \times \left\{ erf\left[\frac{z+\frac{Z}{2}}{2(D_z x/v)^{1/2}}\right] - erf\left[\frac{Z-\frac{Z}{2}}{2(D_z x/v)^{1/2}}\right] \right\} \quad (3)$$

Where *c* is the concentration in time *t* at the location with coordinates *x,y,z*; c_o is the initial concentration at the source; *erf* and *erfc* are error function and complimentary error function respectively; *v* is groundwater (advection) velocity in the direction of flow (*x* direction); D_x, D_y, D_z are dispersion coefficients in *x*, *y*, and *z* directions (longitudinal, transverse and vertical) respectively; *X*, *Y* and *Z* are contaminant source dimensions in three perpendicular directions.

In the 1987 solution, Domenico included a first-order decay term (*k*) leading to the following approximate equation for concentration of a degrading contaminant:

$$c(x,y,z,t) = \frac{c_o}{8} f_x(x,t) f_y(y,x) f_z(z,x)$$

where $$f_x(x,t) = \exp\left\{\frac{x}{2\alpha_x}\left[1-\left(1+\frac{4k\alpha_x}{v}\right)^{1/2}\right]\right\} \times erfc\left\{\frac{x-vt\left(1+\frac{4k\alpha_x}{v}\right)^{1/2}}{2(\alpha_x vt)^{1/2}}\right\}$$

$$f_y(y,x) = \left\{ erf\left[\frac{y+\frac{Y}{2}}{2(\alpha_y x)^{1/2}} \right] - erf\left[\frac{y-\frac{Y}{2}}{2(\alpha_y x)^{1/2}} \right] \right\}$$

$$f_z(z,x) = \left\{ erf\left[\frac{y+\frac{Z}{2}}{2(\alpha_z x)^{1/2}} \right] - erf\left[\frac{y-\frac{Z}{2}}{2(\alpha_z x)^{1/2}} \right] \right\} \qquad (4)$$

where $\alpha_x = D_x/v$; $\alpha_y = D_y/v$; $\alpha_z = D_z/v$ are the dispersivities in the *x*,*y*, and *z* directions respectively.

Although the Domenico solution has been extensively used in the industry and several widely-used analytical groundwater transport models are based on it (e.g., BIOCHLOR, BIOSCREEN, etc.) its approximate nature continues to be a subject of scientific debate (see West and Kueper, 2004; Guyonnet and Neville, 2004; West et al., 2007).

Karanovic et al. (2007) presented an exact analytical solution for the advection-dispersion-degradation equation. The exact solution is derived for the same conceptual model as Domenico (1987) but without invoking approximations in its evaluation that introduce errors of unknown magnitude in the analysis. The exact analytical solution is integrated seamlessly within a modified Excel-based analytical computer program called BIOSCREEN-AT which provides a simple and direct way to calculate an exact solution to the transport equation and, if desired, to assess the significance of the errors introduced by the Domenico (1987) solution for site-specific applications. BIOSCREEN-AT can be used to calculate concentrations of any COCs dissolved in groundwater (organic and inorganic) including effects of sorption, dispersion (in all three main perpendicular directions) and degradation. Notably, since the analytical model does not account for contaminant dilution due to infiltration of clean precipitation (groundwater recharge) along the pathway downgradient of the source, it is considered a conservative screening tool.

The EPM approach applied to the analytical F&T model of total BHCs at the Site is justified by the results of the well pumping tests, slug tests, packer tests, and geophysical logging of the bedrock borings which all show limited evidence of a network of hydraulically connected, dissolutionally enlarged fractures/bedding planes or karst conduits (“tertiary porosity”) that can allow for significant groundwater flow rates. For example, falling-head and rising-head slug tests were performed at eleven wells screened in the Shallow Zone or “epikarst” (less than 100 feet bgs), (URS, 2006). The hydraulic conductivity estimated from the test results for eight wells with valid results varied between 0.03 feet/day (at wells MW-B and MW-F) and 16.4 feet/day (MW-I). The geometric mean of the hydraulic conductivity for all wells was 0.59 feet/day. These values represent the bulk hydraulic conductivity of all of the following: (1) unconsolidated/semi-consolidated sediments in the epikarst zone formed by rock weathering, (2) consolidated rock matrix, and (3) any secondary porosity discontinuities. Notably, the hydraulic conductivity values are orders of magnitude lower than typical values representative of interconnected networks of karst features (conduits).

Although groundwater flow in deeper portions of the bedrock aquifer preferentially takes place along various secondary porosity discontinuities including fracture and bedding planes, a part of the flow and contaminant fate and transport is through the rock matrix as well. In addition, as

illustrated by the packer tests, most of the tested 10-foot intervals in deep bedrock wells, which by definition include both the discontinuities and the rock matrix, show very low flow rates or absence of measurable flow. Therefore, the contaminant fate and transport in the deeper bedrock can be expected to take place at significantly lower advective rates compared to the weathered shallow zone while still exhibiting overall contaminant attenuation as seen in **Table 6.4-1**.

Tables 6.4-4a and 6.4-4b list analytical model input parameters used for the calculations of groundwater flow, and contaminant fate and transport of BHCs between the monitoring well pairs located along the select flow paths in the two main directions of groundwater flow anisotropy: (1) the highest permeability/lowest hydraulic gradient to the southwest (well pair OW-4-70 / OW-14-96); and (2) the lowest permeability/steepest hydraulic gradient to the northwest and southeast (well pairs MW-I-55 / MW-F-70 and MW-A-51 / MW-B-55 respectively). The selected well pairs include the upgradient wells with the highest historic and most recent total BHC concentrations of any Site wells. In addition, all selected wells have BHCs concentration data for at least 10 years preceding the most recent 2017 sampling results thus allowing for time-dependent fate and transport model calculations and calibration.

Table 6.4-4a Input Parameters for the Analytical Model of Groundwater Flow and Fate and Transport of BHCs

Monitoring Well Pair	Average Head Difference, 2017 (ft)	Distance (ft)	Hydraulic Gradient	Hydraulic Conductivity (ft/d)	Hydraulic Conductivity (cm/s)	Effective Porosity	Seepage Velocity (ft/yr)
OW-4-70 OW-14-96	7.98	1244	0.0064	0.03 (minimum)	$1.1x10^{-5}$	0.10	0.7
				16.4 (maximum)	$5.8x10^{-3}$		384
				0.59 (average)	$2.1x10^{-4}$		13.9
MW-I-55 MW-F-70	18.2	378	0.048	0.03 (minimum)	$1.1x10^{-5}$	0.10	5.5
				16.4 (maximum)	$5.8x10^{-3}$		2880
				0.59 (average)	$2.1x10^{-4}$		104
MW-A-51 MW-B-55	10.09	386	0.026	0.03 (minimum)	$1.1x10^{-5}$	0.10	3.0
				16.4 (maximum)	$5.8x10^{-3}$		1560
				0.59 (average)	$2.1x10^{-4}$		56.5

Table 6.4-4b Input Parameters for the Analytical Model of Groundwater Flow, and Fate and Transport of BHCs

Monitoring Well Pair	Initial Source Well Total BHCs Conc. (µg/L)	2017 Total BHCs Conc. (µg/L)	Longitudinal Dispersivity (ft)	K_{oc} (L/kg) (log Koc = 3.04)	Fraction Organic Carbon	Retardation Factor	Solute Half-Life (days)	Solute Half-Life (year)	1st Order Decay Coefficient (1/yr)
OW-4-70 (upgradient)	11.2	5.13	65	1096.48	0.0001	3.8	1454 (max)	3.980	0.17
OW-14-96 (downgradient)		0.891							
MW-I-55 (upgradient)	87	8.39	18	1096.48	0.0001	3.8	1454 (max)	3.980	0.17
OW-F-70 (downgradient)		0.5832							

Monitoring Well Pair	Initial Source Well Total BHCs Conc. (µg/L)	2017 Total BHCs Conc. (µg/L)	Longitudinal Dispersivity (ft)	K_{oc} (L/kg) (log Koc = 3.04)	Fraction Organic Carbon	Retardation Factor	Solute Half-Life (days)	Solute Half-Life (year)	1st Order Decay Coefficient (1/yr)
MW-A-51 (upgradient)	251	37.19	19	1096.48	0.0001	3.8	1454 (max)	3.980	0.17
MW-B-55 (downgradient)		0.0644							

Notes:
Longitudinal dispersivity assumed 1/10 of the distance between wells (see Table 6.4-4a)
Transverse and vertical dispersivity are 0.1 and 0.01 of longitudinal dispersivity respectively
Soil bulk density is 1.9 Kg/L (residuum and weathered limestone/epikarst)

The average hydraulic gradients between the wells along the select flow paths in shallow groundwater are calculated from the potentiometric surface contour maps on **Figures 4-14 through 4-17.**

BHC degradation half-lives were conservatively simulated with their maximum reported values for any of the individual isomers as shown in **Table 6.4-2**. The retardation factor was calculated using a conservative experimental value of log K_{oc} for gamma BHC (lindane) of 3.04 (**Table 6.4-3**) and conservatively assumed soil organic carbon contents of only 0.0001 (0.01 percent) even though the highly weathered epikarst zone would be expected to have a higher percentage of organic matter.

The source decaying constant, which quantifies the rate of concentration decrease at the source wells, was calculated from the available total BHCs concentrations at the source wells for the span of 10 years with data available, using the initial source concentrations in 2007 and the 2017 concentrations (see Tables 6.4-1 and 6.4-4b). The exponential decay constant for the source well OW-4-70 is 0.077 yr^{-1}, for the source well MW-I-55 it is 0.234 yr^{-1}, and for the source well MW-A-51 it is 0.191 yr^{-1}.

Figures 6-3 through 6-8 show the results of the analytical model of fate and transport of BHCs dissolved in groundwater. As can be seen, the model reasonably accurately matches or conservatively over predicts the observed concentrations downgradient of the source wells after ten years of transport (2007-2017) for the selected input parameters represented by values within their expected ranges. The model-predicted concentrations of total BHCs 100 years into the future are expected to be below levels of concern (0.0000992 mg/L) for both the downgradient well locations and beyond, i.e., the overall total BHCs plume is expected to shrink from its current extent and eventually dissipate.

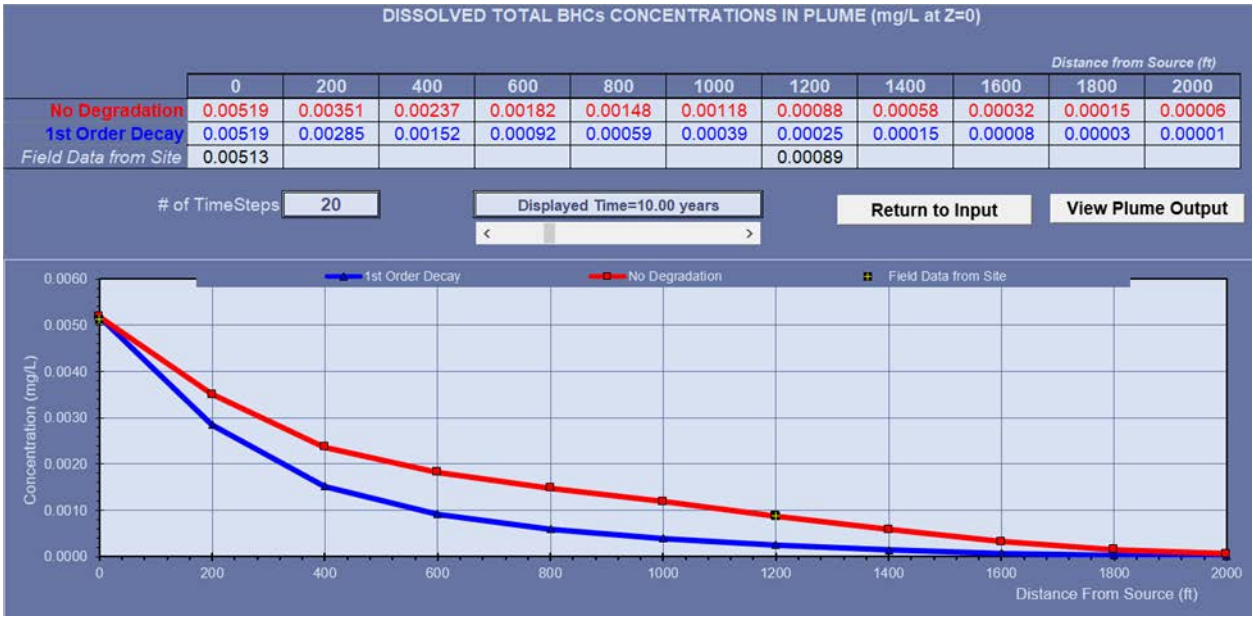


Figure 6-3. Predicted concentration of total BHCs (in mg/L) in year 2017, for the monitoring well pair OW-4-70 / OW-14-96, calibrated model. The source well OW-4-70 is at distance zero (field-observed concentration is 0.00513 mg/L), and the downgradient well OW-14-96 is approximated at distance 1200 feet from the source by the field-observed concentration of 0.00089 mg/L. The hydraulic conductivity is 16.4 feet/day, the highest slug test-based value at the Site.

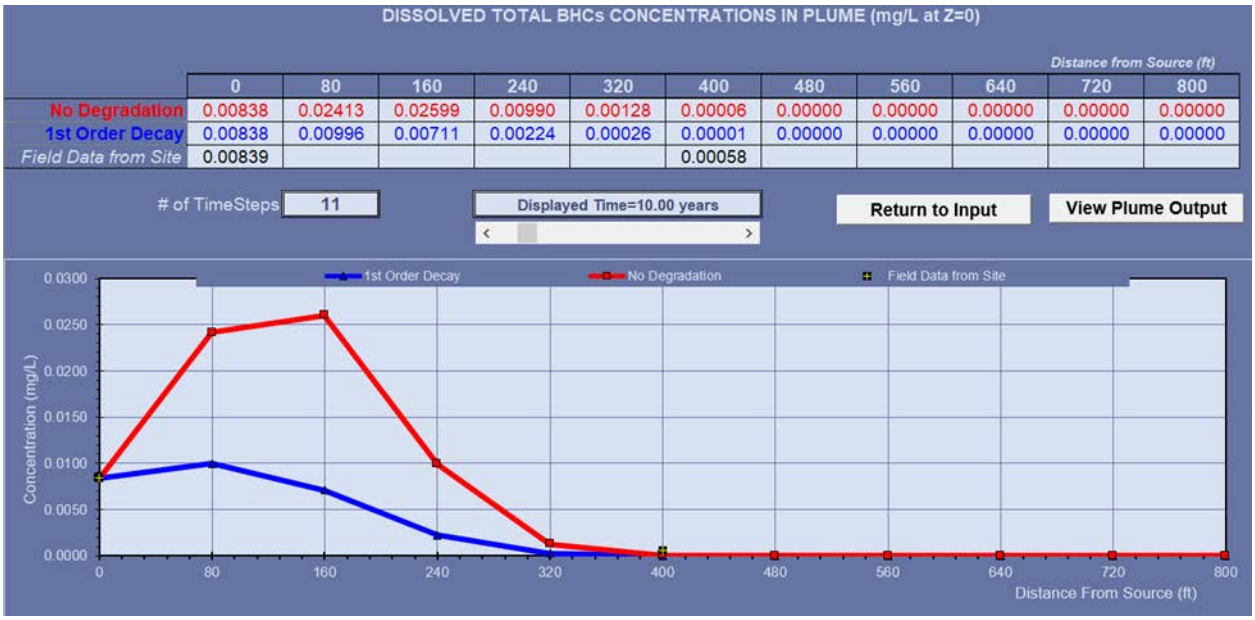


Figure 6-4. Predicted concentration of total BHCs (in mg/L) in year 2017, for the monitoring well pair MW-I-55 / MW-F-70. The source well MW-I-55 is at distance zero (field-observed concentration is 0.00839 mg/L), and the downgradient well MW-F-70 is approximated at distance 400 feet from the source by the field-observed concentration of 0.00058 mg/L. The hydraulic conductivity is 0.25 feet/day (the minimum slug test-based value at the Site is 0.03 feet/day).

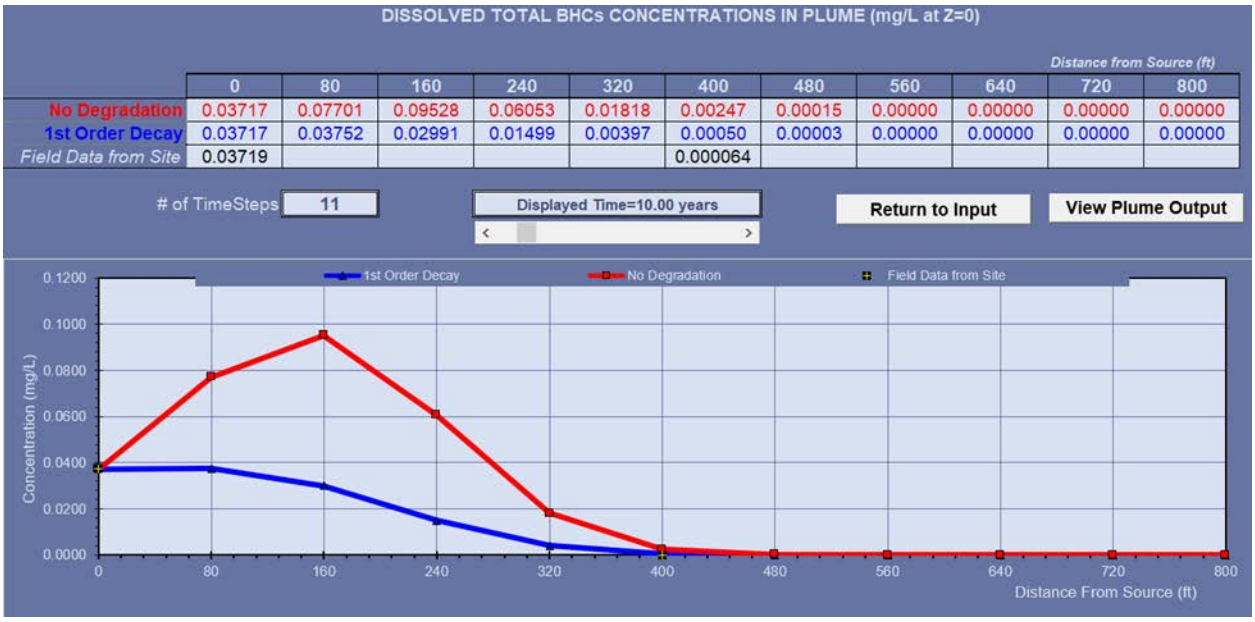


Figure 6-5. Predicted concentration of total BHCs (in mg/L) in year 2017, for the monitoring well pair MW-A-51 / MW-B-55. The source well MW-A-51 is at distance zero (field-observed concentration is 0.03719 mg/L), and the downgradient well MW-B-55 is approximated at distance 400 feet from the source by the field-observed concentration of 0.0000644 mg/L. The hydraulic conductivity is 0.03 feet/day, the lowest slug test-based value at the Site. Note that the model over predicts the field-observed concentration and is therefore conservative.

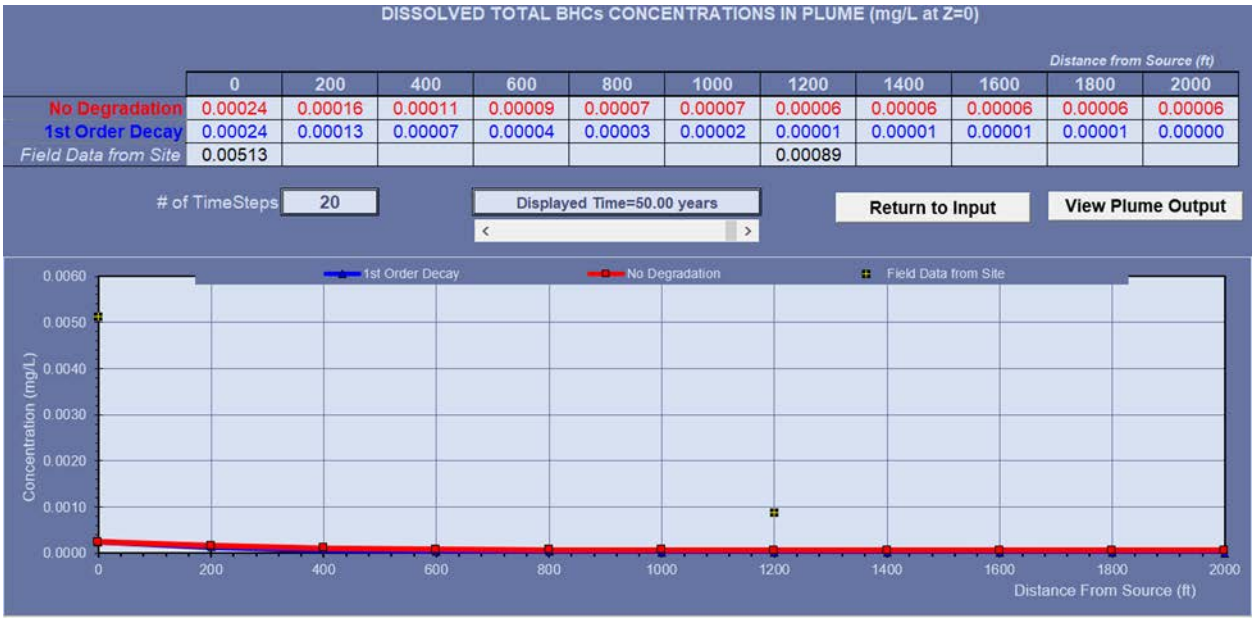


Figure 6-6. Predicted concentration of total BHCs (in mg/L) in year 2117, for the monitoring well pair OW-4-70 / OW-14-96.

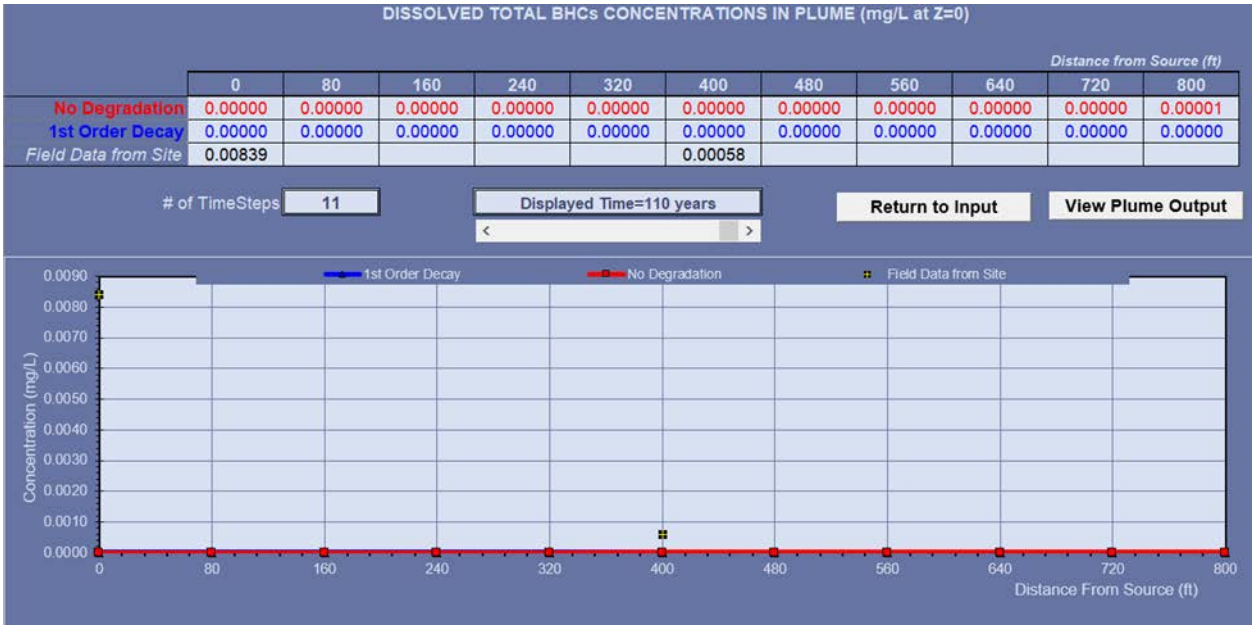


Figure 6-7. Predicted concentration of total BHCs (in mg/L) in year 2117, for the monitoring well pair MW-I-55 / MW-F-70.

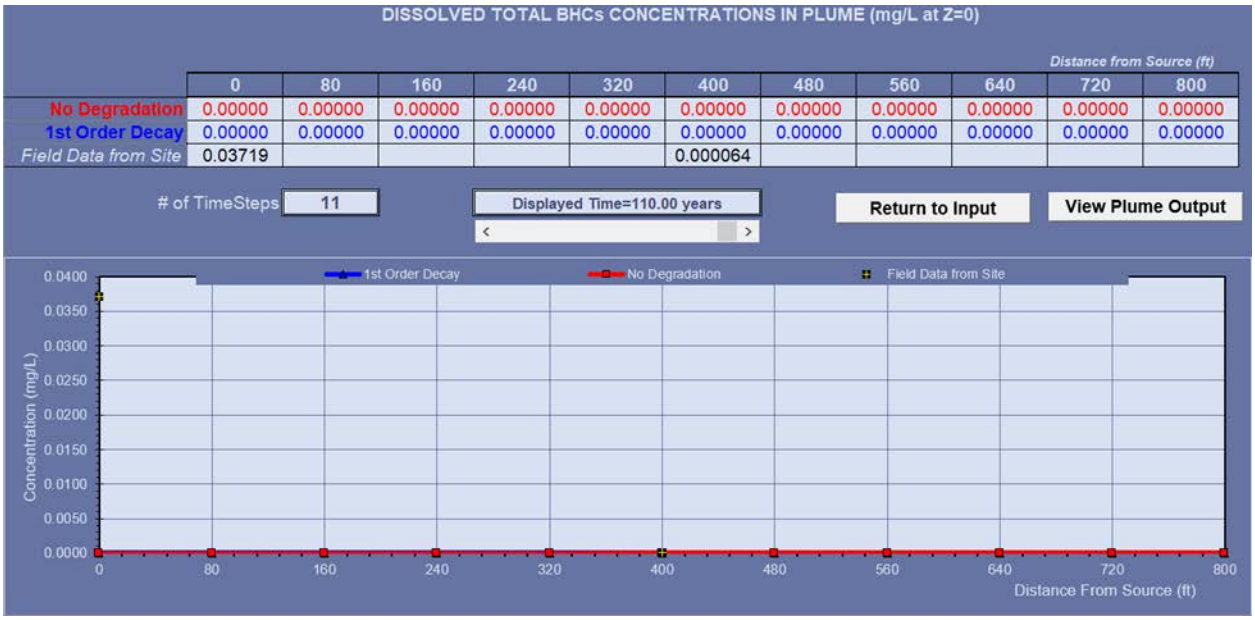


Figure 6-8. Predicted concentration of total BHCs (in mg/L) in year 2117, for the monitoring well pair MW-A-51 / MW-B-55.

The screening-level, conservative analytical model of fate and transport of total BHCs at the Site has the following limitations:

- It assumes that the porous media is homogeneous, with uniform values of model input parameters along the modeled flow path, the so-called Equivalent Porous Media (EPM) approach. As discussed in detail in previous sections of the RI, the actual field conditions

show that the groundwater flow and contaminant fate and transport are taking place through the heterogeneous limestone bedrock including its upper highly weathered portion (epikarst). Nevertheless, the field data including extensive testing in tens of monitoring wells and borings, and analytical groundwater samples collected over a decade indicate that the derived model input parameters reasonably accurately, albeit conservatively, simulate the fate and transport of COCs through the bulk (primary and secondary) porosity.

- The model simulates average annual groundwater flow conditions observed by the monitoring wells and is in steady-state. It does not simulate seasonal or more frequent changes caused by recharge events and does not account for any impacts of the non-contaminated recharge water such as dilution of the plume.
- The model does no simulate any groundwater withdrawal (pumping).

It should be noted that the remedy for OU-1 currently being implemented for both the soils and groundwater will minimize any ongoing loading of COCs from the soils/unsaturated zone to groundwater. In addition, the GETS will contain the most impacted Site groundwater thus preventing significant downgradient migration of COCs off-Site. This remedy was not simulated by the simple screening-level analytical fate and transport model the results of which should therefore be considered very conservative: the model likely over predicts the concentrations of COCs along the flowpath.

7.0 Uncertainty Analysis

Uncertainties and limitations are inherent in the remedial investigation process, and EPA guidance acknowledges that some uncertainty is acceptable. Large uncertainties can lead to an over- or under- estimation of the delineation of COCs and the potential exposure routes. Available data quality, incomplete information about existing conditions and future circumstances, as well as other factors contribute to these uncertainties and limitations.

At a meeting with EPA and MDE on March 1, 2018, several specific technical issues were discussed that are appropriate to consider as uncertainties. This section discusses the following specific technical sources of uncertainty:

- Karst migration pathway
- Background conditions
- COC delineation data gaps
- EPA Tracer Study

7.1 Karst Migration Pathway

The Site is underlain by fractured bedrock. In general, the physical and hydraulic characteristics of individual bedrock fractures and the degree of interconnection within fracture networks is not precisely determinable. Further, the bedrock beneath the Site is a karstic system within which bedrock fractures are prone to solutioning and linear "conduits" can develop acting to redirect groundwater flow toward discharge zones. This adds another level of complexity to the fractured rock water-bearing system. In this RI, the interpretation of the available hydrogeologic and groundwater analytical data supports the conclusion that the solute transport from the Site has been controlled largely by the structural geology and flow primarily occurs within secondary porosity characterized by low to moderate transmissivity. Karstic features, though present, are not sufficiently widespread or transmissive enough to have a discernable effect on the measured distributions of chemicals in groundwater. It is recognized, however, that some diversion of groundwater flow in the karst conduits may result in migration to surface water, but may not be sufficient to distort the measured distribution in groundwater.

As discussed in above and in Section 7.4 below, EPA's tracer study results indicate that dye injected at various locations on-Site may flow to one or more springs in the area. EPA concluded, based on this study, that karst features are preferential migration pathways for Site-derived chemicals. Conversely, sampling of the springs did not indicate BHC presence (which is mobile and is the pesticide most associated with site groundwater impacts). However, karst conduits may transmit Site-derived chemicals only intermittently, which would explain the lack of detections in a discreet sampling event and, on a wider scale, might also explain the observed lack of plume distortion.

In order to observe this intermittent transport to springs (if such occurs), EPA has requested and the Respondent Group has agreed to conduct a passive sampling program where "time-integrated" samples will be collected continuously from spring locations over a time period that includes two wet seasons (6-months). If a valid passive sampling method can be identified and implemented, the uncertainty regarding the nature of transport in karst conduit could be reduced (though by no means eliminated).

Regardless of the results of the passive sampling (if conducted), there will always be uncertainties in the characterization of groundwater flow and solute transport in the fractured rock beneath the Site, exacerbated by the presence of karstic features. This is unavoidable.

Nevertheless, the data generated for this RI are sufficient to form the basis for development and analysis of remedial alternatives in a Feasibility Study provided the uncertainties inherent in the fractured bedrock system are recognized and considered in the analysis.

7.2 Background Conditions

As presented in **Appendix B**, publicly available agricultural records of Washington County, Maryland and other publications confirm apparent wide-spread historical agricultural usage of pesticides in the county.

In addition, several of the metals identified as COCs in the 2009 ROD and detected in groundwater above the respective RSLs (arsenic, aluminum, beryllium, iron, manganese and thallium) are known to be naturally occurring. While not confirmatory, this information suggests that concentrations of pesticide and metal COCs in groundwater, surface water, springs and sediments may include background conditions not related to the Site.

As presented in Section 5.9.3 of this report, arsenic is present at concentrations exceeding the RSL of 0.052 µg/L in almost all on-Site and off-Site monitoring wells, as well as the FHCC well located more than one mile north of the Site. Sixty percent of all monitoring wells have had arsenic detections consistently between 0.2 and 0.9 µg/L in all of the quarterly monitoring events. Based on the available information, elevated concentrations of arsenic appear to be distributed throughout the study area.

Dieldrin is detected in springs, surface water and sediment as well as groundwater over a large area. However, dieldrin in groundwater appears to be delineated vertically, as well delineated horizontally to the north and west of the Site and therefore concentrations of dieldrin in springs and surface water may not be related to on-Site source areas.

Based on readily available information, it appears a background assessment for arsenic, dieldrin and potentially other constituents would be helpful prior to completing the risk assessment activities. Of the 51 groundwater monitoring wells currently in the RI study area, five wells have had non-detectable concentrations, and/or low concentrations below respective RSLs, for DDx, BHCs, and dieldrin: OW-3-105, OW-12-232, OW-13-250, OW-15-202, and OW-16-448. However, in these wells arsenic remains above the RSL with historic concentrations of arsenic ranging from 0.25 to 7.9 µg/L. These monitoring wells along with more distant irrigation wells may form the core data set for a background study. Additionally, we understand that Maryland Geological Survey operates other wells in the area that may be incorporated into an assessment of background conditions.

7.3 COC Delineation

Groundwater sampling data from April 2014 and the four quarterly groundwater sampling events conducted in 2016-2017 show fewer COCs exceeding their respective RSLs in off-Site monitoring wells. In addition, maximum concentrations observed were typically lower in off-Site monitoring wells than in on-Site wells indicating significant retardation and/or degradation of COCs. During the 4th quarterly sampling event in July/August 2017, COCs with the exception of arsenic, chloroform and bis(2-ethylhexyl)phthalate (common laboratory contaminants) were not detected above the respective RSLs in nine off-Site monitoring wells, including one of the deepest wells, OW-17-600 screened from 565 to 600 feet bgs.

Figures 5-8A through 5-9F depict the 4th quarter 2017 groundwater concentrations of surrogates representative of general COC distribution (benzene, pentachlorophenol, arsenic, dieldrin, total BHCs, and total DDX). As shown on the figures, arsenic appears to be a

background condition that is detected above the RSL throughout the study area. Dieldrin appears to be delineated vertically and horizontally to the west, north, and northeast. Benzene, pentachlorophenol, total BHCs and total DDX appear to be delineated horizontally and vertically to concentrations below the respective RSLs.

Despite some delineation uncertainty, groundwater data collected for the OU-2 RI since 2011 shows that the concentrations of COCs are generally decreasing. The contaminant plume as understood in 2007 (**Figure 6-2)** has remained essentially unchanged. While there may be some uncertainty related to the data gaps as several COCs have been detected above the respective RSLs in the deepest screened wells (down to 600 feet) and in three wells at the greatest horizontal distance from the Site, these gaps do not impede the ability to conduct a Feasibility Study.

7.4 EPA Tracer Study

As part of OU-2 RI activities, EPA performed an independent tracer study at the Site between May 2014 and December 2015. The purpose of the tracer study was to investigate possible hydraulic connections between the Site and local springs. The tracer study report identified several interpreted connections between the Site and springs/surface water bodies up to 4 miles away; however, there are uncertainties that could impact the interpretation of the tracer study results.

The key uncertainties in the tracer study are associated with the interpretation of background and limitations related to mass recovery. As stated in the tracer study Work Plan, domestic sewage, certain laundry products (including optical brighteners) and automobile antifreeze can produce the same signature as sodium fluorescein (Acid Yellow 73), the fluorescent dye utilized for the tracer study. As a result, there is a potential for false positive observations to impact the conclusions. An illustrative example is Bester Long Quarry which was identified as having an apparent connection with the Site. At Bester Long Quarry, background tracer concentrations were detected prior to any tracer injection at the Site. A similar example of tracer concentration being detected prior to injection is from Herald Mall Spring. These examples indicate other sources of tracer-like substances were detected prior to tracer study initiation and consequently, introduce some uncertainty regarding the apparent connection between the Site and the springs identified in USEPA's report. The tracer study report attempted to correct for background by adjusting the test results using a single mean background concentration for each location.

However, according to the report, tracer dye "background concentration measurements were quite erratic and unpredictable". Reducing these erratic measurements to a single mean background concentration for each location could lead to a false interpretation of post-injection spikes as an appearance of Acid Yellow 73. A typical example is at the Rest Haven North spring (which USEPA identifies as a possible connection) where the analyzed background concentrations of the tracer prior to dye injection had multiple peaks higher than the peaks observed after dye injection.

The report listed a wide range of tracer-dye mass recovery percentages (e.g.: Test 1: 24%, Test 2: 8%, and Test 3: 112%). The report appropriately identified several problems with monitoring points which could have contributed to this significant variation including: logger malfunction, absence of background concentration data, late installation of loggers, sediment buildup near the sensors, logger being removed from monitoring station by others, partial exposure of the logger to sunlight, logger failed due to dead batteries, frozen over loggers, and logger blocked

by a plastic bag, black waste product, etc. This wide range of mass recovery could introduce uncertainties regarding the confidence in conclusions about hydraulic connections.

Finally, the Tracer Study Work Plan identified a number of other factors that could impact the data collected during the tracer study, including: pH, temperature, sorption, fluorescent dye decay, and weather patterns, including duration and intensity of groundwater recharge episodes. Unfortunately, these factors and any potential impacts on conclusions were not discussed in the Tracer Study report, so it is unclear as to whether or not additional uncertainty was introduced by these factors.

Due to the various uncertainties described above, the tracer study in and of itself, does not conclusively prove connections between the Site and the springs sampled by USEPA. To further assess potential connection between the Site and certain springs, a passive surface water and spring sampling program is being planned to obtain time-integrated water quality data.

8.0 Conclusions

The OU-2 RI Report presents the investigation tasks, methodologies, data and interpretations made to characterize the Site and evaluate the nature and extent of groundwater impacted by COCs. These data inform the HCSM and were used to evaluate the fate and transport of COCs. The data were collected during the following field investigation activities:

- Evaluation and sampling of private water supply wells;
- Sub-slab vapor intrusion evaluation;
- Sampling of surface water in various local streams and springs;
- Sampling of surface water and sediment in the Bester Long Quarry; and,
- Comprehensive quarterly groundwater sampling events.

Based on both observational and empirical remedial investigation data, the following conclusions have been made:

- The Site is situated over a thin epikarst unit overlying limestone bedrock. The bedrock has been substantially deformed by folding and other major structural features resulting in complex anticline-syncline parings across the Site.
    - The strike of the bedrock structure is northeast-southwest.
    - The bedrock structure results in fractures, joints and bedding planes that provide secondary porosity for groundwater flow.

- In the upper epikarst unit, at depths generally less than 100 feet bgs, the geology contains overburden and karstic limestone with solution-widened fractures and occasional open or mud-filled voids.
    - The karst conditions in the shallow unit result in tertiary porosity that is a pathway for groundwater flow.
    - An EPA tracer test confirmed that tertiary porosity is present.

- Groundwater flow in bedrock is through fractures, bedding planes, and solution widened karst features. Site data suggest varying degrees of interconnected porosity. No high hydraulic conductivity values typically associated with well interconnected tertiary porosity were measured during the remedial investigation.
    - Hydraulic slug testing yielded hydraulic conductivity data that suggest secondary porosity is dominant.
    - Packer testing identified water bearing zones with sustained pumping rates of five gallons per minute or less in approximately 80% of tested intervals.
    - Hydraulic testing demonstrated that significant yields in bedrock at depths below 100 feet bgs are rare.

- Shallow groundwater flow (depths less than 100 feet bgs) on the Site is outward from the central portion of the Site from an elongated groundwater mound with its long axis oriented parallel to the northeast-southwest strike of the bedrock structure. On-Site, there is a generally downward vertical hydraulic gradient.
    - An overturned dipping anticlinal structure just west of the Site appears to impede but not prevent groundwater flow in that direction.
    - The EPA tracer study asserts connections to several spring locations indicating potential groundwater pathways from the Site.

- Groundwater flow at depths greater than 100 feet bgs and down to 600 feet bgs is generally toward the south-southeast driven by lower hydraulic head elevations and local discharge boundaries as part of the regional flow regime.

- The empirical RI data indicate that groundwater impacts originate due to releases from the former WMA and other Site soils. The most significant source is the former WMA. These sources are being remediated in 2017-2019 under the OU-1 ROD.

- The data indicate that COCs have migrated both laterally and vertically downward in groundwater as a function of groundwater gradients.
- The nature and extent of groundwater impacts by COCs have been sufficiently delineated.
    - Horizontally:
        - 2,200 feet to the northeast;
        - 2,700 feet to the southwest;
        - 800 feet to the southeast; and,
        - 400 feet to the northwest.
    - Vertically:
        - COCs have been detected to depths of at least 600 feet bgs.

- Five groundwater sampling events have been conducted since 2014. The plume size and orientation is essentially unchanged since the 2009 Groundwater RI Addendum was submitted to EPA indicating that the plume is stable. In some monitoring wells, concentrations appear to be decreasing.

- The following COCs were analyzed to assess COC delineation:
    - Arsenic: Elevated concentrations of arsenic in groundwater have historically been identified in both on-Site and off-Site monitoring wells. The distribution of arsenic appears to be wide-spread. There is an uncertainty as to potential background arsenic conditions. An evaluation of arsenic background conditions is recommended.
    - Benzene: The distribution of benzene appears to be limited to on-Site monitoring wells.
    - Dieldrin: Elevated concentrations of dieldrin in groundwater appear to be concentrated in shallow groundwater in the northern and central portions of the Site and is detected in off-Site monitoring wells. Dieldrin is also detected over a wide area in off-Site surface water, spring and sediment sample results. There is an uncertainty as to potential background dieldrin conditions. An evaluation of dieldrin background conditions is recommended.
    - Pentachlorophenol: Detections of pentachlorophenol are limited to on and near the southern side of the Site.
    - BHC (Total): BHC is considered an indicator parameter; its delineation has been used to define the plume in groundwater. Elevated concentrations of BHCs have been detected on-Site and in off-Site monitoring wells. Highest concentrations are observed in shallow groundwater on the northern portion of the Site, with contaminant migration toward to the south in deeper groundwater intervals
    - DDx (Total): The distribution of total DDx is concentrated in shallow monitoring wells on the northeast and central portions of the Site.

- COC migration both horizontally and vertically appears to be largely controlled by groundwater flow through the bedrock structure and associated secondary porosity. This finding is consistent with the OU-1 CSM (OU-1 Record of Decision).
- Private wells in the area have been identified and sampled. The results provide no clear nexus to the Site.
- Analytical modeling predicts that concentrations of total BHCs are declining as expected and that 100 years into the future are expected to be below levels of concern (0.0000992 mg/L) for both the downgradient well locations and beyond, i.e., the overall total BHCs plume is expected to shrink from its current extent and eventually dissipate.
- EPA's tracer study evaluated tertiary (karst) porosity as a potential pathway for COC migration from the Site to surrounding areas. The empirical data collected:
    - Assert that tertiary porosity may be a groundwater flow path
        - Identified apparent groundwater flow connections between dye injection points on the Site and Bester Long Quarry, Antietam Creek, Antietam Falls, and two springs northwest of the Site (Troupe Spring 1 & 2).
    - Does not support an interpretation that tertiary porosity is a significant contaminant transport pathway. The detections in the spring samples may not represent COCs, suggesting constituents may not be currently migrating to springs via karst features at measurable levels
        - The non-detect results for surface water, spring and sediment analytical data collected during the tracer study are consistent with plume delineation.
        - BHC, a key indicator parameter, was not detected in any spring or surface water samples.
        - Most COCs were not detected in any spring or surface water samples.
- The HCSM has been clarified and refined, but is not substantially changed from that described in the OU-1 RI and OU-1 ROD.
- Uncertainties have been identified that include:
    - Complexity of the fractured bedrock regime.
    - Potential background conditions in soil and groundwater for several constituents, particularly arsenic and dieldrin.
    - Full delineation to their respective RSLs of select COCs in groundwater.
    - Background levels of tracer-like substances that could have led to a false interpretation of post-injection spikes as an actual appearance of the tracer, and a wide range of mass recovery.

Since the 2010 OU-2 RI Work Plan, the OU-2 RI has been comprehensive and provides a large body of data and observations on which remedial decisions can be based. While some uncertainties have been identified, Site characterization of the nature and extent of

contamination is sufficient to proceed with Risk Assessment and Feasibility Study to support remedial decisions.

9.0 Recommendations

Based on the findings and conclusions of the RI, the following recommendations are made:

- A background groundwater study using statistical analysis should be conducted to evaluate background concentrations of COC pesticides and metals in groundwater. The background study would utilize off-Site monitoring well groundwater data and readily available monitoring well network data from the Maryland Geological Survey and Maryland Department of the Environment.
- A passive surface water and spring sampling program should be conducted to obtain time-integrated water quality data for a six-month period (two wet seasons). Upon issuance of the RI Report, the Amec Foster Wheeler will consult with EPA on the sampling methodology (and associated sampling devices), locations and other methodology issues, and prepare a work plan for EPA review and approval. This work plan should include collection of samples at locations in other areas of Washington County (i.e. more than 2 miles from the Site) to assist in evaluating background conditions.

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Table 2-1

Rationale for Monitoring Well Locations 2003 to 2012
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Monitoring Well No.	*Rationale for Well Location*
Phase I RI - On-Site Wells - 2003	
MW-A-51	Eastern boundary of former Waste Management Area (known soil contamination).
MW-B-55	Southeast property boundary, approximately 400 feet downgradient of former Waste Management Area (perpendicular to bedrock strike).
MW-C-40	Evaluate area which underlies the drainage swale; approximately 500 feet south of former Waste Management Area. The swale trends NNE-SSW and overlies an area of shallow bedrock identified by the microgravity survey.
MW-D-77	Southern portion of property; south of former fertilizer plant; approximately 750 feet south (oblique to bedrock strike) of former Waste Management Area.
MW-E-46	Western property boundary adjacent to former warehouse and railroad siding, approximately 450 feet southwest (along bedrock strike) from formerWaste Management Area.
MW-F-70	Northwest property boundary; north of facility buildings; approximately 300 feet west-southwest (oblique to bedrock strike) from former Waste Management Area.
Phase II RI - On-Site Wells - 2004	
MW-G-35	Determine if the low permeability bedrock observed at MW-D-77 extends to the southern property line. Approximately 850 feet south (oblique to bedrock strike) of former lWaste Management Area.
MW-H-65	Center of the Site, approximately 300 feet south of former Waste Management Area.
MW-I-55	Southwest boundary of the formerWaste Management Area.
MW-J-71	Northeast boundary of the former Waste Management Area.
MW-K-80	Approximately 100 feet northwest of and perpendicular to bedrock strike from the former Waste Management Area.
MW-L-48	Northwest property corner, near former Building 7 (storage warehouse). Approximately 400 feet west-southwest (oblique to bedrock strike) from the former Waste Management Area.
Supplemental RI - On-Site Wells - 2005-2006	
MW-M-50 MW-N-83 & MW-N-113 (well couplet)	Southwest boundary of former Waste Management Area. Evaluate extent of groundwater "mound" observed at well MW-I-55; evaluate vertical gradients and vertical extent of impacted groundwater at former Waste Management Area.
PDI - On-Site Wells - 2011-2012	
EW-1-110	Installed as extraction well (pumping well) for PDI pump test hydraulic control investigation. Located along bedrock strike immediately south of and outside confirmed boundary of the former Waste Management Area.
MW-O-145	Installed as observation well for EW-1-110 pumping during PDI pump test hydraulic control investigation. Located parallel to bedrock strike with respect to EW-1-110; northeast of EW-1-110 and outside confirmed boundary of the former Waste Management Area.
MW-P-235	Installed as observation well for EW-1-110 pumping during PDI pump test hydraulic control investigation. Located perpendicular to bedrock strike (i.e., down bedding plane dip) with respect of to EW-1-110; southeast of EW-1-110 and outside confirmed boundary of the former Waste Management Area. Note: 1-inch diameter piezometer (PZ-P-165) installed in MW-P borehole and portion of MW-P borehole from 62 feet bgs (base of steel casing) to 100 feet bgs left open (ungrouted) to allow for water level monitoring purposes.
MW-Q-150	Installed as observation well for EW-1-110 pumping during PDI pump test hydraulic control investigation. Located parallel to bedrock strike with respect to EW-1-110; southwest of EW-1-110 and outside confirmed boundary of the former Waste Management Area. Note: 1-inch diameter piezometer (PZ-Q-118) installed in MW-Q borehole for water level monitoring purposes.
Former Waste Management Area Piezometers	Installed to eveluate the presence or absence of overburden (soil zone) groundwater in the former Waste Management Area and to supplement the PDI hydraulic control investigation. Four shallow piezometers (PZs-1S-10, 2S-13, 3S-15, and 4S-18) installed within the former Waste Management Area with bottom 5-feet screen section set at the base of the waste material. Four deep piezometers (PZs-1D-23, 2D-34, 3D-25, and 4D-44) installed within the former Waste Management Area with bottom 5-feet screen section set in the soil immediately above the top of bedrock.

Table 2-1

Rationale for Monitoring Well Locations 2003 to 2012
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Monitoring Well No.	*Rationale for Well Location*
Supplemental RI - Off-Site Wells - 2005-2006	
OW-1-62 & OW-1-105 (well couplet)	On Kasinof Ave., approximately 650 feet north (oblique to bedrock strike) of the former Waste Management Area. Evaluate groundwater flow direction and the potential vertical gradient.
OW-2-65 & OW-2-115 (well couplet)	On West Irwin Ave., approximately 650 feet northeast (along bedrock strike) of the former Waste Management Area. Evaluate groundwater flow direction, vertical gradients, and water quality.
OW-3-55 & OW-3-105 (well couplet)	On Florida Ave., approximately 1200 feet south-southwest (oblique to bedrock strike) of the former Waste Management Area. Evaluate groundwater flow direction, vertical gradients, and water quality.
OW-4-70	On Florida Ave., approximately 1200 feet south-southwest (along bedrock strike) from the former Waste Management Area. Evaluate groundwater quality and flow direction.
OW-5-90 (well couplet with OW-7-242)	Intersection of Langdon and Linganore, approximately 1350 feet south-southwest (along bedrock strike) from the former Waste Management Area. Evaluate groundwater quality and flow direction.
OW-6 (abandonned 2009)	On Arlington Ave., approximately 1400 feet west (perpendicular to bedrock strike) from the former Waste Management Area. Evaluate groundwater quality and flow direction.
Additional Groundwater Investigation - Off-Site Wells - 2006-2008	
OW-7-242 (well couplet with OW-5-90)	Proximal to OW-5-90 (Intersection of Langdon and Linganore), approximately 1350 feet south-southwest (along bedrock strike) from the former Waste Management Area. Evaluate vertical extent of impacts to groundwater quality, also evaluate vertical gradients and stratigraphy at this off-site location.
OW-8-230 (well couplet with OW-2-65 & 2-115)	Proximal to OW-2-65 and 2-115 (West Irwin Ave.), approximately 650 feet northeast (along bedrock strike) from the former Waste Management Area. Evaluate vertical extent of impacts to groundwater quality, also evaluate vertical gradients and stratigraphy at this off-site location.
OW-9-125	North of the site near the intersection of Beechwood Drive and Pennsylvania Avenue and approximately 1400 feet north of OW-2 and approximately 2000 feet northeast of the former Waste Management Area: to evaluate chemical transport to the northeast along bedrock strike from the former Waste Management Area.
OW-10-250	North of the site near the intersection with West Irwin Avenue and Pennsylvania Avenue. Approximately 1300 feet northeast of the former Waste Management Area: bound the extent of groundwater containing site-related compounds to the east of OW-2 and northeast of the former Waste Management Area.
OW-11-240	Southeast of the site on Burhans Boulevard, approximately 1150 feet southeast (perpendicular to bedrock strike) of former Waste Management Area. Evaluate groundwater quality and flow direction.
OW-12-232	South of the site along Burhans Boulevard, approximately 1400 feet south of MW-G-35 and approximately 2300 feet south (oblique to bedrock strike) from the former Waste Management Area. Evaluate groundwater quality and flow direction.
OW-13-250	Southwest of the site near the intersection of Mitchell Avenue and Hammond Street, approximately 1300 feet south-southwest of OW-5-90/OW-7-242 and 2700 feet south-southwest (roughly along bedrock strike) of the former Waste Management Area. Evaluate groundwater flow direction and water quality along bedrock strike southwest of the former Waste Management Area.
OW-14-96 & OW-14-235 (well couplet)	Southwest of the site near the intersection of Salem Avenue and Linganore Avenue, approximately 1300 feet southwest of OW-4-70 and approximately 2550 feet southwest (directly along bedrock strike) of the former Waste Management Area. Evaluate groundwater quality, flow direction, and vertical gradient along bedrock strike southwest of the Waste Management Area.
OW-15-202	Southwest of the site near the intersection of Salem Ave. and Clarendon Ave., approximately 1250 feet southwest of OW-4-70 and approximately 2450 feet west-southwest (oblique to bedrock strike) of the former Waste Management Area. Evaluate the extent of groundwater containing site-related compounds to the west of OW-14.

Source:

Groundwater Remedial Investigation Addendum Report (URS, March 2009).

Table 2-2
Summary of Monitoring Well Construction Details
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Borehole Designation	Monitoring Well Location	Completion Date	Maryland Department of Environment Permit No.	Northing	Easting	Drilling Methodology [1]	Borehole Depth (ft bgs)	Depth to Bedrock (ft bgs)	10-In. Steel Casing Set to (ft bgs)	6-In. Steel Casing Set to (ft bgs)	Screen Elevation (ft msl)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Bentonite Pellet Seal Interval (ft bgs)	Cement w/ 5% Bentonite Grout Completion Interval (ft bgs)	Benseal Bentonite Grout Slurry Completion Interval (ft bgs)
On-Site Wells																
MW-A-51	MW-A-51	4/10/2003	WA-94-3234	726022.54	1108801.67	12-in A.R. 0' to 18' 8-in A.R. 18' to 51'	51	14	18 (8-in.)	NA	592 - 577	36 - 51	31 - 51	29 - 31	18 - 29	0 - 18
MW-B-55	MW-B-55	4/3/2003	WA-94-3230	725755.13	1109096.40	12-in A.R. 0' to 23' 8-in. A.R. 23' to 60.5'	60.5	17	23 (8-in.)	NA	579 - 564	40 - 55	36 - 60.5	33 - 36	23 - 33	0 - 23
MW-B-XX	MW-B-400	7/25/2013 to 2/3/2016	WA-95-0798	725738.33	1109095.77	15-in A.R. 0' to 200' 10-in A.R. 200' to 350' 6-in A.R. 350' to 400'	400	23	200	350	244 - 219	375 - 400	367 - 400	359 - 367	40 - 359	0 - 40
MW-B-XX-OFFSET	MW-B-598	5/22/2015 to 1/21/2016	WA-95-1056	725729.84	1109082.20	12-in A.R. 0' to 29.5' 10-in A.R. 29.5' to 410' 6-in. A.R. 410' to 552' 6-in. Rollerbit 552' to 600'	600	15	29.5	410	46-21	573 - 598	569.5 - 600	566 - 569.5	57 - 566	0 - 57
MW-C-40	MW-C-40	4/1/2003	WA-94-3229	725382.19	1108717.89	12-in A.R. 0' to 18' 8-in A.R. 18' to 43'	43	16	18 (8-in.)	NA	583 - 568	25 - 40	23 - 43	20.5 - 23	18 - 20.5	0 - 18
MW-D-77	MW-D-77	4/1/2003	WA-94-3233	725120.82	1108586.02	12-in A.R. 0' to 13' 8-in. A.R. 13' to 77'	77	9	13 (8-in.)	NA	593 - 529	NA [2]	NA	NA	NA	NA
MW-E-46	MW-E-46	4/8/2003	WA-94-3232	725568.09	1108320.88	12-in A.R. 0' to 23' 8-in A.R. 23' to 46'	46	21	23 (8-in.)	NA	583 - 568	31 - 46	27 - 46	24 - 27	23 - 24	0 - 23
MW-F-70	MW-F-70	4/4/2003	WA-94-3231	725991.64	1108219.32	15-in A.R. 0' to 33' 12-in A.R. 33' to 38' 8-in A.R. 38' to 70.5'	70.5	33	38 (8-in.)	NA	564 - 549	55 - 70	49 - 70.5	46 - 49	38 - 46	0 - 38
MW-G-35	MW-G-35	3/30/2004	WA-94-3659	725022.58	1108613.23	12-in A.R. 0' to 15' 8-in. A.R. 15' to 35'	35	12	15 (8-in.)	NA	578 - 563	20 - 35	18 - 35	16 - 18	15 - 16	0 - 15
MW-G-XX	MW-G-360	8/8/2013 to 2/2/2016	WA-95-0799	724988.68	1108616.91	15-in A.R. 0' to 150' 10-in A.R. 150' to 300' 6-in A.R. 300' to 360'	360	15	150	300	257 - 237	340-360	334 - 360	326 -334	28 - 326	0 - 28
MW-G-XX-OFFSET	MW-G-600	5/15/2015 to 1/20/2016	WA-95-1055	725004.30	1108608.73	15-in A.R. 0' to 30' 10-in A.R. 30' to 370' 6-in. A.R. 370' to 602'	602	22	30	370	17 - (- 3)	580-600	572 - 602	564 - 572	100 - 564	0 - 100
MW-H-65	MW-H-65	3/31/2004	WA-94-3664	725596.00	1108698.06	12-in A.R. 0' to 32' 8-in A.R. 32' to 65'	65	27	32 (8-in.)	NA	563 - 548	50 - 65	48 - 65	44 - 48	32 - 44	0 - 32
MW-I-55	MW-I-55	4/2/2004	WA-94-3661	725912.82	1108595.29	12-in A.R. 0' to 27' 8-in A.R. 27' to 55'	55	21	27 (8-in.)	NA	584 - 569	40 - 55	37 - 55	34 - 37	27 - 34	0 - 27
MW-J-71	MW-J-71	4/14/2004	WA-94-3663	726208.26	1108674.31	15-in A.R. 0' to 44' 12-in A.R. 44' to 48' 8-in A.R. 48' to 72'	72	44	48 (8-in.)	NA	573 - 558	56 - 71	53 - 72	49 - 53	48 - 49	0 - 48
MW-K-80	MW-K-80	4/7/2004	WA-94-3662	726225.01	1108483.08	12-in A.R. 0' to 26' 8-in. A.R. 26' to 80'	80	23	26 (8-in.)	NA	562 - 547	65 - 80	63 - 80	60 - 63	26 - 60	0 - 26

Table 2-2
Summary of Monitoring Well Construction Details
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Borehole Designation	Monitoring Well Location	Completion Date	Maryland Department of Environment Permit No.	Northing	Easting	Drilling Methodology [1]	Borehole Depth (ft bgs)	Depth to Bedrock (ft bgs)	10-In. Steel Casing Set to (ft bgs)	6-In. Steel Casing Set to (ft bgs)	Screen Elevation (ft msl)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Bentonite Pellet Seal Interval (ft bgs)	Cement w/ 5% Bentonite Grout Completion Interval (ft bgs)	Benseal Bentonite Grout Slurry Completion Interval (ft bgs)
MW-K-XX	MW-K-440	7/16/2013 to 1/22/2016	WA-95-0800	726214.29	1108474.16	15-in A.R. 0' to 100' 10-in A.R. 100' to 200' 6-in A.R. 200' to 452'	452	14	100	200	213 - 188	415-440	409 - 450	403 - 409	50 - 403	0 - 50
MW-L-48	MW-L-48	4/6/2004	WA-94-3660	725821.24	1108158.22	12-in A.R. 0' to 29' 8-in A.R. 29' to 50'	50	26	29 (8-in.)	NA	585 - 570	33 - 48	31 - 50	29 - 31	NA	0 - 29
MW-L-XX	MW-L-250	7/22/2013 to 4/22/2015	WA-95-0801	725839.05	1108151.44	15-in A.R. 0' to 100' 10-in A.R. 100' to 200' 6-in A.R. 200' to 250'	250	27	100	200	388 - 368	230-250	226 - 250	219 - 226	NA	0 - 219
MW-M-50	MW-M-50	6/29/2005	WA-94-4209	726012.90	1108548.8	12-in A.R. 0' to 14' 8-in A.R. 14' to 50'	50	11	14 (8-in.)	NA	588 - 573	35 - 50	31 - 50	28 - 31	14 - 28	0 - 14
MW-N-83	MW-N-83	6/28/2005 to 7/15/2005	WA-94-4208	726018.02	1108538.59	12-in A.R. 0' to 14' 8-in A.R. 14' to 115.5'	115.5	9	14 (8-in.)	NA	556 - 541	67.5 - 83.5[3]	65.5 - 85	32 - 65.5	0 - 32	NA
MW-N-113	MW-N-113	6/28/2005 to 7/15/2005								NA	527 - 512	97 - 113	94 - 115			NA
MW-R-XX	MW-R-330	7/23/2013 to 2/5/2016	WA-95-0802	725638.20	1108507.69	15-in A.R. 0' to 140' 10-in A.R. 140' to 280' 6-in A.R. 280' to 330'	330	15	140	280	323 - 288	295-330	290.5 - 330	282.5 - 290.5	38 - 282.5	0 - 38
MW-R-XX-OFFSET	MW-R-600	6/4/2015 to 1/27/2016	WA-95-1054	725625.35	1108486.36	10-in A.R. 0' to 340' 6-in. A.R. 340' to 370' 6-in. Rollerbit 370' to 600'	600	21.5	NA	340	37.5 - 17.5	580-600	574.5 - 600	570 - 574.5	30 - 570	0 - 30
PDI Hydraulic Control Investigation On-Site Wells																
Extraction Well EW-1-110	Extraction Well EW-1-110	10/4/2011 to 10/6/2011	WA-95-0614	725962.49	1108583.35	12-in A.R. 0' to 52' 8-in A.R. 52' to 154'	154	15	12-in. to 15 8-in. to 52	60 - 110	513.63 - 563.63	60 - 110	19.4 - 58	3 - 19.4	NA	NA
MW-O-145	MW-O-145	9/29/2011 to 10/7/2011	WA-95-0611	726156.64	1108707.34	12-in A.R./Rollerbit 0' to 82' 6-in A.R. 82' to 154'	154	23.5	12-in. to 23.5 6-in. to 82	125 - 145	486.21 - 506.21	125 - 145	115 - 120	1 - 115	NA	NA
MW-P-235	MW-P-235	9/26/2011 to 9/28/2011	WA-95-0613	725909.84	1108707.50	12-in A.R. 0' to 41' 10-in A.R. 41' to 62' 6-in A.R. 62' to 235.5'	235.5	28	6-in. to 62	195.5 - 235.5	389.42 - 429.42	195.5 - 235.5	192-235.5	Bentonite 100 - 147.7 and 167 - 192 Open hole segment to be grouted at later date	NA	NA
MW-P-235	PZ-P-165 (1-inch piezometer for water level monitoring)	9/26/2011 to 9/28/2011								150 - 165	459.92 - 474.92	150-165	147.4-167		NA	NA
MW-P-235	Open hole segment 62 to 100 ft bgs (Borehole segment left open for water level monitoring)	9/26/2011 to 9/28/2011								No screen installed. Open hole 62 to 100 ft bgs	Open Hole 524.92 - 562.92	NA	NA		NA	NA
MW-Q-150	MW-Q-150	10/21/2011 to 10/22/2011	WA-95-0612	725796.05	1108474.23	10-in. A.R. to 82' 6-in. A.R. to 160'	160	3	6-in. to 82	135 - 150	479.14 - 494.14	135-150	132-154	62-82 Bentonite 82 - 96 and 120 - 132	NA	NA
PZ-Q-118	PZ-Q-118 (1-inch piezometer for water level monitoring)	10/21/2011 to 10/22/2011								98 - 118	511.14 - 531.14	98-118	96-120		NA	NA

Table 2-2
Summary of Monitoring Well Construction Details
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Borehole Designation	Monitoring Well Location	Completion Date	Maryland Department of Environment Permit No.	Northing	Easting	Drilling Methodology [1]	Borehole Depth (ft bgs)	Depth to Bedrock (ft bgs)	10-In. Steel Casing Set to (ft bgs)	6-In. Steel Casing Set to (ft bgs)	Screen Elevation (ft msl)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Bentonite Pellet Seal Interval (ft bgs)	Cement w/ 5% Bentonite Grout Completion Interval (ft bgs)	Benseal Bentonite Grout Slurry Completion Interval (ft bgs)
PDI Hydraulic Control Lagoon Piezometers																
PZ-1S Piezometer	PZ-1S Piezometer		WA-95-0616	726121.32	1108536.73	Hollowstem Auger (HSA)	10	NA	NA	5 - 10	616.58 - 621.58	5 - 10	3-10	1-3	NA	NA
PZ-1D Piezometer	PZ-1D Piezometer		WA-95-0615	726118.29	1108542.54	Hollowstem Auger (HSA)	22.7	22.7	NA	17.7 - 22.7	603.88 - 608.88	17.7 - 22.7	15-22.7	13-15	NA	NA
PZ-2S Piezometer	PZ-2S Piezometer		WA-95-0618	726108.62	1108633.4	Hollowstem Auger (HSA)	13.3	NA	NA	8.3 - 13.3	614.35 - 619.35	7.7 - 13.3	6-13.3	4-6	NA	NA
PZ-2D Piezometer	PZ-2D Piezometer		WA-95-0617	726113.28	1108629.67	Hollowstem Auger (HSA)	34.4	34.4	NA	29.4 - 34.4	593.25 - 598.25	29.4 - 34.4	27-34.4	25-27	NA	NA
Off-Site Wells																
OW-1-62	OW-1-62	9/22/2005 to 10/11/2005	WA-94-4285	726816.55	1108492.72	12-in A.R. 0' to 22' 8-in A.R. 22' to 117.5'	117.5	14	22 (8-in.)	NA	578.5 - 563.5	47.5 - 62.5	44-64	42-44	0 - 44	NA
OW-1-105	OW-1-105	9/22/2005 to 10/11/2005								NA	536 - 521	90 - 105	86.2-107	64 - 86.2		NA
OW-2-65	OW-2-65	9/23/2005 to 10/11/2005	WA-94-4284	726709.71	1109119.84	12-in A.R. 0' to 25' 8-in A.R. 25' to 121'	121	13	25 (8-in.)	NA	580 - 565	50 - 65	47 - 67	43.5 - 47	0 - 43.5	NA
OW-2-115	OW-2-115	9/23/2005 to 10/11/2005								NA	529.5 - 514.5	100.5 - 115.5	96.5 - 118.2	67 - 96.5		NA
OW-3-55	OW-3-55	9/21/2005 to 10/10/2005	WA-94-4283	725533.56	1107359.46	12-in A.R. 0' to 26.5' 8-in A.R. 26.5' to 107'	107	19	26.5 (8-in.)	NA	575 - 560	40 - 55	37 - 57	34.7 - 37	0 - 34.7	NA
OW-3-105	OW-3-105	9/21/2005 to 10/10/2005								NA	525.8 - 509	89.8 - 107	86 - 107	57 - 86		NA
OW-4-70	OW-4-70	10/6/2005	WA-94-4282	724880.15	1107905.82	12-in A.R. 0' to 10' 8-in A.R. 10' to 96.5'	96.5	3.5	10 (8-in.)	NA	549 - 534	55.4 - 70.4	51 - 72.5	48 - 51	10 - 48	0 - 10
OW-5-90	OW-5-90	10/6/2005	WA-94-4281	724585.89	1108262.68	12-in A.R. 0' to 17' 8-in A.R. 17' to 92'	92	15	17 (8-in.)	NA	531 - 511	70.85 - 90.85	67 - 92	62 - 67	17 - 62	0 - 17
OW-7-242	OW-7-242	8/15/2006 to 2/27/2007	WA-94-4531	724592.10	1108273.45	12-in A.R. 0' to 39' 6-in A.R. 39' to 250'	250	8	39 (8-in.)	NA	380 - 360	222 - 242	220 - 244	214.5 - 220	39 - 214.5	0 - 39
OW-7-XX	OW-7-410	12/15/2013 to 4/21/2015	WA-95-0889	724582.02	1108248.97	12-in Rollerbit 0' to 250' 8-in A.R. 250' to 300' 5-in A.R. 300' to 410'	410	10	250 (8-in.)	300 (5-in.)	217 - 192	385-410	380 - 410	369 - 380	NA	0 - 369
OW-8-230	OW-8-230	8/21/2006 to 8/22/2006	WA-94-4532	726705.71	1109140.14	12-in A.R. 0' to 46' 6-in A.R. 46' to 250'	250	4	46 (8-in.)	NA	420 - 400	210 - 230	206 - 232	46 - 68 95 - 126 201 - 206	26 - 46 68 - 95 126 - 201	0 - 46
OW-9-125	OW-9-125	8/1/2006	WA-94-4533	728020.05	1109792.95	12-in A.R. 0' to 18.5' 6-in A.R. 18.5' to 250'	250	13	18.5 (8-in.)	NA	518 - 478	85 - 125	81 - 127	78.5 - 81	18 - 78.5	0-18

Table 2-2
Summary of Monitoring Well Construction Details
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Borehole Designation	Monitoring Well Location	Completion Date	Maryland Department of Environment Permit No.	Northing	Easting	Drilling Methodology [1]	Borehole Depth (ft bgs)	Depth to Bedrock (ft bgs)	10-In. Steel Casing Set to (ft bgs)	6-In. Steel Casing Set to (ft bgs)	Screen Elevation (ft msl)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Bentonite Pellet Seal Interval (ft bgs)	Cement w/ 5% Bentonite Grout Completion Interval (ft bgs)	Benseal Bentonite Grout Slurry Completion Interval (ft bgs)
OW-10-250	OW-10-250	8/4/2006 to 2/22/2007	WA-94-4534	726747.13	1109833.63	12-in A.R. 0' to 34' 6-in A.R. 34' to 250.5'	250.5	11	34 (8-in.)	NA	376 - 356	230 - 250	227 - 250.5	223.5 - 227	34 - 223.5	0 - 34
OW-11-240	OW-11-240	7/25/2006 to 2/21/2007	WA-94-4535	725129.00	1109510.86	12-in A.R. 0' to 47' 6-in A.R. 47' to 250'	250	19	47 (8-in.)	NA	393 - 373	220 - 240	216 - 242	212 - 216	47 - 212	0 - 47
OW-11-XX	OW-11-600	6/22/2015 to 3/10/2016	WA-95-1069	725112.56	1109503.94	12-in. A.R. 0' to 61' 10-in A.R. 61' to 260' 6-in A.R. 260' to 495' 6-in. Rollerbit 495' to 602'	602	18	61	260	63 - 13	550-600	545 - 600	538 - 545	20 - 538	0 - 20
OW-12-232	OW-12-232	8/17/2006 to 2/20/2007	WA-94-4536	723662.45	1108924.24	12-in A.R. 0' to 46.5' 6-in A.R. 46.5' to 251'	251	28	46.5 (8-in.)	NA	400 - 380	212 - 232	208 - 234	NA	46.5 - 208 (bentonite chips)	0 - 46.5
OW-13-250	OW-13-250	8/7/2006 to 2/23/2007	WA-94-4537	723249.29	1108021.78	12-in A.R. 0' to 24' 6-in A.R. 24' to 252'	252	9	24 (8-in.)	NA	344 - 324	230 - 250	228 - 252	223 - 228	24 - 223	0-24
OW-14-96	OW-14-96	8/11/2006 to 2/26/2007	WA-94-4538	723748.88	1107308.05	12-in A.R. 0' to 22' 8-in A.R. 22' to 100' 6-in A.R. 100' to 248	248	9	22 (8-in.)	NA	509 - 489	76 - 96	73 - 99	70 - 73	24 - 70	0 - 24
OW-14-235	OW-14-235	8/11/2006 to 2/26/2007									410 - 350	175 - 235	172 - 238	99 - 172		
OW-15-202	OW-15-202	3/21/2007 to 5/14/2007	WA-94-4539	724307.23	1106800.67	12-in A.R. 0' to 35' 6-in A.R. 35' to 225'	225	30	35 (8-in.)	NA	409 - 389	182 - 202	177 - 207	80 - 177 (chips)	35 - 80	0 - 35
OW-16-448	OW-16-448	11/11/2013 to 9/21/2016	WA-95-0887	722903.53	1106556.54	12-in. A.R. 0' to 40' 10-in A.R. 40' to 200' 6-in A.R. 200' to 600'	600[4]	16	75	200	186 - 161	423-448	411.5 - 455.5	408 - 411.5	2 - 408	0 - 2
OW-17-XX	OW-17-600	8/26/2013 to 9/27/2016	WA-95-0839	726287.05	1109379.90	15-in A.R. 0' to 150' 10-in A.R. 150' to 300' 6-in A.R. 300' to 600'	349.5	30	150	300	48-13	565-600	560.5 - 600	552.5 - 560.5	2 - 552.5	0 - 2
OW-18-XX	OW-18-597	10/30/2015 to 3/3/2016	WA-95-1128	724538.150	1108846.579	12-in A.R. 0' to 20' 10-in A.R. 20' to 300' 6-in A.R. 300' to 600'	600	6	20	300	38-3	562-597	558 - 600	548 - 558	20 - 548	0 - 20
OW-19-XX	OW-19-450	7/27/2015 to 2/19/2016	WA-95-1068	726347.80	1107987.88	10-in A.R. 0' to 251' 6-in A.R. 251' to 434' 6-in. Rollerbit 434' to 450'	450	38	38	251	211-176	415-450	407 - 450	398 - 407	70 - 398	1 - 70

Note:
XX' boreholes were extended prior to monitoring well installation.
[1] Drilling Co. - Eichelbergers, Inc.; A.R. = (15". 12", 8", or 6") Hammer bit Air Rotary w/Schramm 450
[2] Well completed as open borehole
[3] No. 1 quartz sand placed immediately above and below 1/4 to 3/8-in. rounded pea gravel installed 66.5 to 83 ft for void fill.
[4] OW-16 borehole backfilled 455.5 to 501 ft bgs with bentonite pellets; and 501 to 600 ft bgs with cement/bentonite grout slurry. Sandpack buffer placed 448 to 455.5 ft bgs between bottom of well screen and top of bentonite pellet borehole backfill.
All wells except MW-D, MW-NS & ND, OW -1S & 1D, OW-2S & 2D, OW-3S & 3D, and OW-7 to OW-15 series constructed of 4-in. PVC materials. MW-D completed as an open hole in bedrock (no well screen) between 13 and 76 ft bgs.
MW-NS & ND, OW -1S & 1D, OW-2S & 2D, and OW-3S & 3D constructed of 2-in. PVC and with pre-pack screen materials as well couplet within same borehole.
OW-12 betonite pellet seal interval reflects entire borehole annulus backfilled with bentonite pellets.
During OW-15 installation, borehole clear to 224 ft bgs, however well PVC access only able to achieve depth of 202 ft bgs.
Lagoon Piezometers PZ-1S, 2S, 3S, and 4S screen base set at bottom of waste interval.
Lagoon Piezometers PZ-1D, 2D, 3D, and 4D screen base set at top of bedrock surface.
Horizontal Datum NAD83
Vertical Datum NAVD1988

Table 3-1
Rationale for Monitoring Well Locations 2013 to 2016
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Monitoring Well No.	*Associated Borehole Designation*	*Associated Shallow Bedrock Well (Installed between 2003 and 2012)*	*Borehole Drilled Depth (feet bgs)*	*Borehole Geophysical Logging and Packer Testing Intervals (ft)*	*Borehole Permanent Casing Intervals (feet bgst)*	*Rationale for Well Location*
On-Site Wells						
MW-B-400	MW-B-XX	MW-B-55	400	0 - 200[(1)]; 200 - 350; 350 - 400	0 - 200; 200 - 350;	Evaluate vertical extent of contamination at property boundary in down-dip direction (southeast) of former lagoon.
MW-B-598	MW-B-XX OFFSET		600	410 - 600	0 - 410	Ascertain depth of contamination at upper northeast property boundary. Delineate vertical extent of COC concentrations detected in deepest packer interval of MW-B-XX borehole and uilized to assist in determining target depth of east/southeast offsite down dip borehole location OW-11-XX.
MW-G-360	MW-G-XX	MW-G-35	360	0 - 150[(1)]; 150 - 300; 300 - 360	0 - 150; 150 - 300	Evaluate vertical extent of contamination at property boundary at southern-most part of the site (directly south of former lagoon).
MW-G-600	MW-G-XX OFFSET		600	370 - 600	0 - 370	Ascertain depth of contamination at lower southeast/southwest property boundary. Delineate vertical extent of COC concentrations detected in deepest packer interval of MW-G-XX borehole and uilized to assist in determining target depth of southeast offsite down dip borehole location OW-18-XX.
MW-L-250	MW-L-XX	MW-L-48	250	0 - 100[(1)]; 100 - 200; 200 - 250	0 - 100; 100 - 200	Evaluate vertical extent of contamination at property boundary located west-southwest of former lagoon (at oblique angle to bedrock strike from lagoon) and historically detected in groundwater samples from previously installed well MW-L-48.
MW-K-440	MW-K-XX	MW-K-80	450	0 - 100[(1)]; 100 - 200; 200 - 250; 250 - 450	0 - 100; 100 - 200	Evaluate vertical extent of contamination at northwest property boundary, perpendicular to bedrock strike in centerline of lagoon and historically detected in groundwater samples from previously installed well MW-K-80.
MW-R-330	MW-R-XX	Southeast of MW-Q-150	330	0 - 140[(1)]; 140 - 280; 280 - 330	0 - 140; 140 - 280	Evaluate vertical extent of contamination directly along bedrock strike southwest of former lagoon.
MW-R-600	MW-R-XX OFFSET		600	340 - 600	0 - 340	Evaluate vertical extent of contamination directly along bedrock strike southwest of former lagoon. Delineate vertical extent of COC concentrations detected in deepest packer interval of MW-R-XX borehole.
Off-Site Wells						
OW-7-410	OW-7-XX	OW-5-90 and OW-7-242	410	250 - 300; 300 - 410	0 - 250	Continue the BHC vertical depth profile at OW-5-90 and OW-7-242 cluster (southwest of on-site wells MW-G-35, MW-G-360, and MW-G-600).
OW-11-600	OW-11-XX	OW-11-240 and Southeast of MW-B-55, MW-B-400, and MW-B-598 East of MW-G-35, MW-G-360, and MW-G-600	600	260 - 600	0 - 260	Determine southeast downdip contaminant concentrations at depth in relation to MW-B-55, MW-B-400, and MW-B-598.
OW-16-448	OW-16-XX	Southwest of OW-14-96 and OW-14-235	600	0 - 61[(1)]; 75 - 200; 200 - 300; 300 - 600	0 - 200	Evaluate southwest vertical extent of contamination along bedrock strike and axis of highest known plume concentrations and delineate vertical extent of COCs historically detected in groundwater samples from previously installed wells OW-14-96 and OW-14-235.
OW-17-600	OW-17-XX	Northeast of MW-B-55, MW-B-400 and MW-B-600	600	0 - 150[(1)]; 150 - 300; 300 - 350; 350 - 600	0 - 150; 150 - 300;	Evaluate vertical extent of contamination to northeast of former lagoon along inferred northwest-trending fracture trace.
OW-18-597	OW-18-XX	Southeast of MW-G-35, MW-G-360, and MW-G-600 and East of OW-5-90 and OW-7-242	600	0 - 300; 300 - 600	0 - 300	Assess contaminant migration to southeast of site along northwest trending fractures at high angle to bedrock strike and delineate vertical extent of COCs historically detected in groundwater samples from previously installed well MW-G-35 and COC concentrations detected in packer samples from MW-G-XX and MW-G-XX OFFSET boreholes. Assess contaminant migration to east of site and delineate vertical extent of COCs historically detected in groundwater samples from previously installed wells OW-5-90 and OW-7-242 and COC concentrations detected in packer samples from the OW-7-XX borehole.
OW-19-450	OW-19-XX	West-Northwest of MW-K-80 and MW-K-440 and North-Northwest of MW-L-48 and MW-L-250	450	0 - 250; 250 - 450	0 - 250	Assess contaminant migration to northwest at axis of regional anticline and delineate vertical extent of COCs historically detected in groundwater samples from previously installed wells MW-K-80 and MW-L-48 and COC concentrations detected in packer samples from MW-K-XX and MW-L-XX boreholes.

Notes:

Table modified from USEPA Scope of Work (SOW) Table 3, dated June 28,2012.

[(1)] Uppermost geophysical logging zone dependent upon temporary casing installation requirements for borehole stabilization purposes.

Table 3-2
Summary of Drill Zone Telescoped Casing Depths, Geophysical Loggin, Packer Testing, and Well Installation Details 2013 to 2016
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Well ID	*Pilot Hole Drill Zone 1*	*Zone 1 6-in. Pilot Hole (Dates Drilled)*	*Geophysical Log (Date Completed)*	*Packer Zones Selected (Date(s) Completed)*	*Pilot Hole Drill Zone 2*	*Zone 1 Reamed w/15-in. bit 10-in. casing Installed (Date(s) Completed)*	*Zone 2 6-in. Pilot Hole (Dates Drilled)*	*Geophysical Log (Date Completed)*	*Packer Zones Selected (Date(s) Completed)*	*Pilot Hole Drill Zone 3*	*Zone 2 Reamed w/10-in. bit 6-in. casing Installed (Date(s) Completed)*	*Zone 3 6-in. Pilot Hole (Dates Drilled)*	*Geophysical Log (Date Completed)*	*Packer Zones Selected (Date(s) Completed)*
MW-B-XX Total Depth = 400 ft **Existing Associated Well MW-B screen bottom = 55 ft**	**Z1 (0 - 200)**	7/25/13 6-in. temp casing to 35 ft	7/30/13	PT 3 (60-75) - 8/12/13 Insufficient recharge - **NO sample collected** PT 2 (135-150) - 8/9/13 Insufficient recharge - **NO sample collected** PT 1 (160-175) - 8/8/13 Sample collected	**Z2 (200-350)**	8/16/13 to 8/21/13	8/22/13 to 8/23/13	8/27/2013	PT 8 (218-233) - 9/20/13 Insufficient recharge - **NO sample collected** PT 7 (255-270) - 9/19/13 Sample collected PT 6 (279-294) - 9/19/13 Sample collected PT 5 (300-315) - 9/18/13 Sample collected PT 4 (330-351) - 9/18/13 Sample collected	**Z3 (350-400)**	10/2/13 to 10/8/13	10/9/2013	10/10/2013	PT 9 (348-363) - 10/29/13 Sample collected PT 10 (372-400) - 10/30/13 Sample collected
MW-G-XX Total Depth = 360 ft **Existing Associated Well MW-G screen bottom = 35 ft**	**Z1 (0 - 150)**	7/18/13 to 7/22/13 6-in. temp casing to 38 ft Note: top overdrilling zone will require 17-in. bit w/15-in. temp casing to 38 ft to enable 15-in. drilling for 10-in. permanent casing to depth	7/24/13 to 7/25/13 **Due to intial BH dry, OFFSET location and redrilled. OFFSET Re-drilled 8/8 to 8/9/13, temp steel set @ 37 ft bgs.** **OFFSET Re-drill loc. geophysically logged 8/13/13**	PT 3 (41-49) - 8/29/13 Sample collected PT 2 (85-100) - 8/28/13 Insufficient recharge - **NO sample collected** PT 1 (131-152) - 8/27/13 Sample collected	**Z2 (150-300)**	9/17/13 to 9/20/13	9/23/2013	10/2/2013	PT 7 (200-215) - 10/17/13 Sample collected PT 6 (220-235) - 10/16/13 Sample collected PT 5 (250-265) - 10/16/13 Insufficient recharge - **NO sample collected** PT 4 (270-285) - 10/15/13 Insufficient recharge - **NO sample collected**	**Z3 (300-360)**	10/30/13 to 10/31/13	11/1/2013	11/5/2013	PT 8 (308-323) - 11/12/13 Sample collected PT 9 (339-360)) - 11/11/13 Sample collected
MW-L-XX Total Depth = 250 ft **Existing Associated Well MW-L screen bottom = 48 ft**	**Z1 (0 - 100)** actually drilled to 105	7/22/13 to 7/23/13 10-in. temp casing to 20 ft 6-in. temp casing to 38 ft Note: top overdrilling zone will require 17-in. bit w/15-in. temp casing to 20 ft to enable 15-in. drilling for 10-in. permanent casing to depth	7/25/13	PT 4 (35-50) - 8/14/13 Sample collected PT 3 (50-65) - 8/14/13 Insufficient recharge - **NO sample collected** PT 2 (65-80) - 8/13/13 Insufficient recharge - **NO sample collected** PT 1 (84-105) - 8/13/13 Sample collected + DUP	**Z2 (100-200)**	8/28/13 to 9/9/13	9/10/13	9/12/13 to 9/18/13	PT 8 (125-140) - 10/1/13 Sample collected PT 7 (143-153) - 10/3/13 Sample collected PT 6 (157-172) - 10/1/13 Sample collected PT 5 (175-200) - 9/30/13 Sample collected	**Z3 (200-250)**	10/17/2013 to 10/22/13	10/23/2013	10/23/2013	PT 9 (201-216) - 11/7/13 Sample collected PT 10 (220-235) - 11/8/13 Sample collected PT 11 (229-250) - 11/11/13 Sample collected

Table 3-2
Summary of Drill Zone Telescoped Casing Depths, Geophysical Loggin, Packer Testing, and Well Installation Details 2013 to 2016
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Well ID	*Pilot Hole Drill Zone 1*	*Zone 1 6-in. Pilot Hole (Dates Drilled)*	*Geophysical Log (Date Completed)*	*Packer Zones Selected (Date(s) Completed)*	*Pilot Hole Drill Zone 2*	*Zone 1 Reamed w/15-in. bit 10-in. casing Installed (Date(s) Completed)*	*Zone 2 6-in. Pilot Hole (Dates Drilled)*	*Geophysical Log (Date Completed)*	*Packer Zones Selected (Date(s) Completed)*	*Pilot Hole Drill Zone 3*	*Zone 2 Reamed w/10-in. bit 6-in. casing Installed (Date(s) Completed)*	*Zone 3 6-in. Pilot Hole (Dates Drilled)*	*Geophysical Log (Date Completed)*	*Packer Zones Selected (Date(s) Completed)*
MW-K-XX Total Depth = 250 ft **Existing Associated Well MW-K screen bottom = 80 ft**	**Z1 (0 - 100)**	7/16/13 to 7/17/13 6-in. temp casing to 19 ft	7/24/13 to 7/25/13	PT 3 (40-55) - 8/7/13 Insufficient recharge - **NO sample collected** PT 2 (57-72) - 8/7/13 Sample collected PT 1 (75-100) - 8/7/13 Sample collected	**Z2 (100-200)**	8/12/13 to 8/13/13	8/14/13 to 8/15/13 BH obstruction @ 171 after completion. Continued attempts to clear unsuccessful.	8/27/13 to 171 ft obstruction	PT 7 (103-120) - 9/16/13 Sample collected PT 6 (123-140) - 9/16/13 Sample collected PT 5 (142-159) - 9/13/13 Sample collected PT 4 (164-200/171) - 9/17/13 Sample collected	**Z3 (200-250)**	10/10/2013 to 10/16/13	10/17/2013	10/23/2013	PT 8 (213-223) - 11/5/13 Sample collected PT 9 (225-235) - 11/5/13 Sample collected PT 10 (238-250) - 11/6/13 Sample collected
MW-R-XX Total Depth = 330 ft **Existing Associated Well MW-Q screen bottom = 150 ft**	**Z1 (0 - 140)**	7/24/13 6-in. temp casing to 19 ft	7/25/13	PT 3 (38-48) - 8/16/13 Sample collected PT 2 (57-67) - 8/16/13 Insufficient recharge - **NO sample collected** PT 1 (95-105) - 8/15/13 Insufficient recharge - **NO sample collected**	**Z2 (140-280)**	9/10/13 to 9/13/13	9/16/13 to 9/17/13	9/18/2013	PT 7 (144-157) - 10/9/13 Sample collected PT 6 (159-172) - 10/8/13 Sample collected PT 5 (200-213) - 10/8/13 Sample collected PT 4 (255-280) - 10/7/13 Insufficient recharge - **NO sample** collected	**Z3 (280-330)**	10/23/2013 to 10/25/13	10/29/2013	10/30/2013	PT 8 (286-297) - 11/15/13 Sample collected PT 9 (297-308) - 11/15/13 Sample collected PT 10 (313-330) - 11/14/13 Sample collected
OW-17-XX Total Depth = 350 ft	**Z1 (0 - 150)**	8/26/13 to 8/27/13 10-in. temp casing to 9 ft 6-in. temp casing to 38.5 ft	8/28/13 to 8/30/13	PT 4 (38.5 - 47) - 9/12/13 Sample collected PT 3 (59-74) - 9/11/13 Sample collected PT 2 (100-115) - 9/11/13 Insufficient recharge - **NO sample** collected PT 1 (125-151) - 9/10/13 Insufficient recharge - **NO sample** collected	**Z2 (150-300)**	9/25/13 to 10/1/13	10/1/13 to 10/2/13	10/4/2013	PT 10 (149-164) - 10/24/13 Insufficient recharge - **NO sample** collected PT 9 (175-190) - 10/24/13 Insufficient recharge - **NO sample** collected PT 8 (217-232) - 10/24/13 Insufficient recharge - **NO sample** collected PT 7 (238-253) - 10/23/13 Insufficient recharge - **NO sample** collected PT 6 (263-278) - 10/23/13 Sample collected PT 5 (280-300) - 10/22/13 Insufficient recharge - **NO sample** collected	**Z3 (300-350)**	11/4/2013 to 11/6/13	11/7/2013	11/11/2013 Bentonite (approx. 4 to 5 ft accumilation) in bottom of BH; may be seepage from large fracture @ approx. 303 to 304 ft bgs. Optical televiewer (TV) camera run 11-13-13 BH and casing subsequently cleaned and bailed/pumped clear of bentonite - verified by Optical televiewer afterward	PT 11 (295-310) - 12/4/13 Sample collected PT 12 (327-350) - 12/4/13 Sample collected

Table 3-2
Summary of Drill Zone Telescoped Casing Depths, Geophysical Loggin, Packer Testing, and Well Installation Details 2013 to 2016
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Well ID	*6-in. Pilot Hole Drill Zone 1*	*Zone 1 6-in. Pilot Hole (Dates Drilled)*	*Geophysical Log (Date Completed)*	*Packer Zones Selected (Date(s) Completed)*	*Pilot Hole Drill Zone 2*	*Zone 1 Reamed w/10-in. bit 6-in. casing Installed (Date(s) Completed)*	*Zone 2 6-in. Pilot Hole (Dates Drilled)*	*Geophysical Log (Date Completed)*	*Packer Zones Selected (Date(s) Completed)*
OW-16-XX Total Depth = 300 ft	**Z1 (0 - 200)**	11/11/2013 to 12/2/13	12/3/13	(40 - 73) - 11/6/13 Sample collected **No packer installed; Base of casing @ 40 ft w/BH collapse @ 60 ft w/drilling completed to 73 ft**	**Z2 (200-300)**	1/9/14 to 1/14/14	1/15/14	1/20/14	PT 4 (226-243) - 1/28/14 Sample collected
				PT 1 (104-124) - 12/9/13 Sample collected					PT 5 (266-283) - 1/28/14 Sample collected
				PT 2 (137-157) - 12/10/13 Sample collected					PT 6 (285-300) - 1/24/14 Sample collected
				PT 3 (160-180) - 12/10/13 Sample collected					

Well ID	*Drill w/12-in. bit 8-in. casing Installed to 250 ft (Date(s) Completed)*	*8-in. Pilot Hole Drill Zone 1*	*Zone 1 8-in. Pilot Hole (Dates Drilled)*	*Geophysical Log (Date Completed)*	*Packer Zones Selected (Date(s) Completed)*	*5-in. Pilot Hole Drill Zone 2*	*Zone 2 5-in. Pilot Hole (Dates Drilled)*	*Geophysical Log (Date Completed)*	*Packer Zones Selected (Date(s) Completed)*
OW-7-XX Total Depth = 330 ft **Existing Associated Well OW-7 screen bottom = 242 ft**	11/19/2013 to 12/18/13 **Note:** Rollerbit and stabilizer lost down original BH location approx. 230 ft bgs. Location offset & redrilled	**Z1 (250 - 300)**	12/19/13	1/3/14	PT 1 (273.5 - 299.5) - 1/9/14 Sample collected	**Z2 (300-410)**	1/15/14 to 1/27/14	1/30/2014	PT 2 (296 to 313 ft top packer inflated within steel casing where steel casing is set @ 300 ft bgs). 2/7/14 - Sample collected
									PT 3 (317 to 334 ft) - 2/6/14 Sample collected
									PT 4 (345 to 362 ft) - 2/6/14 Sample collected
									PT 5 (386 to 410 ft) - 2/5/14 Sample collected

Table 3-3
Summary of Packer Testing Observations
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Well	MW-B-XX (6-in. Borehole)														
	Drilling Zone 1 (0 to 200 ft)			Drilling Zone 2 (200 to 350 ft)					Drilling Zone 3 (350 to 400 ft)		Drilling Zone 4 (400 to 600 ft) [5]					
Test Interval (Feet bgs)	60-75	135-150	160-175	218-233 [1]	255-270 [1]	279-294 [1]	300-315 [1]	330-351 [1]	348 - 363 [2]	372 - 400 [2]	417-432	436-451	455-470	541-556	556-571	574-600
Calculated lift pipe and 1 packer zone purge volume (gals)	24.8	36.2	40.9	21.6	22	27.6	23.2	30	70.4	93.3	45.4	46.7	47.8	53.4	55.3	71.7
Total Volume purged (gals)	2.8 (Lift pipe vol. only)	14.2 (Lift pipe vol. only)	105 (Lift pipe vol. & 3.9 interval vols.)	10 (46% of interval vol)	28.7 (Bladder pump discharge line & 1.3 interval vols.)	29.5 (Bladder pump discharge line & 1 interval vols.)	28.6 (Bladder pump discharge line & 1.2 interval vols.)	30 (Bladder pump discharge line & 1 interval vols.)	659 (Lift pipe vol. & 27.7 interval vols.)	3,344 (Lift pipe vol. & 80 interval vols.)	192 (Lift pipe vol. & 7.6 interval vols.)	196 (Lift pipe vol. & 7.8 interval vols.)	201 (Lift pipe vol. & 7.9 interval vols.)	228 (Lift pipe vol. & 8.9 interval vols.)	207 (Lift pipe vol. & 7.9 interval vols.)	300 (Lift pipe vol. & 6.97 interval vols.)
Maximum sustainable pumping rate (gpm)	NA	NA	1.5	0.076	0.13	0.18	0.2	0.15	3	22	2.5	2	3	6	4.5	5
Pump depth setting (ft bgs)	52	127	152	227	264	288	309	339	359	383	427	446	465	551	566	584
Comments	Zone pumped dry. Calculated recharge rate = 0.016 to 0.021gpm. No sample collected.	Zone pumped dry. Calculated recharge rate = 0.047 to 0.076 gpm. No sample collected.	Sample collected MW-B-160175	Insufficient recharge. No sample collected.	Sample collected MW-B-255270	Sample collected MW-B-279294	Sample collected MW-B-300315	Sample collected MW-B-330351	Sample collected MW-B-348363	Sample collected MW-B-372400	Sample collected MW-B-417432	Sample collected MW-B-436451	Sample collected MW-B-455470	Sample collected MW-B-541556	Sample collected MW-B-556571	Sample collected MW-B-574600

Well	MW-G-XX (6-in. Borehole)													
	Drilling Zone 1 (0 to 150 ft)			Drilling Zone 2 (150 to 300 ft)				Drilling Zone 3 (300 to 360 ft)		Drilling Zone 4 (360 to 600 ft) [5]				
Test Interval (Feet bgs)	41-49	85-100	131-152	200 - 215	220 - 235	250 - 265	270 - 285	308-323 [2]	339-360 [2]	400-415	425-440	557-572	570-585	581-602
Calculated lift pipe and 1 packer zone purge volume (gals)	14.1	31.6	49.3	51.3	52.4	59.4	62.7	68.2	81.9	45.6	47.2	55.7	56.6	56.6
Total Volume purged (gals)	16.5 (Lift pipe vol. & 1.2 interval vols.)	9.6 (Lift pipe vol. only)	66 (Lift pipe vol. & 2 interval vols.)	95.3 (Lift pipe vol. & 3 interval vols.)	52.4 (Lift pipe vol. & 1 interval vol.)	37.4 (Lift pipe vol. only)	40.7 (Lift pipe vol. only)	246 (Lift pipe vol. & 9.1 interval vols.)	176 (Lift pipe vol. & 4.1 interval vols.)	15 (base of top packer to pump intake vol.)	205 (Lift pipe vol. & 8.1 interval vols.)	128 (Lift pipe vol. & 4.3 interval vols.)	128 (Lift pipe vol. & 4.2 interval vols.)	326 (Lift pipe vol. & 9.4 interval vols.)
Maximum sustainable pumping rate (gpm)	NA	NA	0.37	0.79	NA	NA	NA	3	2	NA	5	1.75	2	5
Pump depth setting (ft bgs)	33	78	124	192	212	242	262	318	349	410	435	567	580	591
Comments	Lift pipe repeatedly pumped dry and allowed to recharge. Calculated recharge rate = 0.05 to 0.07gpm. Sample collected MW-G-4149	Zone pumped dry. Calculated recharge rate = 0.001gpm. No sample collected.	Sample collected MW-G-131152	Sample collected MW-G-200215	Lift pipe repeatedly pumped dry and allowed to recharge. Calculated recharge rate = 0.12 to 0.08 gpm. Sample collected MW-G-220235	Zone pumped dry. Calculated recharge rate = 0.0133 to 0.0275 gpm. No sample collected.	Zone pumped dry. Calculated recharge rate = 0.032 to 0.047 gpm. No sample collected.	Sample collected MW-G-308323	Sample collected MW-G-339360	Zone pumped dry (base of top packer to pump intake vol.). No recharge observed. No sample collected.	Sample collected MW-G-425440 pH = 6.70	Sample collected MW-G-557572 pH = 6.92	Sample collected MW-G-570585 pH = 7.00	Sample collected MW-G-581602 pH = 6.84

Well	MW-K-XX (6-in. Borehole)														
	Drilling Zone 1 (0 to 100 ft)			Drilling Zone 2 (100 to 200 ft)				Drilling Zone 3 (200 to 250 ft)			Drilling Zone 4 (250 to 450 ft) [5]				
Test Interval (Feet bgs)	40-55	57-72	75-100	103-120	123-140	142-159	164-200/171	213-223	225-235	238-250 [2]	253-270	273-290	305-322	325-342	415-450
Calculated lift pipe and 1 packer zone purge volume (gals)	19.4	24.4	42.2	32.2	35.6	39	70.3	39.8	41.3	47.9	37.5	38.8	40.8	42.1	74.4
Total Volume purged (gals)	9.1 (47% of interval vol.; single packer set at bottom of interval)	140 (Lift pipe vol. & 6 interval vols.)	210 (Lift pipe vol. & 5.5 interval vols.)	120 (Lift pipe vol. & 4.5 interval vols.)	120 (Lift pipe vol. & 4 interval vols.)	115 (Lift pipe vol. & 4 interval vols.)	188 (Lift pipe vol. & 3 interval vols.)	90 (Lift pipe vol. & 4.4 interval vols.)	66.75 (Lift pipe vol. & 2.7 interval vols.)	207 (Lift pipe vol. & 10 interval vols.)	266 (Lift pipe vol. & 10 interval vols.)	258 (Lift pipe vol. & 9.8 interval vols.)	240 (Lift pipe vol. & 9 interval vols.)	284 (Lift pipe vol. & 10.7 interval vols.)	495 (Lift pipe vol. & 9.2 interval vols.)
Maximum sustainable pumping rate (gpm)	NA	3.5	3.5	2	2	2.4	2	NA	NA	3	4	3.5	4	4	5.5
Pump depth setting (ft bgs)	48	50	68	95	115	135	157	205	217	244	265	285	317	337	427
Comments	Zone pumped dry. No recharge observed. No sample collected.	Sample collected MW-K-5772	Sample collected MW-K-75100	Sample collected MW-K-103120	Sample collected MW-K-132140	Sample collected MW-K-142159	Sample collected MW-K-164200/171 Sample highly turbid	Lift pipe repeatedly pumped dry and allowed to recharge. Calculated recharge rate = 0.75 to 0.5 gpm. Sample collected MW-K-213223	Lift pipe repeatedly pumped dry and allowed to recharge. Calculated recharge rate = 0.33 to 0.29 gpm. Sample collected MW-K-225235	Sample collected MW-K-238250	Sample collected MW-K-253270	Sample collected MW-K-273290	Sample collected MW-K-305322	Sample collected MW-K-325342	Sample collected MW-K-415450

Well	MW-L-XX (6-in. Borehole)										
	Drilling Zone 1 (0 to 100 ft)				Drilling Zone 2 (100 to 200 ft)				Drilling Zone 3 (200 to 250 ft)		
Test Interval (Feet bgs)	35-50	50-65	65-80	84-105	125-140	143-153	157-172	175-200	201-216 [2]	220-235 [2]	229-250 [2]
Calculated lift pipe and 1 packer zone purge volume (gals)	22	24.3	26.9	39	33.3	29	39	57.7	46.8	49.7	59.9
Total Volume purged (gals)	110 (5 interval vols.; single packer set at bottom of interval)	7.4 (Lift pipe vol. & approx. 30% of interval vol.)	17.3 (Lift pipe vol. & approx. 56% of interval vol.)	100 (Lift pipe vol. & 3 interval vols.)	56.3 (Lift pipe vol. & 2 interval vols.)	70 (Lift pipe vol. & 3.8 interval vols.)	95 (Lift pipe vol. & 3.5 interval vols.)	59.5 (Lift pipe vol. & 1 interval vol.)	254 (Lift pipe vol. & 10.4 interval vols.)	160 (Lift pipe vol. & 6 interval vols.)	420 (Lift pipe vol. & 12.7 interval vols.)
Maximum sustainable pumping rate (gpm)	4	NA	NA	1	0.3	0.36	1	NA	2	1	6
Pump depth setting (ft bgs)	44	42	57	77	117	135	149	168	211	230	239
Comments	Sample collected MW-L-3550	Zone pumped dry. Calculated recharge rate = 0.036 to 0.063 gpm. No sample collected.	Zone pumped dry. Calculated recharge rate = 0.072 to 0.1 gpm. No sample collected.	Sample collected MW-L-84105	Sample collected MW-L-125140	Sample collected MW-L-143153	Sample collected MW-L-157172	Lift pipe repeatedly pumped dry and allowed to recharge. Calculated recharge rate = 0.25 to 0.23gpm. Sample collected MW-L-175200	Sample collected MW-L-201216	Sample collected MW-L-220235	Sample collected MW-L-229250

Table 3-3
Summary of Packer Testing Observations
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Well	*MW-R-XX (6-in. Borehole)*													
	Drilling Zone 1 (0 to 140 ft)			*Drilling Zone 2 (140 to 280 ft)*				*Drilling Zone 3 (280 to 330 ft)*			*Drilling Zone 4 (330 to 600 ft)*			
Test Interval (Feet bgs)	*38-48*	*57-67*	*95-105*	*144-157*	*159-172*	*200-213*	*255-280*	*286-297 (3)*	*297-308 (3)*	*313-330 (3)*	*367-387*	*390-410*	*413-433*	*437-600*
Calculated lift pipe and 1 packer zone purge volume (gals)	16.2	19.3	25.6	34.7	35.8	43.8	70.5	44.4	56.7	69.5	49.5	51	52.5	264
Total Volume purged (gals)	74 (Lift pipe vol. & 5 interval vols.)	4.6 (Lift pipe vol. only)	20.5 (Lift pipe vol. & approx. 65% of interval vol.)	54.2 (Lift pipe vol. & 2 interval vols.)	77.9 (Lift pipe vol. & 3.2 interval vols.)	192 (Lift pipe vol. & 8.7 interval vols.)	33.8 (Lift pipe vol. only)	166 (Lift pipe vol. & 8.5 interval vols.)	171 (Lift pipe vol. & 8 interval vols.)	206 (Lift pipe vol. & 6.5 interval vols.)	112.5 (Lift pipe vol. & 3.1 interval vols.)	360 (Lift pipe vol. & 11.5 interval vols.)	255 (Lift pipe vol. & 7.9 interval vols.)	1035 (Lift pipe vol. & 4.2 interval vols.)
Maximum sustainable pumping rate (gpm)	1	NA	NA	NA	0.5	2	NA	2	2	1.25	0.75	6	3	9
Pump depth setting (ft bgs)	31	49	87	136	151	192	247	292.5	303.5	319.5	382	405	428	452
Comments	Sample collected MW-R-3848	Zone pumped dry. Calculated recharge rate = 0.01 to 0.009 gpm. No sample collected.	Zone pumped dry. Calculated recharge rate = 0.039 to 0.044 gpm. No sample collected.	Lift pipe repeatedly pumped dry and allowed to recharge. Calculated recharge rate = 0.21 gpm. Sample collected MW-R-144157	Lift pipe repeatedly pumped dry and allowed to recharge. Calculated recharge rate = 0.52 gpm. Sample collected MW-R-159172	Sample collected MW-R-200213 Note: Sustained yield = 2 gpm, however very slow drawdown observed at rate of 4 gpm.	Zone pumped dry. Calculated recharge rate = 0.021 to 0.024 gpm. No sample collected.	Sample collected MW-R-286297	Sample collected MW-R-297308	Sample collected MW-R-313330	Sample collected MW-R-367387	Sample collected MW-R-390410	Sample collected MW-R-413433	Sample collected MW-R-437600

Well	*OW-7-XX (250 to 300 ft - 8-in. BH; 300 to 410 ft - 5-in. BH)*				
	Drilling Zone 1 (250 to 300 ft)	*Drilling Zone 2 (300 to 410 ft)*			
Test Interval (Feet bgs)	*273.5 - 299.5*	*296 - 313 (Top packer inflated within steel casing set at 300 ft bgs)*	*317 - 334*	*345 - 362*	*386 - 410*
Calculated lift pipe and 1 packer zone purge volume (gals)	108	60	63.2	68.3	81.8
Total Volume purged (gals)	120	120 (Lift pipe & 4.5 interval vols.)	201 (Lift pipe & 8.9 interval vols.)	79.3 (Lift pipe & 1.5 interval vols.)	336 (Lift pipe & 11.3 interval vols.)
Maximum sustainable pumping rate (gpm)	NA	0.33 to 0.35	2	0.51	8
Pump depth setting (ft bgs)	288.8	307	328	356	397
Comments	Interval repeatedly pumped dry to pump intake and allowed to recharge. Calculated recharge rate = 0.625 to 0.51 gpm. Sample collected OW-7-273.5299.5	Sample collectd OW-7-296313	Sample collectd OW-7-317334	Sample collectd OW-7-345362	Sample collectd OW-7-386410

Well	*OW-11-XX (0 to 260 ft - 10-in. BH; 260 to 600 ft - 6-in. BH)*					
	Drilling Zone 1 (0 to 260 ft)	*Drilling Zone 2 (250 to 600 ft)*				
Test Interval (Feet bgs)		*339-355*	*384-400*	*415-431*	*434-450*	*473-600*
Calculated lift pipe and 1 packer zone purge volume (gals)	**No Geophysical Logging or Packer Testing**	41.7	44.6	46.6	47.8	213.4
Total Volume purged (gals)		96 (Lift pipe vol. & 3.3 interval vols.)	106 (Lift pipe vol. & 3.6 interval vols.)	240 (Lift pipe vol. & 9.2 interval vols.)	310 (Lift pipe vol. & 12 interval vols.)	587 (Lift pipe vol. & 3 interval vols.)
Maximum sustainable pumping rate (gpm)	**Refer to associated well log OW-11-240**	0.4	1.25	4	5	6
Pump depth setting (ft bgs)		350	395	426	445	484
Comments	**Installed 7/25/06 to 2/21/07**	Sample collected OW-11-339355	Sample collected OW-11-384400	Sample collected OW-11-415431	Sample collected OW-11-434450	Sample collected OW-11-473600

Well	*OW-16-XX (6-in. Borehole)*												
	Drilling Zone 1 (0 to 200 ft)				*Drilling Zone 2 (200 to 300 ft)*			*Drilling Zone 3 (300 to 600 ft)*					
Test Interval (Feet bgs)	*40-73 (3)*	*104-124 (2)*	*137-157 (4)*	*160-180 (2)*	*226-243 (2)*	*266-283 (2)*	*285-300 (2)*	*316 - 340*	*368 - 392*	*396 - 420*	*424 - 448*	*491 - 515*	*570 - 600*
Calculated lift pipe and 1 packer zone purge volume (gals)	44.1	39.5	45	47.9	55.2	61.8	61.8	52.7	56.0	57.8	59.6	63.9	77.8
Total Volume purged (gals)	601 (Lift pipe & 13.6 interval vols.)	252 (Lift pipe & 8.2 interval vols.)	57 (Lift pipe & 1.5 interval vols.)	273 (Lift pipe & 8.7 interval vols.)	320 (Lift pipe & 11.6 interval vols.)	372 (Lift pipe & 13.4 interval vols.)	300 (Lift pipe & 11.8 interval vols.)	270 (Lift pipe & 7.1 interval vols.)	240 (Lift pipe & 6.2 interval vols.)	250 (Lift pipe & 6.4 interval vols.)	242 (Lift pipe & 6.1 interval vols.)	204 (Lift pipe & 4.9 interval vols.)	360 (Lift pipe & 7.4 interval vols.)
Maximum sustainable pumping rate (gpm)	6.5	6	NA	3.75 to 3.25	4	4	5	3	8	5	4	3	6
Pump depth setting (ft bgs)	53	115.5	148.5/130	171.5	237.5	277.5	297.6	328	380	408	436	503	582
Comments	Sample collected OW-16-4073	Sample collected OW-16-104124	Lift pipe pumped dry and allowed to recharge. Calculated recharge rate = 0.162 to 0.176 gpm. Sample collected OW-16-137157	Sample collected OW-16-160180	Sample collected OW-16-226243	Sample collected OW-16-266283	Sample collected OW-16-285300	Sample collected OW-16-316340	Sample collected OW-16-3683962	Sample collected OW-16-396420	Sample collected OW-16-424448	Sample collected OW-16-491515	Sample collected OW-16-570600

Table 3-3
Summary of Packer Testing Observations
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Well	*OW-17-XX (6-in. Borehole)*																	
	Drilling Zone 1 (0 to 150 ft)				*Drilling Zone 2 (150 to 300 ft)*						*Drilling Zone 3 (300 to 350 ft)*		*Drilling Zone 4 (350 to 600 ft)*					
Test Interval (Feet bgs)	*38.5 - 47*	*59-74*	*100-115*	*125-151*	*149 - 164*	*175 - 190*	*217 - 232*	*238 - 253*	*263 - 278*	*280 - 300*	*295-310*[2]	*327-350*[2]	*370 - 395*	*395 - 420*	*421 - 446*	*455 - 480*	*484 - 509*	*535 - 560*	*565 - 600*
Calculated lift pipe and 1 packer zone purge volume (gals)	14.8	25.6	32.3	52.7	31.6	37.3	47.6	49.5	57.8	70.9	62.7	80.3	57.5	59.1	60.8	62.9	64.8	68.1	84.7
Total Volume purged (gals)	82 (5.5 interval vols.; temporary 6-in. steel casing base @ 38.5 ft bgs; single packer set at bottom of interval)	71 (Lift pipe vol. & 3 interval vols.)	10.3 (Lift pipe vol. only)	14.5 (Lift pipe vol. only)	9.6 (Lift pipe vol. only)	15.3 (Lift pipe vol. only)	25.6 (Lift pipe vol. only)	41.5 (Lift pipe vol. & approx. 72% of interval vol.)	68.8 (Lift pipe vol. & 1.5 interval vols.)	41.5 (Lift pipe vol. only)	110 (Lift pipe vol. & 3 interval vols.)	207 (Lift pipe vol. & 4.5 interval vols.)	240 (Lift pipe vol. & 5.9 interval vols.)	238.5 (Lift pipe vol. & 5.9 interval vols.)	302 (Lift pipe vol. & 7.5 interval vols.)	200 (Lift pipe vol. & 4.7 interval vols.)	264 (Lift pipe vol. & 6.4 interval vols.)	240 (Lift pipe vol. & 5.7 interval vols.)	336 (Lift pipe vol. & 5.9 interval vols.)
Maximum sustainable pumping rate (gpm)	1.25	0.36 to 0.34	NA	NA	NA	NA	NA	NA	NA	NA	0.75	1	4	4.5	4	2	6	4	8
Pump depth setting (ft bgs)	43	51	92	118	141.5	167	209	231	256	272	303.5	332	382	407	433	467	496	547	577
Comments	Sample collected OW-17-38547	Sample collected OW-17-5974	Zone pumped dry. Calculated recharge rate = 0.057 to 0.046 gpm. No sample collected.	Zone pumped dry. Calculated recharge rate = 0.064 to 0.048 gpm. No sample collected.	Lift pipe pumped dry. Insufficient recharge rate. Calculated recharge rate = 0.012 to 0.005 gpm. No sample collected.	Lift pipe repeatedly pumped dry. Insufficient recharge rate. Calculated recharge rate = 0.059 to 0.066 gpm. No sample collected.	Lift pipe repeatedly pumped dry with diminishing recharge rate each time. Calculated recharge rate = 0.098 to 0.063 gpm. No sample collected.	Lift pipe repeatedly pumped dry with diminishing recharge rate each time. Calculated recharge rate = 0.236 to 0.076 gpm. No sample collected.	Lift pipe repeatedly pumped dry and allowed to recharge. Calculated recharge rate = 0.21 to 0.18 gpm. Sample collected OW-17-263278	Zone pumped dry. Calculated recharge rate = 0.043 to 0.040 gpm. No sample collected.	Sample collected OW-17-295310	Sample collected OW-17-327350	Sample collected OW-17-370395	Sample collected OW-17-395420	Sample collected OW-17-421446	Sample collected OW-17-455480	Sample collected OW-17-484509	Sample collected OW-17-535560	Sample collected OW-17-565600

Well	*OW-18-XX (6-in. Borehole)*										
	Drilling Zone 1 (0 to 300 ft)				*Drilling Zone 2 (300 to 600 ft)*						
Test Interval (Feet bgs)	*46-66*	*124-140*	*212-228*	*257-300*	*306-327*	*349-370*	*371-392*	*394-415*	*425-446*	*500-521*	*563-600*
Calculated lift pipe and 1 packer zone purge volume (gals)	29.7	36.3	50.7	97.7	48	50.7	52	53.6	55.5	60.4	88
Total Volume purged (gals)	196.5 (6.6 interval vols. - No lift pipe vol. applicable, single bottom packer system utilized)	12.8 (Lift pipe vol. only)	27.2 (Lift pipe vol. only)	227.5 (Lift pipe vol. & 3 interval vols.)	240 (Lift pipe vol. & 7.2 interval vols.)	215 (Lift pipe vol. & 6.3 interval vols.)	115 (Lift pipe vol. & 3 interval vols.)	320 (Lift pipe vol. & 9.6 interval vols.)	125 (Lift pipe vol. & 3.2 interval vols.)	220 (Lift pipe vol. & 6.1 interval vols.)	464 (Lift pipe vol. & 7.9 interval vols.)
Maximum sustainable pumping rate (gpm)	4.5	NA	NA	1.75	8	5	1	8	1	2	8
Pump depth setting (ft bgs)	58.5	117	205	250	315	358	380	403	434	509	572
Comments	Sample collected OW-18-4666	Lift pipe pumped dry. Insufficient recharge rate. Calculated recharge rate = 0.10 to 0.06 gpm. No sample collected.	Lift pipe pumped dry. Insufficient recharge rate. Calculated recharge rate = 0.035 to 0.014 gpm. No sample collected.	Sample collected OW-18-257300	Sample collected OW-18-306327	Sample collected OW-18-349370	Sample collected OW-18-371392	Sample collected OW-18-394415	Sample collected OW-18-425446	Sample collected OW-18-500521	Sample collected OW-18-563600

Well	*OW-19-XX (0 to 450 ft - 6-in. BH)*									
	Drilling Zone 1 (0 to 250 ft)				*Drilling Zone 2 (250 to 450 ft)*					
Test Interval (Feet bgs)	*155-168*	*191-204*	*216-229*	*231-250*	*270-290*	*290-310*	*317-337*	*346-366*	*385-405*	*418-450*
Calculated lift pipe and 1 packer zone purge volume (gals)	35	40.8	45.1	56.3	42.9	44.2	45.9	47.8	50.3	70
Total Volume purged (gals)	75 (Lift pipe vol. & 3.1 interval vols.)	82.5 (Lift pipe vol. & 3.2 interval vols.)	128 (Lift pipe vol. & 5.3 interval vols.)	218 (Lift pipe vol. & 6.8 interval vols.)	171 (Lift pipe vol. & 5.7 interval vols.)	108 (Lift pipe vol. & 3 interval vols.)	168 (Lift pipe vol. & 5.1 interval vols.)	39 (Lift pipe vol. & approx. 70% of interval vol.)	276 (Lift pipe vol. & 8.7 interval vols.)	468 (Lift pipe vol. & 9.4 interval vols.)
Maximum sustainable pumping rate (gpm)	1.5	1.5	2	2	1.5	0.5	1.75	NA	3.5	9
Pump depth setting (ft bgs)	148	184	209	224	285	305	332	361	400	433
Comments	Sample collected OW-19-155168	Sample collected OW-19-191204	Sample collected OW-19-216229	Sample collected OW-19-231250	Sample collected OW-19-270290	Sample collected OW-19-290310	Sample collected OW-19-317337	Zone pumped dry. Calculated recharge rate = 0.113 to 0.098 gpm. No sample collected.	Sample collected OW-19-385405	Sample collected OW-19-418450

Note:
NA - Not applicable

[1] - Packer test conducted using bladder pump secured to 1.25-in. diam. unslotted/solid pipe within packer interval with air supply and 0.25-in. diam. discharge lines plumbed through top packer.

[2] - Packer test conducted using submersible pump hard plumbed within packer interval (i.e., lift pipe = discharge pipe).

[3] - No packer installed.

[4] - Packer test conducted using combination submersible pump hard plumbed within packer interval (i.e., lift pipe = discharge pipe) and 2-in. submersible pump situated immediately above top packer.

[5] - Packer test conducted using pump hard plumbed within packer interval (i.e., lift pipe = discharge pipe) 1.25-in. lift/discharge pipe.

Table 3-4
Borehole Packer Testing Groundwater Sample
Analytical Parameter List
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Metals
Arsenic
Aluminum
Beryllium
Iron
Manganese
Thallium
Vanadium
Zinc
Herbicides
2,4,5-T
2,4-D
Pesticides
2,4-DDD
2,4-DDT
2,4-DDE
4,4-DDD
4,4-DDT
4,4-DDE
Aldrin
Alpha-BHC
Alpha-Chlordane
Beta-BHC
Delta-BHC
Dieldrin
Endrin
Endrin Ketone
Gamma-BHC
Heptachlor
Heptachlor Epoxide
Toxaphene
Site-Specific Pesticides
Diphenamid
Semi-Volatile Organic Compounds
2,4,6-Trichlorophenol
2,4-Dichlorophenol
Atrazine
Bis(2-ethylhexyl)phthalate
Pentachlorophenol
Volatile Organic Compounds
1,2,4-Trichlorobenzene
1,2-Dichloroethane
1,4-Dichlorobenzene
Benzene
Chlorobenzene
Chloroform
Tetrachloroethene

Notes:

1.) Analytical parameter list from Interim Groundwater Remediation Standards (Table 12) of EPA ROD, dated September, 2009, for the Central Chemical Superfund Site.

2.) Sample anaysis performed using EPA SW-846 Methods by TestAmerica, Pittsburgh, PA.

Table 3-5

Bester Long Quarry Surface Water and Sediment Sample Analytical Parameter List

Operable Unit 2 Remedial Investigation (OU-2 RI)

Central Chemical Site

Hagerstown, Maryland

Surface Water
Metals
Arsenic
Aluminum
Beryllium
Iron
Manganese
Thallium
Vanadium
Zinc
Herbicides
2,4,5-T
2,4-D
Pesticides
2,4-DDD
2,4-DDT
2,4-DDE
4,4-DDD
4,4-DDT
4,4-DDE
Aldrin
Alpha-BHC
Alpha-Chlordane
Beta-BHC
Delta-BHC
Dieldrin
Endrin
Endrin Ketone
Gamma-BHC
Heptachlor
Heptachlor Epoxide
Toxaphene
Site-Specific Pesticides
Diphenamid
General Chemistry
Total Organic Carbon (TOC)
Alcalinity (carb, bicarb, & total)
Total Suspended Solids & Total Dissolved Solids (TSS/TDS)
Hardness

Sediment
Metals
Arsenic
Aluminum
Beryllium
Iron
Manganese
Thallium
Vanadium
Zinc
Herbicides
2,4,5-T
2,4-D
Pesticides
2,4-DDD
2,4-DDT
2,4-DDE
4,4-DDD
4,4-DDT
4,4-DDE
Aldrin
Alpha-BHC
Alpha-Chlordane
Beta-BHC
Delta-BHC
Dieldrin
Endrin
Endrin Ketone
Gamma-BHC
Heptachlor
Heptachlor Epoxide
Toxaphene
Site-Specific Pesticides
Diphenamid
General Chemistry
Total Organic Carbon (TOC)
Percent Moisture/Percent Solids
Grain Size

Notes:

1.) Analytical parameter list from Interim Groundwater Remediation Standards (Table 12) of EPA ROD, dated September, 2009, for the Central Chemical Superfund Site.

2.) Sample anaysis performed using EPA SW-846 Methods by TestAmerica, Pittsburgh, PA.

Table 4-1
April 2014 Groundwater Elevation Data
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Monitoring Well ID	*Top of PVC Elevation (ft. - NAVD '88)*	*April 14, 2014*	
		Depth to GW (ft. below top of PVC)	*GW Elevation (ft. NAVD '88)*
On-Site Monitoring Wells			
MW-A-51	630.04	36.24	593.80
MW-B-55	621.72	42.51	579.21
MW-B (350 - 400 ft)	**619.16**[(1)]	50.25	568.91
MW-C-40	610.16	27.49	582.67
MW-D-77	607.79	25.75	582.04
MW-E-46	616.17	23.47	592.70
MW-F-70	620.65	41.70	578.95
MW-G-35	600.39	19.30	581.09
MW-G (300 - 360 ft)	**596.88**[(1)]	26.60	570.28
MW-H-65	615.10	29.60	585.50
MW-I-55	625.93	27.05	598.88
MW-J-71	630.84	37.59	593.25
MW-K-80	629.33	35.97	593.36
MW-K (200 - 250 ft)	**627.82**[(1)]	56.03	571.79
MW-L-48	620.14	28.13	592.01
MW-L (200 - 250 ft)	**617.8**[(1)]	47.59	570.21
MW-M-50	625.44	26.10	599.34
MW-N-83	625.24	34.48	590.76
MW-N-113	625.22	34.91	590.31
MW-O-145	632.49	52.00	580.49
Open Hole Portion MW-P (62 - 100 ft)	626.51[(2)]	31.20	595.31
PZ-P-165	626.57	46.75	579.82
MW-P-235	626.51	50.49	576.02
PZ-Q-118	630.62	40.12	590.50
MW-Q-150	630.59	47.78	582.81
MW-R (280 - 330 ft)	**617.65**[(1)]	44.87	572.78
EW-1-110	623.83	25.45	598.38
PZ-1S	628.26	9.17	619.09
PZ-1D	628.43	24.15	604.28
PZ-2S	629.68	12.87	616.81
PZ-2D	629.67	30.11	599.56
PZ-3S	630.08	11.00	619.08
PZ-3D	630.14	21.22	608.92
PZ-4S	625.59	6.42	619.17
PZ-4D	625.62	26.10	599.52
Off-Site Monitoring Wells			
OW-1-62	626.09	49.60	576.49
OW-1-105	626.05	50.20	575.85
OW-2-65	629.81	44.32	585.49
OW-2-115	629.88	47.36	582.52
OW-3-55	615.12	41.76	573.36
OW-3-105	615.09	42.38	572.71
OW-4-70	604.07	31.62	572.45
OW-5-90	601.37	36.12	565.25
OW-7-242	601.96	37.37	564.59
OW-7 (300 - 410 ft)	**601.86**[(1)]	34.50	567.36
OW-8-230	629.73	52.53	577.20
OW-9-125	602.80	29.30	573.50
OW-10-250	606.28	35.77	570.51
OW-11-240	612.68	45.32	567.36
OW-12-232	611.62	54.76	556.86
OW-13-250	574.48	13.08	561.40
OW-14-96	584.68	19.51	565.17
OW-14-235	584.69	18.42	566.27
OW-15-202	590.40	19.23	571.17
OW-16 (200 - 300 ft)	**609.03**[(1)]	39.87	569.16
OW-17 (300 - 350 ft)	**613.32**[(1)]	43.77	569.55

Notes:
Reference elevation for MW-D is top of steel as well constructed with no PVC installed in borehole.
NAVD '88 = North American Vertical Datum 1988
601.86[(1)] - Ground Surface Elevation data used and water level data referenced to GS as PVC wells not yet installed as of April 2014.
626.51[(2)] - Top of MW-P-235 PVC used as measuring reference point for water level collection in open hole portion of MW-P borehole.

Prepared by: JD 11/01/2017
Checked by:

Table 4-2
October 2016 (1st Quarter) Groundwater Elevation Data
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Monitoring Well ID	*Top of PVC Elevation (ft. - NAVD '88)*	*October 21, 2016*	
		Depth to GW (ft. below top of PVC)	*GW Elevation (ft. NAVD '88)*
On-Site Monitoring Wells			
MW-A-51	630.04	47.02	583.02
MW-B-55	621.72	48.86	572.86
MW-B-400	621.66	56.98	564.68
MW-B-598	620.39	55.58	564.81
MW-C-40	610.16	32.11	578.05
MW-D-77	607.79	28.46	579.33
MW-E-46	616.17	33.00	583.17
MW-F-70	620.65	50.32	570.33
MW-G-35	600.39	24.74	575.65
MW-G-360	598.38	33.84	564.54
MW-G-600	599.27	36.17	563.10
MW-H-65	615.10	35.63	579.47
MW-I-55	625.93	38.63	587.30
MW-J-71	630.84	47.94	582.90
MW-K-80	629.33	44.98	584.35
MW-K-440	629.55	64.10	565.45
MW-L-48	620.14	36.13	584.01
MW-L-250	619.47	54.63	564.84
MW-M-50	625.44	36.87	588.57
MW-N-83	625.24	44.31	580.93
MW-N-113	625.22	44.00	581.22
MW-O-145	632.49	59.58	572.91
Open Hole Portion of MW-P	626.51	41.28	585.23
PZ-P-165	627.57	54.48	573.09
MW-P-235	626.51	57.53	568.98
PZ-Q-118	630.62	50.22	580.40
MW-Q-150	630.59	56.21	574.38
MW-R-330	619.03	52.40	566.63
MW-R-600	619.98	55.13	564.85
EW-1-110	623.83	36.88	586.95
PZ-1S	628.26	11.64	616.62
PZ-1D	628.43	24.20	604.23
PZ-2S	629.68	15.76	613.92
PZ-2D	629.67	36.04	593.63
PZ-3S	630.08	16.64	613.44
PZ-3D	630.14	27.06	603.08
PZ-4S	625.59	11.79	613.80
PZ-4D	625.62	36.62	589.00
Off-Site Monitoring Wells			
OW-1-62	626.09	55.61	570.48
OW-1-105	626.05	56.49	569.56
OW-2-65	629.81	50.07	579.74
OW-2-115	629.88	55.93	573.95
OW-3-55	615.12	50.00	565.12
OW-3-105	615.09	50.21	564.88
OW-4-70	604.07	40.19	563.88
OW-5-90	601.37	44.44	556.93
OW-7-242	601.96	42.70	559.26
OW-7-410	603.75	41.65	562.10
OW-8-230	629.73	59.90	569.83
OW-9-125	602.80	34.19	568.61
OW-10-250	606.28	40.06	566.22
OW-11-240	612.68	52.22	560.46
OW-11-600	614.86	55.78	559.08
OW-12-232	611.62	62.98	548.64
OW-13-250	574.48	20.31	554.17
OW-14-96	584.68	27.57	557.11
OW-14-235	584.69	25.74	558.95
OW-15-202	590.40	26.23	564.17
OW-16-448	609.62	47.12	562.50
OW-17-600	613.02	47.36	565.66
OW-18-597	602.54	43.41	559.13
OW-19-450	625.40	59.82	565.58

Notes:
Reference elevation for MW-D is top of steel as well constructed with no PVC installed in borehole.
NA = Not Applicable.
NAVD '88 = North American Vertical Datum 1988

Prepared by: JD 11/01/2017
Checked by:

Table 4-3
January 2017 (2nd Quarter) Groundwater Elevation Data
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Monitoring Well ID	*Top of PVC Elevation (ft. - NAVD '88)*	*January 19, 2017*	
		Depth to GW (ft. below top of PVC)	*GW Elevation (ft. NAVD '88)*
On-Site Monitoring Wells			
MW-A-51	630.04	46.74	583.30
MW-B-55	621.72	47.54	574.18
MW-B-400	621.66	57.07	564.59
MW-B-598	620.39	55.73	564.66
MW-C-40	610.16	31.91	578.25
MW-D-77	607.79	31.44	576.35
MW-E-46	616.17	32.05	584.12
MW-F-70	620.65	50.23	570.42
MW-G-35	600.39	26.58	573.81
MW-G-360	598.38	33.56	564.82
MW-G-600	599.27	36.36	562.91
MW-H-65	615.10	34.77	580.33
MW-I-55	625.93	38.93	587.00
MW-J-71	630.84	45.39	585.45
MW-K-80	629.33	44.46	584.87
MW-K-440	629.55	64.48	565.07
MW-L-48	620.14	34.38	585.76
MW-L-250	619.47	55.02	564.45
MW-M-50	625.44	37.98	587.46
MW-N-83	625.24	43.88	581.36
MW-N-113	625.22	44.10	581.12
MW-O-145	632.49	58.67	573.82
Open Hole Portion of MW-P	626.51	41.73	584.78
PZ-P-165	627.57	53.65	573.92
MW-P-235	626.51	56.94	569.57
PZ-Q-118	630.62	49.91	580.71
MW-Q-150	630.59	55.74	574.85
MW-R-330	619.03	52.09	566.94
MW-R-600	619.98	55.46	564.52
EW-1-110	623.83	37.07	586.76
PZ-1S	628.26	11.13	617.13
PZ-1D	628.43	24.28	604.15
PZ-2S	629.68	15.91	613.77
PZ-2D	629.67	36.16	593.51
PZ-3S	630.08	16.73	613.35
PZ-3D	630.14	27.16	602.98
PZ-4S	625.59	11.53	614.06
PZ-4D	625.62	38.16	587.46
Off-Site Monitoring Wells			
OW-1-62	626.09	59.47	566.62
OW-1-105	626.05	56.33	569.72
OW-2-65	629.81	47.88	581.93
OW-2-115	629.88	53.93	575.95
OW-3-55	615.12	50.69	564.43
OW-3-105	615.09	50.78	564.31
OW-4-70	604.07	39.29	564.78
OW-5-90	601.37	43.93	557.44
OW-7-242	601.96	44.01	557.95
OW-7-410	603.75	41.80	561.95
OW-8-230	629.73	58.76	570.97
OW-9-125	602.80	33.69	569.11
OW-10-250	606.28	39.41	566.87
OW-11-240	612.68	50.54	562.14
OW-11-600	614.86	54.78	560.08
OW-12-232	611.62	62.49	549.13
OW-13-250	574.48	19.99	554.49
OW-14-96	584.68	27.58	557.10
OW-14-235	584.69	25.91	558.78
OW-15-202	590.40	27.09	563.31
OW-16-448	609.62	47.87	561.75
OW-17-600	613.02	47.47	565.55
OW-18-597	602.54	42.95	559.59
OW-19-450	625.40	60.42	564.98

Notes:
Reference elevation for MW-D is top of steel as well constructed with no PVC installed in borehole.
NA = Not Applicable.
NAVD '88 = North American Vertical Datum 1988

Prepared by: JD 11/01/2017
Checked by:

Table 4-4
April 2017 (3rd Quarter) Groundwater Elevation Data
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Monitoring Well ID	*Top of PVC Elevation (ft. - NAVD '88)*	*April 20, 2017*	
		Depth to GW (ft. below top of PVC)	*GW Elevation (ft. NAVD '88)*
On-Site Monitoring Wells			
MW-A-51	630.04	42.29	587.75
MW-B-55	621.72	45.44	576.28
MW-B-400	621.66	55.39	566.27
MW-B-598	620.39	54.07	566.32
MW-C-40	610.16	27.96	582.20
MW-D-77	607.79	32.08	575.71
MW-E-46	616.17	25.19	590.98
MW-F-70	620.65	46.00	574.65
MW-G-35	600.39	20.84	579.55
MW-G-360	598.38	31.51	566.87
MW-G-600	599.27	34.60	564.67
MW-H-65	615.10	31.43	583.67
MW-I-55	625.93	31.11	594.82
MW-J-71	630.84	42.00	588.84
MW-K-80	629.33	38.95	590.38
MW-K-440	629.55	62.59	566.96
MW-L-48	620.14	29.19	590.95
MW-L-250	619.47	53.13	566.34
MW-M-50	625.44	29.17	596.27
MW-N-83	625.24	37.87	587.37
MW-N-113	625.22	38.30	586.92
MW-O-145	632.49	55.37	577.12
Open Hole Portion of MW-P	626.51	36.93	589.58
PZ-P-165	627.57	50.38	577.19
MW-P-235	626.51	54.16	572.35
PZ-Q-118	630.62	43.81	586.81
MW-Q-150	630.59	51.40	579.19
MW-R-330	619.03	49.70	569.33
MW-R-600	619.98	53.59	566.39
EW-1-110	623.83	29.46	594.37
PZ-1S	628.26	9.08	619.18
PZ-1D	628.43	24.32	604.11
PZ-2S	629.68	13.75	615.93
PZ-2D	629.67	36.22	593.45
PZ-3S	630.08	14.12	615.96
PZ-3D	630.14	27.22	602.92
PZ-4S	625.59	8.20	617.39
PZ-4D	625.62	31.28	594.34
Off-Site Monitoring Wells			
OW-1-62	626.09	53.47	572.62
OW-1-105	626.05	53.95	572.10
OW-2-65	629.81	47.86	581.95
OW-2-115	629.88	51.49	578.39
OW-3-55	615.12	49.15	565.97
OW-3-105	615.09	49.23	565.86
OW-4-70	604.07	37.35	566.72
OW-5-90	601.37	41.90	559.47
OW-7-242	601.96	50.29	551.67
OW-7-410	603.75	39.99	563.76
OW-8-230	629.73	56.84	572.89
OW-9-125	602.80	32.07	570.73
OW-10-250	606.28	38.19	568.09
OW-11-240	612.68	49.39	563.29
OW-11-600	614.86	53.88	560.98
OW-12-232	611.62	61.89	549.73
OW-13-250	574.48	18.03	556.45
OW-14-96	584.68	25.56	559.12
OW-14-235	584.69	23.97	560.72
OW-15-202	590.40	25.32	565.08
OW-16-448	609.62	46.20	563.42
OW-17-600	613.02	45.99	567.03
OW-18-597	602.54	Property sold to new owner - Attempted contact for access unsucessful Water level not collected	
OW-19-450	625.40	58.54	566.86

Notes:
Reference elevation for MW-D is top of steel as well constructed with no PVC installed in borehole.
NA = Not Applicable.
NAVD '88 = North American Vertical Datum 1988

Table 4-5
July 2017 (4th Quarter) Groundwater Elevation Data
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Monitoring Well ID	*Top of PVC Elevation (ft. - NAVD '88)*	*July 26, 2017*	
		Depth to GW (ft. below top of PVC)	*GW Elevation (ft. NAVD '88)*
On-Site Monitoring Wells			
MW-A-51	630.04	42.30	587.74
MW-B-55	621.72	43.65	578.07
MW-B-400	621.66	55.21	566.45
MW-B-598	620.39	53.86	566.53
MW-C-40	610.16	29.76	580.40
MW-D-77	607.79	31.80	575.99
MW-E-46	616.17	26.31	589.86
MW-F-70	620.65	44.76	575.89
MW-G-35	600.39	21.93	578.46
MW-G-360	598.38	31.25	567.13
MW-G-600	599.27	34.39	564.88
MW-H-65	615.10	32.65	582.45
MW-I-55	625.93	32.20	593.73
MW-J-71	630.84	42.84	588.00
MW-K-80	629.33	39.42	589.91
MW-K-440	629.55	62.22	567.33
MW-L-48	620.14	30.82	589.32
MW-L-250	619.47	52.75	566.72
MW-M-50	625.44	30.67	594.77
MW-N-83	625.24	37.66	587.58
MW-N-113	625.22	38.11	587.11
MW-O-145	632.49	55.20	577.29
Open Hole Portion of MW-P	626.51	37.44	589.07
PZ-P-165	627.57	49.97	577.60
MW-P-235	626.51	53.84	572.67
PZ-Q-118	630.62	43.86	586.76
MW-Q-150	630.59	51.15	579.44
MW-R-330	619.03	49.40	569.63
MW-R-600	619.98	53.62	566.36
EW-1-110	623.83	30.57	593.26
PZ-1S	628.26	10.91	617.35
PZ-1D	628.43	24.25	604.18
PZ-2S	629.68	14.88	614.80
PZ-2D	629.67	35.78	593.89
PZ-3S	630.08	14.99	615.09
PZ-3D	630.14	26.75	603.39
PZ-4S	625.59	9.47	616.12
PZ-4D	625.62	31.68	593.94
Off-Site Monitoring Wells			
OW-1-62	626.09	53.13	572.96
OW-1-105	626.05	53.52	572.53
OW-2-65	629.81	46.77	583.04
OW-2-115	629.88	50.07	579.81
OW-3-55	615.12	48.29	566.83
OW-3-105	615.09	48.52	566.57
OW-4-70	604.07	35.46	568.61
OW-5-90	601.37	41.11	560.26
OW-7-242	601.96	41.80	560.16
OW-7-410	603.75	39.66	564.09
OW-8-230	629.73	55.90	573.83
OW-9-125	602.80	31.70	571.10
OW-10-250	606.28	37.65	568.63
OW-11-240	612.68	48.56	564.12
OW-11-600	614.86	53.44	561.42
OW-12-232	611.62	60.31	551.31
OW-13-250	574.48	17.75	556.73
OW-14-96	584.68	25.13	559.55
OW-14-235	584.69	23.54	561.15
OW-15-202	590.40	25.02	565.38
OW-16-448	609.62	25.79	583.83
OW-17-600	613.02	45.84	567.18
OW-18-597	602.54	41.39	561.15
OW-19-450	625.40	58.20	567.20

Notes:
Reference elevation for MW-D is top of steel as well constructed with no PVC installed in borehole.
NA = Not Applicable.
NAVD '88 = North American Vertical Datum 1988
Water level measurements collected 7/31/2017 through 8/9/2017

Prepared by: JD 11/01/2017
Reviewed by:

Table 5-1
2014-2015
Private Well Sampling Field Parameter Readings
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Well Address	*Sample Date*	*Sample ID*	*Temperature (ºC)*	*Dissolved Oxygen (mg/L)*	*pH (Std.Units)*	*Turbidity (NTUs)*	*Conductivity (mS/cm)*	*Oxygen Reduction Potential (mV)*	*Rate (gpm)*
2014									
18942 Preston Road	5/5/2014	18942 Preston Rd	12.64	6.32	7.14	0.0	0.735	147	3.0
13212 Woodbine Lane	5/6/2014	13212 Woodbine Ln	13.68	7.10	6.95	0.0	1.26	127	4.0
12914 Fountain Head Road	5/5/2014	12914 FHRD	12.95	7.89	6.89	0.0	0.897	174	3.0
12918 Fountain Head Rd	5/5/2014	12918 FHRD	12.42	7.32	7.05	0.0	0.828	88	3.0
13011 Fountain Head Road	5/6/2014	13011 FHRD	13.37	6.86	6.96	0.0	1.02	112	3.5
13238 Fountain Head Road	5/6/2014	13238 FHRD	12.58	0.82	6.77	0.0	0.701	76	3.5
Fountain Head Country Club Golf Course	5/6/2014	FHCC Well	13.82	6.90	6.81	0.0	0.881	92	5/20[(1)]
2015									
12918 Fountain Head Rd	11/4/2015	12918 FHRD - RD 2	12.21	0.0	7.19	0.0	0.564	84	3
13212 Woodbine Lane	10/21/2015	13212 Woodbine Ln - RD 2	13.08	0.0	7.06	0.0	0.901	189	5
Fountain Head Country Club Golf Course	10/21/2015	FHCC Well - RD 2	13.48	0.32	7.13	0.0	0.648	131	5/25[(1)]

Notes:

[(1)] 5 GPM is flow rate in flow-thru cell during collection of stabilization readings. 20 or 25 GPM is total flow rate as sprinkler system operated at time of collection.

gpm - gallons per minute

Table 5-2
2014-2015 Private Well Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Location ID	EPA Region 3 Risk Screening Levels (RSLs) June 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	18942 Preston Road	13212 Woodbine Lane	12914 Fountain Head Road	12918 Fountain Head Road	13011 Fountain Head Road	13238 Fountain Head Road	Fountain Head Country Club Golf Course	13212 Woodbine Lane	12918 Fountain Head Road	Fountain Head Country Club Golf Course
Sample Date			5/5/2014	5/6/2014	5/5/2014	5/5/2014	5/6/2014	5/6/2014	5/6/2014	10/21/2015	11/4/2015	10/21/2015
Sample ID			18942 Preston Rd	13212 Woodbine Ln	12914 FH RD	12918 FH RD	13011 FH RD	13238 FH RD	FHCC Well	13212 Woodbine Ln - RD 2	12918 FHRD-RD2	FHCC Well - RD2
Diphenamid	530	---	<0.19 U	<0.19 U	<0.19 U	<0.19 U	<0.19 U	<0.19 U	<0.19 U	<0.19 U	<0.19 U	<0.19 U
2,4'-DDD	0.032	---	<0.00015 U	<0.00015 U	<0.00015 U	<0.00015 U	<0.00015 U	<0.00015 U	<0.00015 U	<0.00015 U	<0.00015 U	<0.00015 U
2,4'-DDE	0.046	---	0.0002 Jp	0.0016 p	0.00098 Jp	0.00069 Jp	0.00084 Jp	0.0015	0.0022 p	0.0032	<0.00014 U	0.0019 p
2,4'-DDT	0.23	---	<0.00021 U	<0.00021 U	<0.00021 U	0.00064 Jp	0.00054 Jp	<0.00021 U	<0.00021 U	<0.00021 U	<0.00021 U	0.00049 Jp
4,4'-DDD	0.032	---	<0.00064 U	<0.00064 U	<0.00063 U	<0.00064 U	<0.00064 U	<0.00064 U	<0.00064 U	<0.00063 U	<0.00064 U	<0.00064 U
4,4'-DDE	0.046	---	<0.00075 U	<0.00075 U	<0.00075 U	<0.00075 U	<0.00075 U	0.00086 Jp	<0.00075 U	<0.00075 U	<0.00076 U	<0.00075 U
4,4'-DDT	0.23	---	<0.0007 U	<0.0007 U	<0.0007 U	0.0021	<0.0007 U	<0.0007 U	<0.0007 U	<0.0007 U	<0.00071 U	0.0027
Aldrin	0.00092	---	<0.00079 U	<0.00079 U	<0.00079 U	<0.00079 U	<0.00079 U	<0.00079 U	<0.00079 U	<0.00079 U	<0.0008 U	<0.00079 U
Alpha-BHC	0.0072	---	<0.00063 U	<0.00063 U	<0.00062 U	<0.00063 U	<0.00063 U	<0.00063 U	<0.00063 U	<0.00062 U	<0.00063 U	<0.00063 U
Alpha-chlordane	0.02	2	<0.00093 U	<0.00093 U	<0.00092 U	<0.00093 U	<0.00093 U	<0.00093 U	0.002	<0.00092 U	<0.00094 U	0.0030
Beta-BHC	0.025	---	<0.00095 U	0.0018	<0.00094 U	<0.00095 U	0.0015	<0.00095 U	0.0016	<0.00094 U	<0.00096 U	<0.00095 U
Delta-BHC	0.025	---	<0.00036 U	<0.00036 U	<0.00036 U	<0.00036 U	<0.00036 U	<0.00036 U	<0.00036 U	<0.00036 U	<0.00037 U	<0.00036 U
Dieldrin	0.0018	---	0.0016	**0.003**	**0.022**	0.0013	**0.0036**	**0.0086**	**0.019**	**0.007**	0.0011 J	**0.0088**
Endosulfan I	100	---	<0.0009 U	0.0045	0.0069	<0.0009 U	<0.0009 U	<0.0009 U	<0.0009 U	0.0067	<0.0009 U	0.0034
Endosulfan II	100	---	<0.00093 U	<0.00093 U	<0.00092 U	<0.00093 U	<0.00093 U	<0.00093 U	<0.00093 U	<0.00092 U	<0.00094 U	<0.00093 U
Endosulfan Sulfate	---	---	<0.00054 U	<0.00054 U	<0.00054 U	<0.00054 U	<0.00054 U	<0.00054 U	0.0032 p	<0.00054 U	<0.00055 U	0.0021
Endrin	2.3	2.0	<0.00091 U	<0.00091 U	<0.00091 U	<0.00091 U	<0.00091 U	<0.00091 U	<0.00091 U	<0.00091 U	<0.00092 U	<0.00091 U
Endrin aldehyde	---	---	<0.00086 U	<0.00086 U	<0.00085 U	<0.00086 U	<0.00086 U	<0.00086 U	<0.00086 U	<0.00085 U	<0.00087 U	0.0027
Endrin ketone	---	---	<0.00088 U	0.0034	<0.00087 U	0.0018	<0.00088 U	<0.00088 U	0.002 p	<0.00087 U	<0.00088 U	<0.00088 U
Gamma-BHC (Lindane)	0.042	0.2	<0.00076 U	<0.00076 U	<0.00075 U	<0.00076 U	<0.00076 U	<0.00076 U	<0.00076 U	<0.00075 U	<0.00077 U	<0.00076 U
Gamma-chlordane	0.02	2	<0.00091 U	0.001 J	0.0041	0.0042	0.0013 p	<0.00091 U	0.0055 p	<0.00091 U	<0.00092 U	0.0015 p
Heptachlor	0.0014	0.4	<0.00094 U	<0.00094 U	<0.00093 U	<0.00094 U	<0.00094 U	<0.00094 U	<0.00094 U	<0.00093 U	<0.00095 U	<0.00094 U
Heptachlor Epoxide	0.0014	0.2	<0.00092 U	**0.0038**	0.0013 p	0.00094 Jp	0.00095 Jp	<0.00092 U	0.0013 p	**0.0044**	0.00095 Jp	**0.0017 p**
Methoxychlor	37	40	<0.00087 U	<0.00087 U	<0.00086 U	<0.00087 U	<0.00087 U	<0.00087 U	0.00092 Jp	<0.00086 U	<0.00088 U	<0.00087 U
Toxaphene	0.071	3	<0.018 U	<0.018 U	<0.018 U	<0.018 U	<0.018 U	<0.018 U	<0.018 U	<0.018 U	<0.018 U	<0.018 U

Notes:
USEPA RSL for TAP WATER (latest version, November 2017)
USEPA MCL (latest version, November 2017)
All results reported in micrograms per liter (ug/L)
U - The analyte was not detected above the reporting limit (RL).
p - The %RPD is between the primary and confirmation column/detector is >40%. The lower value has been reported.
J - Result is either less than the RL but greater than or equal to the method detection limit (MDL) or the result is estimated due to a minor quality control anomaly.
Red bolded detected concentration exceeds RSL

Table 5-3
February 2014 Sub-Slab Soil Vapor Analytical Results (TO-15 VOCs)
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Sample ID		[1]VISL Calculator value Target Sub-Slab and Exterior Soil Gas Concentration @ TCR = 1E-06 or THQ = 1 (ug/m^3)	VI-CC-01	VI-CC-SS1	DUP021814	VI-CC-SS2	VI-CC-SS3	VI-CC-SS4
Location			Background Ambient Air Sample Outside 1028 Matthew Court	1028 Matthew Court	Duplicate of VI-CC-SS1 1028 Matthew Court	1022 Matthew Court	1017 Matthew Court	1019 Matthew Court
71-55-6	1,1,1-Trichloroethane	174,000	<0.11	**9.6**	**8.2**	<0.57	<0.29	<0.46
79-34-5	1,1,2,2-Tetrachloroethane	1.61	<0.11	<0.11	<0.11	<0.55	<0.27	<0.44
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	174,000	**0.50 J**	**0.75 J**	**0.65 J**	<0.69	**1.0 J**	<0.55
79-00-5	1,1,2-Trichloroethane	5.85	<0.093	<0.093	<0.093	<0.46	<0.23	<0.37
75-34-3	1,1-Dichloroethane	58.5	<0.15	<0.15	<0.15	<0.77	<0.38	<0.62
75-35-4	1,1-Dichloroethene	6,950	<0.095	<0.095	<0.095	<0.48	<0.24	<0.38
120-82-1	1,2,4-Trichlorobenzene	69.5	<0.20	<0.20	<0.20	<1.0	<0.50	<0.80
106-93-4	1,2-Dibromoethane	0.156	<0.15	<0.15	<0.15	<0.77	<0.38	<0.61
95-50-1	1,2-Dichlorobenzene	6,950	<0.084	<0.084	<0.084	<0.42	<0.21	<0.34
107-06-2	1,2-Dichloroethane	3.6	<0.069	<0.069	<0.069	**1.4 J**	<0.17	<0.28
78-87-5	1,2-Dichloropropane	25.3	<0.15	<0.15	<0.15	<0.74	<0.37	<0.59
541-73-1	1,3-Dichlorobenzene	NS	<0.084	<0.084	<0.084	<0.42	**2.9 J**	<0.34
106-46-7	1,4-Dichlorobenzene	8.51	<0.084	<0.084	<0.084	<0.42	<0.21	<0.34
78-93-3	2-Butanone (Methyl Ethyl Ketone)	174,000	<0.71	**3.4**	**3.2**	<3.6	**9.1**	<2.9
591-78-6	2-Hexanone	1,040	<0.82	<0.82	<0.82	<4.1	<2.0	<3.3
108-10-1	4-Methyl-2-pentanone	104,000	<0.11	**0.37 J**	<0.11	<0.55	**1.6 J**	<0.44
67-64-1	Acetone	1,070,000	<3.0	**19**	**19**	**270**	**110**	**81**
71-43-2	Benzene	12	**0.88**	**0.42 J**	**0.25 J**	**1.8 J**	**1.8**	**4.5**
75-27-4	Bromodichloromethane	2.53	<0.11	<0.11	<0.11	<0.57	**1.1 J**	<0.46
75-25-2	Bromoform	85.1	<0.10	<0.10	<0.10	<0.52	<0.26	<0.41
74-83-9	Bromomethane	174	<0.11	<0.11	<0.11	<0.54	<0.27	<0.43
75-15-0	Carbon disulfide	24,300	<0.21	**7.0**	**2.1**	<1.0	<0.51	<0.82
56-23-5	Carbon tetrachloride	15.6	**0.38 J**	**0.44 J**	**0.35 J**	<0.66	**0.57 J**	<0.53
108-90-7	Chlorobenzene	1,740	<0.037	<0.037	<0.037	<0.19	<0.093	<0.15
75-00-3	Chloroethane	348,000	<0.079	<0.079	<0.079	<0.40	**0.76 J**	<0.32
67-66-3	Chloroform	4.07	<0.12	<0.12	**0.41 J**	<0.61	**2.6**	**2.6 J**
74-87-3	Chloromethane	3,130	<0.28	**1.9**	<0.28	<1.4	**4.8**	<1.1
156-59-2	cis-1,2-Dichloroethene	NS	<0.15	<0.15	<0.15	<0.75	<0.38	<0.60
10061-01-5	cis-1,3-Dichloropropene	NS	<0.13	<0.13	<0.13	<0.64	<0.32	<0.51
98-82-8	Cumene	13,900	<0.079	<0.079	<0.079	<0.39	**0.80 J**	<0.31
110-82-7	Cyclohexane	209,000	<0.086	<0.086	<0.086	<0.43	**2.0**	<0.34
124-48-1	Dibromochloromethane	NS	<0.17	<0.17	<0.17	<0.85	<0.43	<0.68
75-71-8	Dichlorodifluoromethane	3,480	**2.1 J**	**2.6**	**2.0 J**	**2.1 J**	**2.6 J**	**2.3 J**
100-41-4	Ethylbenzene	37.4	**0.19 J**	**0.32 J**	**0.43 J**	**1.6 J**	**3.6**	**1.8 J**
1634-04-4	Methyl tert-butyl ether	360	<0.079	<0.079	<0.079	<0.40	<0.20	<0.32
75-09-2	Methylene Chloride	3,380	**1.3 J**	<0.43	<0.43	<2.2	<1.1	<1.7
100-42-5	Styrene	34,800	<0.077	**0.15 J**	<0.077	<0.38	<0.19	<0.31
127-18-4	Tetrachloroethene	360	**1.7**	**4.7**	**4.0**	**1.0 J**	**0.95 J**	<0.43
108-88-3	Toluene	174,000	**1.2**	**1.9**	**1.4**	**10**	**18**	**18**
156-60-5	trans-1,2-Dichloroethene	NS	<0.11	<0.11	<0.11	<0.57	<0.29	<0.46
10061-02-6	trans-1,3-Dichloropropene	NS	<0.10	<0.10	<0.10	<0.50	<0.25	<0.40
79-01-6	Trichloroethene	15.9	**0.19 J**	**0.61 J**	**0.26 J**	<0.64	<0.32	<0.52
75-69-4	Trichlorofluoromethane	NS	**1.1 J**	**1.2**	**1.1 J**	<0.84	**1.3 J**	<0.67
75-01-4	Vinyl chloride	5.59	<0.097	<0.097	<0.097	<0.49	<0.24	<0.39
1330-20-7	Xylene (total)	3,480	**0.70 J**	**1.4**	**2.4**	**8.8**	**21**	**6.9**

Notes:
[1] USEPA Office of Solid Waste and Emergency Response (OSWER) Vapor Intrusion Screening Level (VISL) Calculator, February, 2018 Residential Regional Screening Levels (RSLs) where: Target Risk for Carcinogens (TCR) = 1.00E-06 and Target Hazard Quotient for Non-Carcinogens (THQ) = 1
Bold indicates analyte detected concentration
Results reported in ug/m^3
NS - No standard for VISL calculator value
<0.17 - Analyte not detected above the Method Detection Limit
J - value is estimated

Table 5-4
2005 Spring Sample Field Parameter Data
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Spring Location	Temperature (^{O}C)	Dissolved Oxygen (mg/L)	pH	Turbidity (NTU)	Specific Conductivity (mS/cm)	Oxidation-Reduction Potential (mV)
WA Ai-12 Rest Haven Cemetery	17.52	3.70	6.21	17.4	0.569	114
WA Ai-20 Fountain Head Country Club (FCC)	17.69	6.28	6.56	50.8	0.536	124
WA Bi-33 City Park	16.38	10.91	6.11	22.5	0.573	122
WA Bi-34 City Park	18.72	5.57	6.76	26.3	0.623	103
WA Bi-35 City Park	16.01	11.01	5.49	36.4	0.625	151
WA Bi-42 Hager House - City Park	17.49	4.43	6.48	20.2	0.711	128

Table 5-5
2005 Spring Sample Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Spring Location	Fountain Head Country Club	Rest Haven Cememtery	City Park	City Park	City Park	Hager House - City Park
Sample ID	FCC	WA-Ai-12	WA-Bi-33	WA-Bi-34	WA-Bi-35	WA-Bi-42
Sample Date	7/12/2005	7/12/2005	7/13/2005	7/12/2005	7/13/2005	7/12/2005
TOTAL METALS in ug/L						
Arsenic	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Calcium	116000	107000	123000	132000	123000	131000
Iron	14.3	10.3	12.4	203	< 100	15.2
Lead	< 3 U	< 3 U	< 3 U	1.1	< 3 U	< 3 U
Magnesium	8000	9540	11300	12100	11200	11800
Potassium	1870	2310	3070	3350	2900	4260
Sodium	12800	27500	21900	23200	21800	51600
INORGANIC PROPERTIES in mg/L						
Chloride	21.2	47.5	42.8	45.1	45.2	96.3
Nitrate as N	7.9	4.2	7.9	6.9	8.5	6.5
Sulfate	28.2	32.2	35.9	45.9	40.8	60.8
Bicarbonate Alkalinity	235	222	239	266	250	238
Carbonate Alkalinity	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
PESTICIDES in ug/L						
Aramite	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.19 U
Coumaphos	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.19 U
Delnav	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.19 U
Diphenamid	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.19 U
Guthion (Azinphos-methyl)	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.19 U
Karathane	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.19 U
Propargite	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.19 U
Sevin (Carbaryl)	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.19 U
2,4'-DDD	< 0.05 U	< 0.048 U	< 0.05 U	< 0.048 U	< 0.048 U	< 0.048 U
2,4'-DDE	< 0.05 U	< 0.048 U	< 0.05 U	< 0.048 U	< 0.048 U	< 0.048 U
2,4'-DDT	< 0.05 U	< 0.048 U	< 0.05 U	< 0.048 U	< 0.048 U	< 0.048 U
4,4'-DDD	< 0.1 U	< 0.095 U	< 0.1 U	< 0.096 U	< 0.095 U	< 0.095 U
4,4'-DDE	< 0.1 U	< 0.095 U	< 0.1 U	< 0.096 U	< 0.095 U	< 0.095 U
4,4'-DDT	< 0.1 U	< 0.095 U	< 0.1 U	< 0.096 U	< 0.095 U	< 0.095 U
ALDRIN	< 0.05 U	< 0.048 U	< 0.05 U	< 0.048 U	< 0.048 U	< 0.048 U
alpha-BHC	< 0.05 U	< 0.048 U	< 0.05 U	< 0.048 U	< 0.048 U	< 0.048 U
alpha-Chlordane	< 0.05 U	< 0.048 U	< 0.05 U	< 0.048 U	< 0.048 U	< 0.048 U
beta-BHC	< 0.05 U	< 0.048 U	< 0.05 U	< 0.048 U	< 0.048 U	< 0.048 U
delta-BHC	< 0.05 U	< 0.048 U	< 0.05 U	< 0.048 U	< 0.048 U	< 0.048 U
Dieldrin	< 0.1 U	< 0.095 U	< 0.1 U	< 0.096 U	< 0.095 U	< 0.095 U
Endosulfan I	< 0.05 U	< 0.048 U	< 0.05 U	< 0.048 U	< 0.048 U	< 0.048 U
Endosulfan II	< 0.1 U	< 0.095 U	< 0.1 U	< 0.096 U	< 0.095 U	< 0.095 U
Endosulfan Sulfate	< 0.1 U	< 0.095 U	< 0.1 U	< 0.096 U	< 0.095 U	< 0.095 U
Endrin	< 0.1 U	< 0.095 U	< 0.1 U	< 0.096 U	< 0.095 U	< 0.095 U
Endrin Aldehyde	< 0.1 U	< 0.095 U	< 0.1 U	< 0.096 U	< 0.095 U	< 0.095 U
Endrin Ketone	< 0.1 U	< 0.095 U	< 0.1 U	< 0.096 U	< 0.095 U	< 0.095 U
gamma-BHC (Lindane)	< 0.05 U	< 0.048 U	< 0.05 U	< 0.048 U	< 0.048 U	< 0.048 U
gamma-Chlordane	< 0.05 U	< 0.048 U	< 0.05 U	< 0.048 U	< 0.048 U	< 0.048 U
Heptachlor	< 0.05 U	< 0.048 U	< 0.05 U	< 0.048 U	< 0.048 U	< 0.048 U
Heptachlor Epoxide	< 0.05 U	< 0.048 U	< 0.05 U	< 0.048 U	< 0.048 U	< 0.048 U
Methoxychlor	< 0.05 U	< 0.048 U	< 0.5 U	< 0.48 U	< 0.48 U	< 0.48 U
Toxaphene	< 5 U	< 4.8 U	< 5 U	< 4.8 U	< 4.8 U	< 4.8 U
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L						
2,2'-oxybis(1-Chloropropane)	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
2,4,5-Trichlorophenol	< 26 U	< 24 U	< 24 U	< 24 U	< 24 U	< 24 U
2,4,6-trichlorophenol	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
2,4-Dichlorophenol	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
2,4-Dimethylphenol	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
2,4-Dinitrophenol	< 26 U	< 24 U	< 24 U	< 24 U	< 24 U	< 24 U
2,4-Dinitrotoluene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
2,6-Dinitrotoluene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
2-Chloronaphthalene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
2-Chlorophenol	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
2-Methlyphenol	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
2-Methylnaphthalene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
2-Nitroaniline	< 26 U	< 24 U	< 24 U	< 24 U	< 24 U	< 24 U
2-Nitrophenol	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
3,3'-Dichlorobenzidine	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
3-Nitroaniline	< 26 U	< 24 U	< 24 U	< 24 U	< 24 U	< 24 U
4,6-Dinitro-2-methylphenol	< 26 U	< 24 U	< 24 U	< 24 U	< 24 U	< 24 U
4-Bromophenyl Phenyl Ether	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
4-Chloro-3-methylphenol	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
4-Chloroaniline	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
4-Chlorophenyl Phenyl Ether	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
4-Methlyphenol	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
4-Nitroaniline	< 26 U	< 24 U	< 24 U	< 24 U	< 24 U	< 24 U
4-Nitrophenol	< 26 U	< 24 U	< 24 U	< 24 U	< 24 U	< 24 U
Acenaphthene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Acenaphthylene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Acetophenone	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Anthracene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Atrazine	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Benzaldehyde	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Benzo[a]anthracene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Benzo[a]pyrene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Benzo[b]fluoranthene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Benzo[g,h,i]perylene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Benzo[k]fluoranthene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Benzyl Butyl Phthalate	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Biphenyl	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
bis(2-Chloroethoxy)methane	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
bis(2-Chloroethyl) ether	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
bis(2-Ethylhexyl) phthalate	1.7	2.3	< 9.7 U	26	2.9	< 9.5 U
Caprolactam	9.7	3.1	4.6	2	4.8	1.6
Carbazole	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Chrysene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U

Table 5-5
2005 Spring Sample Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Spring Location	Fountain Head Country Club	Rest Haven Cememtery	City Park	City Park	City Park	Hager House - City Park
Sample ID	FCC	WA-Ai-12	WA-Bi-33	WA-Bi-34	WA-Bi-35	WA-Bi-42
Sample Date	7/12/2005	7/12/2005	7/13/2005	7/12/2005	7/13/2005	7/12/2005
Dibenz[a,h]anthracene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Dibenzofuran	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Diethyl Phthalate	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Dimethyl Phthalate	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Di-n-butyl phthalate	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Di-n-octyl phthalate	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Fluoranthene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Fluorene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Hexachlorobenzene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Hexachlorobutadiene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Hexachlorocyclopentadiene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Hexachloroethane	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Indeno[1,2,3-cd]pyrene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Isophorone	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Naphthalene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Nitrobenzene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
N-Nitrosodi-n-propylamine	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
N-Nitrosodiphenylamine	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Pentachlorophenol	< 26 U	< 24 U	< 9.7 U	< 9.7 U	< 24 U	< 24 U
Phenanthrene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Phenol	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
Pyrene	< 10 U	< 9.5 U	< 9.7 U	< 9.7 U	< 9.5 U	< 9.5 U
VOLATILE ORGANIC COMPOUNDS in ug/L						
1,1,1-trichloroethane	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
1,1,2,2-Tetrachloroethane	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
1,1,2-Trichloro-1,2,2-trifluoroethane	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
1,1,2-Trichloroethane	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
1,1-Dichloroethane	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
1,1-Dichloroethylene	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
1,2,4-Trichlorobenzene	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
1,2-Dibromo-3-Chloropropane (DBCP)	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
1,2-Dibromoethane	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
1,2-Dichlorobenzene	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
1,2-Dichloroethane	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
1,2-dichloropropane	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
1,3-Dichlorobenzene	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
1,4-Dichlorobenzene	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
2-Butanone	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
2-Hexanone	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
4-Methyl-2-pentanone	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Acetone	< 10 U	2.3	2.7	2.3	2.3	2.4
Benzene	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Bromodichloromethane	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Bromoform	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Bromomethane	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Carbon Disulfide	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Carbon Tetrachloride	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Chlorobenzene	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Chloroethane	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Chloroform	3	2.9	< 10 U	< 10 U	< 10 U	3.1
Chloromethane	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
cis-1,2-Dichloroethene	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
cis-1,3-Dichloropropylene	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Cyclohexane	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Dibromochloromethane	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Dichlorodifluoromethane	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Ethylbenzene	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Isopropylbenzene (Cumene)	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Methyl Acetate	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Methyl tert-butyl ether	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Methylcyclohexane	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Methylene chloride	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Styrene (Monomer)	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Tetrachloroethylene	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Toluene	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
trans-1,2-Dichloroethene	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
trans-1,3-Dichloropropene	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Trichloroethylene	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Trichlorofluoromethane	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Vinyl chloride	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Xylenes	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U

Notes:
mg/L - milligrams per liter
ug/L - micrograms per liter

Table 5-6
October 2013 Bester Long Quarry Surface Water and Sediment Sampling Field Parameter Data
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Date & Time: 10/15/13 - 11:20 | Location (Point Name): BLQ-1 | Depth to Bottom (ft): 13

Shallow Sample Depth (ft): 3 | Thermocline Depth (ft): None Observed | Deep Sample Depth (ft): 12

Weather: Sunny; Approx. 60°F; No wind on water.

Water Depth (feet below water surface)	Temperature (°C)	Specific Conductivity (mS/cm)	DO (%)	DO (mg/L)	ORP (mV)	pH
2	16.54	0.507	66.9	6.50	149.3	7.83
4	16.44	0.507	66.0	6.40	151.2	7.82
6	16.32	0.507	57.1	5.55	153.2	7.75
8	16.21	0.506	49.0	4.79	155.2	7.69
10	16.19	0.518	39.7	3.85	157.2	7.55
12	16.26	0.645	1.6	0.16	- 82	7.14

Sediment Characteristics

Depth to Bottom/Sample Depth (ft): 13 | Temperature (°C): 17.82 | ORP (mV): - 74.5 | pH: 7.13

Color & Composition: Grey; Silt with some small cobbles

Date & Time: 10/15/13 - 15:20 | Location (Point Name): BLQ-2 | Depth to Bottom (ft): 8.5

Shallow Sample Depth (ft): 3 | Thermocline Depth (ft): None Observed | Deep Sample Depth (ft): 7.5

Weather: Hazy/Overcast; Approx. 70°F

Water Depth (feet below water surface)	Temperature (°C)	Specific Conductivity (mS/cm)	DO (%)	DO (mg/L)	ORP (mV)	pH
2	17.26	0.504	77.2	7.41	191.1	7.86
4	16.65	0.504	75.0	7.26	192.0	7.82
6	16.45	0.504	64.1	6.25	193.6	7.72
8	16.31	0.509	48.0	4.67	193.2	7.54

Sediment Characteristics

Depth to Bottom/Sample Depth (ft): 8.5 | Temperature (°C): 17.86 | ORP (mV): - 95.8 | pH: 7.21

Color & Composition: Medium grey; Clayey silt

Table 5-7
October 2013 Bester Long Quarry
Surface Water Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Sample Location	Maryland Fresh Water Acute Criteria[1]	Maryland Fresh Water Chronic Criteria[1]	BLQ-1		BLQ-2	
Sample ID			SWBLQ-1-3	SWBLQ-1-12	SWBLQ-2-3	SWBLQ-2-7.5
Sample Depth (ft below water surface)			3	12	3	7.5
Pesticides (ug/L)						
2,4'-DDD	---	---	**0.00032 J**	**0.00044 J**	**0.00031 J**	< 0.00015 U
2,4'-DDE	---	---	< 0.00014 U	< 0.00014 U	< 0.00014 U	< 0.00014 U
2,4'-DDT	---	---	< 0.00021 U	< 0.00021 U	< 0.00021 U	< 0.00021 U
4,4'-DDD	---	---	< 0.00064 U	**0.0011 J**	< 0.00064 U	< 0.00064 U
4,4'-DDE	---	---	< 0.00075 U	< 0.00075 U	< 0.00075 U	< 0.00075 U
4,4'-DDT	1.1	0.001	**0.00086 J p**	**0.00081 J p**	**0.00082 J p**	**0.00082 J p**
Aldrin	3	---	< 0.00079 U	< 0.00079 U	< 0.00079 U	< 0.00079 U
alpha-BHC	---	---	< 0.00063 U	**0.00073 J**	**0.00071 J p**	< 0.00063 U
alpha-Chlordane	---	---	< 0.00093 U	< 0.00093 U	< 0.00093 U	< 0.00093 U
beta-BHC	---	---	< 0.00095 U	< 0.00095 U	< 0.00095 U	< 0.00095 U
delta-BHC	---	---	< 0.00036 U	< 0.00036 U	< 0.00036 U	< 0.00036 U
Dieldrin	0.24	0.056	< 0.00078 U	< 0.00078 U	< 0.00078 U	< 0.00078 U
Diphenamid	---	---	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U
Endrin	0.086	0.036	< 0.00091 U	< 0.00091 U	< 0.00091 U	< 0.00091 U
Endrin ketone	---	---	< 0.00088 U	< 0.00088 U	< 0.00088 U	< 0.00088 U
gamma-BHC (Lindane)	0.95	---	< 0.00076 U	< 0.00076 U	< 0.00076 U	< 0.00076 U
Heptachlor	0.52	0.0038	< 0.00094 U	< 0.00094 U	< 0.00094 U	< 0.00094 U
Heptachlor epoxide	0.52	0.0038	< 0.00092 U	< 0.00092 U	< 0.00092 U	< 0.00092 U
Toxaphene	0.73	0.002	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U
Total BHCs	---	---	ND	**0.00073**	**0.00071**	ND
Herbicides (ug/L)						
2,4,5-T	---	---	< 0.092 U	< 0.092 U	< 0.092 U	< 0.092 U
2,4-D	---	---	< 0.43 U	< 0.43 U	< 0.43 U	< 0.43 U
Metals (ug/L)						
Arsenic	340	150	< 0.29 U	**0.44 J**	**0.44 J**	**0.32 J**
Manganese	---	---	**34 B**	**240 B**	**33 B**	**47 B**
Thallium	---	---	**0.026 J B**	**0.11 J B**	**0.04 J B**	**0.031 J B**
General Chemistry (mg/L)						
Total Organic Carbon	---	---	7.4	7	7.4	7.2
Alkalinity (total)	---	---	190	220	190	190
Carbonate	---	---	< 0.41 U	< 0.41 U	< 0.41 U	< 0.41 U
Bicarbonate	---	---	190	220	190	190
Total Suspended Solids	---	---	4.4	32	4	4.4
Total Dissolved Soilds	---	---	230	250	220	210
Hardness	---	---	200	240	200	200

Notes:
[1] Maryland Numerical Criteria for Toxic Substances in Surface Waters - Aquatic Life (COMAR 26.08.02)
mg/L - milligrams per liter
ug/L - micrograms per liter
ND - None Detected
U - Compound not detected above specified detection limit
J - Result is less than the Reporting Limit but greater than or equal to the Method Detection Limit. Concentration is estimated.
B - Parameter was detected in associated laboratory method blank at a concentration greater than the Instrument Detection Limit but less than the Reporting Limit.
p - Sample results on the front and rear chromatography column exhibited imprecision greater than 40%. The lower value has been reported.

Table 5-8
October 2013 Bester Long Quarry
Sediment Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Sample Location	BLQ-1	BLQ-2
Sample ID	SDBLQ-1-13	SDBLQ-2-8.5
Sample Depth (ft below water surface)	13	8.5
Pesticides (ug/Kg)		
2,4'-DDD	**9.9 J**	**8.8**
2,4'-DDE	**2.5 J p**	**2.3 J**
2,4'-DDT	< 2 U	< 0.5 U
4,4'-DDD	**43**	**45**
4,4'-DDE	**78**	**32**
4,4'-DDT	**13 J p**	**3.9 J p**
Aldrin	< 4.2 U	< 1 U
alpha-BHC	< 3.8 U	< 0.95 U
alpha-Chlordane	< 4.7 U	**2.5 J**
beta-BHC	< 6.1 U	< 1.5 U
delta-BHC	< 3.6 U	< 0.89 U
Dieldrin	< 3.9 U	< 0.97 U
Diphenamid	< 820 U	< 130 U
Endrin	< 4.5 U	< 1.1 U
Endrin ketone	< 3.6 U	< 0.91 U
gamma-BHC (Lindane)	< 4.1 U	< 1 U
Heptachlor	< 5.2 U	< 1.3 U
Heptachlor epoxide	< 4.6 U	< 1.1 U
Toxaphene	< 160 U	< 39 U
Total BHCs	ND	ND
Herbicides (ug/Kg)		
2,4,5-T	< 7.2 U	< 4.4 U
2,4-D	< 16 U	< 9.6 U
Metals (mg/Kg)		
Arsenic	**3.6**	**2.5**
Manganese	**660 B**	**620 B**
Thallium	**0.13 J**	**0.085 J**
General Chemistry		
Total Organic Carbon (mg/Kg)	39,000	26,000
Percent Moisture	65	43
Percent Solids	35	57

Notes:

ND: None Detected

U: Compound not detected above specified detection limit

J: Result is less than the Reporting Limit but greater than or equal to the Method Detection Limit. Concentration is estimated.

B: Parameter was detected in associated laboratory method blank at a concentration greater than the Instrument Detection Limit but less than the Reporting Limit.

p: Sample results on the front and rear chromatography column exhibited imprecision greater than 40%. The lower value has been reported.

Table 5-9
October 2013 Bester Long Quarry Sediment Sampling Geotechnical Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Sample Location	BLQ-1	BLQ-2
Sample ID	SDBLQ-1-13	SDBLQ-2-8.5
Sample Depth (ft below water surface)	13	8.5
General		
Percent Moisture	65	43
Percent Solids	35	57
Grain Size		
Clay (%)	28.3	37.7
Silt (%)	70	61.3
Fine Sand (%)	0.7	0.6
Medium Sand (%)	0	0.2
Coarse Sand (%)	1	0.2
Gravel (%)	0	0
Hydrometer Reading 1 - Percent Finer (% Passing)	70.9	80.9
Hydrometer Reading 2 - Percent Finer (% Passing)	64.3	73.7
Hydrometer Reading 3 - Percent Finer (% Passing)	51.2	61.7
Hydrometer Reading 4 - Percent Finer (% Passing)	36.5	47.3
Hydrometer Reading 5 - Percent Finer (% Passing)	28.3	37.7
Hydrometer Reading 6 - Percent Finer (% Passing)	15.3	20.8
Hydrometer Reading 7 - Percent Finer (% Passing)	8.7	8.8
Sieve Size #10 - Percent Finer (% Passing)	99	99.8
Sieve Size #100 - Percent Finer (% Passing)	98.8	99.4
Sieve Size #20 - Percent Finer (% Passing)	99	99.7
Sieve Size #200 - Percent Finer (% Passing)	98.3	99
Sieve Size #4 - Percent Finer (% Passing)	100	100
Sieve Size #40 - Percent Finer (% Passing)	99	99.6
Sieve Size #60 - Percent Finer (% Passing)	98.9	99.5
Sieve Size #80 - Percent Finer (% Passing)	98.9	99.4
Sieve Size 0.375 inch - Percent Finer (% Passing)	100	100
Sieve Size 0.75 inch - Percent Finer (% Passing)	100	100
Sieve Size 1 inch - Percent Finer (% Passing)	100	100
Sieve Size 1.5 inch - Percent Finer (% Passing)	100	100
Sieve Size 2 inch - Percent Finer (% Passing)	100	100
Sieve Size 3 inch - Percent Finer (% Passing)	100	100

Table 5-10
2016-2017 USEPA Tracer Study Surface Water Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Analyte	Location ID	Maryland Fresh Water Acute Criteria[1]	Maryland Fresh Water Chronic Criteria[1]	Antietam Creek				Antietam Creek Bkg			
	Date Collected			6/21/2016	10/4/2016	1/26/2017	4/20/2017	6/21/2016	10/4/2016	1/26/2017	4/20/2017
	Sample Depth (bgs)			0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft
	Sample Type			Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
	Units			Result	Result	Result	Result	Result	Result	Result	Result
PESTICIDES											
4,4'-DDD	ug/l	NS	NS	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	ug/l	NS	NS	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	ug/l	1.1	0.001	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U
Aldrin	ug/l	3	NS	0.0005 U	0.05 U	0.051 U	0.05 U	0.0005 U	0.05 U	0.052 U	0.05 U
alpha-BHC	ug/l	NS	NS	0.026 U	0.05 U	0.051 U	0.05 U	0.026 U	0.05 U	0.052 U	0.05 U
alpha-Chlordane	ug/l	NS	NS	0.0043 U	0.05 U	0.051 U	0.05 U	0.0043 U	0.05 U	0.052 U	0.05 U
beta-BHC	ug/l	NS	NS	0.005 U	0.05 U	0.051 U	0.05 U	0.005 U	0.05 U	0.052 U	0.05 U
delta-BHC	ug/l	NS	NS	0.005 U	0.05 U	0.051 U	0.05 U	0.005 U	0.05 U	0.052 U	0.05 U
Dieldrin	ug/l	0.24	0.056	0.0069 J	0.1 U	0.1 U	0.1 U	0.00092 J	0.1 U	0.1 U	0.1 U
Endosulfan I	ug/l	NS	NS	0.005 U	0.05 U	0.051 U	0.05 U	0.005 U	0.05 U	0.052 U	0.05 U
Endosulfan II	ug/l	NS	NS	0.056 U	0.1 U	0.1 U	0.1 U	0.056 U	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	ug/l	NS	NS	0.01 U	0.1 U	0.1 U	0.1 U	0.015	0.1 U	0.1 U	0.1 U
Endrin	ug/l	0.086	0.036	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.1 U	0.1 U	0.1 U
Endrin aldehyde	ug/l	NS	NS	0.01 U	0.1 U	0.1 U	0.1 U	0.01 U	0.1 U	0.1 U	0.1 U
Endrin ketone	ug/l	NS	NS	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.1 U	0.1 U	0.1 U
gamma-BHC (Lindane)	ug/l	0.95	NS	0.005 U	0.05 U	0.051 U	0.05 U	0.005 U	0.05 U	0.052 U	0.05 U
gamma-Chlordane	ug/l	NS	NS	0.0023 J	0.05 U	0.051 U	0.05 U	0.016	0.05 U	0.052 U	0.05 U
Heptachlor	ug/l	0.52	0.0038	0.00079 U	0.05 U	0.051 U	0.05 U	0.00079 U	0.05 U	0.052 U	0.05 U
Heptachlor epoxide	ug/l	0.52	0.0038	0.0038 U	0.05 U	0.051 U	0.05 U	0.0038 U	0.05 U	0.052 U	0.05 U
Methoxychlor	ug/l	NS	NS	0.03 U	0.5 U	0.51 U	0.5 U	0.03 U	0.5 U	0.52 U	0.5 U
Toxaphene	ug/l	0.73	0.002	0.05 U	5 U	5.1 U	5 U	0.05 U	5 U	5.2 U	5 U
MISCELLANEOUS											
Total Suspended Solids	mg/l	NS	NS	--	--	12	8.8	--	--	16	5.6
Hardnes, as CACO3	ug/l	NS	NS	--	--	139	186,000	--	--	126	173,000
Total Organic Carbon	mg/l	NS	NS	--	--	1 U	2	--	--	1 U	2.3

Notes:

[1] Maryland Numerical Criteria for Toxic Substances in Surface Waters - Aquatic Life (COMAR 26.08.02)

NS = No standard

-- = Not sampled

J = positive detect; value estimated

U = analyte not detected; reporting limit provided

Red bolded detected concentration above criteria

Table 5-10
2016-2017 USEPA Tracer Study Surface Water Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Analyte	Location ID	Maryland Fresh Water Acute Criteria[1]	Maryland Fresh Water Chronic Criteria[1]	Antietam Falls					Bester-Long Quarry			
	Date Collected			6/21/2016		10/4/2016	1/26/2017	4/20/2017	6/22/2016	10/3/2016	1/24/2017	4/19/2017
	Sample Depth (bgs)			0-0.5 ft		0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	Not Sampled; New Property Owner, no Access to Bester Long
	Sample Type			Normal	Duplicate	Normal	Normal	Normal	Normal	Normal	Normal	
	Units			Result	Result	Result	Result	Result	Result	Result	Result	
PESTICIDES												
4,4'-DDD	ug/l	NS	NS	0.001 U	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	--
4,4'-DDE	ug/l	NS	NS	0.001 U	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	--
4,4'-DDT	ug/l	1.1	0.001	0.001 U	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	--
Aldrin	ug/l	3	NS	0.0005 U	0.0005 U	0.05 U	0.052 U	0.05 U	0.0005 U	0.051 U	0.052 U	--
alpha-BHC	ug/l	NS	NS	0.026 U	0.026 U	0.05 U	0.052 U	0.05 U	0.026 U	0.051 U	0.052 U	--
alpha-Chlordane	ug/l	NS	NS	0.0043 U	0.0043 U	0.05 U	0.052 U	0.05 U	0.0043 U	0.051 U	0.052 U	--
beta-BHC	ug/l	NS	NS	0.005 U	0.005 U	0.05 U	0.052 U	0.05 U	0.005 U	0.051 U	0.052 U	--
delta-BHC	ug/l	NS	NS	0.005 U	0.005 U	0.05 U	0.052 U	0.05 U	0.005 U	0.051 U	0.052 U	--
Dieldrin	ug/l	0.24	0.056	0.012	0.011	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	--
Endosulfan I	ug/l	NS	NS	0.005 U	0.005 U	0.05 U	0.052 U	0.05 U	0.005 U	0.051 U	0.052 U	--
Endosulfan II	ug/l	NS	NS	0.056 U	0.056 U	0.1 U	0.1 U	0.1 U	0.056 U	0.1 U	0.1 U	--
Endosulfan sulfate	ug/l	NS	NS	0.01 U	0.01 U	0.1 U	0.1 U	0.1 U	0.015	0.1 U	0.1 U	--
Endrin	ug/l	0.086	0.036	0.036 U	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.1 U	0.1 U	--
Endrin aldehyde	ug/l	NS	NS	0.01 U	0.01 U	0.1 U	0.1 U	0.1 U	0.01 U	0.1 U	0.1 U	--
Endrin ketone	ug/l	NS	NS	0.036 U	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.1 U	0.1 U	--
gamma-BHC (Lindane)	ug/l	0.95	NS	0.005 U	0.005 U	0.05 U	0.052 U	0.05 U	0.005 U	0.051 U	0.052 U	--
gamma-Chlordane	ug/l	NS	NS	0.0043 U	0.012	0.05 U	0.052 U	0.05 U	0.016	0.051 U	0.052 U	--
Heptachlor	ug/l	0.52	0.0038	0.00079 U	0.00079 U	0.05 U	0.052 U	0.05 U	0.00079 U	0.051 U	0.052 U	--
Heptachlor epoxide	ug/l	0.52	0.0038	0.0038 U	0.0038 U	0.05 U	0.052 U	0.05 U	0.0038 U	0.051 U	0.052 U	--
Methoxychlor	ug/l	NS	NS	0.03 U	0.03 U	0.5 U	0.52 U	0.5 U	0.03 U	0.51 U	0.52 U	--
Toxaphene	ug/l	0.73	0.002	0.05 U	0.05 U	5 U	5.2 U	5 U	0.05 U	5.1 U	5.2 U	--
MISCELLANEOUS												
Total Suspended Solids	mg/l	NS	NS	--	--	--	28	8.6	--	--	3.1	--
Hardnes, as CACO3	ug/l	NS	NS	--	--	--	133	177,000	--	--	209	--
Total Organic Carbon	mg/l	NS	NS	--	--	--	1 U	1.9	--	--	5.5	--

Notes:

[1] Maryland Numerical Criteria for Toxic Substances in Surface Waters - Aquatic Life (COMAR 26.

NS = No standard

-- = Not sampled

J = positive detect; value estimated

U = analyte not detected; reporting limit provided

Red bolded detected concentration above criteria

Table 5-10
2016-2017 USEPA Tracer Study Surface Water Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Analyte	Location ID	Maryland Fresh Water Acute Criteria[1]	Maryland Fresh Water Chronic Criteria[1]	Fountain Head				Hager House			
	Date Collected			6/20/2016	10/3/2016	1/24/2017	4/19/2017	6/22/2016	10/4/2016	1/26/2017	4/21/2017
	Sample Depth (bgs)			0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft
	Sample Type			Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
	Units			Result	Result	Result	Result	Result	Result	Result	Result
PESTICIDES											
4,4'-DDD	ug/l	NS	NS	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	ug/l	NS	NS	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	ug/l	1.1	0.001	0.001 U	**0.034 J**	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U
Aldrin	ug/l	3	NS	0.0005 U	0.05 U	0.051 U	0.051 U	0.0005 U	0.05 U	0.052 U	0.05 U
alpha-BHC	ug/l	NS	NS	0.026 U	0.05 U	0.051 U	0.051 U	0.026 U	0.05 U	0.052 U	0.05 U
alpha-Chlordane	ug/l	NS	NS	0.0043 U	0.05 U	0.051 U	0.051 U	0.0043 U	0.05 U	0.052 U	0.05 U
beta-BHC	ug/l	NS	NS	0.005 U	0.05 U	0.051 U	0.051 U	0.005 U	0.05 U	0.052 U	0.05 U
delta-BHC	ug/l	NS	NS	0.005 U	0.05 U	0.051 U	0.051 U	0.005 U	0.05 U	0.052 U	0.05 U
Dieldrin	ug/l	0.24	0.056	0.001 U	0.1 U	0.1 U	0.0091 J	0.001 U	0.024 J	0.026 J	0.022 J
Endosulfan I	ug/l	NS	NS	0.005 U	0.05 U	0.051 U	0.051 U	0.005 U	0.05 U	0.052 U	0.05 U
Endosulfan II	ug/l	NS	NS	0.056 U	0.1 U	0.1 U	0.1 U	0.056 U	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	ug/l	NS	NS	0.01 U	0.1 U	0.1 U	0.1 U	0.01 U	0.1 U	0.1 U	0.1 U
Endrin	ug/l	0.086	0.036	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.1 U	0.1 U	0.1 U
Endrin aldehyde	ug/l	NS	NS	0.01 U	0.1 U	0.1 U	0.1 U	0.01 U	0.1 U	0.1 U	0.1 U
Endrin ketone	ug/l	NS	NS	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.1 U	0.1 U	0.1 U
gamma-BHC (Lindane)	ug/l	0.95	NS	0.005 U	0.05 U	0.051 U	0.051 U	0.005 U	0.05 U	0.052 U	0.05 U
gamma-Chlordane	ug/l	NS	NS	0.0043 U	0.05 U	0.051 U	0.051 U	0.012	0.05 U	0.052 U	0.05 U
Heptachlor	ug/l	0.52	0.0038	0.00079 U	0.05 U	0.051 U	0.051 U	0.00079 U	0.05 U	0.052 U	0.05 U
Heptachlor epoxide	ug/l	0.52	0.0038	0.0038 U	0.05 U	0.051 U	0.051 U	0.0038 U	0.05 U	0.052 U	0.05 U
Methoxychlor	ug/l	NS	NS	0.03 U	0.5 U	0.51 U	0.51 U	0.03 U	0.5 U	0.52 U	0.5 U
Toxaphene	ug/l	0.73	0.002	0.05 U	5 U	5.1 U	5.1 U	0.05 U	5 U	5.2 U	5 U
MISCELLANEOUS											
Total Suspended Solids	mg/l	NS	NS	--	--	1 U	2 U	--	--	1 U	2.8
Hardnes, as CACO3	ug/l	NS	NS	--	--	349	367,000	--	--	349	353,000
Total Organic Carbon	mg/l	NS	NS	--	--	0.9 J	0.84 J	--	--	1 U	0.98 J

Notes:

[1] Maryland Numerical Criteria for Toxic Substances in Surface Waters - Aquatic Life (COMAR 26.

NS = No standard

-- = Not sampled

J = positive detect; value estimated

U = analyte not detected; reporting limit provided

Red bolded detected concentration above criteria

Table 5-10
2016-2017 USEPA Tracer Study Surface Water Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Analyte	Location ID	Maryland Fresh Water Acute Criteria[1]	Maryland Fresh Water Chronic Criteria[1]	Hagers Crossing				Hagerstown City Park							
	Date Collected			6/20/2016	10/3/2016	1/24/2017	4/20/2017	6/22/2016		10/4/2016		1/26/2017		4/21/2017	4/21/2017
	Sample Depth (bgs)			0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft		0-0.5 ft		0-0.5 ft		0-0.5 ft	
	Sample Type			Normal	Normal	Normal	Normal	Normal	Duplicate	Normal	Duplicate	Normal	Duplicate	Normal	Duplicate
	Units			Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PESTICIDES															
4,4'-DDD	ug/l	NS	NS	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.001 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	ug/l	NS	NS	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.001 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	ug/l	1.1	0.001	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.001 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Aldrin	ug/l	3	NS	0.0005 U	0.05 U	0.05 U	0.051 U	0.0005 U	0.0005 U	0.052 U	0.05 U	0.051 U	0.051 U	0.051 U	0.051 U
alpha-BHC	ug/l	NS	NS	0.026 U	0.05 U	0.05 U	0.051 U	0.026 U	0.026 U	0.052 U	0.05 U	0.051 U	0.051 U	0.051 U	0.051 U
alpha-Chlordane	ug/l	NS	NS	0.0043 U	0.05 U	0.05 U	0.051 U	0.0039 J	0.0043 U	0.052 U	0.05 U	0.051 U	0.051 U	0.051 U	0.051 U
beta-BHC	ug/l	NS	NS	0.005 U	0.05 U	0.05 U	0.051 U	0.005 U	0.005 U	0.052 U	0.05 U	0.051 U	0.051 U	0.051 U	0.051 U
delta-BHC	ug/l	NS	NS	0.005 U	0.05 U	0.05 U	0.051 U	0.005 U	0.005 U	0.052 U	0.05 U	0.051 U	0.051 U	0.051 U	0.051 U
Dieldrin	ug/l	0.24	0.056	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.00028 J	0.1 U	0.1 U	0.0087 J	0.1 U	0.0056 J	0.0055 J
Endosulfan I	ug/l	NS	NS	0.005 U	0.05 U	0.05 U	0.051 U	0.005 U	0.005 U	0.052 U	0.05 U	0.051 U	0.051 U	0.051 U	0.051 U
Endosulfan II	ug/l	NS	NS	0.056 U	0.1 U	0.1 U	0.1 U	0.056 U	0.056 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	ug/l	NS	NS	0.017	0.1 U	0.1 U	0.1 U	0.01 U	0.01 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin	ug/l	0.086	0.036	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.036 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin aldehyde	ug/l	NS	NS	0.01 U	0.1 U	0.1 U	0.1 U	0.01 U	0.01 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin ketone	ug/l	NS	NS	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.036 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
gamma-BHC (Lindane)	ug/l	0.95	NS	0.005 U	0.05 U	0.05 U	0.051 U	0.005 U	0.005 U	0.052 U	0.05 U	0.051 U	0.051 U	0.051 U	0.051 U
gamma-Chlordane	ug/l	NS	NS	0.0043 U	0.05 U	0.05 U	0.051 U	0.0049	0.0043 U	0.052 U	0.05 U	0.051 U	0.051 U	0.051 U	0.051 U
Heptachlor	ug/l	0.52	0.0038	0.00079 U	0.05 U	0.05 U	0.051 U	0.00079 U	0.00079 U	0.052 U	0.05 U	0.051 U	0.051 U	0.051 U	0.051 U
Heptachlor epoxide	ug/l	0.52	0.0038	0.0038 U	0.05 U	0.05 U	0.051 U	0.0013 J	0.0038 U	0.052 U	0.05 U	0.051 U	0.051 U	0.051 U	0.051 U
Methoxychlor	ug/l	NS	NS	0.03 U	0.5 U	0.5 U	0.51 U	0.03 U	0.03 U	0.52 U	0.5 U	0.51 U	0.51 U	0.51 U	0.51 U
Toxaphene	ug/l	0.73	0.002	0.05 U	5 U	5 U	5.1 U	0.05 U	0.05 U	5.2 U	5 U	5.1 U	5.1 U	5.1 U	5.1 U
MISCELLANEOUS															
Total Suspended Solids	mg/l	NS	NS	--	--	1 U	2 U	--	--	--	--	5.8	7.3	2 U	2 U
Hardnes, as CACO3	ug/l	NS	NS	--	--	336	383,000	--	--	--	--	343	336	364,000	350,000
Total Organic Carbon	mg/l	NS	NS	--	--	0.95 J	1	--	--	--	--	--	--	0.84 J	0.83 J

Notes:

[1] Maryland Numerical Criteria for Toxic Substances in Surface Waters - Aquatic Life (COMAR 26.

NS = No standard

-- = Not sampled

J = positive detect; value estimated

U = analyte not detected; reporting limit provided

Red bolded detected concentration above criteria

Table 5-10
2016-2017 USEPA Tracer Study Surface Water Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Analyte	Location ID	Maryland Fresh Water Acute Criteria[1]	Maryland Fresh Water Chronic Criteria[1]	Hagerstown CP Grotto				Hamilton Run			
	Date Collected			6/22/2016	10/4/2016	1/26/2017	4/21/2017	6/20/2016	10/3/2016	1/24/2017	4/19/2017
	Sample Depth (bgs)			0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft
	Sample Type			Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
	Units			Result	Result	Result	Result	Result	Result	Result	Result
PESTICIDES											
4,4'-DDD	ug/l	NS	NS	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	ug/l	NS	NS	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	ug/l	1.1	0.001	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U
Aldrin	ug/l	3	NS	0.0005 U	0.051 U	0.051 U	0.05 U	0.0005 U	0.052 U	0.052 U	0.052 U
alpha-BHC	ug/l	NS	NS	0.026 U	0.051 U	0.051 U	0.05 U	0.026 U	0.052 U	0.052 U	0.052 U
alpha-Chlordane	ug/l	NS	NS	0.0043 U	0.051 U	0.051 U	0.05 U	0.0043 U	0.052 U	0.052 U	0.052 U
beta-BHC	ug/l	NS	NS	0.005 U	0.051 U	0.051 U	0.05 U	0.005 U	0.052 U	0.052 U	0.052 U
delta-BHC	ug/l	NS	NS	0.005 U	0.051 U	0.051 U	0.05 U	0.005 U	0.052 U	0.052 U	0.052 U
Dieldrin	ug/l	0.24	0.056	0.0053 J	0.1 U	0.1 U	0.0054 J	0.00082 J	0.1 U	0.1 U	0.0055 J
Endosulfan I	ug/l	NS	NS	0.005 U	0.051 U	0.051 U	0.05 U	0.005 U	0.052 U	0.052 U	0.052 U
Endosulfan II	ug/l	NS	NS	0.056 U	0.1 U	0.1 U	0.1 U	0.0055 J	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	ug/l	NS	NS	0.01 U	0.1 U	0.1 U	0.1 U	0.01 U	0.1 U	0.1 U	0.1 U
Endrin	ug/l	0.086	0.036	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.1 U	0.1 U	0.1 U
Endrin aldehyde	ug/l	NS	NS	0.01 U	0.1 U	0.1 U	0.1 U	0.01 U	0.1 U	0.1 U	0.1 U
Endrin ketone	ug/l	NS	NS	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.1 U	0.1 U	0.1 U
gamma-BHC (Lindane)	ug/l	0.95	NS	0.005 U	0.051 U	0.051 U	0.05 U	0.005 U	0.052 U	0.052 U	0.052 U
gamma-Chlordane	ug/l	NS	NS	0.0043 U	0.051 U	0.051 U	0.05 U	0.021	0.052 U	0.052 U	0.052 U
Heptachlor	ug/l	0.52	0.0038	0.00079 U	0.051 U	0.051 U	0.05 U	0.00079 U	0.052 U	0.052 U	0.052 U
Heptachlor epoxide	ug/l	0.52	0.0038	0.0038 U	0.051 U	0.051 U	0.05 U	0.0038 U	0.052 U	0.052 U	0.052 U
Methoxychlor	ug/l	NS	NS	0.03 U	0.51 U	0.51 U	0.5 U	0.03 U	0.52 U	0.52 U	0.52 U
Toxaphene	ug/l	0.73	0.002	0.05 U	5.1 U	5.1 U	5 U	0.05 U	5.2 U	5.2 U	5.2 U
MISCELLANEOUS											
Total Suspended Solids	mg/l	NS	NS	--	--	1 U	2 U	--	--	28	10
Hardnes, as CACO3	ug/l	NS	NS	--	--	339	358,000	--	--	290	325,000
Total Organic Carbon	mg/l	NS	NS	--	--	1 U	1	--	--	1.1	1.1

Notes:

[1] Maryland Numerical Criteria for Toxic Substances in Surface Waters - Aquatic Life (COMAR 26.

NS = No standard

-- = Not sampled

J = positive detect; value estimated

U = analyte not detected; reporting limit provided

Red bolded detected concentration above criteria

Table 5-10
2016-2017 USEPA Tracer Study Surface Water Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Analyte	Location ID	Maryland Fresh Water Acute Criteria[1]	Maryland Fresh Water Chronic Criteria[1]	Herald Mail				Pangborn Park						
	Date Collected			6/22/2016	10/4/2016	1/26/2017	4/21/2017	6/21/2016	10/4/2016		1/26/2017		4/21/2017	
	Sample Depth (bgs)			0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft		0-0.5 ft		0-0 ft	
	Sample Type			Normal	Normal	Normal	Normal	Normal	Normal	Duplicate	Normal	Duplicate	Normal	Duplicate
	Units			Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PESTICIDES														
4,4'-DDD	ug/l	NS	NS	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	ug/l	NS	NS	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	ug/l	1.1	0.001	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Aldrin	ug/l	3	NS	0.0005 U	0.051 U	0.05 U	0.051 U	0.0005 U	0.051 U	0.05 U	0.05 U	0.051 U	0.052 U	0.051 U
alpha-BHC	ug/l	NS	NS	0.026 U	0.051 U	0.05 U	0.051 U	0.026 U	0.051 U	0.05 U	0.05 U	0.051 U	0.052 U	0.051 U
alpha-Chlordane	ug/l	NS	NS	0.0043 U	0.051 U	0.05 U	0.051 U	0.0043 U	0.051 U	0.05 U	0.05 U	0.051 U	0.052 U	0.051 U
beta-BHC	ug/l	NS	NS	0.005 U	0.051 U	0.05 U	0.051 U	0.005 U	0.051 U	0.05 U	0.05 U	0.051 U	0.052 U	0.051 U
delta-BHC	ug/l	NS	NS	0.005 U	0.051 U	0.05 U	0.051 U	0.005 U	0.051 U	0.05 U	0.05 U	0.051 U	0.052 U	0.051 U
Dieldrin	ug/l	0.24	0.056	0.0025	0.032 J	0.041 J	0.031 J	0.011	0.1 U	0.1 U	0.1 U	0.01 J	0.0088 J	0.0052 J
Endosulfan I	ug/l	NS	NS	0.005 U	0.051 U	0.05 U	0.051 U	0.005 U	0.051 U	0.05 U	0.05 U	0.051 U	0.052 U	0.051 U
Endosulfan II	ug/l	NS	NS	0.056 U	0.1 U	0.1 U	0.1 U	0.0059 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	ug/l	NS	NS	0.01 U	0.1 U	0.1 U	0.1 U	0.01 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin	ug/l	0.086	0.036	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin aldehyde	ug/l	NS	NS	0.01 U	0.1 U	0.1 U	0.1 U	0.01 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Endrin ketone	ug/l	NS	NS	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
gamma-BHC (Lindane)	ug/l	0.95	NS	0.005 U	0.051 U	0.05 U	0.051 U	0.005 U	0.051 U	0.05 U	0.05 U	0.051 U	0.052 U	0.051 U
gamma-Chlordane	ug/l	NS	NS	0.01	0.051 U	0.05 U	0.051 U	0.019	0.051 U	0.05 U	0.05 U	0.051 U	0.052 U	0.051 U
Heptachlor	ug/l	0.52	0.0038	0.00079 U	0.051 U	0.05 U	0.051 U	0.00079 U	0.051 U	0.05 U	0.05 U	0.051 U	0.052 U	0.051 U
Heptachlor epoxide	ug/l	0.52	0.0038	0.0038 U	0.051 U	0.05 U	0.051 U	0.0038 U	0.051 U	0.05 U	0.05 U	0.051 U	0.052 U	0.051 U
Methoxychlor	ug/l	NS	NS	0.03 U	0.51 U	0.5 U	0.51 U	0.03 U	0.51 U	0.5 U	0.5 U	0.51 U	0.52 U	0.51 U
Toxaphene	ug/l	0.73	0.002	0.05 U	5.1 U	5 U	5.1 U	0.05 U	5.1 U	5 U	5 U	5.1 U	5.2 U	5.1 U
MISCELLANEOUS														
Total Suspended Solids	mg/l	NS	NS	--	--	5.3	6	--	--	--	--	--	22	20
Hardnes, as CACO3	ug/l	NS	NS	--	--	365	373,000	--	--	--	308	321	241,000	240,000
Total Organic Carbon	mg/l	NS	NS	--	--	1 U	1.3	--	--	--	--	--	3.3	3.3

Notes:

[1] Maryland Numerical Criteria for Toxic Substances in Surface Waters - Aquatic Life (COMAR 26.

NS = No standard

-- = Not sampled

J = positive detect; value estimated

U = analyte not detected; reporting limit provided

Red bolded detected concentration above criteria

Table 5-10
2016-2017 USEPA Tracer Study Surface Water Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Analyte	Location ID	Maryland Fresh Water Acute Criteria[1]	Maryland Fresh Water Chronic Criteria[1]	Paradise Farms Spring				Rest Haven North			
	Date Collected			6/20/2016	10/3/2016	1/24/2017	4/20/2017	6/20/2016	10/3/2016	1/24/2017	4/19/2017
	Sample Depth (bgs)			0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft
	Sample Type			Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
	Units			Result	Result	Result	Result	Result	Result	Result	Result
PESTICIDES											
4,4'-DDD	ug/l	NS	NS	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	ug/l	NS	NS	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	ug/l	1.1	0.001	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U
Aldrin	ug/l	3	NS	0.0005 U	0.051 U	0.051 U	0.05 U	0.0005 U	0.051 U	0.051 U	0.052 U
alpha-BHC	ug/l	NS	NS	0.026 U	0.051 U	0.051 U	0.05 U	0.026 U	0.051 U	0.051 U	0.052 U
alpha-Chlordane	ug/l	NS	NS	0.0043 U	0.051 U	0.051 U	0.05 U	0.0043 U	0.051 U	0.051 U	0.052 U
beta-BHC	ug/l	NS	NS	0.005 U	0.051 U	0.051 U	0.05 U	0.005 U	0.051 U	0.051 U	0.052 U
delta-BHC	ug/l	NS	NS	0.005 U	0.051 U	0.051 U	0.05 U	0.005 U	0.051 U	0.051 U	0.052 U
Dieldrin	ug/l	0.24	0.056	0.032	0.1 U	0.1 U	0.1 U	0.0081	0.1 U	0.1 U	0.1 U
Endosulfan I	ug/l	NS	NS	0.005 U	0.051 U	0.051 U	0.05 U	0.005 U	0.051 U	0.051 U	0.052 U
Endosulfan II	ug/l	NS	NS	0.0042 J	0.1 U	0.1 U	0.1 U	0.056 U	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	ug/l	NS	NS	0.021	0.1 U	0.1 U	0.1 U	0.01 U	0.1 U	0.1 U	0.1 U
Endrin	ug/l	0.086	0.036	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.1 U	0.1 U	0.1 U
Endrin aldehyde	ug/l	NS	NS	0.01 U	0.1 U	0.1 U	0.1 U	0.01 U	0.1 U	0.1 U	0.1 U
Endrin ketone	ug/l	NS	NS	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.1 U	0.1 U	0.1 U
gamma-BHC (Lindane)	ug/l	0.95	NS	0.005 U	0.051 U	0.051 U	0.05 U	0.005 U	0.051 U	0.051 U	0.052 U
gamma-Chlordane	ug/l	NS	NS	0.0043 U	0.051 U	0.051 U	0.05 U	0.016	0.051 U	0.051 U	0.052 U
Heptachlor	ug/l	0.52	0.0038	0.00079 U	0.051 U	0.051 U	0.05 U	0.00079 U	0.051 U	0.051 U	0.052 U
Heptachlor epoxide	ug/l	0.52	0.0038	0.0038 U	0.051 U	0.051 U	0.05 U	0.0038 U	0.051 U	0.051 U	0.052 U
Methoxychlor	ug/l	NS	NS	0.03 U	0.51 U	0.51 U	0.5 U	0.03 U	0.51 U	0.51 U	0.52 U
Toxaphene	ug/l	0.73	0.002	0.05 U	5.1 U	5.1 U	5 U	0.05 U	5.1 U	5.1 U	5.2 U
MISCELLANEOUS											
Total Suspended Solids	mg/l	NS	NS	--	--	17	2 U	--	--	1 U	2 U
Hardnes, as CACO3	ug/l	NS	NS	--	--	370	355,000	--	--	243	268,000
Total Organic Carbon	mg/l	NS	NS	--	--	2	1.1	--	--	0.85 J	0.9 J

Notes:

[1] Maryland Numerical Criteria for Toxic Substances in Surface Waters - Aquatic Life (COMAR 26.

NS = No standard

-- = Not sampled

J = positive detect; value estimated

U = analyte not detected; reporting limit provided

Red bolded detected concentration above criteria

Table 5-10
2016-2017 USEPA Tracer Study Surface Water Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Analyte	Location ID	Maryland Fresh Water Acute Criteria[1]	Maryland Fresh Water Chronic Criteria[1]	Rest Haven South				Saint James Run			
	Date Collected			6/20/2016	10/3/2016	1/24/2017	4/19/2017	6/20/2016	10/3/2016	1/24/2017	4/20/2017
	Sample Depth (bgs)			0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft
	Sample Type			Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
	Units			Result	Result	Result	Result	Result	Result	Result	Result
PESTICIDES											
4,4'-DDD	ug/l	NS	NS	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	ug/l	NS	NS	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	ug/l	1.1	0.001	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U
Aldrin	ug/l	3	NS	0.0005 U	0.05 U	0.052 U	0.052 U	0.0005 U	0.051 U	0.051 U	0.051 U
alpha-BHC	ug/l	NS	NS	0.026 U	0.05 U	0.052 U	0.052 U	0.026 U	0.051 U	0.051 U	0.051 U
alpha-Chlordane	ug/l	NS	NS	0.0043 U	0.05 U	0.052 U	0.052 U	0.0043 U	0.051 U	0.051 U	0.051 U
beta-BHC	ug/l	NS	NS	0.005 U	0.05 U	0.052 U	0.052 U	0.005 U	0.051 U	0.051 U	0.051 U
delta-BHC	ug/l	NS	NS	0.005 U	0.05 U	0.052 U	0.052 U	0.005 U	0.051 U	0.051 U	0.051 U
Dieldrin	ug/l	0.24	0.056	0.016	0.1 U	0.1 U	0.0028 J	0.00097 J	0.1 U	0.1 U	0.0034 J
Endosulfan I	ug/l	NS	NS	0.005 U	0.05 U	0.052 U	0.052 U	0.005 U	0.051 U	0.051 U	0.051 U
Endosulfan II	ug/l	NS	NS	0.056 U	0.1 U	0.1 U	0.1 U	0.004 J	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	ug/l	NS	NS	0.01 U	0.1 U	0.1 U	0.1 U	0.0015 J	0.1 U	0.1 U	0.1 U
Endrin	ug/l	0.086	0.036	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.1 U	0.1 U	0.1 U
Endrin aldehyde	ug/l	NS	NS	0.01 U	0.1 U	0.1 U	0.1 U	0.01 U	0.1 U	0.1 U	0.1 U
Endrin ketone	ug/l	NS	NS	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.1 U	0.1 U	0.1 U
gamma-BHC (Lindane)	ug/l	0.95	NS	0.005 U	0.05 U	0.052 U	0.052 U	0.005 U	0.051 U	0.051 U	0.051 U
gamma-Chlordane	ug/l	NS	NS	0.011	0.05 U	0.052 U	0.052 U	0.033	0.051 U	0.051 U	0.051 U
Heptachlor	ug/l	0.52	0.0038	0.00079 U	0.05 U	0.052 U	0.052 U	0.00079 U	0.051 U	0.051 U	0.051 U
Heptachlor epoxide	ug/l	0.52	0.0038	0.0038 U	0.05 U	0.052 U	0.052 U	0.0038 U	0.051 U	0.051 U	0.051 U
Methoxychlor	ug/l	NS	NS	0.03 U	0.5 U	0.52 U	0.52 U	0.03 U	0.51 U	0.51 U	0.51 U
Toxaphene	ug/l	0.73	0.002	0.05 U	5 U	5.2 U	5.2 U	0.05 U	5.1 U	5.1 U	5.1 U
MISCELLANEOUS											
Total Suspended Solids	mg/l	NS	NS	--	--	1.4	2 U	--	--	6.2	2
Hardnes, as CACO3	ug/l	NS	NS	--	--	324	345,000	--	--	328	352,000
Total Organic Carbon	mg/l	NS	NS	--	--	0.87 J	0.82 J	--	--	1.1	1.2

Notes:

[1] Maryland Numerical Criteria for Toxic Substances in Surface Waters - Aquatic Life (COMAR 26.

NS = No standard

-- = Not sampled

J = positive detect; value estimated

U = analyte not detected; reporting limit provided

Red bolded detected concentration above criteria

Table 5-10
2016-2017 USEPA Tracer Study Surface Water Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Analyte	Location ID	Maryland Fresh Water Acute Criteria[1]	Maryland Fresh Water Chronic Criteria[1]	Staley Park				Troupe Spring 1				Troupe Spring 2			
	Date Collected			6/22/2016	10/4/2016	1/26/2017	4/21/2017	6/20/2016	10/3/2016	1/24/2017	4/20/2017	6/20/2016	10/3/2016	1/24/2017	4/20/2017
	Sample Depth (bgs)			0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft
	Sample Type			Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
	Units			Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PESTICIDES															
4,4'-DDD	ug/l	NS	NS	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	ug/l	NS	NS	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	ug/l	1.1	0.001	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U	0.001 U	0.1 U	0.1 U	0.1 U
Aldrin	ug/l	3	NS	0.0005 U	0.051 U	0.05 U	0.051 U	0.0005 U	0.051 U	0.051 U	0.05 U	0.0005 U	0.05 U	0.05 U	0.051 U
alpha-BHC	ug/l	NS	NS	0.026 U	0.051 U	0.05 U	0.051 U	0.026 U	0.051 U	0.051 U	0.05 U	0.026 U	0.05 U	0.05 U	0.051 U
alpha-Chlordane	ug/l	NS	NS	0.0043 U	0.051 U	0.05 U	0.051 U	0.0043 U	0.051 U	0.051 U	0.05 U	0.0043 U	0.05 U	0.05 U	0.051 U
beta-BHC	ug/l	NS	NS	0.005 U	0.051 U	0.05 U	0.051 U	0.005 U	0.051 U	0.051 U	0.05 U	0.005 U	0.05 U	0.05 U	0.051 U
delta-BHC	ug/l	NS	NS	0.005 U	0.051 U	0.05 U	0.051 U	0.005 U	0.051 U	0.051 U	0.05 U	0.005 U	0.05 U	0.05 U	0.051 U
Dieldrin	ug/l	0.24	0.056	0.001 U	0.1 U	0.1 U	0.1 U	0.015	0.1 U	0.1 U	0.1 U	0.0081	0.1 U	0.1 U	0.1 U
Endosulfan I	ug/l	NS	NS	0.005 U	0.051 U	0.05 U	0.051 U	0.005 U	0.051 U	0.051 U	0.05 U	0.005 U	0.05 U	0.05 U	0.051 U
Endosulfan II	ug/l	NS	NS	0.056 U	0.1 U	0.1 U	0.1 U	0.056 U	0.1 U	0.1 U	0.1 U	0.0028 J	0.1 U	0.1 U	0.1 U
Endosulfan sulfate	ug/l	NS	NS	0.01 U	0.1 U	0.1 U	0.1 U	0.01 U	0.1 U	0.1 U	0.1 U	0.01 U	0.1 U	0.1 U	0.1 U
Endrin	ug/l	0.086	0.036	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.1 U	0.1 U	0.1 U
Endrin aldehyde	ug/l	NS	NS	0.01 U	0.1 U	0.1 U	0.1 U	0.01 U	0.1 U	0.1 U	0.1 U	0.01 U	0.1 U	0.1 U	0.1 U
Endrin ketone	ug/l	NS	NS	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.1 U	0.1 U	0.1 U	0.036 U	0.1 U	0.1 U	0.1 U
gamma-BHC (Lindane)	ug/l	0.95	NS	0.005 U	0.051 U	0.05 U	0.051 U	0.005 U	0.051 U	0.051 U	0.05 U	0.005 U	0.05 U	0.05 U	0.051 U
gamma-Chlordane	ug/l	NS	NS	0.0043 U	0.051 U	0.05 U	0.051 U	0.0043 U	0.051 U	0.051 U	0.05 U	0.019	0.05 U	0.05 U	0.051 U
Heptachlor	ug/l	0.52	0.0038	0.00079 U	0.051 U	0.05 U	0.051 U	0.00079 U	0.051 U	0.051 U	0.05 U	0.00079 U	0.05 U	0.05 U	0.051 U
Heptachlor epoxide	ug/l	0.52	0.0038	0.0038 U	0.051 U	0.05 U	0.051 U	0.0038 U	0.051 U	0.051 U	0.05 U	0.0038 U	0.05 U	0.05 U	0.051 U
Methoxychlor	ug/l	NS	NS	0.03 U	0.51 U	0.5 U	0.51 U	0.03 U	0.51 U	0.51 U	0.5 U	0.03 U	0.5 U	0.5 U	0.51 U
Toxaphene	ug/l	0.73	0.002	0.05 U	5.1 U	5 U	5.1 U	0.05 U	5.1 U	5.1 U	5 U	0.05 U	5 U	5 U	5.1 U
MISCELLANEOUS															
Total Suspended Solids	mg/l	NS	NS	--	--	1 U	2 U	--	--	1 U	2 U	--	--	23	15
Hardnes, as CACO3	ug/l	NS	NS	--	--	370	380,000	--	--	377	347,000	--	--	341	342,000
Total Organic Carbon	mg/l	NS	NS	--	--	0.62 J	1.1	--	--	1 U	0.85 J	--	--	1 U	1.4

Notes:

[1] Maryland Numerical Criteria for Toxic Substances in Surface Waters - Aquatic Life (COMAR 26.

NS = No standard

-- = Not sampled

J = positive detect; value estimated

U = analyte not detected; reporting limit provided

Red bolded detected concentration above criteria

Table 5-11
2016-2017 USEPA Tracer Study Sediment Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Analyte	Location ID	Antietam Creek		Antietam Creek Bkg		Antietam Falls			Bester-Long Quarry	
	Date Collected	6/21/2016	4/20/2017	6/21/2016	4/20/2017	6/21/2016		4/20/2017	6/22/2016	4/19-20/2017
	Sample Depth (bgs)	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft		0-0.5 ft	0-0.5 ft	Not Sampled; New Property Owner, no Access to Bester Long
	Sample Type	Normal	Normal	Normal	Normal	Normal	Duplicate	Normal	Normal	
	Units	Result	Result	Result	Result	Result	Result	Result	Result	
PESTICIDES										
4,4'-DDD	ug/kg	0.76 U	7.4 U	0.72 U	5.8 U	0.76 U	0.89 U	10 UJ	0.4 U	--
4,4'-DDE	ug/kg	7.2 U	7.4 U	6.8 U	5.8 U	7.1 U	8.4 U	10 UJ	3.8 U	--
4,4'-DDT	ug/kg	0.76 U	7.4 U	0.72 U	5.8 U	0.76 U	0.89 U	10 UJ	0.4 U	--
Aldrin	ug/kg	0.39 U	3.8 U	0.37 U	3 U	0.39 U	0.46 U	5.3 UJ	0.21 U	--
alpha-BHC	ug/kg	1.9 U	3.8 U	1.8 U	3 U	1.9 U	2.2 U	5.3 UJ	1 U	--
alpha-Chlordane	ug/kg	0.39 U	3.8 U	0.37 U	3 U	0.39 U	0.46 U	5.3 UJ	0.21 U	--
beta-BHC	ug/kg	0.39 U	3.8 U	0.37 U	3 U	0.39 U	0.46 U	5.3 UJ	0.21 U	--
delta-BHC	ug/kg	0.39 U	3.8 U	0.37 U	3 U	0.39 U	0.46 U	5.3 UJ	0.21 U	--
Dieldrin	ug/kg	3 U	7.4 U	2.9 U	5.8 U	3 U	3.5 U	10 UJ	1.6 U	--
Endosulfan I	ug/kg	0.39 U	3.8 U	0.37 U	3 U	0.39 U	0.46 U	5.3 UJ	0.21 U	--
Endosulfan II	ug/kg	0.76 U	7.4 U	0.72 U	5.8 U	0.76 U	0.89 U	10 UJ	0.4 U	--
Endosulfan sulfate	ug/kg	0.76 U	7.4 U	0.72 U	5.8 U	0.76 U	0.89 U	10 UJ	0.4 U	--
Endrin	ug/kg	5.1 U	7.4 U	4.8 U	5.8 U	5.1 U	5.9 U	10 UJ	2.7 U	--
Endrin aldehyde	ug/kg	5.1 U	7.4 U	4.8 U	5.8 U	5.1 U	5.9 U	10 UJ	2.7 U	--
Endrin ketone	ug/kg	5.1 U	7.4 U	4.8 U	5.8 U	5.1 U	5.9 U	10 UJ	2.7 U	--
gamma-BHC (Lindane)	ug/kg	0.39 U	3.8 U	0.37 U	3 U	0.39 U	0.46 U	5.3 UJ	0.21 U	--
gamma-CHLORDANE	ug/kg	0.39 U	3.8 U	0.37 U	3 U	0.39 U	0.46 U	5.3 UJ	0.21 U	--
Heptachlor	ug/kg	0.14 U	3.8 U	0.13 U	3 U	0.14 U	0.16 U	5.3 UJ	0.073 U	--
Heptachlor epoxide	ug/kg	3.9 U	3.8 U	3.7 U	3 U	3.9 U	4.6 U	5.3 UJ	2.1 U	--
Methoxychlor	ug/kg	30 U	38 U	29 U	30 U	30 U	35 U	53 UJ	16 U	--
Toxaphene	ug/kg	3.9 U	380 U	3.7 U	300 U	3.9 U	4.6 U	530 UJ	2.1 U	--
MISCELLANEOUS										
Total Organic Carbon	mg/kg	--	87,000	--	30,000	--	--	89,000	--	--

Notes:

J = positive detection; value estimated

U = not detected; reporting limit provided

UJ = not detected; estimated reporting limit

Table 5-11
2016-2017 USEPA Tracer Study Sediment Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Analyte	Location ID	Fountain Head		Hager House		Hagers Crossing		Hagerstown City Park			
	Date Collected	6/20/2016	4/19/2017	6/22/2016	4/21/2017	6/20/2016	4/20/2017	6/22/2016	6/22/2016	4/21/2017	
	Sample Depth (bgs)	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	
	Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Duplicate	Normal	Duplicate
	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PESTICIDES											
4,4'-DDD	ug/kg	0.42 U	4.1 UJ	0.43 U	4.7 UJ	0.43 U	5.9 UJ	0.51 U	0.7 U	4.5 UJ	5.5 UJ
4,4'-DDE	ug/kg	4 U	1.2 J	4 U	4.7 UJ	4.1 U	5.9 UJ	4.8 U	6.5 U	4.5 UJ	5.5 UJ
4,4'-DDT	ug/kg	0.42 U	1 J	0.43 U	0.66 J	0.43 U	5.9 UJ	0.51 U	0.7 U	2 J	5.1 J
Aldrin	ug/kg	0.22 U	2.1 UJ	0.22 U	2.4 UJ	0.22 U	3.1 UJ	0.27 U	0.36 U	2.3 UJ	2.9 UJ
alpha-BHC	ug/kg	1 U	2.1 UJ	1.1 U	2.4 UJ	1.1 U	3.1 UJ	1.3 U	1.7 U	2.3 UJ	2.9 UJ
alpha-Chlordane	ug/kg	0.22 U	0.26 J	0.22 U	1 J	0.22 U	3.1 UJ	0.27 U	0.36 U	1.4 J	1.1 J
beta-BHC	ug/kg	0.22 U	2.1 UJ	0.22 U	2.4 UJ	0.22 U	3.1 UJ	0.27 U	0.36 U	2.3 UJ	2.9 UJ
delta-BHC	ug/kg	0.22 U	2.1 UJ	0.22 U	2.4 UJ	0.22 U	3.1 UJ	0.27 U	0.36 U	2.3 UJ	2.9 UJ
Dieldrin	ug/kg	1.7 U	0.42 J	1.7 U	4.7 UJ	1.7 U	5.9 UJ	2 U	2.7 U	4.5 UJ	5.5 UJ
Endosulfan I	ug/kg	0.22 U	2.1 UJ	0.22 U	2.4 UJ	0.22 U	3.1 UJ	0.27 U	0.36 U	2.3 UJ	2.9 UJ
Endosulfan II	ug/kg	0.42 U	4.1 UJ	0.43 U	4.7 UJ	0.43 U	5.9 UJ	0.51 U	0.7 U	4.5 UJ	5.5 UJ
Endosulfan sulfate	ug/kg	0.42 U	4.1 UJ	0.43 U	4.7 UJ	0.43 U	5.9 UJ	0.51 U	0.7 U	4.5 UJ	5.5 UJ
Endrin	ug/kg	2.8 U	4.1 UJ	2.8 U	4.7 UJ	2.9 U	5.9 UJ	3.4 U	4.6 U	4.5 UJ	5.5 UJ
Endrin aldehyde	ug/kg	2.8 U	4.1 UJ	2.8 U	4.7 UJ	2.9 U	5.9 UJ	3.4 U	4.6 U	4.5 UJ	5.5 UJ
Endrin ketone	ug/kg	2.8 U	4.1 UJ	2.8 U	4.7 UJ	2.9 U	5.9 UJ	3.4 U	4.6 U	4.5 UJ	5.5 UJ
gamma-BHC (Lindane)	ug/kg	0.22 U	2.1 UJ	0.22 U	2.4 UJ	0.22 U	3.1 UJ	0.27 U	0.36 U	2.3 UJ	2.9 UJ
gamma-CHLORDANE	ug/kg	0.22 U	0.29 J	0.22 U	0.84 J	0.22 U	3.1 UJ	0.27 U	0.36 U	1.3 J	1.1 J
Heptachlor	ug/kg	0.077 U	2.1 UJ	0.078 U	2.4 UJ	0.079 U	3.1 UJ	0.093 U	0.13 U	2.3 UJ	2.9 UJ
Heptachlor epoxide	ug/kg	2.2 U	2.1 UJ	2.2 U	2.4 UJ	2.2 U	3.1 UJ	2.6 U	3.6 U	2.3 UJ	2.9 UJ
Methoxychlor	ug/kg	17 U	21 UJ	17 U	24 UJ	17 U	31 UJ	20 U	27 U	23 UJ	29 UJ
Toxaphene	ug/kg	2.2 U	210 UJ	2.2 U	240 UJ	2.2 U	310 UJ	2.6 U	3.6 U	230 UJ	290 UJ
MISCELLANEOUS											
Total Organic Carbon	mg/kg	--	51,000 J	--	63,000	--	27,000	--	--	29,000	22,000

Notes:

J = positive detection; value estimated

U = not detected; reporting limit provided

UJ = not detected; estimated reporting limit

Table 5-11
2016-2017 USEPA Tracer Study Sediment Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Analyte	Location ID	Hagerstown CP Grotto		Hamilton Run		Pangborn Park			Paradise Farms Sprin	
	Date Collected	6/22/2016	4/21/2017	6/20/2016	4/19/2017	6/21/2016	4/21/2017		6/20/2016	4/20/2017
	Sample Depth (bgs)	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft		0-0.5 ft	0-0.5 ft
	Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Duplicate	Normal	Normal
	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result
PESTICIDES										
4,4'-DDD	ug/kg	0.38 U	0.49 J	0.79 U	0.76 J	0.48 U	3.3 J	2.1 J	0.49 U	5.8 UJ
4,4'-DDE	ug/kg	3.6 U	10	7.5 U	8.4 UJ	4.5 U	5.7 UJ	7.2 UJ	4.6 U	5.8 UJ
4,4'-DDT	ug/kg	0.38 U	14	0.79 U	0.65 J	0.48 U	4.4 J	0.62 J	0.49 U	5.8 UJ
Aldrin	ug/kg	0.2 U	2.2 U	0.41 U	4.3 UJ	0.25 U	2.9 UJ	3.7 UJ	0.25 U	3 UJ
alpha-BHC	ug/kg	0.95 U	2.2 U	2 U	4.3 UJ	1.2 U	2.9 UJ	3.7 UJ	1.2 U	3 UJ
alpha-Chlordane	ug/kg	0.2 U	2.2 U	0.41 U	4.3 UJ	0.25 U	2.3 J	1.5 J	0.25 U	3 UJ
beta-BHC	ug/kg	0.2 U	2.2 U	0.41 U	4.3 UJ	0.25 U	2.9 UJ	3.7 UJ	0.25 U	3 UJ
delta-BHC	ug/kg	0.2 U	2.2 U	0.41 U	4.3 UJ	0.25 U	2.9 UJ	3.7 UJ	0.25 U	3 UJ
Dieldrin	ug/kg	1.5 U	4.4 U	3.1 U	8.4 UJ	1.9 U	5.7 UJ	7.2 UJ	1.9 U	5.8 UJ
Endosulfan I	ug/kg	0.2 U	2.2 U	0.41 U	4.3 UJ	0.25 U	2.9 UJ	3.7 UJ	0.25 U	3 UJ
Endosulfan II	ug/kg	0.38 U	4.4 U	0.79 U	8.4 UJ	0.48 U	5.7 UJ	7.2 UJ	0.49 U	5.8 UJ
Endosulfan sulfate	ug/kg	0.38 U	4.4 U	0.79 U	8.4 UJ	0.48 U	5.7 UJ	7.2 UJ	0.49 U	5.8 UJ
Endrin	ug/kg	2.5 U	4.4 U	5.3 U	8.4 UJ	3.2 U	5.7 UJ	7.2 UJ	3.3 U	5.8 UJ
Endrin aldehyde	ug/kg	2.5 U	4.4 U	5.3 U	8.4 UJ	3.2 U	5.7 UJ	7.2 UJ	3.3 U	5.8 UJ
Endrin ketone	ug/kg	2.5 U	4.4 U	5.3 U	8.4 UJ	3.2 U	5.7 UJ	7.2 UJ	3.3 U	5.8 UJ
gamma-BHC (Lindane)	ug/kg	0.2 U	2.2 U	0.41 U	4.3 UJ	0.25 U	2.9 UJ	3.7 UJ	0.25 U	3 UJ
gamma-CHLORDANE	ug/kg	0.2 U	2.2 U	0.41 U	4.3 UJ	0.25 U	2.7 J	1.2 J	0.25 U	3 UJ
Heptachlor	ug/kg	0.069 U	2.2 U	0.14 U	4.3 UJ	0.087 U	2.9 UJ	3.7 UJ	0.089 U	3 UJ
Heptachlor epoxide	ug/kg	2 U	2.2 U	4.1 U	4.3 UJ	2.5 U	2.9 UJ	3.7 UJ	2.5 U	3 UJ
Methoxychlor	ug/kg	15 U	22 U	31 U	44 UJ	19 U	29 UJ	37 UJ	19 U	30 UJ
Toxaphene	ug/kg	2 U	220 U	4.1 U	430 UJ	2.5 U	290 UJ	370 UJ	2.5 U	300 UJ
MISCELLANEOUS										
Total Organic Carbon	mg/kg	--	12,000	--	98,000	--	72,000	71,000	--	59,000

Notes:

J = positive detection; value estimated

U = not detected; reporting limit provided

UJ = not detected; estimated reporting limit

Table 5-11
2016-2017 USEPA Tracer Study Sediment Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Analyte	Location ID	Rest Haven North		Rest Haven South		Saint James Run		Staley Park	
	Date Collected	6/20/2016	4/19/2017	6/20/2016	4/19/2017	6/20/2016	4/20/2017	6/22/2016	4/21/2017
	Sample Depth (bgs)	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft
	Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
	Units	Result	Result	Result	Result	Result	Result	Result	Result
PESTICIDES									
4,4'-DDD	ug/kg	0.59 U	4.4 UJ	0.51 U	5.2 UJ	0.8 U	4.8 U	0.42 U	12 UJ
4,4'-DDE	ug/kg	5.5 U	3.9 J	4.8 U	5.2 UJ	7.5 U	4.8 U	3.9 U	2.7 J
4,4'-DDT	ug/kg	0.59 U	4.4 UJ	0.51 U	0.78 J	0.8 U	4.8 U	0.42 U	12 UJ
Aldrin	ug/kg	0.3 U	2.3 UJ	0.26 U	2.7 UJ	0.41 U	2.5 U	0.22 U	5.9 UJ
alpha-BHC	ug/kg	1.5 U	2.3 UJ	1.3 U	2.7 UJ	2 U	2.5 U	1 U	5.9 UJ
alpha-Chlordane	ug/kg	0.3 U	0.51 J	0.26 U	2.7 UJ	0.41 U	2.5 U	0.22 U	5.9 UJ
beta-BHC	ug/kg	0.3 U	2.3 UJ	0.26 U	2.7 UJ	0.41 U	2.5 U	0.12 J	5.9 UJ
delta-BHC	ug/kg	0.3 U	2.3 UJ	0.26 U	2.7 UJ	0.41 U	2.5 U	0.22 U	5.9 UJ
Dieldrin	ug/kg	2.3 U	4.4 UJ	2 U	5.2 UJ	3.2 U	4.8 U	1.6 U	12 UJ
Endosulfan I	ug/kg	0.3 U	2.3 UJ	0.26 U	2.7 UJ	0.41 U	2.5 U	0.22 U	5.9 UJ
Endosulfan II	ug/kg	0.59 U	4.4 UJ	0.51 U	5.2 UJ	0.8 U	4.8 U	0.42 U	12 UJ
Endosulfan sulfate	ug/kg	0.59 U	4.4 UJ	0.51 U	5.2 UJ	0.8 U	4.8 U	0.42 U	12 UJ
Endrin	ug/kg	3.9 U	4.4 UJ	3.4 U	5.2 UJ	5.3 U	4.8 U	2.8 U	12 UJ
Endrin aldehyde	ug/kg	3.9 U	4.4 UJ	3.4 U	5.2 UJ	5.3 U	4.8 U	2.8 U	12 UJ
Endrin ketone	ug/kg	3.9 U	4.4 UJ	3.4 U	5.2 UJ	5.3 U	4.8 U	2.8 U	12 UJ
gamma-BHC (Lindane)	ug/kg	0.3 U	2.3 UJ	0.26 U	2.7 UJ	0.41 U	2.5 U	0.22 U	5.9 UJ
gamma-CHLORDANE	ug/kg	0.3 U	0.44 J	0.26 U	2.7 UJ	0.41 U	2.5 U	0.22 U	5.9 UJ
Heptachlor	ug/kg	0.11 U	2.3 UJ	0.092 U	2.7 UJ	0.15 U	2.5 U	0.076 U	5.9 UJ
Heptachlor epoxide	ug/kg	3 U	2.3 UJ	2.6 U	2.7 UJ	4.1 U	2.5 U	0.26 J	5.9 UJ
Methoxychlor	ug/kg	23 U	23 UJ	20 U	27 UJ	31 U	25 U	16 U	59 UJ
Toxaphene	ug/kg	3 U	230 UJ	2.6 U	270 UJ	4.1 U	250 U	2.2 U	590 UJ
MISCELLANEOUS									
Total Organic Carbon	mg/kg	--	36,000	--	10,000	--	100,000	--	130,000

Notes:

J = positive detection; value estimated

U = not detected; reporting limit provided

UJ = not detected; estimated reporting limit

Table 5-11
2016-2017 USEPA Tracer Study Sediment Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Analyte	Location ID	Troupe Spring 1		Troupe Spring 2	
	Date Collected	6/20/2016	4/20/2017	6/20/2016	4/20/2017
	Sample Depth (bgs)	0-0.5 ft	0-0.5 ft	0-0.5 ft	0-0.5 ft
	Sample Type	Normal	Normal	Normal	Normal
	Units	Result	Result	Result	Result
PESTICIDES					
4,4'-DDD	ug/kg	0.4 U	5.8 U	0.64 U	5.3 J
4,4'-DDE	ug/kg	3.7 U	5.8 U	6 U	1.7 J
4,4'-DDT	ug/kg	0.4 U	5.8 U	0.64 U	10
Aldrin	ug/kg	0.21 U	3 U	0.33 U	3 U
alpha-BHC	ug/kg	0.99 U	3 U	1.6 U	3 U
alpha-Chlordane	ug/kg	0.21 U	3 U	0.33 U	3 U
beta-BHC	ug/kg	0.21 U	3 U	0.33 U	3 U
delta-BHC	ug/kg	0.21 U	3 U	0.33 U	3 U
Dieldrin	ug/kg	1.6 U	5.6 J	2.5 U	5.9 U
Endosulfan I	ug/kg	0.21 U	3 U	0.33 U	3 U
Endosulfan II	ug/kg	0.4 U	5.8 U	0.64 U	5.9 U
Endosulfan sulfate	ug/kg	0.4 U	5.8 U	0.64 U	5.9 U
Endrin	ug/kg	2.6 U	5.8 U	4.3 U	5.9 U
Endrin aldehyde	ug/kg	2.6 U	5.8 U	4.3 U	5.9 U
Endrin ketone	ug/kg	2.6 U	5.8 U	4.3 U	5.9 U
gamma-BHC (Lindane)	ug/kg	0.21 U	3 U	0.33 U	3 U
gamma-CHLORDANE	ug/kg	0.21 U	3 U	0.33 U	3 U
Heptachlor	ug/kg	0.072 U	3 U	0.12 U	3 U
Heptachlor epoxide	ug/kg	2 U	3 U	3.3 U	3 U
Methoxychlor	ug/kg	16 U	30 U	25 U	30 U
Toxaphene	ug/kg	2 U	300 U	3.3 U	300 U
MISCELLANEOUS					
Total Organic Carbon	mg/kg	--	120,000	--	54,000

Notes:

J = positive detection; value estimated

U = not detected; reporting limit provided

UJ = not detected; estimated reporting limit

Table 5-12
April 2014 Groundwater Sampling Field Parameter Data
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Monitoring Well	Sample Date	Temperature (ºC)	Dissolved Oxygen (mg/L)	pH (Std.Units)	Turbidity (NTUs)	Conductivity (mS/cm)	Oxygen Reduction Potential (mV)	Rate (mL/min)	Depth to Water (ft below top of PVC)
On Site Monitoring Wells									
MW-A-51	4/29/2014	11.5	0.40	6.24	72.3	3.08	-20	260	39.27
MW-B-55	4/26/2014	15.2	5.12	7.23	0.0	0.981	182	100	46.01
MW-C-40	4/26/2014	15.70	5.61	6.61	0.0	0.907	190	130	28.41
MW-D-77	4/27/2014	16.25	1.99	6.78	0.9	2.40	204	100	27.31
MW-E-46	4/27/2014	15.24	3.37	6.55	0.0	2.91	180	100	27.87
MW-F-70	4/28/2014	14.04	0.39	7.05	0.0	1.13	-188	100	47.43
MW-G-35	4/28/2014	14.28	0.88	4.19	2.6	3.680	345	400	20.67
MW-H-65	4/28/2014	12.95	2.95	6.51	11.61	2.48	-20	365	30.74
MW-I-55	4/30/2014	12.07	0.82	6.69	2.5	1.51	-85	400	27.66
MW-J-71	4/30/2014	11.94	0.46	6.39	0.9	2.84	-64	345	37.88
MW-K-80	4/30/2014	11.97	0.56	6.76	129	2.14	-60	120	38.12
MW-L-48	4/28/2014	13.62	1.40	6.60	0.0	1.590	52	400	28.86
MW-M-50	4/29/2014	11.55	1.92	6.51	0.0	2.60	41	110	27.78
MW-N-83	4/29/2014	10.77	3.58	6.62	0.0	1.900	-100	140	35.43
MW-N-113	4/29/2014	11.31	0.45	6.55	8.9	2.56	-251	150	36.03
MW-O-145	4/29/2014	11.04	0.58	6.90	0.0	2.75	-125	115	56.93
MW-P-235	4/25/2014	12.76	0.49	6.87	0.0	2.71	-144	300	53.45
MW-Q-150	4/28/2014	15.94	0.47	6.55	259	2.13	-84	110	51.04
EW-1-110	4/30/2014	11.62	2.60	6.71	3.9	2.27	-78	230	26.24
Off Site Monitoring Wells									
OW-1-62	4/22/2014	13.98	6.00	6.85	0.0	1.950	148	400	50.48
OW-1-105	4/22/2014	13.85	7.00	7.11	110	1.100	134	130	52.36
OW-2-65	4/22/2014	14.70	1.49	6.59	25.5	1.500	130	360	45.69
OW-2-115	4/23/2014	12.25	2.22	6.77	35.7	2.20	-51	100	50.31
OW-3-55	4/22/2014	13.61	8.50	6.95	0.0	1.020	127	400	42.72
OW-3-105	4/23/2014	14.33	3.60	7.66	20.1	10.20	-191	100	46.93
OW-4-70	4/24/2014	13.31	5.70	6.86	0.0	1.700	132	110	34.40
OW-5-90	4/24/2014	17.39	1.38	6.77	2	1.41	122	100	38.45
OW-7-242	4/24/2014	14.15	0.98	7.24	499	1.40	69	100	50.75[(1)]
OW-8-230	4/24/2014	17.56	0.80	6.90	0.0	2.350	-25	115	55.67
OW-9-125	4/21/2014	14.87	5.80	6.47	10.8	1.130	130	185	30.74
OW-10-250	4/23/2014	13.18	4.16	7.23	0.0	0.928	41	315	37.40
OW-11-240	4/22/2014	14.76	0.87	7.26	989	0.901	-161	105	47.60
OW-12-232	4/21/2014	17.17	1.08	7.65	> 1000	0.994	-139	100	64.10
OW-13-250	4/24/2014	12.35	3.42	7.27	0.00	0.635	110	210	15.10
OW-14-96	4/21/2014	13.84	6.4	7.19	16.3	0.724	123	375	20.58
OW-14-235	4/22/2014	14.22	5.93	7.15	0.0	0.715	171	360	18.88
OW-15-202	4/21/2014	15.18	5.52	7.29	1.3	0.666	145	400	19.94

Notes:
mg/L - milligrams per liter
[(1)]Water level drop continuous at lowest achieveable pump rate.

Table 5-13
April 2014 Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-A-51 4/29/2014 MWA-51-042914	MW-B-55 4/26/2014 MWB-55-042614	MW-C-40 4/26/2014 MWC-40-042614	MW-D-77 4/27/2014 MWD-77-042714	MW-E-46 4/27/2014 MWE-46-042714	MW-F-70 4/28/2014 MWF-70-042814	MW-G-35 4/25/2014 MWG-35-042514	MW-H-65 4/28/2014 MWH-65-042814	MW-I-55 4/30/2014 MWI-55-043014	MW-J-71 4/30/2014 MWJ-71-043014
TOTAL METALS in ug/L													
7429-90-5	Aluminum	20,000	---	760	19 J	1800	67	< 30 U	< 30 U	220000	380	300	150
7440-36-0	Antimony	7.8	6	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
7440-38-2	Arsenic	0.052	10	0.63 J	2.9	2	< 1 UJ	4 J	2.9 J	1.2	0.31 J	1.1	1.4
7440-39-3	Barium	3,800	2,000	22	38	3.2 J	35	7.3 J	30	20	19	38	16
7440-41-7	Beryllium	25	4	1.2	< 1 U	0.9 J	0.091 J	< 1 U	< 1 U	40	0.71 J	< 1 U	2.0
7440-43-9	Cadmium	9.2	5	0.28 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	8.1	< 1 U	< 1 U	< 1 U
7440-70-2	Calcium Metal	---	---	620000 B	97000 B	150000 B	360000	610000	150000	530000 B	520000	290000 B	610000 B
7440-47-3	Chromium[1]	---	100	9.4	4.9	8.1	4.3 U	2.8 U	3.6 U	14	3 U	3.8 U	2.8 U
7440-48-4	Cobalt	6	---	12	0.14 J	0.17 J	1.3	1.2	0.14 J	170	1.5	0.78	1.7
7440-50-8	Copper	800	1,300	22 B	0.8 J	1.7 J	1.6 J	2.6	0.5 J	240	0.98 J	< 2 U	< 2 U
7439-89-6	Iron	14,000	---	36000	17 J	110	150	16 J	1800	3900	10000	16000	62000
7439-92-1	Lead	15	15	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.8	< 1 U	< 1 U	32 B
7439-95-4	Magnesium	---	---	96000 B	52000	17000	110000	25000	44000	79000 J	48000	19000 B	61000 B
7439-96-5	Manganese	430	---	4900	< 5 U	< 5 U	170	140	10	2700	6000	2100	8000
7440-02-0	Nickel	390	---	31	< 1 U	1.3 U	7	0.68 J	< 1 U	280	1.1	< 1 U	< 1 U
7440-09-7	Potassium	---	---	41000 B	2500 B	5900 B	20000 B	7700 B	1800 B	17000 B	12000 B	6100 B	16000 B
7782-49-2	Selenium	100	50	0.91 J	< 5 U	< 5 U	< 5 U	0.69 J	0.46 J	20	< 5 U	< 5 U	1.2 J
7440-22-4	Silver	94	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-23-5	Sodium	---	---	30000 B	16000 B	3600 B	22000 J	30000 J	6700 J	12000 B	32000 J	36000 B	24000 B
7440-28-0	Thallium	0.2	2	0.023 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.61 J	< 1 U	< 1 U	< 1 U
7440-62-2	Vanadium	86	---	< 1 U	32	7.8	0.31 J	5.8 J	1.1 J	< 1 J	1.5 J	1.7	2.7
7440-66-6	Zinc	6,000	---	690	2.7 J	2.4 J	7.8	3.3 J	< 5 U	970	16	14 U	83
57-12-5	Cyanide	1.5	200	5.8 J	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
7439-97-6	Mercury	0.63	2	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L													
16887-00-6	Chloride	---	---	79 B	5.9 B	2.3 U	52 B	33 B	13 B	27 B	30 B	24 B	52 B
14797-55-8	Nitrate as N	32	10	1.2 B	5.8	1.7	< 0.1 U	1.7	0.062 J	7.4 J	0.23	0.21	< 0.25 U
14808-79-8	Sulfate	---	---	1600 B	65	160	1100	1400	170	2700	1300	520 B	1800 B
ALKB	Bicarbonate Alkalinity	---	---	500 B	400 B	210 B	330 B	260 B	370 B	< 5 U	330 B	310 B	250 B
ALKC	Carbonate Alkalinity	---	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	---	500	400	210	330	260	370	<0.41 U	330	310	250
PESTICIDES in ug/L													
140-57-8	Aramite	1.3	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
56-72-4	Coumaphos	---	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
78-34-2	Delnav	---	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
957-51-7	Diphenamid	530	---	480	< 1 U	< 1 U	1.8	< 0.96 U	0.66 J	< 0.97 U	190	12	140
86-50-0	Guthion	---	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
39300-45-3	Karathane	---	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3212-35-8	Propargite	---	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
53-19-0	Sevin (Carbaryl)	---	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
53-19-0	2,4'-DDD	0.032	---	0.096 J	< 0.0013 U	< 0.013 U	< 0.061 U	< 0.025 U	< 0.0064 U	0.013 NJ	< 0.028 U	< 0.0012 U	0.054 NJ
3424-82-6	2,4'-DDE	0.046	---	0.043 NJ	0.0016	0.031	0.025 J	0.76 J	0.025 J	0.0081 NJ	0.31 J	0.21 J	0.0037 NJ
789-02-6	2,4'-DDT	0.23	---	0.0037 NJ	0.00034 J	< 0.013 U	< 0.061 U	0.028 NJ	< 0.0064 U	0.018 J	< 0.028 U	< 0.0012 U	< 0.0012 U
72-54-8	4,4'-DDD	0.032	---	0.21 J	< 0.0013 U	0.011 J	< 0.061 U	< 0.025 U	0.0043 J	0.045 J	< 0.028 U	0.0062 NJ	< 0.0012 U
72-55-9	4,4'-DDE	0.046	---	< 0.0013 U	< 0.0013 U	< 0.013 U	< 0.061 U	< 0.025 U	< 0.0064 U	0.013 J	< 0.028 U	0.0059 J	< 0.0012 U
50-29-3	4,4'-DDT	0.23	---	< 0.0013 U	0.005	< 0.013 U	< 0.061 U	0.019 J	< 0.0064 U	0.01 J	< 0.028 U	0.033 NJ	< 0.0012 U
309-00-2	Aldrin	0.00092	---	0.093 NJ	< 0.0013 U	< 0.013 U	0.068 NJ	0.044 NJ	0.012 NJ	0.0021 NJ	0.12 NJ	0.037 NJ	< 0.025 NJ
319-84-6	alpha-BHC	0.0072	---	9.6 J	< 0.0013 U	0.018	2.5 J	0.051 J	0.013 J	5.7	0.029 J	1.3	4.9 J
5103-71-9	alpha-Chlordane	0.02	2	0.0032 NJ	< 0.0013 U	< 0.013 U	< 0.061 U	0.2 J	< 0.0064 U	0.0034 NJ	< 0.028 U	0.0031 NJ	0.015 J
319-85-7	beta-BHC	0.025	---	15 J	0.0013	1.5	1.1 J	3.1 J	0.14 J	5.0	2.2 J	3.6	3.5
319-86-8	delta-BHC	0.025	---	65 J	< 0.0013 U	0.018	4.1 J	0.1 J	0.59 J	4 B	4.1 J	7 B	40 B
60-57-1	Dieldrin	0.0018	---	< 0.0013 U	< 0.0013 U	0.018 J	< 0.061 U	0.49	< 0.0064 U	0.022 J	< 0.028 U	0.96	< 0.0012 U
959-98-8	Endosulfan I	100	---	0.0047 J	< 0.0013 U	< 0.013 U	< 0.061 U	0.03 NJ	< 0.0064 U	0.017 J	< 0.028 U	0.0077 J	< 0.0012 U
33213-65-9	Endosulfan II	100	---	0.0057 J	< 0.0013 U	< 0.013 U	< 0.061 U	< 0.025 U	< 0.0064 U	0.022 J	< 0.028 U	0.0036 NJ	0.13 J
1031-07-8	Endosulfan Sulfate	---	---	< 0.0013 U	< 0.0013 U	< 0.013 U	< 0.061 U	0.24	0.0038 NJ	0.017 J	0.035 NJ	0.11 J	0.14 J
72-20-8	Endrin	2.3	2	< 0.0013 U	< 0.0013 U	< 0.013 U	< 0.061 U	0.028 J	< 0.0064 U	< 0.0013 U	< 0.028 U	0.021 NJ	< 0.0012 U
7421-93-4	Endrin aldehyde	---	---	0.017 NJ	< 0.0013 U	< 0.013 U	< 0.061 U	0.037 J	0.013 J	0.014 NJ	0.037 J	0.044 J	0.13 J
53494-70-5	Endrin ketone	---	---	0.02 J	< 0.0013 U	< 0.013 U	< 0.061 U	0.23	< 0.0064 U	0.011 J	< 0.028 U	0.0026 J	< 0.0012 U
58-89-9	gamma-BHC (Lindane)	0.042	0.2	10 J	< 0.0013 U	< 0.013 U	3.4	0.026	< 0.0064 U	0.91	< 0.028 U	< 0.0012 U	0.14 NJ
12789-03-6	gamma-Chlordane	0.02	2	0.0041 J	< 0.0013 U	< 0.013 U	< 0.061 U	0.065 J	< 0.0064 U	< 0.0013 U	< 0.028 U	0.01 J	0.0088 NJ
76-44-8	Heptachlor	0.0014	0.4	< 0.13 U	< 0.0013 U	< 0.013 U	< 0.061 U	< 0.025 U	< 0.0064 U	< 0.066 U	< 0.028 U	< 0.025 U	< 0.025 U
1024-57-3	Heptachlor epoxide	0.0014	0.2	0.037 J	< 0.0013 U	< 0.013 U	< 0.061 U	0.27	0.014	0.041 J	< 0.028 U	0.04 J	< 0.0012 U
72-43-5	Methoxychlor	37	40	< 0.0024 U	< 0.0026 U	< 0.026 U	< 0.12 U	< 0.048 U	0.02	< 0.0026 U	0.2 J	< 0.0024 U	0.075 J
8001-35-2	Toxaphene	0.071	3	< 0.096 U	< 0.1 U	< 1 U	< 4.7 U	< 1.9 U	< 0.49 U	< 0.1 U	< 2.2 U	< 0.095 U	< 0.095 U
HERBICIDES in ug/L													
94-75-7	2,4-D	170	70	1.9 J	< 4.1 U	< 4 U	0.83 NJ	< 3.8 U	< 3.9 U	< 4.1 U	6.1 NJ	< 3.9 U	< 3.9 U
93-76-5	2,4,5-T	160	---	< 1 U	< 1 U	< 1 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1.1 U	< 0.98 U	0.36 J

Table 5-13
April 2014 Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-A-51 4/29/2014 MWA-51-042914	MW-B-55 4/26/2014 MWB-55-042614	MW-C-40 4/26/2014 MWC-40-042614	MW-D-77 4/27/2014 MWD-77-042714	MW-E-46 4/27/2014 MWE-46-042714	MW-F-70 4/28/2014 MWF-70-042814	MW-G-35 4/25/2014 MWG-35-042514	MW-H-65 4/28/2014 MWH-65-042814	MW-I-55 4/30/2014 MWI-55-043014	MW-J-71 4/30/2014 MWJ-71-043014
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L													
108-60-1	2,2'-Oxybis(1-Chloropropane)	710	---	< 0.2 U	< 0.21 U	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.22 U	< 0.2 U	< 0.2 U
95-95-4	2,4,5-Trichlorophenol	1,200	---	1.7	< 1 U	< 1 U	0.19 J	< 0.96 U	< 1 U	0.18 J	6.9	0.15 J	2.5
88-06-2	2,4,6-Trichlorophenol	4.1	---	2.7	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	22	< 0.98 U	0.68 J
120-83-2	2,4-Dichlorophenol	46	---	1	< 0.21 U	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	4.9	0.32	3.6
105-67-9	2,4-Dimethylphenol	360	---	< 1 U	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	< 1.1 U	< 0.98 U	< 0.99 U
51-28-5	2,4-Dinitrophenol	39	---	< 5.1 U	< 5.2 U	< 5 U	< 4.8 U	< 4.8 U	< 5.1 U	< 4.9 U	< 5.6 U	< 4.9 U	< 5 U
121-14-2	2,4-Dinitrotoluene	0.24	---	**< 1 U**	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 0.96 U**	**< 1 U**	**< 0.97 U**	**< 1.1 U**	**< 0.98 U**	**< 0.99 U**
606-20-2	2,6-Dinitrotoluene	0.049	---	**< 1 U**	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 0.96 U**	**< 1 U**	**< 0.97 U**	**< 1.1 U**	**< 0.98 U**	**< 0.99 U**
91-58-7	2-Chloronaphthalene	750	---	< 0.2 U	< 0.21 U	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.22 U	< 0.2 U	< 0.2 U
95-57-8	2-Chlorophenol	91	---	1.6	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	0.67 J	0.5 J	1.9
95-48-7	2-Methlyphenol	930	---	< 1 U	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	< 1.1 U	< 0.98 U	< 0.99 U
91-57-6	2-Methylnaphthalene	36	---	< 0.2 U	< 0.21 U	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.22 U	< 0.2 U	< 0.2 U
88-74-4	2-Nitroaniline	190	---	< 5.1 U	< 5.2 U	< 5 U	< 4.8 U	< 4.8 U	< 5.1 U	< 4.9 U	< 5.6 U	< 4.9 U	< 5 U
88-75-5	2-Nitrophenol	---	---	< 1 U	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	< 1.1 U	< 0.98 U	< 0.99 U
91-94-1	3,3-Dichlorobenzidine	0.13	---	**< 1 U**	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 0.96 U**	**< 1 U**	**< 0.97 R**	**< 1.1 U**	**< 0.98 U**	**< 0.99 U**
99-09-2	3-Nitroaniline	---	---	< 5.1 U	< 5.2 U	< 5 U	< 4.8 U	< 4.8 U	< 5.1 U	< 4.9 U	< 5.6 U	< 4.9 U	< 5 U
534-52-1	4,6-Dinitro-2-Methylphenol	1.5	---	**< 5.1 U**	**< 5.2 U**	**< 5 U**	**< 4.8 U**	**< 4.8 U**	**< 5.1 U**	**< 4.9 U**	**< 5.6 U**	**< 4.9 U**	**< 5 U**
101-55-3	4-Bromophenyl Phenyl Ether	---	---	< 1 U	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	< 1.1 U	< 0.98 U	< 0.99 U
59-50-7	4-Chloro-3-Methylphenol	1,400	---	< 1 U	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	< 1.1 U	< 0.98 U	< 0.99 U
106-47-8	4-Chloroaniline	0.37	---	**< 1 U**	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 0.96 U**	**< 1 U**	**< 0.97 U**	**< 1.1 U**	**< 0.98 U**	2
7005-72-3	4-Chlorophenyl Phenyl Ether	---	---	< 1 U	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	< 1.1 U	< 0.98 U	< 0.99 U
106-44-5	4-Methlyphenol	1,900	---	< 1 U	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	< 1.1 U	< 0.98 U	< 0.99 U
100-01-6	4-Nitroaniline	3.8	---	**< 5.1 U**	**< 5.2 U**	**< 5 U**	**< 4.8 U**	**< 4.8 U**	**< 5.1 U**	**< 4.9 U**	**< 5.6 U**	**< 4.9 U**	**< 5 U**
100-02-7	4-Nitrophenol	---	---	< 5.1 U	< 5.2 U	< 5 U	< 4.8 U	< 4.8 U	< 5.1 U	< 4.9 U	< 5.6 U	< 4.9 U	< 5 U
83-32-9	Acenaphthene	530	---	0.18 J	< 0.21 U	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.22 U	0.2	1.8
208-96-8	Acenaphthylene	---	---	< 0.2 U	< 0.21 U	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.22 U	< 0.2 U	< 0.2 U
98-86-2	Acetophenone	1,900	---	< 1 U	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	< 1.1 U	< 0.98 U	< 0.99 U
120-12-7	Anthracene	1,800	---	< 0.2 U	< 0.21 U	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	0.049 J	< 0.2 U	< 0.2 U
1912-24-9	Atrazine	0.3	3	**< 1 U**	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 0.96 U**	**< 1 U**	**< 0.97 U**	**< 1.1 U**	**< 0.98 U**	**< 0.99 U**
100-52-7	Benzaldehyde	19	---	0.81 J	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	< 1.1 U	< 0.98 U	< 0.99 U
56-55-3	Benzo[a]anthracene	0.03	---	**< 0.2 U**	**< 0.21 U**	**< 0.2 U**	0.074 J	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.22 U**	**< 0.2 U**	**< 0.2 U**
50-32-8	Benzo[a]pyrene	0.025	0.2	**< 0.2 U**	**< 0.21 U**	**< 0.2 U**	0.051 J	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.22 U**	**< 0.2 U**	**< 0.2 U**
205-99-2	Benzo[b]fluoranthene	0.25	---	< 0.2 U	< 0.21 U	< 0.2 U	0.14 J	< 0.19 U	< 0.2 U	< 0.19 U	< 0.22 U	< 0.2 U	< 0.2 U
191-24-2	Benzo[g,h,i]perylene	---	---	< 0.2 U	< 0.21 U	< 0.2 U	0.079 J	< 0.19 U	< 0.2 U	< 0.19 U	< 0.22 U	< 0.2 U	< 0.2 U
207-08-9	Benzo[k]fluoranthene	2.5	---	< 0.2 U	< 0.21 U	< 0.2 U	0.056 J	< 0.19 U	< 0.2 U	< 0.19 U	< 0.22 U	< 0.2 U	< 0.2 U
85-68-7	Benzyl Butyl Phthalate	16	---	< 1 U	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	< 1.1 U	< 0.98 U	< 0.99 U
92-52-4	Biphenyl	0.83	---	**< 1 U**	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 0.96 U**	**< 1 U**	**< 0.97 U**	**< 1.1 U**	**< 0.98 U**	**< 0.99 U**
111-91-1	Bis(2-Chloroethoxy)methane	59	---	< 1 U	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	< 1.1 U	< 0.98 U	< 0.99 U
111-44-4	Bis(2-Chloroethyl) Ether	0.014	---	**< 0.2 U**	**< 0.21 U**	**< 0.2 U**	**< 0.19 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.22 U**	**< 0.2 U**	**< 0.2 U**
117-81-7	Bis(2-Ethylhexyl) Phthalate	5.6	6	< 2 U	< 2.1 U	< 2 U	< 1.9 U	< 1.9 U	< 2 U	< 1.9 U	< 2.2 U	< 2 U	< 2 U
105-60-2	Caprolactam	9,900	---	< 5.1 U	< 5.2 U	< 5 U	< 4.8 U	< 4.8 U	< 5.1 U	< 4.9 U	< 5.6 U	< 4.9 U	< 5 U
86-74-8	Carbazole	---	---	0.42	< 0.21 U	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	0.35	< 0.2 U	0.46
218-01-9	Chrysene	25	---	< 0.2 U	< 0.21 U	< 0.2 U	0.082 J	< 0.19 U	< 0.2 U	< 0.19 U	< 0.22 U	< 0.2 U	< 0.2 U
53-70-3	Dibenz[a,h]Anthracene	0.025	---	**< 0.2 U**	**< 0.21 U**	**< 0.2 U**	**< 0.19 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.22 U**	**< 0.2 U**	**< 0.2 U**
132-64-9	Dibenzofuran	7.9	---	0.25 J	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	0.31 J	0.23 J	0.68 J
84-66-2	Diethyl Phthalate	15,000	---	< 1 U	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	< 1.1 U	< 0.98 U	< 0.99 U
131-11-3	Dimethyl Phthalate	---	---	< 1 U	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	< 1.1 U	< 0.98 U	< 0.99 U
84-74-2	Di-N-Butyl Phthalate	900	---	< 1 U	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	< 1.1 U	< 0.98 U	< 0.99 U
117-84-0	Di-N-octyl Phthalate	200	---	< 1 U	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	< 1.1 U	< 0.98 U	< 0.99 U
206-44-0	Fluoranthene	800	---	< 0.2 U	< 0.21 U	< 0.2 U	0.098 J	< 0.19 U	< 0.2 U	< 0.19 U	< 0.22 U	< 0.2 U	< 0.2 U
86-73-7	Fluorene	290	---	0.46	< 0.21 U	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	0.43	0.11 J	1.5
118-74-1	Hexachlorobenzene	0.0098	1	**< 0.2 U**	**< 0.21 U**	**< 0.2 U**	**< 0.19 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.22 U**	**< 0.2 U**	**< 0.2 U**
87-68-3	Hexachlorobutadiene	0.14	---	**< 0.2 U**	**< 0.21 U**	**< 0.2 U**	**< 0.19 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.22 U**	**< 0.2 U**	**< 0.2 U**
77-47-4	Hexachlorocyclopentadiene	0.41	50	**< 1 U**	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 0.96 U**	**< 1 U**	**< 0.97 U**	**< 1.1 U**	**< 0.98 U**	**< 0.99 U**
67-72-1	Hexachloroethane	0.33	---	**< 1 U**	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 0.96 U**	**< 1 U**	**< 0.97 U**	**< 1.1 U**	**< 0.98 U**	**< 0.99 U**
193-39-5	Indeno[1,2,3-CD]Pryene	0.25	---	< 0.2 U	< 0.21 U	< 0.2 U	0.065 J	< 0.19 U	< 0.2 U	< 0.19 U	< 0.22 U	< 0.2 U	< 0.2 U
78-59-1	Isophorone	78	---	< 1 U	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	< 1.1 U	< 0.98 U	< 0.99 U
91-20-3	Naphthalene	0.17	---	**< 0.2 U**	**< 0.21 U**	**< 0.2 U**	**< 0.19 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.22 U**	0.038 J	0.38
98-95-3	Nitrobenzene	0.14	---	**< 2 U**	**< 2.1 U**	**< 2 U**	**< 1.9 U**	**< 1.9 U**	**< 2 U**	**< 1.9 U**	**< 2.2 U**	**< 2 U**	**< 2 U**
621-64-7	N-Nitrosodi-N-Propylamine	0.011	---	**< 0.2 U**	**< 0.21 U**	**< 0.2 U**	**< 0.19 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.22 U**	**< 0.2 U**	**< 0.2 U**
86-30-6	N-Nitrosodiphenylamine	12	---	< 1 U	< 1 U	< 1 U	< 0.96 U	< 0.96 U	< 1 U	< 0.97 U	< 1.1 U	< 0.98 U	< 0.99 U
87-86-5	Pentachlorophenol	0.041	1	7.1	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 0.96 U**	0.26 J	**< 0.97 U**	290	**< 0.98 U**	**< 0.99 U**
85-01-8	Phenanthrene	---	---	< 0.2 U	< 0.21 U	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	0.21 J	< 0.2 U	< 0.2 U
108-95-2	Phenol	5,800	---	< 0.2 U	< 0.21 U	< 0.2 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.22 U	< 0.2 U	0.56
129-00-0	Pyrene	120	---	0.023 J	< 0.21 U	< 0.2 U	0.095 J	< 0.19 U	< 0.2 U	< 0.19 U	< 0.22 U	< 0.2 U	< 0.2 U

Table 5-13
April 2014 Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-A-51 4/29/2014 MWA-51-042914	MW-B-55 4/26/2014 MWB-55-042614	MW-C-40 4/26/2014 MWC-40-042614	MW-D-77 4/27/2014 MWD-77-042714	MW-E-46 4/27/2014 MWE-46-042714	MW-F-70 4/28/2014 MWF-70-042814	MW-G-35 4/25/2014 MWG-35-042514	MW-H-65 4/28/2014 MWH-65-042814	MW-I-55 4/30/2014 MWI-55-043014	MW-J-71 4/30/2014 MWJ-71-043014
VOLATILE ORGANIC COMPOUNDS in ug/L													
71-55-6	1,1,1-Trichloroethane	8,000	200	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 25 U
79-34-5	1,1,2,2-Tetrachloroethane	0.076	---	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 25 U**
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	10,000	---	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 25 U
79-00-5	1,1,2-Trichloroethane	0.28	5	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 25 U**
75-34-3	1,1-Dichloroethane	2.8	---	**< 5 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 5 U**	< 1 U	**< 25 U**
75-35-4	1,1-Dichloroethylene	280	7	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 25 U
120-82-1	1,2,4-Trichlorobenzene	1.2	70	2 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	1.5	**< 25 U**
96-12-8	1,2-Dibromo-3-Chloropropane (DBCP)	0.00033	0.2	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 25 U**
106-93-4	1,2-Dibromoethane	0.0075	0.05	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 25 U**
95-50-1	1,2-Dichlorobenzene	300	600	26	< 1 U	< 1 U	0.43 J	< 1 U	0.25 J	< 1 U	11	9.7	67
107-06-2	1,2-Dichloroethane	0.17	5	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 25 U**
78-87-5	1,2-Dichloropropane	0.85	5	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 25 U**
541-73-1	1,3-Dichlorobenzene	---	---	0.99 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.67 J	0.85 J	< 25 U
106-46-7	1,4-Dichlorobenzene	0.48	75	24	< 1 U	< 1 U	0.37 J	< 1 U	0.33 J	< 1 U	17	21	63
78-93-3	2-Butanone	5,600	---	< 25 U	< 5 U	< 5 U	< 5 U	1.4 J	1.5 J	< 5 U	< 25 U	< 5 U	< 130 U
591-78-6	2-Hexanone	38	---	< 25 U	< 5 U	< 5 U	< 5 U	< 5 U	0.26 J	< 5 U	< 25 U	< 5 UJ	**< 130 U**
108-10-1	4-Methyl-2-Pentanone	6,300	---	< 25 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 25 U	< 5 UJ	< 130 U
67-64-1	Acetone	14,000	---	< 25 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 25 U	< 5 U	< 130 U
71-43-2	Benzene	0.46	5	15	**< 1 U**	**< 1 U**	0.73 J	**< 1 U**	0.47 J	**< 1 U**	8.3	3.3	57
75-27-4	Bromodichloromethane	0.13	80	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 25 U**
75-25-2	Bromoform	3.3	80	**< 5 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 5 U**	< 1 U	**< 25 U**
74-83-9	Bromomethane	7.5	---	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 25 U
75-15-0	Carbon Disulfide	810	---	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 25 U
56-23-5	Carbon Tetrachloride	0.46	5	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 25 U**
108-90-7	Chlorobenzene	78	100	150	< 1 U	< 1 U	6.7	< 1 U	6.9	< 1 U	110	70	670
75-00-3	Chloroethane	21,000	---	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 25 U
67-66-3	Chloroform	0.22	80	35	**< 1 U**	**< 1 U**	3.5	0.44 J	**< 1 U**	**0.94 J**	**< 5 U**	0.36 J	**< 25 U**
74-87-3	Chloromethane	190	---	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 25 U
156-59-2	cis-1,2-Dichloroethene	36	70	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 25 U
10061-01-5	cis-1,3-Dichloropropylene	---	---	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 25 U
110-82-7	Cyclohexane	13,000	---	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 25 U
124-48-1	Dibromochloromethane	0.87	---	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 25 U**
75-71-8	Dichlorodifluoromethane	200	---	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 25 U
100-41-4	Ethylbenzene	1.5	700	1.7 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	2.1 J	0.3 J	7 J
98-82-8	Isopropylbenzene (Cumene)	450	---	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 25 U
79-20-9	Methyl Acetate	20,000	---	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 25 U
1634-04-4	Methyl Tert-Butyl Ether	14	---	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	1.7	< 1 U	< 5 U	< 1 U	**< 25 U**
108-87-2	Methylcylohexane	---	---	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 25 U
75-09-2	Methylene Chloride	11	5	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	**< 25 U**
100-42-5	Styrene (Monomer)	1,200	100	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 25 U
127-18-4	Tetrachloroethylene	11	5	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	**< 25 U**
108-88-3	Toluene	1,100	1,000	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	0.19 J	< 1 U	< 5 U	< 1 U	< 25 U
156-60-5	trans-1,2-Dichloroethene	360	100	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 25 U
10061-02-6	trans-1,3-Dichloropropene	---	---	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 25 U
79-01-6	Trichloroethylene	0.49	5	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 25 U**
75-69-4	Trichlorofluoromethane	5,200	---	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 25 U
75-01-4	Vinyl Chloride	0.019	2	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 25 U**
XYLENES	Xylenes, Total	190	10000	< 15 U	< 3 U	< 3 U	< 3 U	< 3 U	< 3 U	< 3 U	< 15 U	0.53 J	< 75 U

Notes:
USEPA RSL for TAP WATER (latest version, November 2017)
USEPA MCL (latest version, November 2017)
(1) No RSL exists, MCL utilized.
NA - Not Ananlyzed
U - The analyte was not detected above the reporting limit (RL).
UJ - The reporting limit is estimated due to minor quality control anomaly.
J - Result is either less than the RL but greater than or equal to the method detection limit (MDL) or the result is estimated due to a minor quality control anomaly.
B - Parameter was detected in associated laboratory method blank.
NJ - Result is estimated due to a dual column imprecision greater than 100%.
Bold indicates the reporting limit was above the RSL and/or MCL.
Red bolded detected concentration exceeds RSL
Red bolded and highlighted detected concentration exceeds MCL

Table 5-13
April 2014 Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	MW-K-80 4/30/2014 MWK-80-043014	MW-L-48 4/28/2014 MWL-48-042814	MW-M-50 4/29/2014 MWM-50-042914	MW-N-83 4/29/2014 MWN-83-042914	MW-N-113 4/29/2014 MWN-113-042914	MW-O-145 4/29/2014 MWO-145-042914	MW-P-235 4/25/2014 MWP-235-042514	MW-Q-150 4/28/2014 MWQ-150-042814	EW-1-110 4/30/2014 EW1-110-043014
TOTAL METALS in ug/L											
7429-90-5	Aluminum	20,000	1800	9.7 J	26 J	130	390	7.2 J	35	220	1500
7440-36-0	Antimony	7.8	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	6.8 B	< 2 U
7440-38-2	Arsenic	0.052	**2.5**	**1.9 J**	**0.65 J**	**0.7 J**	**1.2**	**0.72 J**	**< 1 U**	**9.5 J**	**0.73 J**
7440-39-3	Barium	3,800	36	25	11	24	18	15	21	30	52
7440-41-7	Beryllium	25	< 1 U	< 1 U	0.18 J	0.14 J	0.11 J	0.093 J	< 1 U	0.11 J	< 1 U
7440-43-9	Cadmium	9.2	0.14 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-70-2	Calcium Metal	---	490000 B	280000	600000 B	370000 B	490000 B	600000 B	560000 B	460000	470000 B
7440-47-3	Chromium[(1)]	---	< 8.5 U	< 3.1 U	3.1	3.1	3.5	3.5	2.9	< 3.7 U	< 3.7 U
7440-48-4	Cobalt	6	2	4.3	1.2	0.53	0.81	0.9	0.58	2	1.3
7440-50-8	Copper	800	< 2.7 U	0.9 J	< 2 U	< 2 U	< 2 U	< 2 U	1.8 J	3.7	< 2 U
7439-89-6	Iron	14,000	13000	260	420	**15000**	**18000**	12000	8700	**20000**	**36000**
7439-92-1	Lead	15	**68 B**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**450**	2.1 B
7439-95-4	Magnesium	---	29000 B	29000	16000 B	19000 B	38000 B	45000 B	47000 J	23000	28000 B
7439-96-5	Manganese	430	**4100**	**1100**	33	**2500**	**8600**	**3400**	**3200**	**4500**	**4300**
7440-02-0	Nickel	390	2.3 U	2.9	3	< 1 U	< 1 U	< 1 U	< 1 U	2.4	< 1 U
7440-09-7	Potassium	---	10000 B	7300 B	3600 B	17000 B	16000 B	8500 B	4000 B	18000 B	8200 B
7782-49-2	Selenium	100	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	0.51 J	< 5 U	< 5 U
7440-22-4	Silver	94	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-23-5	Sodium	---	11000 B	6800 J	1500 B	5300 B	7000 B	56000 B	51000 B	9600 J	11000 B
7440-28-0	Thallium	0.2	0.02 J	**< 1 U**	0.13 J	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	0.056 J
7440-62-2	Vanadium	86	5.5	3.6 J	1.2	2.1	1.7	< 1 U	0.66 J	3 J	1.8
7440-66-6	Zinc	6,000	10 U	2.5 J	1.4 J	1.4 J	2.2 J	2.8 J	240	20	100
57-12-5	Cyanide	1.5	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**
7439-97-6	Mercury	0.63	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L											
16887-00-6	Chloride	---	12 B	19 B	5.8 B	17 B	27 B	75 B	61 B	21 B	37 B
14797-55-8	Nitrate as N	32	< 0.1 U	1.1	1 B	< 0.1 U	< 0.1 U	< 0.1 U	< 0.25 UJ	< 0.1 U	< 0.1 U
14808-79-8	Sulfate	---	1100 B	520	1500 B	670 B	1200 B	1600 B	1500	900	1000 B
ALKB	Bicarbonate Alkalinity	---	330 B	360 B	210 B	400 B	370 B	150 B	120 B	370 B	290 B
ALKC	Carbonate Alkalinity	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	330	360	210	400	370	150	120	370	290
PESTICIDES in ug/L											
140-57-8	Aramite	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA
56-72-4	Coumaphos	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
78-34-2	Delnav	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
957-51-7	Diphenamid	530	0.66 J	1.4	< 1.1 U	5.2	11	360	190	12	26
86-50-0	Guthion	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
39300-45-3	Karathane	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
3212-35-8	Propargite	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
53-19-0	Sevin (Carbaryl)	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
53-19-0	2,4'-DDD	0.032	< 0.0012 U	< 0.025 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	**0.13 NJ**	< 0.026 U	< 0.0012 U
3424-82-6	2,4'-DDE	0.046	**0.42**	**0.57 J**	**0.35**	**0.47**	**0.37**	0.012 NJ	< 0.0013 UJ	**0.35 J**	0.17 J
789-02-6	2,4'-DDT	0.23	0.022 J	0.0078 NJ	0.032	< 0.0013 U	0.0059 NJ	< 0.0012 U	0.012 NJ	< 0.026 U	< 0.0012 U
72-54-8	4,4'-DDD	0.032	0.021	< 0.025 U	**0.047**	**0.085 J**	0.0043 NJ	< 0.0012 U	**0.09 J**	< 0.026 U	< 0.0012 U
72-55-9	4,4'-DDE	0.046	0.04 NJ	0.021 J	0.011 J	**0.058 NJ**	0.011 NJ	< 0.0012 U	0.041 NJ	**0.091**	0.0034 NJ
50-29-3	4,4'-DDT	0.23	0.011 J	0.031 J	0.1 J	0.013 J	0.028 NJ	< 0.0012 U	0.091 NJ	0.19	0.0025 NJ
309-00-2	Aldrin	0.00092	**0.073 NJ**	**0.02 NJ**	**0.009 NJ**	**0.069 NJ**	**0.068 NJ**	**0.17 NJ**	**0.011 NJ**	**0.048 NJ**	**0.031 NJ**
319-84-6	alpha-BHC	0.0072	**0.31**	**17 J**	**0.1 J**	**2.4**	**2.4**	**0.046 J**	**0.076 J**	**1.4 J**	**1.6**
5103-71-9	alpha-Chlordane	0.02	0.019 NJ	**< 0.025 U**	< 0.0013 U	**0.049 NJ**	0.018 NJ	< 0.0012 U	**0.021 J**	**0.022 NJ**	0.0037 NJ
319-85-7	beta-BHC	0.025	**1.8**	**8.6 J**	**4.5**	**6.4**	**3.3**	**0.81**	**0.26 J**	**3.7 J**	**6.1**
319-86-8	delta-BHC	0.025	**5.5**	**22 J**	**0.39**	**12**	**9.7**	**5.7**	**2.2 B**	**7.2 J**	**13**
60-57-1	Dieldrin	0.0018	**0.052**	**0.14**	**0.34**	**0.008 NJ**	**0.0058 NJ**	< 0.0012 U	< 0.0013 UJ	**0.041 J**	**0.21**
959-98-8	Endosulfan I	100	0.022 NJ	< 0.025 U	0.046	0.019 NJ	0.011 NJ	< 0.0012 U	< 0.0013 UJ	0.057 J	< 0.0012 U
33213-65-9	Endosulfan II	100	0.028 J	0.026 J	0.0093 J	0.043 J	0.017 J	0.11 J	0.036 J	0.025 NJ	0.038 J
1031-07-8	Endosulfan Sulfate	---	0.047 NJ	0.17	0.069 J	0.46	0.48	0.12 NJ	0.095 J	0.42 J	0.078 J
72-20-8	Endrin	2.3	< 0.0012 U	0.039 J	0.027 NJ	0.0096 NJ	0.086	< 0.0012 U	0.019 J	< 0.026 U	0.019 NJ
7421-93-4	Endrin aldehyde	---	0.1	0.035	0.048 J	0.15	0.13	0.19 J	0.14 J	0.15 J	0.043 J
53494-70-5	Endrin ketone	---	< 0.0012 U	0.2	0.19	0.016 NJ	< 0.0013 U	0.0042 NJ	0.013 J	< 0.026 U	0.0049 J
58-89-9	gamma-BHC (Lindane)	0.042	0.029 J	< 0.025 U	0.019 J	0.0028 NJ	0.0075 NJ	**0.08 NJ**	< 0.0013 UJ	< 0.026 U	< 0.0012 U
12789-03-6	gamma-Chlordane	0.02	**0.035 NJ**	**< 0.025 U**	0.0082 NJ	**0.03 J**	**0.028 J**	0.0014 NJ	**0.03 J**	**0.044 J**	0.0076 J
76-44-8	Heptachlor	0.0014	**0.14 NJ**	**< 0.025 U**	**< 0.0013 U**	**< 0.13 U**	**< 0.063 U**	**< 0.062 U**	**0.15 NJ**	**< 0.026 U**	**< 0.12 U**
1024-57-3	Heptachlor epoxide	0.0014	**0.18**	< 0.025 U	**0.026**	**0.3**	**0.046 NJ**	< 0.0012 U	< 0.0013 UJ	**0.14 J**	**0.06 NJ**
72-43-5	Methoxychlor	37	0.017 NJ	< 0.048 U	< 0.0026 U	0.093	0.17	0.12 J	0.05 NJ	0.14	< 0.0024 U
8001-35-2	Toxaphene	0.071	**< 0.095 U**	**< 1.9 U**	**< 0.1 U**	**< 0.1 U**	**< 0.097 U**	**< 0.095 U**	**< 0.1 UJ**	**< 2 U**	**< 0.095 U**
HERBICIDES in ug/L											
94-75-7	2,4-D	170	< 4 U	< 3.9 U	< 4.4 U	0.55 NJ	< 3.8 U	0.8 NJ	< 4.1 U	0.45 NJ	< 3.8 U
93-76-5	2,4,5-T	160	< 0.99 U	< 0.97 U	< 1.1 U	0.67 J	0.51 J	0.55 J	< 1 U	0.14 NJ	< 0.96 U

Table 5-13
April 2014 Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	MW-K-80 4/30/2014 MWK-80-043014	MW-L-48 4/28/2014 MWL-48-042814	MW-M-50 4/29/2014 MWM-50-042914	MW-N-83 4/29/2014 MWN-83-042914	MW-N-113 4/29/2014 MWN-113-042914	MW-O-145 4/29/2014 MWO-145-042914	MW-P-235 4/25/2014 MWP-235-042514	MW-Q-150 4/28/2014 MWQ-150-042814	EW-1-110 4/30/2014 EW1-110-043014
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L											
108-60-1	2,2'-Oxybis(1-Chloropropane)	710	< 0.21 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.21 U	< 0.2 U
95-95-4	2,4,5-Trichlorophenol	1,200	< 1 U	0.29 J	< 1.1 U	< 1.1 U	0.2 J	1.1	< 1.1 U	< 1 U	< 1 U
88-06-2	2,4,6-Trichlorophenol	4.1	< 1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 1 U	< 1 U
120-83-2	2,4-Dichlorophenol	46	0.37	< 0.2 U	< 0.21 U	0.23	0.67	2	0.52	0.28	0.83
105-67-9	2,4-Dimethylphenol	360	< 1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 1 U	< 1 U
51-28-5	2,4-Dinitrophenol	39	< 5.2 U	< 4.9 U	< 5.3 U	< 5.4 U	< 4.9 U	< 5.3 U	< 5.4 U	< 5.2 U	< 5 U
121-14-2	2,4-Dinitrotoluene	0.24	**< 1 U**	**< 0.98 U**	**< 1.1 U**	**< 1.1 U**	**< 0.98 U**	**< 1.1 U**	**< 1.1 U**	**< 1 U**	**< 1 U**
606-20-2	2,6-Dinitrotoluene	0.049	**< 1 U**	**< 0.98 U**	**< 1.1 U**	**< 1.1 U**	**< 0.98 U**	**< 1.1 U**	**< 1.1 U**	**< 1 U**	**< 1 U**
91-58-7	2-Chloronaphthalene	750	< 0.21 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.21 U	< 0.2 U
95-57-8	2-Chlorophenol	91	0.27 J	< 0.98 U	< 1.1 U	0.35 J	0.9 J	1.9	1 J	0.52 J	1.6
95-48-7	2-Methlyphenol	930	< 1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 0.98 U	0.14 J	< 1.1 U	< 1 U	< 1 U
91-57-6	2-Methylnaphthalene	36	< 0.21 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.21 U	< 0.2 U
88-74-4	2-Nitroaniline	190	< 5.2 U	< 4.9 U	< 5.3 U	< 5.4 U	< 4.9 U	< 5.3 U	< 5.4 U	< 5.2 U	< 5 U
88-75-5	2-Nitrophenol	---	< 1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 1 U	< 1 U
91-94-1	3,3-Dichlorobenzidine	0.13	**< 1 U**	**< 0.98 U**	**< 1.1 U**	**< 1.1 U**	**< 0.98 U**	**< 1.1 U**	**< 1.1 U**	**< 1 U**	**< 1 U**
99-09-2	3-Nitroaniline	---	< 5.2 U	< 4.9 U	< 5.3 U	< 5.4 U	< 4.9 U	< 5.3 U	< 5.4 U	< 5.2 U	< 5 U
534-52-1	4,6-Dinitro-2-Methylphenol	1.5	**< 5.2 U**	**< 4.9 U**	**< 5.3 U**	**< 5.4 U**	**< 4.9 U**	**< 5.3 U**	**< 5.4 U**	**< 5.2 U**	**< 5 U**
101-55-3	4-Bromophenyl Phenyl Ether	---	< 1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 1 U	< 1 U
59-50-7	4-Chloro-3-Methylphenol	1,400	< 1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 1 U	< 1 U
106-47-8	4-Chloroaniline	0.37	**< 1 U**	**< 0.98 U**	**< 1.1 U**	**< 1.1 U**	1.9	6.5	2.9	**< 1 U**	**< 1 U**
7005-72-3	4-Chlorophenyl Phenyl Ether	---	< 1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 1 U	< 1 U
106-44-5	4-Methlyphenol	1,900	< 1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 1 U	< 1 U
100-01-6	4-Nitroaniline	3.8	**< 5.2 U**	**< 4.9 U**	**< 5.3 U**	**< 5.4 U**	**< 4.9 U**	**< 5.3 U**	**< 5.4 U**	**< 5.2 U**	**< 5 U**
100-02-7	4-Nitrophenol	---	< 5.2 U	< 4.9 U	< 5.3 U	< 5.4 U	< 4.9 U	< 5.3 U	< 5.4 U	< 5.2 U	< 5 U
83-32-9	Acenaphthene	530	< 0.21 U	< 0.2 U	< 0.21 U	0.59	0.19 J	0.54	0.36	< 0.21 U	0.34
208-96-8	Acenaphthylene	---	< 0.21 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.21 U	< 0.2 U
98-86-2	Acetophenone	1,900	< 1 U	< 0.98 U	< 1.1 U	0.8 J	0.26 J	< 1.1 U	< 1.1 U	0.52 J	< 1 U
120-12-7	Anthracene	1,800	< 0.21 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.21 U	< 0.2 U
1912-24-9	Atrazine	0.3	**< 1 U**	**< 0.98 U**	**< 1.1 U**	**< 1.1 U**	**< 0.98 U**	**< 1.1 U**	**< 1.1 U**	**< 1 U**	**< 1 U**
100-52-7	Benzaldehyde	19	< 1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 1 U	< 1 U
56-55-3	Benzo[a]anthracene	0.03	**< 0.21 U**	**< 0.2 U**	**< 0.21 U**	**< 0.22 U**	**< 0.2 U**	0.21	**< 0.22 U**	**< 0.21 U**	**< 0.2 U**
50-32-8	Benzo[a]pyrene	0.025	**< 0.21 U**	**< 0.2 U**	**< 0.21 U**	**< 0.22 U**	**< 0.2 U**	0.22	**< 0.22 U**	**< 0.21 U**	**< 0.2 U**
205-99-2	Benzo[b]fluoranthene	0.25	< 0.21 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.21 U	< 0.2 U
191-24-2	Benzo[g,h,i]perylene	---	< 0.21 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.21 U	< 0.2 U
207-08-9	Benzo[k]fluoranthene	2.5	< 0.21 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.21 U	< 0.2 U
85-68-7	Benzyl Butyl Phthalate	16	0.19 J	< 0.98 U	< 1.1 U	< 1.1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 1 U	0.23 J
92-52-4	Biphenyl	0.83	**< 1 U**	**< 0.98 U**	**< 1.1 U**	**< 1.1 U**	**< 0.98 U**	**< 1.1 U**	**< 1.1 U**	**< 1 U**	**< 1 U**
111-91-1	Bis(2-Chloroethoxy)methane	59	< 1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 1 U	< 1 U
111-44-4	Bis(2-Chloroethyl) Ether	0.014	**< 0.21 U**	**< 0.2 U**	**< 0.21 U**	**< 0.22 U**	**< 0.2 U**	**< 0.21 U**	**< 0.22 U**	**< 0.21 U**	**< 0.2 U**
117-81-7	Bis(2-Ethylhexyl) Phthalate	5.6	< 2.1 U	< 2 U	< 2.1 U	< 2.2 U	< 2 U	< 2.1 U	< 2.2 U	2.8	< 2 U
105-60-2	Caprolactam	9,900	< 5.2 U	< 4.9 U	< 5.3 U	< 5.4 U	< 4.9 U	< 5.3 U	< 5.4 U	< 5.2 U	< 5 U
86-74-8	Carbazole	---	< 0.21 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.21 U	0.25
218-01-9	Chrysene	25	< 0.21 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.2 U	0.18 J	< 0.22 U	< 0.21 U	< 0.2 U
53-70-3	Dibenz[a,h]Anthracene	0.025	**< 0.21 U**	**< 0.2 U**	**< 0.21 U**	**< 0.22 U**	**< 0.2 U**	**< 0.21 U**	**< 0.22 U**	**< 0.21 U**	**< 0.2 U**
132-64-9	Dibenzofuran	7.9	< 1 U	< 0.98 U	< 1.1 U	0.58 J	0.13 J	0.23 J	0.24 J	< 1 U	0.29 J
84-66-2	Diethyl Phthalate	15,000	< 1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 1 U	< 1 U
131-11-3	Dimethyl Phthalate	---	< 1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 1 U	< 1 U
84-74-2	Di-N-Butyl Phthalate	900	< 1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 1 U	< 1 U
117-84-0	Di-N-octyl Phthalate	200	< 1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 1 U	< 1 U
206-44-0	Fluoranthene	800	< 0.21 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.2 U	0.29	< 0.22 U	< 0.21 U	< 0.2 U
86-73-7	Fluorene	290	< 0.21 U	< 0.2 U	< 0.21 U	0.55	0.1 J	0.46	0.23	< 0.21 U	0.39
118-74-1	Hexachlorobenzene	0.0098	**< 0.21 U**	**< 0.2 U**	**< 0.21 U**	**< 0.22 U**	**< 0.2 U**	**< 0.21 U**	**< 0.22 U**	**< 0.21 U**	**< 0.2 U**
87-68-3	Hexachlorobutadiene	0.14	**< 0.21 U**	**< 0.2 U**	**< 0.21 U**	**< 0.22 U**	**< 0.2 U**	**< 0.21 U**	**< 0.22 U**	**< 0.21 U**	**< 0.2 U**
77-47-4	Hexachlorocyclopentadiene	0.41	**< 1 U**	**< 0.98 U**	**< 1.1 U**	**< 1.1 U**	**< 0.98 U**	**< 1.1 U**	**< 1.1 U**	**< 1 U**	**< 1 U**
67-72-1	Hexachloroethane	0.33	**< 1 U**	**< 0.98 U**	**< 1.1 U**	**< 1.1 U**	**< 0.98 U**	**< 1.1 U**	**< 1.1 U**	**< 1 U**	**< 1 U**
193-39-5	Indeno[1,2,3-CD]Pryene	0.25	< 0.21 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.21 U	< 0.2 U
78-59-1	Isophorone	78	< 1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 1 U	< 1 U
91-20-3	Naphthalene	0.17	**< 0.21 U**	**< 0.2 U**	**< 0.21 U**	**< 0.22 U**	**< 0.2 U**	**< 0.21 U**	**< 0.22 U**	**< 0.21 U**	**< 0.2 U**
98-95-3	Nitrobenzene	0.14	**< 2.1 U**	**< 2 U**	**< 2.1 U**	**< 2.2 U**	**< 2 U**	**< 2.1 U**	**< 2.2 U**	**< 2.1 U**	**< 2 U**
621-64-7	N-Nitrosodi-N-Propylamine	0.011	**< 0.21 U**	**< 0.2 U**	**< 0.21 U**	**< 0.22 U**	**< 0.2 U**	**< 0.21 U**	**< 0.22 U**	**< 0.21 U**	**< 0.2 U**
86-30-6	N-Nitrosodiphenylamine	12	< 1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 0.98 U	< 1.1 U	< 1.1 U	< 1 U	< 1 U
87-86-5	Pentachlorophenol	0.041	**< 1 U**	**< 0.98 U**	**< 1.1 U**	**< 1.1 U**	**< 0.98 U**	**< 1.1 U**	**< 1.1 U**	0.2 J	**< 1 U**
85-01-8	Phenanthrene	---	< 0.21 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.21 U	< 0.2 U
108-95-2	Phenol	5,800	< 0.21 U	< 0.2 U	< 0.21 U	0.15 J	< 0.2 U	0.86	0.43	< 0.21 U	0.29
129-00-0	Pyrene	120	< 0.21 U	< 0.2 U	< 0.21 U	< 0.22 U	< 0.2 U	0.22	< 0.22 U	< 0.21 U	< 0.2 U

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Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
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CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	MW-K-80 4/30/2014 MWK-80-043014	MW-L-48 4/28/2014 MWL-48-042814	MW-M-50 4/29/2014 MWM-50-042914	MW-N-83 4/29/2014 MWN-83-042914	MW-N-113 4/29/2014 MWN-113-042914	MW-O-145 4/29/2014 MWO-145-042914	MW-P-235 4/25/2014 MWP-235-042514	MW-Q-150 4/28/2014 MWQ-150-042814	EW-1-110 4/30/2014 EW1-110-043014
VOLATILE ORGANIC COMPOUNDS in ug/L											
71-55-6	1,1,1-Trichloroethane	8,000	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	< 50 U	< 2 U	< 10 U
79-34-5	1,1,2,2-Tetrachloroethane	0.076	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 5 U**	**< 5 U**	**< 50 U**	**< 2 U**	**< 10 U**
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	10,000	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	< 50 U	< 2 U	< 10 U
79-00-5	1,1,2-Trichloroethane	0.28	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 5 U**	**< 5 U**	**< 50 U**	**< 2 U**	**< 10 U**
75-34-3	1,1-Dichloroethane	2.8	< 1 U	< 1 U	< 1 U	< 2 U	**< 5 U**	**< 5 U**	**< 50 U**	< 2 U	**< 10 U**
75-35-4	1,1-Dichloroethylene	280	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	< 50 U	< 2 U	< 10 U
120-82-1	1,2,4-Trichlorobenzene	1.2	0.61 J	0.66 J	0.54 J	**2.3**	**14**	**1.9 J**	**< 50 U**	1.2 J	**< 10 U**
96-12-8	1,2-Dibromo-3-Chloropropane (DBCP)	0.00033	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 5 U**	**< 5 U**	**< 50 U**	**< 2 U**	**< 10 U**
106-93-4	1,2-Dibromoethane	0.0075	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 5 U**	**< 5 U**	**< 50 U**	**< 2 U**	**< 10 U**
95-50-1	1,2-Dichlorobenzene	300	11	3.1	0.17 J	3.1	35	74	60	2.6	14
107-06-2	1,2-Dichloroethane	0.17	**< 1 U**	**< 1 U**	**0.49 J**	**< 2 U**	**< 5 U**	**< 5 U**	**< 50 U**	**< 2 U**	**< 10 U**
78-87-5	1,2-Dichloropropane	0.85	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 5 U**	**< 5 U**	**< 50 U**	**< 2 U**	**< 10 U**
541-73-1	1,3-Dichlorobenzene	---	0.32 J	0.2 J	< 1 U	0.61 J	3.8 J	2.1 J	< 50 U	0.36 J	1.3 J
106-46-7	1,4-Dichlorobenzene	0.48	**7.3**	**8.1**	0.43 J	**10**	**77**	**62**	**150**	**7.9**	**30**
78-93-3	2-Butanone	5,600	< 5 U	< 5 U	< 5 U	< 10 U	< 25 U	< 25 U	< 250 U	1.6 J	< 50 U
591-78-6	2-Hexanone	38	< 5 UJ	< 5 U	< 5 U	< 10 U	< 25 U	< 25 U	**< 250 U**	< 10 U	**< 50 U**
108-10-1	4-Methyl-2-Pentanone	6,300	< 5 UJ	< 5 U	< 5 U	< 10 U	< 25 U	< 25 U	< 250 U	< 10 U	< 50 U
67-64-1	Acetone	14,000	< 5 U	< 5 U	< 5 U	< 10 U	< 25 U	< 25 U	< 250 U	< 10 U	< 50 U
71-43-2	Benzene	0.46	**1**	**< 1 U**	**< 1 U**	**1.9 J**	**17**	**68**	**35 J**	**1.1 J**	**6.6 J**
75-27-4	Bromodichloromethane	0.13	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 5 U**	**< 5 U**	**< 50 U**	**< 2 U**	**< 10 U**
75-25-2	Bromoform	3.3	< 1 U	< 1 U	< 1 U	< 2 U	**< 5 U**	**< 5 U**	**< 50 U**	< 2 U	**< 10 U**
74-83-9	Bromomethane	7.5	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	**< 50 U**	< 2 U	**< 10 U**
75-15-0	Carbon Disulfide	810	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	< 50 U	< 2 U	< 10 U
56-23-5	Carbon Tetrachloride	0.46	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 5 U**	**< 5 U**	**< 50 U**	**< 2 U**	**< 10 U**
108-90-7	Chlorobenzene	78	30	32	1.1	42	**190**	**910**	**540**	41	**160**
75-00-3	Chloroethane	21,000	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	< 50 U	< 2 U	< 10 U
67-66-3	Chloroform	0.22	**< 1 U**	**0.55 J**	**3.3**	**< 2 U**	**< 5 U**	**< 5 U**	**< 50 U**	**< 2 U**	**< 10 U**
74-87-3	Chloromethane	190	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	< 50 U	< 2 U	< 10 U
156-59-2	cis-1,2-Dichloroethene	36	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	**< 50 U**	< 2 U	< 10 U
10061-01-5	cis-1,3-Dichloropropylene	---	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	< 50 U	< 2 U	< 10 U
110-82-7	Cyclohexane	13,000	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	< 50 U	< 2 U	< 10 U
124-48-1	Dibromochloromethane	0.87	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 5 U**	**< 5 U**	**< 50 U**	**< 2 U**	**< 10 U**
75-71-8	Dichlorodifluoromethane	200	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	< 50 U	< 2 U	< 10 U
100-41-4	Ethylbenzene	1.5	< 1 U	< 1 U	< 1 U	< 2 U	**2.6 J**	**2.7 J**	**< 50 U**	**< 2 U**	**< 10 U**
98-82-8	Isopropylbenzene (Cumene)	450	< 1 U	< 1 U	< 1 U	2.2	0.88 J	< 5 U	< 50 U	0.69 J	< 10 U
79-20-9	Methyl Acetate	20,000	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	< 50 U	< 2 U	< 10 U
1634-04-4	Methyl Tert-Butyl Ether	14	< 1 U	0.61 J	< 1 U	< 2 U	< 5 U	< 5 U	**< 50 U**	< 2 U	< 10 U
108-87-2	Methylcylohexane	---	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	< 50 U	< 2 U	< 10 U
75-09-2	Methylene Chloride	11	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	**< 50 U**	< 2 U	1.6 J
100-42-5	Styrene (Monomer)	1,200	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	< 50 U	< 2 U	< 10 U
127-18-4	Tetrachloroethylene	11	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	**< 50 U**	< 2 U	**< 10 U**
108-88-3	Toluene	1,100	< 1 U	< 1 U	0.15 J	< 2 U	< 5 U	< 5 U	< 50 U	0.59 J	< 10 U
156-60-5	trans-1,2-Dichloroethene	360	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	< 50 U	< 2 U	< 10 U
10061-02-6	trans-1,3-Dichloropropene	---	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	< 50 U	< 2 U	< 10 U
79-01-6	Trichloroethylene	0.49	**0.28 J**	**< 1 U**	**< 1 U**	**< 2 U**	**< 5 U**	**< 5 U**	**< 50 U**	**< 2 U**	**< 10 U**
75-69-4	Trichlorofluoromethane	5,200	< 1 U	< 1 U	< 1 U	< 2 U	< 5 U	< 5 U	< 50 U	< 2 U	< 10 U
75-01-4	Vinyl Chloride	0.019	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 5 U**	**< 5 U**	**< 50 U**	**< 2 U**	**< 10 U**
XYLENES	Xylenes, Total	190	< 3 U	< 3 U	< 3 U	< 6 U	< 15 U	< 15 U	< 150 U	< 6 U	< 30 U

Notes:
USEPA RSL for TAP WATER (latest version, November 2017)
USEPA MCL (latest version, November 2017)
(1) No RSL exists, MCL utilized.
NA - Not Ananlyzed
U - The analyte was not detected above the reporting limit (RL).
UJ - The reporting limit is estimated due to minor quality control anomaly.
J - Result is either less than the RL but greater than or equal to the method detecti
B - Parameter was detected in associated laboratory method blank.
NJ - Result is estimated due to a dual column imprecision greater than 100%.
Bold indicates the reporting limit was above the RSL and/or MCL.
Red bolded detected concentration exceeds RSL
Red bolded and highlighted detected concentration exceeds MCL

Table 5-13
April 2014 Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	OW-1-62 4/22/2014 OW1-62-042214	OW-1-105 4/22/2014 OW1-105-042214	OW-2-65 4/22/2014 OW2-65-042214	OW-2-115 4/23/2014 OW2-115-042314	OW-3-55 4/24/2014 OW3-55-042414	OW-3-105 4/23/2014 OW3-105-042314	OW-4-70 4/24/2014 OW4-70-042414	OW-5-90 4/24/2014 OW5-90-042414	OW-7-242 4/23/2014 OW7-242-042314
TOTAL METALS in ug/L											
7429-90-5	Aluminum	20,000	14 J	2500	700	1300	27 J	820	97	670	180
7440-36-0	Antimony	7.8	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	3 B	< 2 U	< 2 U
7440-38-2	Arsenic	0.052	**< 1 U**	**0.32 J**	**< 1 U**	**1.8**	**< 1 U**	**2.5**	**< 1 U**	**< 1 U**	**0.31 J**
7440-39-3	Barium	3,800	120	160	43	26	110	270	33	64	64
7440-41-7	Beryllium	25	< 1 U	0.16 J	0.058 J	< 1 U	< 1 U	< 1 U	< 1 U	0.8 J	< 1 U
7440-43-9	Cadmium	9.2	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-70-2	Calcium Metal	---	210000 B	140000 B	240000 B	310000 B	140000	95000 B	220000	240000	110000 B
7440-47-3	Chromium[1]	---	2.9 U	6.1 U	2.9 U	5.4	1.4 J	5.1	1.1 J	2.3	3.9
7440-48-4	Cobalt	6	0.17 J	0.57	0.26 J	**10**	0.14 J	0.44 J	0.49 J	0.52	0.33 J
7440-50-8	Copper	800	< 2 U	3.8 U	< 2 U	10 B	< 2 U	7.5 B	2 U	< 2 U	< 2 U
7439-89-6	Iron	14,000	6.5 J	1400	430	**20000**	36 J	1600	39 J	360	23 J
7439-92-1	Lead	15	< 1 U	2	< 1 U	**180**	0.049 J	2.6	**32**	2.7	< 1 U
7439-95-4	Magnesium	---	16000	14000	25000	24000	15000	15000	44000	28000	51000
7439-96-5	Manganese	430	< 5 U	16 B	25 B	**3100 B**	< 5 U	170 B	45	140	22 B
7440-02-0	Nickel	390	< 1 U	1.3 U	< 1 U	6	< 1 U	1.6	2 U	< 1 U	0.54 J
7440-09-7	Potassium	---	2900 B	2500 B	2700 B	5000 B	2600 B	4300 B	29000 B	17000 B	24000 B
7782-49-2	Selenium	100	0.44 J	< 5 U	< 5 U	< 5 U	1 J	< 5 U	0.74 J	< 5 U	< 5 U
7440-22-4	Silver	94	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-23-5	Sodium	---	140000 B	34000 B	31000 B	54000 B	35000	1500000 B	51000	23000	88000 B
7440-28-0	Thallium	0.2	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	0.09 J	**< 1 U**	**0.42 J**	**0.21 J**	**< 1 U**
7440-62-2	Vanadium	86	1.2 U	3.3	< 1 U	2.6	< 1 U	1.6 U	< 1 U	0.73 J	2 U
7440-66-6	Zinc	6,000	< 5 U	38 U	7.3 U	100	2 J	62	5.6	9.9	8
57-12-5	Cyanide	1.5	**89**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**16**	**< 10 U**	**< 10 U**	**< 10 U**
7439-97-6	Mercury	0.63	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L											
16887-00-6	Chloride	---	330 B	110 B	68 B	130	84 B	2800	98 B	30 B	25
14797-55-8	Nitrate as N	32	4.2	3.7	1.1	< 0.1 UJ	5.3	0.27 J	7.7	9.9	0.96
14808-79-8	Sulfate	---	54 J	46 J	240 J	550	35	38	360	280	330
ALKB	Bicarbonate Alkalinity	---	370	310	430	360 B	320 B	180 B	320 B	360 B	340 B
ALKC	Carbonate Alkalinity	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	370	310	430	360	320	180	320	360	340
PESTICIDES in ug/L											
140-57-8	Aramite	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA
56-72-4	Coumaphos	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
78-34-2	Delnav	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
957-51-7	Diphenamid	530	< 1.1 U	< 1.1 U	< 1.1 U	24	< 1.1 U	< 1.1 U	1.8	2	3.4
86-50-0	Guthion	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
39300-45-3	Karathane	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
3212-35-8	Propargite	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
53-19-0	Sevin (Carbaryl)	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
53-19-0	2,4'-DDD	0.032	< 0.0014 U	< 0.0072 U	< 0.028 U	0.017 J	< 0.0013 UJ	0.002 J	< 0.0013 UJ	< 0.0013 UJ	< 0.0013 UJ
3424-82-6	2,4'-DDE	0.046	< 0.0014 U	0.014 J	< 0.028 U	0.014 J	0.0038 J	0.00034 J	**0.14**	**0.056**	0.035 J
789-02-6	2,4'-DDT	0.23	< 0.0014 U	0.0013 J	< 0.028 U	0.02 J	< 0.0013 U	0.0019 J	0.028 J	0.0054 J	0.00097 J
72-54-8	4,4'-DDD	0.032	< 0.0014 U	< 0.0072 U	< 0.028 U	**0.056**	0.0026	0.011	0.03 J	0.014	0.005
72-55-9	4,4'-DDE	0.046	< 0.0014 U	< 0.0072 U	< 0.028 U	0.034	< 0.0013 U	0.0024	0.018	0.0055	< 0.0013 U
50-29-3	4,4'-DDT	0.23	< 0.0014 U	< 0.0072 U	< 0.028 U	**0.26**	0.0016	0.02	0.011 J	0.0093 J	0.0011 NJ
309-00-2	Aldrin	0.00092	**< 0.0014 U**	**< 0.0072 U**	**0.049 NJ**	**0.09 NJ**	**< 0.0013 U**	**< 0.0013 U**	**0.012 NJ**	**0.014 NJ**	**0.015 NJ**
319-84-6	alpha-BHC	0.0072	< 0.0014 U	**0.013**	**0.052**	**0.08**	< 0.0013 U	< 0.0013 U	**0.74**	**0.92 J**	**0.41**
5103-71-9	alpha-Chlordane	0.02	< 0.0014 U	< 0.0072 U	**< 0.028 U**	**0.022**	0.0036	< 0.0013 U	**0.025 J**	0.009	< 0.0013 U
319-85-7	beta-BHC	0.025	< 0.0014 U	**0.044**	**0.23**	**0.36**	< 0.0013 U	< 0.0013 U	**2.2**	**1.4**	**0.7**
319-86-8	delta-BHC	0.025	< 0.0014 U	0.0071 J	**0.7**	**3.8 B**	0.00049 J	< 0.0013 U	**0.48 B**	**1.7 B**	**0.69 B**
60-57-1	Dieldrin	0.0018	< 0.0014 U	< 0.0072 U	**< 0.028 U**	< 0.0014 U	**0.018**	< 0.0013 U	**0.11 J**	**0.028**	**0.0023 J**
959-98-8	Endosulfan I	100	< 0.0014 U	< 0.0072 U	< 0.028 U	< 0.0014 U	0.0018 J	< 0.0013 U	0.0052 NJ	0.0053	0.00099 J
33213-65-9	Endosulfan II	100	< 0.0014 U	< 0.0072 U	< 0.028 U	0.0086 J	< 0.0013 U	< 0.0013 U	0.024	0.0057 J	0.0014 NJ
1031-07-8	Endosulfan Sulfate	---	< 0.0014 U	0.012	< 0.028 U	0.014 J	0.00096 J	< 0.0013 U	0.079	0.03	0.016
72-20-8	Endrin	2.3	< 0.0014 U	< 0.0072 U	< 0.028 U	0.0057 NJ	< 0.0013 U	< 0.0013 U	0.038	0.011	0.0015 J
7421-93-4	Endrin aldehyde	---	< 0.0014 U	< 0.0072 U	< 0.028 U	0.013 J	< 0.0013 U	< 0.0013 U	0.012 NJ	0.0079 J	0.0026 NJ
53494-70-5	Endrin ketone	---	< 0.0014 U	< 0.0072 U	< 0.028 U	0.0071	0.0013	< 0.0013 U	0.067	0.033	0.0069 J
58-89-9	gamma-BHC (Lindane)	0.042	< 0.0014 U	0.0065 J	< 0.028 U	< 0.0014 U	< 0.0013 U	< 0.0013 U	**0.32**	**0.98**	**0.42**
12789-03-6	gamma-Chlordane	0.02	< 0.0014 U	< 0.0072 U	**< 0.028 U**	0.008 NJ	0.003 J	< 0.0013 U	0.0098 J	0.0064	0.0012 J
76-44-8	Heptachlor	0.0014	**< 0.0014 U**	**< 0.0072 U**	**< 0.028 U**	**0.1 NJ**	**< 0.0013 U**	**< 0.0013 U**	**< 0.0013 U**	**0.11 NJ**	**< 0.0013 U**
1024-57-3	Heptachlor epoxide	0.0014	< 0.0014 U	**< 0.0072 U**	**< 0.028 U**	**0.027 NJ**	**0.0019 J**	< 0.0013 U	**0.029 NJ**	**0.0061 NJ**	**0.0018 NJ**
72-43-5	Methoxychlor	37	< 0.0027 U	< 0.014 U	< 0.054 U	< 0.0026 U	< 0.0026 U	< 0.0026 U	< 0.0026 U	< 0.0026 U	< 0.0025 U
8001-35-2	Toxaphene	0.071	**< 0.11 U**	**< 0.56 U**	**< 2.2 U**	**< 0.1 U**	**< 0.1 U**	**< 0.1 U**	**< 0.1 U**	**< 0.1 U**	**< 0.099 U**
HERBICIDES in ug/L											
94-75-7	2,4-D	170	< 4.2 U	< 4.4 U	< 4.3 U	< 4.1 U	< 4.1 U	< 4.1 U	< 4.1 U	< 4.1 U	< 4 U
93-76-5	2,4,5-T	160	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 1 U	< 1 U	0.2 J	< 1 U	< 0.99 U

Table 5-13
April 2014 Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	OW-1-62 4/22/2014 OW1-62-042214	OW-1-105 4/22/2014 OW1-105-042214	OW-2-65 4/22/2014 OW2-65-042214	OW-2-115 4/23/2014 OW2-115-042314	OW-3-55 4/24/2014 OW3-55-042414	OW-3-105 4/23/2014 OW3-105-042314	OW-4-70 4/24/2014 OW4-70-042414	OW-5-90 4/24/2014 OW5-90-042414	OW-7-242 4/23/2014 OW7-242-042314
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L											
108-60-1	2,2'-Oxybis(1-Chloropropane)	710	< 0.21 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.21 U	< 0.22 U	< 0.21 U
95-95-4	2,4,5-Trichlorophenol	1,200	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	0.21 J	< 1.1 U
88-06-2	2,4,6-Trichlorophenol	4.1	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
120-83-2	2,4-Dichlorophenol	46	< 0.21 U	< 0.22 U	< 0.22 U	0.12 J	< 0.22 U	< 0.22 U	< 0.21 U	< 0.22 U	< 0.21 U
105-67-9	2,4-Dimethylphenol	360	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
51-28-5	2,4-Dinitrophenol	39	< 5.3 U	< 5.5 U	< 5.4 U	< 5.4 U	< 5.4 U	< 5.4 U	< 5.3 U	< 5.4 U	< 5.3 U
121-14-2	2,4-Dinitrotoluene	0.24	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**
606-20-2	2,6-Dinitrotoluene	0.049	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**
91-58-7	2-Chloronaphthalene	750	< 0.21 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.21 U	< 0.22 U	< 0.21 U
95-57-8	2-Chlorophenol	91	< 1.1 U	< 1.1 U	< 1.1 U	1 J	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
95-48-7	2-Methlyphenol	930	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
91-57-6	2-Methylnaphthalene	36	< 0.21 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.21 U	< 0.22 U	< 0.21 U
88-74-4	2-Nitroaniline	190	< 5.3 U	< 5.5 U	< 5.4 U	< 5.4 U	< 5.4 U	< 5.4 U	< 5.3 U	< 5.4 U	< 5.3 U
88-75-5	2-Nitrophenol	---	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
91-94-1	3,3-Dichlorobenzidine	0.13	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**
99-09-2	3-Nitroaniline	---	< 5.3 U	< 5.5 U	< 5.4 U	< 5.4 U	< 5.4 U	< 5.4 U	< 5.3 U	< 5.4 U	< 5.3 U
534-52-1	4,6-Dinitro-2-Methylphenol	1.5	**< 5.3 U**	**< 5.5 U**	**< 5.4 U**	**< 5.4 U**	**< 5.4 U**	**< 5.4 U**	**< 5.3 U**	**< 5.4 U**	**< 5.3 U**
101-55-3	4-Bromophenyl Phenyl Ether	---	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
59-50-7	4-Chloro-3-Methylphenol	1,400	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
106-47-8	4-Chloroaniline	0.37	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**
7005-72-3	4-Chlorophenyl Phenyl Ether	---	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
106-44-5	4-Methlyphenol	1,900	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
100-01-6	4-Nitroaniline	3.8	**< 5.3 U**	**< 5.5 U**	**< 5.4 U**	**< 5.4 U**	**< 5.4 U**	**< 5.4 U**	**< 5.3 U**	**< 5.4 U**	**< 5.3 U**
100-02-7	4-Nitrophenol	---	< 5.3 U	< 5.5 U	< 5.4 U	< 5.4 U	< 5.4 U	< 5.4 U	< 5.3 U	< 5.4 U	< 5.3 U
83-32-9	Acenaphthene	530	< 0.21 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.21 U	0.022 J	< 0.21 U
208-96-8	Acenaphthylene	---	< 0.21 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.21 U	0.027 J	< 0.21 U
98-86-2	Acetophenone	1,900	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
120-12-7	Anthracene	1,800	< 0.21 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.21 U	0.054 J	< 0.21 U
1912-24-9	Atrazine	0.3	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**2.5**	**1.1**	**2.4 J**
100-52-7	Benzaldehyde	19	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
56-55-3	Benzo[a]anthracene	0.03	**< 0.21 U**	**< 0.22 U**	**< 0.22 U**	**0.049 J**	**< 0.22 U**	0.025 J	**< 0.21 U**	**0.45**	**< 0.21 U**
50-32-8	Benzo[a]pyrene	0.025	**< 0.21 U**	**< 0.22 U**	**< 0.22 U**	**0.083 J**	**< 0.22 U**	**0.035 J**	< 0.21 U	**0.12 J**	**< 0.21 U**
205-99-2	Benzo[b]fluoranthene	0.25	< 0.21 U	< 0.22 U	< 0.22 U	**0.18 J**	< 0.22 U	0.081 J	< 0.21 U	**0.41**	< 0.21 U
191-24-2	Benzo[g,h,i]perylene	---	< 0.21 U	< 0.22 U	< 0.22 U	0.11 J	< 0.22 U	0.046 J	< 0.21 U	0.076 J	< 0.21 U
207-08-9	Benzo[k]fluoranthene	2.5	< 0.21 U	< 0.22 U	< 0.22 U	0.063 J	< 0.22 U	< 0.22 U	< 0.21 U	0.16 J	< 0.21 U
85-68-7	Benzyl Butyl Phthalate	16	< 1.1 U	0.3 J	< 1.1 U	< 1.1 U	< 1.1 U	0.21 J	< 1.1 U	< 1.1 U	0.22 J
92-52-4	Biphenyl	0.83	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**
111-91-1	Bis(2-Chloroethoxy)methane	59	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
111-44-4	Bis(2-Chloroethyl) Ether	0.014	**< 0.21 U**	**< 0.22 U**	**< 0.22 U**	**< 0.22 U**	**< 0.22 U**	**< 0.22 U**	**< 0.21 U**	**< 0.22 U**	**< 0.21 U**
117-81-7	Bis(2-Ethylhexyl) Phthalate	5.6	< 2.1 U	< 2.2 U	< 2.2 U	< 2.2 U	< 2.2 U	< 2.2 U	< 2.1 U	< 2.2 U	< 2.1 U
105-60-2	Caprolactam	9,900	< 5.3 U	< 5.5 U	< 5.4 U	< 5.4 U	< 5.4 U	< 5.4 U	< 5.3 U	< 5.4 U	< 5.3 U
86-74-8	Carbazole	---	< 0.21 U	< 0.22 U	< 0.22 U	0.041 J	< 0.22 U	< 0.22 U	< 0.21 U	< 0.22 U	< 0.21 U
218-01-9	Chrysene	25	< 0.21 U	< 0.22 U	< 0.22 U	0.13 J	< 0.22 U	0.062 J	< 0.21 U	0.43	< 0.21 U
53-70-3	Dibenz[a,h]Anthracene	0.025	**< 0.21 U**	**< 0.22 U**	**< 0.22 U**	**< 0.22 U**	**< 0.22 U**	**< 0.22 U**	**< 0.21 U**	**0.027 J**	**< 0.21 U**
132-64-9	Dibenzofuran	7.9	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
84-66-2	Diethyl Phthalate	15,000	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	0.15 J
131-11-3	Dimethyl Phthalate	---	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
84-74-2	Di-N-Butyl Phthalate	900	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
117-84-0	Di-N-octyl Phthalate	200	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
206-44-0	Fluoranthene	800	< 0.21 U	< 0.22 U	< 0.22 U	0.17 J	< 0.22 U	0.077 J	< 0.21 U	1.2	< 0.21 U
86-73-7	Fluorene	290	< 0.21 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.21 U	0.027 J	< 0.21 U
118-74-1	Hexachlorobenzene	0.0098	**< 0.21 U**	**< 0.22 U**	**< 0.22 U**	**< 0.22 U**	**< 0.22 U**	**< 0.22 U**	**< 0.21 U**	**< 0.22 U**	**< 0.21 U**
87-68-3	Hexachlorobutadiene	0.14	**< 0.21 U**	**< 0.22 U**	**< 0.22 U**	**< 0.22 U**	**< 0.22 U**	**< 0.22 U**	**< 0.21 U**	**< 0.22 U**	**< 0.21 U**
77-47-4	Hexachlorocyclopentadiene	0.41	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**
67-72-1	Hexachloroethane	0.33	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**
193-39-5	Indeno[1,2,3-CD]Pryene	0.25	< 0.21 U	< 0.22 U	< 0.22 U	**0.085 J**	< 0.22 U	0.036 J	< 0.21 U	0.082 J	< 0.21 U
78-59-1	Isophorone	78	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
91-20-3	Naphthalene	0.17	**< 0.21 U**	**< 0.22 U**	**< 0.22 U**	**< 0.22 U**	**< 0.22 U**	**< 0.22 U**	**< 0.21 U**	**< 0.22 U**	**0.091 J**
98-95-3	Nitrobenzene	0.14	**< 2.1 U**	**< 2.2 U**	**< 2.2 U**	**< 2.2 U**	**< 2.2 U**	**< 2.2 U**	**< 2.1 U**	**< 2.2 U**	**< 2.1 U**
621-64-7	N-Nitrosodi-N-Propylamine	0.011	**< 0.21 U**	**< 0.22 U**	**< 0.22 U**	**< 0.22 U**	**< 0.22 U**	**< 0.22 U**	**< 0.21 U**	**< 0.22 U**	**< 0.21 U**
86-30-6	N-Nitrosodiphenylamine	12	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
87-86-5	Pentachlorophenol	0.041	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**0.61 J**	**< 1.1 U**
85-01-8	Phenanthrene	---	< 0.21 U	< 0.22 U	< 0.22 U	0.078 J	< 0.22 U	< 0.22 U	< 0.21 U	0.23	< 0.21 U
108-95-2	Phenol	5,800	< 0.21 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.21 U	< 0.22 U	< 0.21 U
129-00-0	Pyrene	120	< 0.21 U	< 0.22 U	< 0.22 U	0.14 J	< 0.22 U	0.075 J	< 0.21 U	0.86	< 0.21 U

Table 5-13
April 2014 Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	OW-1-62 4/22/2014 OW1-62-042214	OW-1-105 4/22/2014 OW1-105-042214	OW-2-65 4/22/2014 OW2-65-042214	OW-2-115 4/23/2014 OW2-115-042314	OW-3-55 4/24/2014 OW3-55-042414	OW-3-105 4/23/2014 OW3-105-042314	OW-4-70 4/24/2014 OW4-70-042414	OW-5-90 4/24/2014 OW5-90-042414	OW-7-242 4/23/2014 OW7-242-042314
VOLATILE ORGANIC COMPOUNDS in ug/L											
71-55-6	1,1,1-Trichloroethane	8,000	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-34-5	1,1,2,2-Tetrachloroethane	0.076	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	10,000	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-00-5	1,1,2-Trichloroethane	0.28	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-34-3	1,1-Dichloroethane	2.8	< 1 U	< 1 U	< 1 U	**< 5 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-35-4	1,1-Dichloroethylene	280	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
120-82-1	1,2,4-Trichlorobenzene	1.2	< 1 U	< 1 U	< 1 U	**< 5 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
96-12-8	1,2-Dibromo-3-Chloropropane (DBCP)	0.00033	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
106-93-4	1,2-Dibromoethane	0.0075	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
95-50-1	1,2-Dichlorobenzene	300	< 1 U	< 1 U	< 1 U	3.1 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
107-06-2	1,2-Dichloroethane	0.17	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**0.92 J**	**< 1 U**	**0.83 J**
78-87-5	1,2-Dichloropropane	0.85	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
541-73-1	1,3-Dichlorobenzene	---	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
106-46-7	1,4-Dichlorobenzene	0.48	< 1 U	< 1 U	< 1 U	**4.2 J**	< 1 U	< 1 U	0.24 J	< 1 U	< 1 U
78-93-3	2-Butanone	5,600	< 5 U	< 5 U	< 5 U	< 25 U	< 5 U	0.61 J	< 5 U	2.4 J	< 5 U
591-78-6	2-Hexanone	38	< 5 U	< 5 U	< 5 U	< 25 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
108-10-1	4-Methyl-2-Pentanone	6,300	< 5 U	< 5 U	< 5 U	< 25 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
67-64-1	Acetone	14,000	< 5 U	< 5 U	< 5 U	< 25 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
71-43-2	Benzene	0.46	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-27-4	Bromodichloromethane	0.13	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-25-2	Bromoform	3.3	< 1 U	< 1 U	< 1 U	**< 5 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
74-83-9	Bromomethane	7.5	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-15-0	Carbon Disulfide	810	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
56-23-5	Carbon Tetrachloride	0.46	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
108-90-7	Chlorobenzene	78	< 1 U	< 1 U	< 1 U	**80**	< 1 U	< 1 U	< 1 U	< 1 U	0.18 J
75-00-3	Chloroethane	21,000	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
67-66-3	Chloroform	0.22	**< 1 U**	**0.25 J**	0.18 J	**< 5 U**	**2.7**	**< 1 U**	**0.46 J**	**0.81 J**	**0.57 J**
74-87-3	Chloromethane	190	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
156-59-2	cis-1,2-Dichloroethene	36	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
10061-01-5	cis-1,3-Dichloropropylene	---	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
110-82-7	Cyclohexane	13,000	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
124-48-1	Dibromochloromethane	0.87	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-71-8	Dichlorodifluoromethane	200	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
100-41-4	Ethylbenzene	1.5	< 1 U	< 1 U	< 1 U	**< 5 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
98-82-8	Isopropylbenzene (Cumene)	450	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-20-9	Methyl Acetate	20,000	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1634-04-4	Methyl Tert-Butyl Ether	14	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	0.64 J	< 1 U	< 1 U
108-87-2	Methylcylohexane	---	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-09-2	Methylene Chloride	11	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
100-42-5	Styrene (Monomer)	1,200	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
127-18-4	Tetrachloroethylene	11	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	0.24 J	0.31 J	< 1 U	< 1 U
108-88-3	Toluene	1,100	< 1 U	0.23 J	< 1 U	< 5 U	< 1 U	0.22 J	0.23 J	0.79 J	< 1 U
156-60-5	trans-1,2-Dichloroethene	360	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
10061-02-6	trans-1,3-Dichloropropene	---	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-01-6	Trichloroethylene	0.49	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**0.17 J**	**< 1 U**	**< 1 U**
75-69-4	Trichlorofluoromethane	5,200	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-01-4	Vinyl Chloride	0.019	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
XYLENES	Xylenes, Total	190	< 3 U	< 3 U	< 3 U	< 15 U	< 3 U	< 3 U	< 3 U	< 3 U	< 3 U

Notes:
USEPA RSL for TAP WATER (latest version, November 2017)
USEPA MCL (latest version, November 2017)
(1) No RSL exists, MCL utilized.
NA - Not Ananlyzed
U - The analyte was not detected above the reporting limit (RL).
UJ - The reporting limit is estimated due to minor quality control anomaly.
J - Result is either less than the RL but greater than or equal to the method detecti
B - Parameter was detected in associated laboratory method blank.
NJ - Result is estimated due to a dual column imprecision greater than 100%.
Bold indicates the reporting limit was above the RSL and/or MCL.
Red bolded detected concentration exceeds RSL
Red bolded and highlighted detected concentration exceeds MCL

Table 5-13
April 2014 Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	OW-8-230 4/24/2014 OW8-230-042414	OW-9-125 4/21/2014 OW9-125-042114	OW-10-250 4/23/2014 OW10-250-042314	OW-11-240 4/22/2014 OW11-240-042214	OW-12-232 4/21/2014 OW12-232-042114	OW-13-250 4/24/2014 OW13-250-042414	OW-14-96 4/21/2014 OW14-96-042114	OW-14-235 4/22/2014 OW14-235-042214	OW-15-202 4/21/2014 OW15-202-042114
TOTAL METALS in ug/L											
7429-90-5	Aluminum	20,000	290	580 J	47	18000	**30000 J**	43	1200 J	190	240 J
7440-36-0	Antimony	7.8	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
7440-38-2	Arsenic	0.052	**< 1 U**	**< 1 U**	**< 1 U**	**14**	**7.9**	**< 1 U**	**0.3 J**	**< 1 U**	**< 1 U**
7440-39-3	Barium	3,800	25	89	87	280	620	160	110	130	140
7440-41-7	Beryllium	25	< 1 U	0.092 J	< 1 U	1.1	2.7	< 1 U	< 1 U	< 1 U	< 1 U
7440-43-9	Cadmium	9.2	< 1 U	< 1 U	< 1 U	0.3 J	0.34 J	< 1 U	< 1 U	< 1 U	< 1 U
7440-70-2	Calcium Metal	---	440000	160000	120000 B	120000 B	110000	96000	110000	120000 B	88000
7440-47-3	Chromium[1]	---	2.2	< 3.9 U	4.1	< 16 U	17 B	1.2 J	4.1 U	2.3 U	2.7 U
7440-48-4	Cobalt	6	0.93	0.25 J	0.086 J	3.5	3.7	0.081 J	0.26 J	0.08 J	0.093 J
7440-50-8	Copper	800	< 3 U	< 2 U	< 2 U	< 22 U	38 B	< 2 U	< 2 U	< 2 U	< 2 U
7439-89-6	Iron	14,000	880	380 B	30 J	**38000**	**23000 B**	8.2 J	1000 B	< 50 U	< 50 U
7439-92-1	Lead	15	1	< 1 U	< 1 U	**29**	**58**	< 1 U	0.56 J	< 1 U	< 1 U
7439-95-4	Magnesium	---	80000	18000	15000	19000	30000	21000	18000	18000	24000
7439-96-5	Manganese	430	300	< 5 U	< 5 U	360 B	380	< 5 U	5.4	< 5 U	< 5 U
7440-02-0	Nickel	390	< 1 U	0.51 J	< 1 U	10	10	< 1 U	0.36 J	< 1 U	< 1 U
7440-09-7	Potassium	---	2400 B	1700	1900 B	4200 B	7100	1600 B	1300	1200 B	1200
7782-49-2	Selenium	100	< 5 U	< 5 U	< 5 U	0.84 J	1.2 J	< 5 U	< 5 U	< 5 U	< 5 U
7440-22-4	Silver	94	< 1 U	< 1 U	< 1 U	0.34 J	0.19 J	< 1 U	< 1 U	< 1 U	< 1 U
7440-23-5	Sodium	---	34000	35000 B	35000 B	33000 B	63000 B	3900	5700 B	1700 B	2100 B
7440-28-0	Thallium	0.2	**0.21 J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	0.042 J	**< 1 U**	**< 1 U**	**< 1 U**
7440-62-2	Vanadium	86	< 1 U	0.87 J	1.4 U	14	12	< 1 U	2.5	1.4 U	0.29 J
7440-66-6	Zinc	6,000	17	5.2	6.1	150	310	2.8 J	2.7 J	< 5 U	2.8 J
57-12-5	Cyanide	1.5	**< 10 U**	**< 10 UJ**	**< 10 U**	**< 10 U**	**< 10 UJ**	**< 10 U**	**29 J**	**< 10 U**	**< 10 UJ**
7439-97-6	Mercury	0.63	< 0.2 U	< 0.2 U	< 0.2 U	0.055 J	0.068 J	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L											
16887-00-6	Chloride	---	74 B	91 B	75	31 B	39 B	5.1 B	19 B	9.4 B	2.8 B
14797-55-8	Nitrate as N	32	< 0.1 U	2.6	2.1	0.54	< 0.1 U	3.7	4	2.8	2.6
14808-79-8	Sulfate	---	1100	91	35	53 J	150	11	49	58 J	8.3
ALKB	Bicarbonate Alkalinity	---	320 B	360 B	290 B	340	330 B	290 B	290 B	280	320 B
ALKC	Carbonate Alkalinity	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	320	360	290	340	330	290	290	280	320
PESTICIDES in ug/L											
140-57-8	Aramite	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA
56-72-4	Coumaphos	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
78-34-2	Delnav	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
957-51-7	Diphenamid	530	19	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
86-50-0	Guthion	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
39300-45-3	Karathane	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
3212-35-8	Propargite	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
53-19-0	Sevin (Carbaryl)	---	NA	NA	NA	NA	NA	NA	NA	NA	NA
53-19-0	2,4'-DDD	0.032	0.013 J	< 0.027 U	0.0011 J	0.0095 J	0.0034	0.00053 J	< 0.027 U	< 0.025 U	< 0.0012 U
3424-82-6	2,4'-DDE	0.046	0.011	0.0065 J	0.00092 J	< 0.027 U	0.00058 J	0.00024 J	0.016 J	0.036	< 0.0012 U
789-02-6	2,4'-DDT	0.23	0.0052 J	< 0.027 U	< 0.0012 UJ	0.0052 J	0.0023	< 0.0013 UJ	< 0.027 U	< 0.025 U	< 0.0012 U
72-54-8	4,4'-DDD	0.032	0.0058 NJ	< 0.027 U	0.0054	0.031	0.018	0.0021	< 0.027 U	< 0.025 U	< 0.0012 U
72-55-9	4,4'-DDE	0.046	< 0.0013 U	< 0.027 U	< 0.0012 U	< 0.027 U	0.0066	< 0.0013 U	< 0.027 U	< 0.025 U	< 0.0012 U
50-29-3	4,4'-DDT	0.23	< 0.0013 U	< 0.027 U	0.0035	0.031	0.014	0.001 J	< 0.027 U	< 0.025 U	< 0.0012 U
309-00-2	Aldrin	0.00092	**0.054 NJ**	**< 0.027 U**	**< 0.0012 U**	**< 0.027 U**	**< 0.0013 U**	**< 0.0013 U**	**< 0.027 U**	**< 0.025 U**	**< 0.0012 U**
319-84-6	alpha-BHC	0.0072	**0.031**	< 0.027 U	< 0.0012 U	< 0.027 U	< 0.0013 U	< 0.0013 U	< 0.027 U	**0.038**	< 0.0012 U
5103-71-9	alpha-Chlordane	0.02	0.0061 J	**< 0.027 U**	< 0.0012 U	**< 0.027 U**	< 0.0013 U	< 0.0013 U	**< 0.027 U**	**< 0.025 U**	< 0.0012 U
319-85-7	beta-BHC	0.025	**0.14**	**0.17**	0.0091	< 0.027 U	< 0.0013 U	< 0.0013 U	**0.34**	**0.7**	< 0.0012 U
319-86-8	delta-BHC	0.025	**2.1 B**	**0.075**	< 0.0012 U	< 0.027 U	< 0.0013 U	0.00078 J	0.016 J	**0.055**	< 0.0012 U
60-57-1	Dieldrin	0.0018	< 0.0013 U	**< 0.027 U**	< 0.0012 U	**< 0.027 U**	< 0.0013 U	< 0.0013 U	**< 0.027 U**	**< 0.025 U**	< 0.0012 U
959-98-8	Endosulfan I	100	< 0.0013 U	< 0.027 U	< 0.0012 U	< 0.027 U	< 0.0013 U	< 0.0013 U	< 0.027 U	< 0.025 U	< 0.0012 U
33213-65-9	Endosulfan II	100	0.0061 NJ	< 0.027 U	< 0.0012 U	< 0.027 U	< 0.0013 U	< 0.0013 U	< 0.027 U	< 0.025 U	< 0.0012 U
1031-07-8	Endosulfan Sulfate	---	0.016 NJ	< 0.027 U	< 0.0012 U	< 0.027 U	< 0.0013 U	< 0.0013 U	0.014 J	0.037	< 0.0012 U
72-20-8	Endrin	2.3	< 0.0013 U	< 0.027 U	< 0.0012 U	< 0.027 U	< 0.0013 U	< 0.0013 U	< 0.027 U	< 0.025 U	< 0.0012 U
7421-93-4	Endrin aldehyde	---	0.0047 NJ	< 0.027 U	< 0.0012 U	< 0.027 U	< 0.0013 U	< 0.0013 U	< 0.027 U	< 0.025 U	< 0.0012 U
53494-70-5	Endrin ketone	---	< 0.0013 U	< 0.027 U	< 0.0012 U	< 0.027 U	< 0.0013 U	< 0.0013 U	< 0.027 U	0.021 J	< 0.0012 U
58-89-9	gamma-BHC (Lindane)	0.042	0.016 NJ	< 0.027 U	< 0.0012 U	< 0.027 U	< 0.0013 U	< 0.0013 U	< 0.027 U	< 0.025 U	< 0.0012 U
12789-03-6	gamma-Chlordane	0.02	0.0025 NJ	**< 0.027 U**	< 0.0012 U	**< 0.027 U**	< 0.0013 U	< 0.0013 U	**< 0.027 U**	< 0.025 U	< 0.0012 U
76-44-8	Heptachlor	0.0014	**0.12 NJ**	**< 0.027 U**	**< 0.0012 U**	**< 0.027 U**	**< 0.0013 U**	**< 0.0013 U**	**< 0.027 U**	**< 0.025 U**	**< 0.0012 U**
1024-57-3	Heptachlor epoxide	0.0014	**0.019 NJ**	**< 0.027 U**	< 0.0012 U	**< 0.027 U**	< 0.0013 U	< 0.0013 U	**< 0.027 U**	**< 0.025 U**	< 0.0012 U
72-43-5	Methoxychlor	37	0.027	< 0.051 UJ	< 0.0024 U	< 0.053 U	< 0.0026 U	< 0.0026 U	< 0.051 UJ	< 0.047 U	< 0.0024 UJ
8001-35-2	Toxaphene	0.071	**< 0.1 U**	**< 2 U**	**< 0.095 U**	**< 2.1 U**	**< 0.1 U**	**< 0.1 U**	**< 2 U**	**< 1.9 U**	**< 0.094 U**
HERBICIDES in ug/L											
94-75-7	2,4-D	170	< 4.1 U	< 4.1 U	< 3.8 U	< 4.1 U	< 4.2 U	< 4.1 U	< 4.1 U	< 3.8 U	< 3.8 U
93-76-5	2,4,5-T	160	< 1 U	< 1 U	< 0.95 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.96 U	< 0.94 U

Table 5-13
April 2014 Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	OW-8-230 4/24/2014 OW8-230-042414	OW-9-125 4/21/2014 OW9-125-042114	OW-10-250 4/23/2014 OW10-250-042314	OW-11-240 4/22/2014 OW11-240-042214	OW-12-232 4/21/2014 OW12-232-042114	OW-13-250 4/24/2014 OW13-250-042414	OW-14-96 4/21/2014 OW14-96-042114	OW-14-235 4/22/2014 OW14-235-042214	OW-15-202 4/21/2014 OW15-202-042114
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L											
108-60-1	2,2'-Oxybis(1-Chloropropane)	710	< 0.21 U	< 0.21 U	< 0.19 U	< 0.22 U	< 0.22 U	< 0.21 U	< 0.21 U	< 0.19 U	< 0.19 U
95-95-4	2,4,5-Trichlorophenol	1,200	< 1.1 U	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
88-06-2	2,4,6-Trichlorophenol	4.1	< 1.1 U	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
120-83-2	2,4-Dichlorophenol	46	< 0.21 U	< 0.21 U	< 0.19 U	< 0.22 U	< 0.22 U	< 0.21 U	< 0.21 U	< 0.19 U	< 0.19 U
105-67-9	2,4-Dimethylphenol	360	< 1.1 U	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
51-28-5	2,4-Dinitrophenol	39	< 5.3 U	< 5.3 U	< 4.9 U	< 5.4 U	< 5.4 U	< 5.3 U	< 5.3 U	< 4.8 U	< 4.8 U
121-14-2	2,4-Dinitrotoluene	0.24	**< 1.1 U**	**< 1.1 U**	**< 0.97 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 0.96 U**	**< 0.95 U**
606-20-2	2,6-Dinitrotoluene	0.049	**< 1.1 U**	**< 1.1 U**	**< 0.97 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 0.96 U**	**< 0.95 U**
91-58-7	2-Chloronaphthalene	750	< 0.21 U	< 0.21 U	< 0.19 U	< 0.22 U	< 0.22 U	< 0.21 U	< 0.21 U	< 0.19 U	< 0.19 U
95-57-8	2-Chlorophenol	91	< 1.1 U	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
95-48-7	2-Methlyphenol	930	< 1.1 U	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
91-57-6	2-Methylnaphthalene	36	< 0.21 U	< 0.21 U	< 0.19 U	< 0.22 U	< 0.22 U	< 0.21 U	< 0.21 U	< 0.19 U	< 0.19 U
88-74-4	2-Nitroaniline	190	< 5.3 U	< 5.3 U	< 4.9 U	< 5.4 U	< 5.4 U	< 5.3 U	< 5.3 U	< 4.8 U	< 4.8 U
88-75-5	2-Nitrophenol	---	< 1.1 U	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
91-94-1	3,3-Dichlorobenzidine	0.13	**< 1.1 U**	**< 1.1 U**	**< 0.97 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 0.96 U**	**< 0.95 U**
99-09-2	3-Nitroaniline	---	< 5.3 U	< 5.3 U	< 4.9 U	< 5.4 U	< 5.4 U	< 5.3 U	< 5.3 U	< 4.8 U	< 4.8 U
534-52-1	4,6-Dinitro-2-Methylphenol	1.5	**< 5.3 U**	**< 5.3 U**	**< 4.9 U**	**< 5.4 U**	**< 5.4 U**	**< 5.3 U**	**< 5.3 U**	**< 4.8 U**	**< 4.8 U**
101-55-3	4-Bromophenyl Phenyl Ether	---	< 1.1 U	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
59-50-7	4-Chloro-3-Methylphenol	1,400	< 1.1 U	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
106-47-8	4-Chloroaniline	0.37	**< 1.1 U**	**< 1.1 U**	**< 0.97 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 0.96 U**	**< 0.95 U**
7005-72-3	4-Chlorophenyl Phenyl Ether	---	< 1.1 U	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
106-44-5	4-Methlyphenol	1,900	< 1.1 U	< 1.1 U	0.26 J	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
100-01-6	4-Nitroaniline	3.8	**< 5.3 U**	**< 5.3 U**	**< 4.9 U**	**< 5.4 U**	**< 5.4 U**	**< 5.3 U**	**< 5.3 U**	**< 4.8 U**	**< 4.8 U**
100-02-7	4-Nitrophenol	---	< 5.3 U	< 5.3 U	< 4.9 U	< 5.4 U	< 5.4 U	< 5.3 U	< 5.3 U	< 4.8 U	< 4.8 U
83-32-9	Acenaphthene	530	< 0.21 U	< 0.21 U	< 0.19 U	< 0.22 U	< 0.22 U	< 0.21 U	< 0.21 U	< 0.19 U	< 0.19 U
208-96-8	Acenaphthylene	---	< 0.21 U	< 0.21 U	0.13 J	< 0.22 U	< 0.22 U	< 0.21 U	< 0.21 U	< 0.19 U	< 0.19 U
98-86-2	Acetophenone	1,900	< 1.1 U	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
120-12-7	Anthracene	1,800	< 0.21 U	< 0.21 U	0.51	< 0.22 U	< 0.22 U	< 0.21 U	< 0.21 U	< 0.19 U	< 0.19 U
1912-24-9	Atrazine	0.3	**< 1.1 U**	**< 1.1 U**	**< 0.97 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 0.96 U**	**< 0.95 U**
100-52-7	Benzaldehyde	19	< 1.1 U	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
56-55-3	Benzo[a]anthracene	0.03	**< 0.21 U**	**< 0.21 U**	**1.5**	**< 0.22 U**	**0.033 J**	**< 0.21 U**	**< 0.21 U**	**< 0.19 U**	**< 0.19 U**
50-32-8	Benzo[a]pyrene	0.025	**< 0.21 U**	**< 0.21 U**	**0.99**	< 0.22 U	**0.028 J**	**< 0.21 U**	**< 0.21 U**	**< 0.19 U**	**< 0.19 U**
205-99-2	Benzo[b]fluoranthene	0.25	< 0.21 U	< 0.21 U	**1.4**	< 0.22 U	0.049 J	< 0.21 U	< 0.21 U	< 0.19 U	< 0.19 U
191-24-2	Benzo[g,h,i]perylene	---	< 0.21 U	< 0.21 U	0.41	< 0.22 U	0.06 J	< 0.21 U	< 0.21 U	< 0.19 U	< 0.19 U
207-08-9	Benzo[k]fluoranthene	2.5	< 0.21 U	< 0.21 U	0.5	< 0.22 U	< 0.22 U	< 0.21 U	< 0.21 U	< 0.19 U	< 0.19 U
85-68-7	Benzyl Butyl Phthalate	16	< 1.1 U	< 1.1 U	0.23 J	0.48 J	< 1.1 U	< 1.1 U	< 1.1 U	0.15 J	< 0.95 U
92-52-4	Biphenyl	0.83	**< 1.1 U**	**< 1.1 U**	**< 0.97 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 0.96 U**	**< 0.95 U**
111-91-1	Bis(2-Chloroethoxy)methane	59	< 1.1 U	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
111-44-4	Bis(2-Chloroethyl) Ether	0.014	**< 0.21 U**	**< 0.21 U**	**< 0.19 U**	**< 0.22 U**	**< 0.22 U**	**< 0.21 U**	**< 0.21 U**	**< 0.19 U**	**< 0.19 U**
117-81-7	Bis(2-Ethylhexyl) Phthalate	5.6	< 2.1 U	< 2.1 U	< 1.9 U	1.9 J	4.9	< 2.1 U	< 2.1 U	< 1.9 U	< 1.9 U
105-60-2	Caprolactam	9,900	< 5.3 U	< 5.3 U	< 4.9 U	< 5.4 U	< 5.4 U	< 5.3 U	< 5.3 U	< 4.8 U	< 4.8 U
86-74-8	Carbazole	---	< 0.21 U	< 0.21 U	0.81	< 0.22 U	< 0.22 U	< 0.21 U	< 0.21 U	< 0.19 U	< 0.19 U
218-01-9	Chrysene	25	< 0.21 U	< 0.21 U	1.3	< 0.22 U	0.054 J	< 0.21 U	< 0.21 U	< 0.19 U	< 0.19 U
53-70-3	Dibenz[a,h]Anthracene	0.025	**< 0.21 U**	**< 0.21 U**	**0.15 J**	**< 0.22 U**	**0.07 J**	**< 0.21 U**	**< 0.21 U**	**< 0.19 U**	**< 0.19 U**
132-64-9	Dibenzofuran	7.9	< 1.1 U	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
84-66-2	Diethyl Phthalate	15,000	< 1.1 U	0.19 J	< 0.97 U	< 1.1 U	0.27 J	< 1.1 U	< 1.1 U	0.14 J	< 0.95 U
131-11-3	Dimethyl Phthalate	---	< 1.1 U	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
84-74-2	Di-N-Butyl Phthalate	900	< 1.1 U	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	0.13 J
117-84-0	Di-N-octyl Phthalate	200	< 1.1 U	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
206-44-0	Fluoranthene	800	< 0.21 U	< 0.21 U	2.8	< 0.22 U	< 0.22 U	< 0.21 U	< 0.21 U	< 0.19 U	< 0.19 U
86-73-7	Fluorene	290	< 0.21 U	< 0.21 U	0.06 J	< 0.22 U	< 0.22 U	< 0.21 U	< 0.21 U	< 0.19 U	< 0.19 U
118-74-1	Hexachlorobenzene	0.0098	**< 0.21 U**	**< 0.21 U**	**< 0.19 U**	**< 0.22 U**	**< 0.22 U**	**< 0.21 U**	**< 0.21 U**	**< 0.19 U**	**< 0.19 U**
87-68-3	Hexachlorobutadiene	0.14	**< 0.21 U**	**< 0.21 U**	**< 0.19 U**	**< 0.22 U**	**< 0.22 U**	**< 0.21 U**	**< 0.21 U**	**< 0.19 U**	**< 0.19 U**
77-47-4	Hexachlorocyclopentadiene	0.41	**< 1.1 U**	**< 1.1 U**	**< 0.97 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 0.96 U**	**< 0.95 U**
67-72-1	Hexachloroethane	0.33	**< 1.1 U**	**< 1.1 U**	**< 0.97 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 0.96 U**	**< 0.95 U**
193-39-5	Indeno[1,2,3-CD]Pryene	0.25	< 0.21 U	< 0.21 U	**0.46**	< 0.22 U	0.054 J	< 0.21 U	< 0.21 U	< 0.19 U	< 0.19 U
78-59-1	Isophorone	78	< 1.1 U	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
91-20-3	Naphthalene	0.17	**0.099 J**	**< 0.21 U**	**0.069 J**	**0.069 J**	**0.098 J**	**0.12 J**	**< 0.21 U**	0.054 J	0.051 J
98-95-3	Nitrobenzene	0.14	**< 2.1 U**	**< 2.1 U**	**< 1.9 U**	**< 2.2 U**	**< 2.2 U**	**< 2.1 U**	**< 2.1 U**	**< 1.9 U**	**< 1.9 U**
621-64-7	N-Nitrosodi-N-Propylamine	0.011	**< 0.21 U**	**< 0.21 U**	**< 0.19 U**	**< 0.22 U**	**< 0.22 U**	**< 0.21 U**	**< 0.21 U**	**< 0.19 U**	**< 0.19 U**
86-30-6	N-Nitrosodiphenylamine	12	< 1.1 U	< 1.1 U	< 0.97 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 0.96 U	< 0.95 U
87-86-5	Pentachlorophenol	0.041	**< 1.1 U**	**< 1.1 U**	**< 0.97 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 0.96 U**	**< 0.95 U**
85-01-8	Phenanthrene	---	< 0.21 U	< 0.21 U	1.7	< 0.22 U	< 0.22 U	< 0.21 U	< 0.21 U	< 0.19 U	< 0.19 U
108-95-2	Phenol	5,800	< 0.21 U	0.16 J	0.35	< 0.22 U	< 0.22 U	< 0.21 U	< 0.21 U	< 0.19 U	< 0.19 U
129-00-0	Pyrene	120	< 0.21 U	< 0.21 U	1.9	< 0.22 U	< 0.22 U	< 0.21 U	< 0.21 U	< 0.19 U	< 0.19 U

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VOLATILE ORGANIC COMPOUNDS in ug/L											
71-55-6	1,1,1-Trichloroethane	8,000	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-34-5	1,1,2,2-Tetrachloroethane	0.076	**< 2 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	10,000	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-00-5	1,1,2-Trichloroethane	0.28	**< 2 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-34-3	1,1-Dichloroethane	2.8	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.18 J	< 1 U	< 1 U
75-35-4	1,1-Dichloroethylene	280	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
120-82-1	1,2,4-Trichlorobenzene	1.2	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
96-12-8	1,2-Dibromo-3-Chloropropane (DBCP)	0.00033	**< 2 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
106-93-4	1,2-Dibromoethane	0.0075	**< 2 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
95-50-1	1,2-Dichlorobenzene	300	2.9	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
107-06-2	1,2-Dichloroethane	0.17	**0.48 J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
78-87-5	1,2-Dichloropropane	0.85	**< 2 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
541-73-1	1,3-Dichlorobenzene	---	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
106-46-7	1,4-Dichlorobenzene	0.48	**3.3**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
78-93-3	2-Butanone	5,600	< 10 U	1.5 J	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
591-78-6	2-Hexanone	38	< 10 U	0.26 J	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
108-10-1	4-Methyl-2-Pentanone	6,300	< 10 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
67-64-1	Acetone	14,000	< 10 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
71-43-2	Benzene	0.46	**< 2 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-27-4	Bromodichloromethane	0.13	**< 2 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-25-2	Bromoform	3.3	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
74-83-9	Bromomethane	7.5	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-15-0	Carbon Disulfide	810	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
56-23-5	Carbon Tetrachloride	0.46	**< 2 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	0.21 J	**< 1 U**	**< 1 U**
108-90-7	Chlorobenzene	78	68	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-00-3	Chloroethane	21,000	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
67-66-3	Chloroform	0.22	**< 2 U**	**5.2**	**6**	**< 1 U**	**< 1 U**	**0.28 J**	**2.6**	**2.5**	**< 1 U**
74-87-3	Chloromethane	190	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
156-59-2	cis-1,2-Dichloroethene	36	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
10061-01-5	cis-1,3-Dichloropropylene	---	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
110-82-7	Cyclohexane	13,000	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
124-48-1	Dibromochloromethane	0.87	**< 2 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-71-8	Dichlorodifluoromethane	200	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
100-41-4	Ethylbenzene	1.5	**< 2 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
98-82-8	Isopropylbenzene (Cumene)	450	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-20-9	Methyl Acetate	20,000	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1634-04-4	Methyl Tert-Butyl Ether	14	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
108-87-2	Methylcylohexane	---	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-09-2	Methylene Chloride	11	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
100-42-5	Styrene (Monomer)	1,200	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
127-18-4	Tetrachloroethylene	11	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	2.8	< 1 U	< 1 U
108-88-3	Toluene	1,100	< 2 U	0.18 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
156-60-5	trans-1,2-Dichloroethene	360	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
10061-02-6	trans-1,3-Dichloropropene	---	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-01-6	Trichloroethylene	0.49	**< 2 U**	**< 1 U**	**< 1 U**	**0.24 J**	**0.23 J**	**< 1 U**	**0.3 J**	**0.53 J**	**< 1 U**
75-69-4	Trichlorofluoromethane	5,200	< 2 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-01-4	Vinyl Chloride	0.019	**< 2 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
XYLENES	Xylenes, Total	190	< 6 U	< 3 U	< 3 U	< 3 U	< 3 U	< 3 U	< 3 U	< 3 U	< 3 U

Notes:
USEPA RSL for TAP WATER (latest version, November 2017)
USEPA MCL (latest version, November 2017)
(1) No RSL exists, MCL utilized.
NA - Not Ananlyzed
U - The analyte was not detected above the reporting limit (RL).
UJ - The reporting limit is estimated due to minor quality control anomaly.
J - Result is either less than the RL but greater than or equal to the method detecti
B - Parameter was detected in associated laboratory method blank.
NJ - Result is estimated due to a dual column imprecision greater than 100%.
Bold indicates the reporting limit was above the RSL and/or MCL.
Red bolded detected concentration exceeds RSL
Red bolded and highlighted detected concentration exceeds MCL

Table 5-14
October-November 2016 (1st Quarter) Groundwater Sampling Field Parameter Data
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Monitoring Well	Sample Date	Temperature (ºC)	Dissolved Oxygen (mg/L)	pH (Std.Units)	Turbidity (NTUs)	Conductivity (mS/cm)	Oxygen Reduction Potential (mV)	Rate (mL/min)	Depth to Water (ft below top of PVC)
On Site Monitoring Wells									
MW-A-51	11/10/2016	13.4	0.0	6.29	0.0	3.51	-33	100	48.65
MW-B-55	11/4/2016	14.47	0.0	6.82	0.0	0.661	382	100	51.35
MW-B-400	11/8/2016	12.21	0.0	7.12	0.0	1.10	3	350	57.70
MW-B-598	11/8/2016	13.16	0.31	7.41	0.0	0.667	111	350	56.77
MW-C-40	11/7/2016	12.25	0.0	6.56	11.0	0.732	386	200	33.13
MW-D-77	11/1/2016	14.14	0.0	7.46	15.8	1.45	307	125	29.91
MW-E-46	11/2/2016	16.78	0.0	6.54	0.0	2.39	296	100	35.47
MW-F-70	11/3/2016	14.35	0.0	7.10	0.0	0.742	-14	150	54.62[(1)]
MW-G-35	11/1/2016	13.62	0.0	4.13	0.0	3.41	363	100	28.21
MW-G-360	11/9/2016	13.10	0.0	7.17	0.0	1.84	163	225	36.07
MW-G-600	11/9/2016	13.11	0.66	7.36	0.0	0.849	158	310	36.98
MW-H-65	11/7/2016	13.46	0.0	6.61	4.0	2.47	-2	200	36.56
MW-I-55	11/8/2016	14.25	0.0	6.76	0.0	1.14	-34	200	40.26
MW-J-71	11/11/2016	14.22	0.0	6.46	21.9	2.80	-26	325	50.39
MW-K-80	11/3/2016	14.76	0.0	6.70	0.0	1.19	-16	100	50.01
MW-K-440	11/4/2016	12.47	3.92	7.76	0.0	0.582	186	450	64.76
MW-L-48	11/2/2016	13.55	0.0	6.57	0.0	2.50	-8	150	37.43
MW-L-250	11/7/2016	12.90	3.79	7.54	0.0	0.526	200	360	56.02
MW-M-50	11/10/2016	12.78	0.0	6.53	0.0	2.64	-40	100	40.20
MW-N-83	11/9/2016	13.00	0.0	6.64	0.0	1.70	-38	200	46.32
MW-N-113	11/9/2016	12.83	0.0	6.62	0.0	1.76	-14	150	46.66
MW-O-145	11/10/2016	12.91	0.0	6.99	0.0	2.65	-62	100	64.84
MW-P-235	11/7/2016	14.88	0.0	7.49	0.0	2.49	-63	155	59.63
MW-Q-150	11/8/2016	14.84	0.0	6.61	0.0	1.86	-32	100	59.98
MW-R-330	11/10/2016	13.36	0.0	6.49	0.0	2.08	37	250	54.75
MW-R-600	11/8/2016	14.35	0.0	7.38	0.0	0.794	-100	370	56.17
EW-1-110	11/11/2016	13.39	0.0	6.55	0.0	2.48	-56	240	38.87
Off Site Monitoring Wells									
OW-1-62	10/24/2016	15.93	1.38	8.55	26.6	2.41	202	70	57.30
OW-1-105	10/24/2016	15.28	6.85	8.60	2.3	0.818	219	270	59.65
OW-2-65	10/26/2016	14.74	0.79	7.24	0.0	0.929	203	320	50.95
OW-2-115	10/25/2016	16.21	0.00	8.30	13.9	1.860	-34	150	58.27
OW-3-55	10/27/2016	14.27	2.35	7.02	62.7	0.703	179	200	51.62[(2)]
OW-3-105	10/27/2016	13.70	0.00	7.51	67.9	1.60	-55	100	53.00
OW-4-70	10/28/2016	13.72	0.0	7.03	0.0	1.37	77	100	41.9
OW-5-90	10/31/2016	15.26	0.0	7.11	32.6	0.863	150	115	46.56
OW-7-242	11/3/2016	19.93	0.00	8.02	0.0	0.852	-119	60	52.21
OW-7-410	11/3/2016	14.92	0.0	7.31	0.0	1.52	95	420	42.76
OW-8-230	10/28/2016	11.99	0.0	6.74	0.0	2.06	134	100	62.15
OW-9-125	10/26/2016	15.84	4.74	7.32	29.8	0.863	199	125	34.57
OW-10-250	10/26/2016	14.23	0.0	7.21	0.0	0.745	236	200	41.25
OW-11-240	11/2/2016	13.40	0.0	7.47	0.0	0.595	-40	100	54.80
OW-11-600	11/1/2016	13.47	4.58	7.71	0.0	0.519	159	510	56.63
OW-12-232	10/31/2016	13.51	0.0	7.46	0.0	0.731	-109	90	69.22
OW-13-250	11/3/2016	15.65	0.5	7.97	0.0	0.500	184	220	22.55
OW-14-96	10/31/2016	14.51	4.13	7.52	0.0	0.520	198	330	28.54
OW-14-235	11/2/2016	16.59	5.00	7.70	0.0	0.516	194	290	26.20
OW-15-202	11/2/2016	15.01	4.93	7.68	0.0	0.476	173	220	27.04
OW-16-448	10/27/2016	13.72	0.0	7.46	0.0	0.572	327	333	49.5
OW-17-600	10/25/2016	14.03	0.0	7.50	0.0	0.518	287	175	47.88
OW-18-597	10/31/2016	12.58	0.0	6.99	0.0	0.898	147	375	44.24
OW-19-450	10/25/2016	13.64	0.0	7.47	0.0	0.518	276	250	60.16

Notes:
mg/L - milligrams per liter
[(1)] Parameters stable; however, drawdown still observed at minimum possible pump rate. Sample collected due to imminent dangerous weather.
[(2)] Water level drop continuous at lowest achieveable pump rate.

Prepared by: JD 11/01/2017
Reviewed by:

Table 5-15
October-November 2016 (1st Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-A-51 11/10/2016 MWA-51-111016	MW-B-55 11/4/2016 MWB-55-110416	MW-B-400 11/8/2016 MWB-400-110816	MW-B-598 11/8/2016 MWB-598-110816	MW-C-40 11/7/2016 MWC-40-110716	MW-D-77 11/1/2016 MWD-77-110116	MW-E-46 11/2/2016 MWE-46-110216	MW-F-70 11/3/2016 MWF-70-110316	MW-G-35 11/1/2016 MWG-35-110116	MW-G-360 11/9/2016 MWG-360-110916	MW-G-600 11/9/2016 MWG-600-110916	MW-H-65 11/7/2016 MWH-65-110716	MW-I-55 11/8/2016 MWI-55-110816
TOTAL METALS in ug/L																
7429-90-5	ALUMINUM	20,000	---	250	11 J	< 30 U	< 30 U	1800	110	< 30 U	< 30 U	**180000 J**	< 30 U	< 30 U	440	12 J
7440-36-0	ANTIMONY	7.8	6	< 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 U
7440-38-2	ARSENIC	0.052	10	**0.87 J**	**< 1 U**	**0.18 J**	**< 1 U**	**2.7**	**0.14 J**	**4.7**	**< 1 U**	**22 R**	**0.19 J**	**< 1 U**	**2.1**	**1**
7440-39-3	BARIUM	3,800	2,000	20	51	39	120	3.6 J	40	2.8 J	6.5 J	18 J	33	56	21	41
7440-41-7	BERYLLIUM	25	4	0.61 J	< 1 U	< 1 U	< 1 U	1	< 1 U	< 1 U	< 1 U	**51 J**	< 1 U	< 1 U	< 1 U	< 1 U J
7440-43-9	CADMIUM	9.2	5	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	7.6	< 1 U	< 1 U	< 1 U	< 1 U
7440-70-2	CALCIUM METAL	---	---	660000	130000	210000	120000	170000	220000	640000	31000	490000 J	310000	170000	610000	420000
7440-47-3	CHROMIUM[1]	---	100	1.1 J	< 2 U	< 2 U	< 2 U	4.3	0.37 J	< 2 U	< 2 U	11 R	2.8	< 2 U	< 2 U	< 2 U
7440-48-4	COBALT	6	---	1.7	< 0.5 U	0.55	1.3	< 0.5 U	0.71	< 0.5 U	< 0.5 U	**290 R**	0.34 J	0.055 J	0.83	0.12 J
7440-50-8	COPPER	800	1,300	8.8 B	< 2 U	1 J	1.1 J	1 J	< 2 U	0.56 J	< 2 U	310	< 2 U	< 2 U	< 2 U	0.99 J
7439-89-6	IRON	14,000	---	**67000**	< 50 U	430	17 J	< 50 U	140	< 50 U	95	3700 R	92	52	**15000**	**22000**
7439-92-1	LEAD	15	15	0.22 J	< 1 U	< 1 U	< 1 U	< 1 U	0.43 J	< 1 U	< 1 U	1.4 J	0.091 J	< 1 U	< 1 U	< 1 U
7439-95-4	MAGNESIUM	---	---	110000	48000	61000	29000	21000	71000	24000	9600	120000 J	84000	30000	57000	21000
7439-96-5	MANGANESE	430	---	**6900**	< 5 U	100	33	< 5 U	15	< 9.4 U	< 5 U	**3900 R**	62	22	**7400**	**2700**
7440-02-0	NICKEL	390	---	4.6	< 1 U	2.4	1.1	1.5	5.9	1.2 J	< 1 U	**460 R**	4.7	0.68 J	1.9	0.5 J
7440-09-7	POTASSIUM	---	---	44000	3200	2200	1300	9700	19000	8700 J	540	16000 J	17000	2000	14000	6500
7782-49-2	SELENIUM	100	50	1.4 J	< 5 U	1.3 J	< 5 U	3.3 J	4.8 J	0.53 J	< 5 U	52 R	< 5 U	< 5 U	< 5 U	< 5 U
7440-22-4	SILVER	94	---	< 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 U
7440-23-5	SODIUM	---	---	54000	7300	14000 J	14000 J	3700	19000	28000 J	1400	6000 J	28000	7600	38000	13000 J
7440-28-0	THALLIUM	0.2	2	**< 1 U**	**< 1 U**	0.092 J	0.075 J	**< 1 U**	0.1 J	**< 1 U**	**< 1 U**	**0.63 J**	**0.37 J B**	**< 1 U**	**< 1 U**	**< 1 U**
7440-62-2	VANADIUM	86	---	0.72 J	< 1 U	< 1 U	< 1 U	6.3	< 1 U	8.7 J	< 1 U	1 R	< 1 U	< 1 U	< 1 U	< 1 U
7440-66-6	ZINC	6,000	---	140	< 5 U	2.7 J	6	3.9 J	5.1	2.7 J	< 5 U	1600 R	3.7 J	7.4	16	9.6
57-12-5	CYANIDE	1.5	200	**2.1 J**	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	**1.8 J**	< 10 U	< 10 U	< 10 U
7439-97-6	MERCURY	0.63	2	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L																
16887-00-6	CHLORIDE	---	---	62	5.6	33	11	3.7	28	19	12	11	58	17	30	32
14797-55-8	NITRATE AS N	32	10	0.17 J	6.7	8.1	4.2	5.4	6.5	2.6	0.14	6.2	**30**	4.7	< 0.25 U	0.039 J
14808-79-8	SULFATE	---	---	1500	62	470	120	150	730	1400	170	2600	500	200	1400	1200
ALKB	BICARBONATE ALKALINITY	---	---	680	510	460	430	300	210	280	420	< 5 U	430	380	370	440
ALKC	CARBONATE ALKALINITY	---	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	---	680	510	460	430	300	210	280	420	< 5 U	430	380	370	440
PESTICIDES in ug/L																
957-51-7	DIPHENAMID	530		**890**	< 0.96 U	1.8	< 0.96 U	< 0.96 U	< 1 U	< 1 U	0.43 J	< 1 U	21	1.1	210	7.6
53-19-0	2,4'-DDD	0.032		**< 0.12 U**	< 0.0013 U J	0.01 J	0.0035 J	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.025 U	< 0.0012 U	**0.057 J**	< 0.025 U
3424-82-6	2,4'-DDE	0.046		**< 0.12 U**	< 0.0013 U J	< 0.0012 U	< 0.0012 U	< 0.0012 U	0.022	< 0.0013 U	< 0.0013 U	**0.49**	**0.12**	0.017	**0.2**	< 0.025 U
789-02-6	2,4'-DDT	0.23		< 0.12 U	< 0.0013 U J	< 0.0012 U	< 0.0012 U	< 0.025 U	0.01	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.025 U	< 0.0062 U	< 0.064 U	< 0.025 U
72-54-8	4,4'-DDD	0.032		**0.15 J**	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.025 U	0.001 J	0.011	< 0.0013 U	< 0.0013 U	< 0.025 U	< 0.0012 U	< 0.064 U	< 0.025 U
72-55-9	4,4'-DDE	0.046		**< 0.12 U**	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	0.024	< 0.0013 U	0.0027	< 0.0013 U	< 0.025 U	< 0.0012 U	< 0.064 U	< 0.025 U
50-29-3	4,4'-DDT	0.23		< 0.12 U	0.0016	< 0.0012 U	< 0.0012 U	< 0.0012 U	0.014	< 0.0013 U	< 0.0013 U	< 0.013 U	< 0.025 U	0.0054 J	< 0.064 U	< 0.025 U
309-00-2	ALDRIN	0.00092		< 0.12 U	< 0.0013 U	**0.012 J**	< 0.0012 U	< 0.0012 U	< 0.0013 U	**0.027 J**	< 0.0013 U	< 0.0013 U	< 0.025 U	< 0.0012 U	< 0.064 U	**0.052 J**
319-84-6	ALPHA-BHC	0.0072		**3**	**0.0074**	**1.4**	**0.045 J**	**0.031**	**0.14 J**	**0.034**	**0.0086**	**9.4**	**2.9**	**0.12**	**< 0.064 U**	**0.47**
5103-71-9	ALPHA-CHLORDANE	0.02	2	**< 0.12 U**	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	**< 0.025 U**	< 0.0012 U	< 0.064 U	**< 0.025 U**
319-85-7	BETA-BHC	0.025		**7**	**0.092**	**3.6**	**0.66**	**1.7**	**0.1**	**3.8**	**0.11**	**7.3**	**1.7**	**0.35**	**1.8**	**2.8**
319-86-8	DELTA-BHC	0.025		**72**	0.0031	**1.5**	**0.054**	0.023	**0.1**	**0.061**	**0.29 B**	< 0.0013 U	**3.7**	**0.29**	**6.4**	**5.2**
60-57-1	DIELDRIN	0.0018		**< 0.12 U**	0.0012 J	< 0.0012 U	< 0.0012 U	**0.027 J**	**0.0037**	**0.98**	0.001 J	< 0.0013 U	**0.037 J**	**0.0047 J**	< 0.064 U	**0.52**
959-98-8	ENDOSULFAN I	100		< 0.12 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.025 U	< 0.0012 U	< 0.064 U	< 0.025 U
33213-65-9	ENDOSULFAN II	100		< 0.12 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	0.018 J	0.003	< 0.0013 U	< 0.025 U	< 0.0012 U	< 0.064 U	< 0.025 U
1031-07-8	ENDOSULFAN SULFATE	---	---	< 0.12 U	< 0.0013 U	< 0.0012 U	0.0055	< 0.0012 U	< 0.0013 U	< 0.0013 U	0.013	0.02 J	0.051 J	0.012	< 0.064 U	0.098
72-20-8	ENDRIN	2.3	2	< 0.12 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	0.0014 J	< 0.0013 U	< 0.025 U	< 0.0012 U	< 0.064 U	< 0.025 U
7421-93-4	ENDRIN ALDEHYDE	---	---	< 0.12 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	0.0064 J	< 0.0013 U	< 0.025 U	< 0.0012 U	< 0.064 U	< 0.025 U
53494-70-5	ENDRIN KETONE	---	---	< 0.12 U	0.0012 J	0.012 J	0.002	< 0.025 U	0.0018	0.25	< 0.0013 U	0.013 J	0.039	0.0038 J	< 0.064 U	< 0.025 U
58-89-9	GAMMA-BHC (LINDANE)	0.042	0.2	**< 0.12 U**	0.002	**0.7**	0.016 J	0.012	**0.27**	0.015	< 0.0013 U	**1.4**	**3**	**0.059**	**< 0.064 U**	< 0.025 U
12789-03-6	gamma-Chlordane	0.02	2	**< 0.12 U**	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	**< 0.025 U**	0.0021	**< 0.064 U**	**< 0.025 U**
76-44-8	HEPTACHLOR	0.0014	0.4	**< 0.12 U**	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	**0.13 J**	**< 0.025 U**	< 0.0012 U	**< 0.064 U**	**< 0.025 U**
1024-57-3	HEPTACHLOR EPOXIDE	0.0014	0.2	**< 0.12 U**	< 0.0013 U	< 0.0012 U	< 0.0012 U	**0.0021**	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	**< 0.025 U**	< 0.0012 U	**< 0.064 U**	**< 0.025 U**
72-43-5	METHOXYCHLOR	37	40	< 0.12 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0063 U	< 0.0013 U	< 0.0013 U	< 0.013 U	< 0.025 U	< 0.0062 U	< 0.064 U	< 0.12 U
8001-35-2	TOXAPHENE	0.071	3	**< 9.4 U**	**< 0.098 U**	**< 0.095 U**	**< 0.095 U**	**< 0.095 U**	**< 0.097 U**	**< 0.1 U**	**< 0.099 U**	**< 0.1 U**	**< 1.9 U**	**< 0.095 U**	**< 5 U**	**< 1.9 U**
HERBICIDES in ug/L																
94-75-7	2,4-D	170	70	< 3.8 U	< 3.8 U	0.47 J	< 3.8 U	< 3.9 U	< 4 U	< 3.8 U	< 3.9 U	< 3.8 U	< 3.8 U	< 3.8 U	1.3 J	< 3.8 U
93-76-5	2,4,5-T	160	---	< 0.95 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.98 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U

Table 5-15
October-November 2016 (1st Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-A-51 11/10/2016 MWA-51-111016	MW-B-55 11/4/2016 MWB-55-110416	MW-B-400 11/8/2016 MWB-400-110816	MW-B-598 11/8/2016 MWB-598-110816	MW-C-40 11/7/2016 MWC-40-110716	MW-D-77 11/1/2016 MWD-77-110116	MW-E-46 11/2/2016 MWE-46-110216	MW-F-70 11/3/2016 MWF-70-110316	MW-G-35 11/1/2016 MWG-35-110116	MW-G-360 11/9/2016 MWG-360-110916	MW-G-600 11/9/2016 MWG-600-110916	MW-H-65 11/7/2016 MWH-65-110716	MW-I-55 11/8/2016 MWI-55-110816
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L																
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	710	---	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
95-95-4	2,4,5-TRICHLOROPHENOL	1,200	---	2.7 J	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 1 U	< 1 U	< 1 U	0.31 J	0.34 J	< 0.96 U	7.3	< 0.99 U
88-06-2	2,4,6-TRICHLOROPHENOL	4.1	---	**< 9.5 U**	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	0.18 J	< 1 U	0.18 J	< 1 U	< 0.95 U	< 0.96 U	16	< 0.99 U
120-83-2	2,4-DICHLOROPHENOL	46	---	2.1	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	3	0.3
105-67-9	2,4-DIMETHYLPHENOL	360	---	< 9.5 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.99 U
51-28-5	2,4-DINITROPHENOL	39	---	**< 48 U**	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5.1 U	< 5 U	< 5.1 U	< 5.1 U	< 4.8 U	< 4.8 U	< 5 U	< 5 U
121-14-2	2,4-DINITROTOLUENE	0.24	---	**< 9.5 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.99 U**
606-20-2	2,6-DINITROTOLUENE	0.049	---	**< 9.5 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.99 U**
91-58-7	2-CHLORONAPHTHALENE	750	---	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
95-57-8	2-CHLOROPHENOL	91	---	< 9.5 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U	0.54 J	0.42 J
95-48-7	2-METHLYPHENOL	930	---	< 9.5 U	< 0.18 U	< 0.96 U	< 0.96 U	< 0.96 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.99 U
91-57-6	2-METHYLNAPHTHALENE	36	---	< 1.8 U	< 0.96 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
88-74-4	2-NITROANILINE	190	---	< 48 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5.1 U	< 5 U	< 5.1 U	< 5.1 U	< 4.8 U	< 4.8 U	< 5 U	< 5 U
88-75-5	2-NITROPHENOL	---	---	< 9.5 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.99 U
91-94-1	3,3`-DICHLOROBENZIDINE	0.13	---	**< 9.5 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.99 U**
99-09-2	3-NITROANILINE	---	---	< 48 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5.1 U	< 5 U	< 5.1 U	< 5.1 U	< 4.8 U	< 4.8 U	< 5 U	< 5 U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	1.5	---	**< 48 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 5.1 U**	**< 5 U**	**< 5.1 U**	**< 5.1 U**	**< 4.8 U**	**< 4.8 U**	**< 5 U**	**< 5 U**
101-55-3	4-BROMOPHENYL PHENYL ETHER	---	---	< 9.5 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.99 U
59-50-7	4-CHLORO-3-METHYLPHENOL	1,400	---	< 9.5 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.99 U
106-47-8	4-CHLOROANILINE	0.37	---	**< 9.5 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.99 U**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	---	---	< 9.5 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.99 U
106-44-5	4-METHLYPHENOL	1,900	---	< 9.5 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.99 U
100-01-6	4-NITROANILINE	3.8	---	**< 48 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 5.1 U**	**< 5 U**	**< 5.1 U**	**< 5.1 U**	**< 4.8 U**	**< 4.8 U**	**< 5 U**	**< 5 U**
100-02-7	4-NITROPHENOL	---	---	< 48 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5.1 U	< 5 U	< 5.1 U	< 5.1 U	< 4.8 U	< 4.8 U	< 5 U	< 5 U
83-32-9	ACENAPHTHENE	530	---	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
208-96-8	ACENAPHTHYLENE	---	---	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
98-86-2	ACETOPHENONE	1,900	---	< 9.5 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 1 U	< 1 U	< 1 U	0.14 J	< 0.95 U	< 0.96 U	< 1 U	< 0.99 U
120-12-7	ANTHRACENE	1,800	---	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
1912-24-9	ATRAZINE	0.3	3	**< 9.5 U**	**< 0.96 U**	1.7	**< 0.96 U**	**< 0.96 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	1.3	0.13 J	**< 1 U**	**< 0.99 U**
100-52-7	BENZALDEHYDE	19	---	< 9.5 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.99 U
56-55-3	BENZO[A]ANTHRACENE	0.03	---	**< 1.8 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**
50-32-8	BENZO[A]PYRENE	0.025	0.2	**< 1.8 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**
205-99-2	BENZO[B]FLUORANTHENE	0.25	---	**< 1.8 U**	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
191-24-2	BENZO[G,H,I]PERYLENE	---	---	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
207-08-9	BENZO[K]FLUORANTHENE	2.5	---	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
85-68-7	BENZYL BUTYL PHTHALATE	16	---	< 9.5 U	< 0.96 U	< 0.96 U	0.24 J	0.45 J	< 1 U	< 1 U	0.38 J	< 1 U	< 0.95 U	0.22 J	0.17 J	0.28 J
92-52-4	BIPHENYL	0.83	---	**< 9.5 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.99 U**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	59	---	< 9.5 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.99 U
111-44-4	BIS(2-CHLOROETHYL) ETHER	0.014	---	**< 1.8 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.6	6	**< 19 U**	< 1.9 U	1.4 J	< 1.9 U	< 1.9 U	< 2 U	1.8 J	< 2 U	< 2 U	< 1.9 U	< 1.9 U	1.4 J	1.2 J
105-60-2	CAPROLACTAM	9,900	---	< 48 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5.1 U	< 5 U	< 5.1 U	< 5.1 U	< 4.8 U	< 4.8 U	< 5 U	< 5 U
86-74-8	CARBAZOLE	---	---	0.77 J	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	0.43	< 0.19 U
218-01-9	CHRYSENE	25	---	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
53-70-3	DIBENZ[A,H]ANTHRACENE	0.025	---	**< 1.8 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**
132-64-9	DIBENZOFURAN	7.9	---	< 9.5 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U	0.28 J	< 0.99 U
84-66-2	DIETHYL PHTHALATE	15,000	---	1.4 J	< 0.96 U	0.14 J	0.2 J	0.17 J	0.15 J	0.18 J	0.15 J	0.15 J	< 0.95 U	0.24 J	0.25 J	0.17 J
131-11-3	DIMETHYL PHTHALATE		---	< 9.5 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.99 U
84-74-2	DI-N-BUTYL PHTHALATE	900	---	< 9.5 U	< 0.96 U	< 0.96 U	< 0.96 U	0.13 J	< 1 U	0.14 J	0.15 J	< 1 U	< 0.95 U	0.23 J	< 1 U	< 0.99 U
117-84-0	DI-N-OCTYL PHTHALATE	200	---	< 9.5 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.99 U
206-44-0	FLUORANTHENE	800	---	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
86-73-7	FLUORENE	290	---	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	0.43	< 0.19 U
118-74-1	HEXACHLOROBENZENE	0.0098	1	**< 1.8 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**
87-68-3	HEXACHLOROBUTADIENE	0.14	---	**< 1.8 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**
77-47-4	HEXACHLOROCYCLOPENTADIENE	0.41	50	**< 9.5 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.99 U**
67-72-1	HEXACHLOROETHANE	0.33	---	**< 9.5 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.99 U**
193-39-5	INDENO[1,2,3-CD]PYRENE	0.25	---	**< 1.8 U**	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
78-59-1	ISOPHORONE	78	---	< 9.5 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.99 U
91-20-3	NAPHTHALENE	0.17	---	**< 1.8 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**
98-95-3	NITROBENZENE	0.14	---	**< 19 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 2 U**	**< 2 U**	**< 2 U**	**< 2 U**	**< 1.9 U**	**< 1.9 U**	**< 2 U**	**< 2 U**
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.011	---	**< 1.8 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**
86-30-6	N-NITROSODIPHENYLAMINE	12	---	< 9.5 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.99 U
87-86-5	PENTACHLOROPHENOL	0.041	1	91	**< 0.96 U**	6.3	**< 0.96 U**	**< 0.96 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	3.2	0.15 J	210	**< 0.99 U**
85-01-8	PHENANTHRENE	---	---	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
108-95-2	PHENOL	5,800	---	< 9.5 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 1 U	< 1 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.99 U
129-00-0	PYRENE	120	---	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U

Table 5-15
October-November 2016 (1st Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-A-51 11/10/2016 MWA-51-111016	MW-B-55 11/4/2016 MWB-55-110416	MW-B-400 11/8/2016 MWB-400-110816	MW-B-598 11/8/2016 MWB-598-110816	MW-C-40 11/7/2016 MWC-40-110716	MW-D-77 11/1/2016 MWD-77-110116	MW-E-46 11/2/2016 MWE-46-110216	MW-F-70 11/3/2016 MWF-70-110316	MW-G-35 11/1/2016 MWG-35-110116	MW-G-360 11/9/2016 MWG-360-110916	MW-G-600 11/9/2016 MWG-600-110916	MW-H-65 11/7/2016 MWH-65-110716	MW-I-55 11/8/2016 MWI-55-110816
VOLATILE ORGANIC COMPOUNDS in ug/L																
71-55-6	1,1,1-TRICHLOROETHANE	8,000	200	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.076	---	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10,000	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-00-5	1,1,2-TRICHLOROETHANE	0.28	5	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-34-3	1,1-DICHLOROETHANE	2.8	---	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.96 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-35-4	1,1-DICHLOROETHYLENE	280	7	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
120-82-1	1,2,4-TRICHLOROBENZENE	1.2	70	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**1.5**	0.98 J
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	0.00033	0.2	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
106-93-4	1,2-DIBROMOETHANE	0.0075	0.05	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
95-50-1	1,2-DICHLOROBENZENE	300	600	49	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.26 J	< 1 U	< 1 U	0.61 J	< 1 U	21	8
107-06-2	1,2-DICHLOROETHANE	0.17	5	**< 25 U**	**< 1 U**	**0.86 J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**0.5 J**	**0.44 J**	**< 1 U**	**< 1 U**
78-87-5	1,2-DICHLOROPROPANE	0.85	5	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
541-73-1	1,3-DICHLOROBENZENE	---	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.5	0.77 J
106-46-7	1,4-DICHLOROBENZENE	0.48	75	**40**	**< 1 U**	**0.55 J**	**< 1 U**	**< 1 U**	**< 1 U**	**0.95 J**	**< 1 U**	**< 1 U**	**1.1**	**0.65 J**	**30**	**17**
78-93-3	2-BUTANONE	5,600	---	< 130 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
591-78-6	2-HEXANONE	38	---	**< 130 U**	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
108-10-1	4-METHYL-2-PENTANONE	6,300	---	< 130 U	< 5 U J	< 5 U	< 5 U	< 5 U J	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
67-64-1	ACETONE	14,000	---	< 130 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
71-43-2	BENZENE	0.46	5	**70**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	0.35 J	**< 1 U**	**< 1 U**	**< 1 U**	**11**	**0.56 J**
75-27-4	BROMODICHLOROMETHANE	0.13	80	**< 25 U J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-25-2	BROMOFORM	3.3	80	**< 25 U J**	< 1 U	< 1 U J	< 1 U J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
74-83-9	BROMOMETHANE	7.5	---	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-15-0	CARBON DISULFIDE	810	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
56-23-5	CARBON TETRACHLORIDE	0.46	5	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
108-90-7	CHLOROBENZENE	78	100	**320**	< 1 U	0.28 J	< 1 U	< 1 U	0.36 J	9.3	5.2	0.25 J	10	2.1	**250**	43
75-00-3	CHLOROETHANE	21,000	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
67-66-3	CHLOROFORM	0.22	80	**< 25 U**	**< 1 U**	**0.84 J**	**0.35 J**	**< 1 U**	**0.79 J**	**0.56 J**	**< 1 U**	**0.97 J**	**1**	**0.48 J**	**< 1 U**	**< 1 U**
74-87-3	CHLOROMETHANE	190	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
156-59-2	CIS-1,2-DICHLOROETHENE	36	70	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	---	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
110-82-7	CYCLOHEXANE	13,000	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
124-48-1	DIBROMOCHLOROMETHANE	0.87	---	**< 25 U J**	**< 1 U**	**< 1 U J**	**< 1 U J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-71-8	DICHLORODIFLUOROMETHANE	200	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
100-41-4	ETHYLBENZENE	1.5	700	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
98-82-8	ISOPROPYLBENZENE (CUMENE)	450	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-20-9	METHYL ACETATE	20,000	---	< 130 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1634-04-4	METHYL TERT-BUTYL ETHER	14	---	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.75 J	1.1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
108-87-2	METHYLCYLOHEXANE	---	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-09-2	METHYLENE CHLORIDE	11	5	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
100-42-5	STYRENE (MONOMER)	1,200	100	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
127-18-4	TETRACHLOROETHYLENE	11	5	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
108-88-3	TOLUENE	1,100	1,000	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
156-60-5	TRANS-1,2-DICHLOROETHENE	360	100	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	---	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-01-6	TRICHLOROETHYLENE	0.49	5	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-69-4	TRICHLOROFLUOROMETHANE	5,200	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-01-4	VINYL CHLORIDE	0.019	2	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
XYLENES	Xylenes, Total	190	10000	< 50 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

Notes:
USEPA RSL for TAP WATER (latest version, November 2017)
USEPA MCL (latest version, November 2017)
(1) No RSL exists, MCL utilized
U - The analyte was not detected above the reporting limit (RL).
UJ - The reporting limit is estimated due to minor quality control anomaly.
J - Result is either less than the RL but greater than or equal to the method detection limit (MDL) or the result is estimated due to a minor quality control anomaly.
B - Parameter was detected in associated laboratory method blank.
R - Based on data quality review, result is rejected by validator and considered unusable due to a major quality control anomaly.
NJ - Result was tentatively identified in a Tentatively Identified Compound (TIC) scan.
Bold indicates the reporting limit was above the RSL and/or MCL.
Red bolded detected concentration exceeds RSL
Red bolded and highlighted detected concentration exceeds MCL

Table 5-15
October-November 2016 (1st Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-J-71 11/11/2016 MWJ-71-111116	MW-K-80 11/3/2016 MWK-80-110316	MW-K-440 11/4/2016 MWK-440-110416	MW-K-440 11/4/2016 DUP-110416	MW-L-48 11/2/2016 MWL-48-110216	MW-L-250 11/7/2016 MWL-250-110716	MW-M-50 11/10/2016 MWM-50-111016	MW-N-83 11/9/2016 MWN-83-110916	MW-N-113 11/9/2016 MWN-113-110916	MW-O-145 11/10/2016 MWO-145-111016	MW-P-235 11/7/2016 MWP-235-110716	MW-Q-150 11/8/2016 MWQ-150-110816	MW-R-330 11/10/2016 MWR-330-111016	MW-R-600 11/8/2016 MWR-600-110816
TOTAL METALS in ug/L																	
7429-90-5	ALUMINUM	20,000	---	1200	< 30 U	< 30 U	< 30 U	< 30 U	8.4 J	< 30 U	< 30 U	< 30 U	48	11 J	< 30 U	300	< 30 U
7440-36-0	ANTIMONY	7.8	6	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	1.6 J B	< 2 U	< 2 U
7440-38-2	ARSENIC	0.052	10	1.9	0.29 J	< 1 U	< 1 U	< 1 U	< 1 U	1.3	0.54 J	1.5	0.21 J	< 1 U	7.3	0.36 J	0.87 J
7440-39-3	BARIUM	3,800	2,000	22	23	120	120	24	120	23	28	18	14	21	18	23	64
7440-41-7	BERYLLIUM	25	4	1.4	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.15 J	< 1 U	< 1 U	< 1 U	0.1 J	0.36 J	< 1 U
7440-43-9	CADMIUM	9.2	5	< 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 U	< 1 U
7440-70-2	CALCIUM METAL	---	---	590000	370000	130000	140000	480000	120000	620000	380000	410000	600000	600000	420000	430000	140000
7440-47-3	CHROMIUM[1]	---	100	2.2	< 2 U	0.49 J	0.49 J	< 2 U	2.4	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
7440-48-4	COBALT	6	---	2.9	< 0.5 U	< 0.5 U	< 0.5 U	4.3	< 0.5 U	2.4	0.27 J	0.17 J	0.037 J	< 0.5 U	2.1	4.5	1.8
7440-50-8	COPPER	800	1,300	< 2.4 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	1.4 J	< 2 U	1.2 J
7439-89-6	IRON	14,000	---	50000	8400	< 50 U	< 50 U	28000 B	200	28000	16000	16000	13000	4600	19000	1200	2900
7439-92-1	LEAD	15	15	25	4	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	61	< 1 U	< 1 U
7439-95-4	MAGNESIUM	---	---	49000	21000	19000	200000	97000	16000	29000	19000	25000	40000	47000	21000	46000	25000
7439-96-5	MANGANESE	430	---	6100	3800	< 5 U	< 5 U	6700 B	< 5 U	2100	2800	6600	2700	3300	4200	2000	520
7440-02-0	NICKEL	390	---	4.5	< 1 U	0.56 J	< 1 U	3.4	2.1	0.69 J	0.49 J	< 1 U	< 1 U	0.42 J	3.3	3.3	2.4
7440-09-7	POTASSIUM	---	---	14000	7900	1300	1300	7000	1400	14000	19000	13000	9100	4000	17000	14000	1900
7782-49-2	SELENIUM	100	50	2.2 J	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	1.1 J	0.53 J	0.5 J	< 5 U	< 5 U	< 5 U	0.45 J	< 5 U
7440-22-4	SILVER	94	---	< 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 U	< 1 U
7440-23-5	SODIUM	---	---	27000	9100	2400	2400	9600	3600	3600	12000	6500	56000	44000	7900	16000	17000 J
7440-28-0	THALLIUM	0.2	2	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.7 B	< 1 U
7440-62-2	VANADIUM	86	---	3	< 1 U	< 1 U	< 1 U	1.8	< 1 U	< 1 U	< 1 U	< 1 U	0.37 J	< 1 U	< 1 U	0.34 J	< 1 U
7440-66-6	ZINC	6,000	---	120	< 5 U	< 5 U	< 5 U	4.5 J	6	2.7 J	5.5	< 5 U	4 J	29	2.9 J	10	3 J
57-12-5	CYANIDE	1.5	200	4.8 J	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	2.8 J	3.5 J	< 10 U	< 10 U	< 10 U	< 10 U
7439-97-6	MERCURY	0.63	2	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L																	
16887-00-6	CHLORIDE	---	---	50	18	17	16	28	22	17	15	17	57	53	22	37	18
14797-55-8	NITRATE AS N	32	10	0.04 J	< 0.1 U	3.4	3.5	0.75	3.6	0.075 J	< 0.25 U	< 0.25 U	< 0.25 U	< 0.25 U	< 0.1 U	0.17 J	0.4
14808-79-8	SULFATE	---	---	1500	680	98	99	1300	34	1400	610	790	1500	1500	1000	800	200
ALKB	BICARBONATE ALKALINITY	---	---	310	410	320	330	330	320	410	530	470	200	170	470	470	390
ALKC	CARBONATE ALKALINITY	---	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	---	310	410	320	330	330	320	410	530	470	200	170	470	470	390
PESTICIDES in ug/L																	
957-51-7	DIPHENAMID	530		130	0.74 J	< 0.95 U	< 0.95 U	0.47 J	< 0.95 U	4.6	3.5	2.2	310	130	10	16	2.2
53-19-0	2,4'-DDD	0.032		< 0.62 U	< 0.026 U	< 0.0012 U J	< 0.0012 U J	< 0.13 U	< 0.0012 U	< 0.026 U	< 0.026 U	< 0.026 U	< 0.033 U	0.33 J	< 0.025 U	< 0.025 U	0.013
3424-82-6	2,4'-DDE	0.046		< 0.62 U	< 0.026 U	< 0.0012 U J	< 0.0012 U J	1.2	< 0.0012 U	0.11 J	0.32	0.21 J	< 0.033 U	< 0.025 U	0.16	0.2 J	< 0.0012 U
789-02-6	2,4'-DDT	0.23		< 0.62 U	< 0.026 U	< 0.0012 U J	< 0.0012 U J	< 0.13 U	< 0.0012 U	< 0.026 U	< 0.026 U	< 0.026 U	< 0.033 U	< 0.025 U	< 0.025 U	< 0.025 U	< 0.0012 U
72-54-8	4,4'-DDD	0.032		< 0.62 U	< 0.026 U	< 0.0012 U	< 0.0012 U	0.086 J	< 0.0012 U	< 0.026 U	0.099 J	0.034 J	< 0.033 U	< 0.025 U	< 0.025 U	< 0.025 U	0.0051 J
72-55-9	4,4'-DDE	0.046		< 0.62 U	< 0.026 U	< 0.0012 U	< 0.0012 U	< 0.13 U	< 0.0012 U	< 0.026 U	< 0.026 U	< 0.026 U	< 0.033 U	< 0.025 U	< 0.025 U	< 0.025 U	< 0.0012 U
50-29-3	4,4'-DDT	0.23		< 0.62 U	< 0.026 U	0.003 J	0.0043 J	< 0.13 U	< 0.0012 U	< 0.026 U	< 0.026 U	< 0.026 U	< 0.033 U	< 0.025 U	< 0.025 U	< 0.025 U	< 0.0012 U
309-00-2	ALDRIN	0.00092		< 0.62 U	< 0.026 U	< 0.0012 U	< 0.0012 U	< 0.13 U	< 0.0012 U	< 0.026 U	< 0.026 U	< 0.026 U	< 0.033 U	< 0.025 U	< 0.025 U	< 0.025 U	< 0.0012 U
319-84-6	ALPHA-BHC	0.0072		0.51	0.32	0.024 J	0.0035 J	0.73	0.018	1.7	2.5	1.4	< 0.033 U	0.11 J	0.71	2.3	0.34
5103-71-9	ALPHA-CHLORDANE	0.02	2	< 0.62 U	< 0.026 U	< 0.0012 U	< 0.0012 U	< 0.13 U	< 0.0012 U	< 0.026 U	0.037 J	< 0.026 U	< 0.033 U	< 0.025 U	< 0.025 U	< 0.025 U	< 0.0012 U
319-85-7	BETA-BHC	0.025		1.5	1.5	0.12	0.16	7.5	0.06	5.5	4.9	2.1	0.5	0.23	2.2	3.2	0.53
319-86-8	DELTA-BHC	0.025		17	5.5 B	0.057	0.069	3.2	0.007	9.3	8.7	4.9	4.6 J	1.8	3.9	6.7	0.66
60-57-1	DIELDRIN	0.0018		< 0.62 U	0.039	0.0072	0.0099	0.52	0.0019	0.11	< 0.026 U	< 0.026 U	< 0.033 U	< 0.025 U	< 0.025 U	0.015 J	< 0.0012 U
959-98-8	ENDOSULFAN I	100		< 0.62 U	< 0.026 U	< 0.0012 U	< 0.0012 U	< 0.13 U	< 0.0012 U	< 0.026 U	< 0.026 U	< 0.026 U	< 0.033 U	< 0.025 U	< 0.025 U	< 0.025 U	< 0.0012 U
33213-65-9	ENDOSULFAN II	100		< 0.62 U	0.032 J	< 0.0012 U	< 0.0012 U	< 0.13 U	< 0.0012 U	0.021 J	< 0.026 U	0.064	< 0.033 U	< 0.025 U	< 0.025 U	< 0.025 U	< 0.0012 U
1031-07-8	ENDOSULFAN SULFATE	---	---	0.3	< 0.026 U	< 0.0012 U	< 0.0012 U	< 0.13 U	< 0.0012 U	< 0.026 U	0.23 J	< 0.026 U	0.56 J	0.45	< 0.025 U	< 0.025 U	0.054 J
72-20-8	ENDRIN	2.3	2	< 0.62 U	< 0.026 U	< 0.0012 U	< 0.0012 U	0.17	< 0.0012 U	< 0.026 U	< 0.026 U	0.016 J	< 0.033 U	< 0.025 U	< 0.025 U	< 0.025 U	< 0.0012 U
7421-93-4	ENDRIN ALDEHYDE	---	---	0.12	< 0.026 U	< 0.0012 U	< 0.0012 U	< 0.13 U	< 0.0012 U	0.048 J	< 0.026 U	< 0.026 U	0.14 J	0.088 J	< 0.025 U	< 0.025 U	< 0.0012 U
53494-70-5	ENDRIN KETONE	---	---	< 0.62 U	< 0.026 U	< 0.0012 U	< 0.0012 U	0.83	< 0.0012 U	< 0.026 U	< 0.026 U	< 0.026 U	< 0.033 U	< 0.025 U	< 0.025 U	< 0.025 U	< 0.0012 U
58-89-9	GAMMA-BHC (LINDANE)	0.042	0.2	< 0.62 U	< 0.026 U	< 0.0012 U	< 0.0012 U	< 0.13 U	0.0054	< 0.026 U	< 0.026 U	< 0.026 U	< 0.033 U	< 0.025 U	< 0.025 U	0.09 J	0.029
12789-03-6	gamma-Chlordane	0.02	2	< 0.62 U	0.097	< 0.0012 U	< 0.0012 U	< 0.13 U	< 0.0012 U	< 0.026 U	0.065 J	0.036 J	< 0.033 U	< 0.025 U	0.023 J	0.028	0.0059
76-44-8	HEPTACHLOR	0.0014	0.4	< 0.62 U	< 0.026 U	< 0.0012 U	< 0.0012 U	< 0.13 U	< 0.0012 U	< 0.026 U	< 0.026 U	< 0.026 U	< 0.033 U	< 0.025 U	< 0.025 U	< 0.025 U	< 0.0012 U
1024-57-3	HEPTACHLOR EPOXIDE	0.0014	0.2	< 0.62 U	< 0.026 U	< 0.0012 U	< 0.0012 U	< 0.13 U	< 0.0012 U	< 0.026 U	< 0.026 U	< 0.026 U	< 0.033 U	< 0.025 U	< 0.025 U	< 0.025 U	< 0.0012 U
72-43-5	METHOXYCHLOR	37	40	< 0.62 U	< 0.13 U	< 0.0012 U	< 0.0012 U	< 0.13 U	< 0.0012 U	< 0.026 U	< 0.026 U	< 0.026 U	< 0.033 U	< 0.025 U	< 0.025 U	< 0.025 U	< 0.0012 U
8001-35-2	TOXAPHENE	0.071	3	< 4.8 U	< 2 U	< 0.095 U	< 0.095 U	< 10 U	< 0.095 U	< 2 U	< 2 U	< 2 U	< 2.5 U	< 1.9 U	< 1.9 U	< 1.9 U	< 0.095 U
HERBICIDES in ug/L																	
94-75-7	2,4-D	170	70	< 3.8 U	< 4 U	< 3.8 U	< 3.8 U	< 4 U	< 3.8 U	< 4 U	< 4 U	< 4 U	< 3.9 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U
93-76-5	2,4,5-T	160	---	< 0.95 U	< 1 U	< 0.95 U	< 0.94 U	< 0.99 U	< 0.95 U	< 1 U	< 0.99 U	< 0.99 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.95 U

Table 5-15
October-November 2016 (1st Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-J-71 11/11/2016 MWJ-71-111116	MW-K-80 11/3/2016 MWK-80-110316	MW-K-440 11/4/2016 MWK-440-110416	MW-K-440 11/4/2016 DUP-110416	MW-L-48 11/2/2016 MWL-48-110216	MW-L-250 11/7/2016 MWL-250-110716	MW-M-50 11/10/2016 MWM-50-111016	MW-N-83 11/9/2016 MWN-83-110916	MW-N-113 11/9/2016 MWN-113-110916	MW-O-145 11/10/2016 MWO-145-111016	MW-P-235 11/7/2016 MWP-235-110716	MW-Q-150 11/8/2016 MWQ-150-110816	MW-R-330 11/10/2016 MWR-330-111016	MW-R-600 11/8/2016 MWR-600-110816
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L																	
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	710	---	< 0.9 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 4.5 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
95-95-4	2,4,5-TRICHLOROPHENOL	1,200	---	< 4.8 U	< 0.98 U	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	1	< 0.96 U	< 0.96 U	< 24 U	< 0.95 U	< 0.96 U	0.23 J	< 0.95 U
88-06-2	2,4,6-TRICHLOROPHENOL	4.1	---	< 4.8 U	< 0.98 U	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 24 U	< 0.95 U	< 0.96 U	< 0.94 U	< 0.95 U
120-83-2	2,4-DICHLOROPHENOL	46	---	1.1	0.086 J	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	2.5	< 0.18 U	0.19	< 4.5 U	0.17 J	0.25	< 0.18 U	< 0.18 U
105-67-9	2,4-DIMETHYLPHENOL	360	---	< 4.8 U	< 0.98 U	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 24 U	< 0.95 U	< 0.96 U	< 0.94 U	< 0.95 U
51-28-5	2,4-DINITROPHENOL	39	---	< 24 U	< 4.9 U	< 4.8 U	< 4.8 U	< 5.1 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 120 U	< 4.8 U	< 4.8 U	< 4.7 U	< 4.8 U
121-14-2	2,4-DINITROTOLUENE	0.24	---	**< 4.8 U**	**< 0.98 U**	**< 0.95 U**	**< 0.95 U**	**< 1 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 24 U**	**< 0.95 U**	**< 0.96 U**	**< 0.94 U**	**< 0.95 U**
606-20-2	2,6-DINITROTOLUENE	0.049	---	**< 4.8 U**	**< 0.98 U**	**< 0.95 U**	**< 0.95 U**	**< 1 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 24 U**	**< 0.95 U**	**< 0.96 U**	**< 0.94 U**	**< 0.95 U**
91-58-7	2-CHLORONAPHTHALENE	750	---	< 0.9 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 4.5 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
95-57-8	2-CHLOROPHENOL	91	---	1.4 J	< 0.98 U	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	0.27 J	0.51 J	0.28 J	< 24 U	0.18 J	0.25 J	< 0.94 U	< 0.95 U
95-48-7	2-METHLYPHENOL	930	---	< 4.8 U	< 0.98 U	< 0.18 U	< 0.18 U	< 1 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 24 U	< 0.95 U	< 0.96 U	< 0.94 U	< 0.95 U
91-57-6	2-METHYLNAPHTHALENE	36	---	< 0.9 U	< 0.19 U	< 0.95 U	< 0.95 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 4.5 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
88-74-4	2-NITROANILINE	190	---	< 24 U	< 4.9 U	< 4.8 U	< 4.8 U	< 5.1 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 120 U	< 4.8 U	< 4.8 U	< 4.7 U	< 4.8 U
88-75-5	2-NITROPHENOL	---	---	< 4.8 U	< 0.98 U	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 24 U	< 0.95 U	< 0.96 U	< 0.94 U	< 0.95 U
91-94-1	3,3`-DICHLOROBENZIDINE	0.13	---	**< 4.8 U**	**< 0.98 U**	**< 0.95 U**	**< 0.95 U**	**< 1 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 24 U**	**< 0.95 U**	**< 0.96 U**	**< 0.94 U**	**< 0.95 U**
99-09-2	3-NITROANILINE	---	---	< 24 U	< 4.9 U	< 4.8 U	< 4.8 U	< 5.1 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 120 U	< 4.8 U	< 4.8 U	< 4.7 U	< 4.8 U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	1.5	---	**< 24 U**	**< 4.9 U**	**< 4.8 U**	**< 4.8 U**	**< 5.1 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 120 U**	**< 4.8 U**	**< 4.8 U**	**< 4.7 U**	**< 4.8 U**
101-55-3	4-BROMOPHENYL PHENYL ETHER	---	---	< 4.8 U	< 0.98 U	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 24 U	< 0.95 U	< 0.96 U	< 0.94 U	< 0.95 U
59-50-7	4-CHLORO-3-METHYLPHENOL	1,400	---	< 4.8 U	< 0.98 U	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 24 U	< 0.95 U	< 0.96 U	< 0.94 U	< 0.95 U
106-47-8	4-CHLOROANILINE	0.37	---	2.5 J	**< 0.98 U**	**< 0.95 U**	**< 0.95 U**	**< 1 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	3.8 J	2.1	**< 0.96 U**	**< 0.94 U**	**< 0.95 U**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	---	---	< 4.8 U	< 0.98 U	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 24 U	< 0.95 U	< 0.96 U	< 0.94 U	< 0.95 U
106-44-5	4-METHLYPHENOL	1,900	---	< 4.8 U	< 0.98 U	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 24 U	< 0.95 U	< 0.96 U	< 0.94 U	< 0.95 U
100-01-6	4-NITROANILINE	3.8	---	**< 24 U**	**< 4.9 U**	**< 4.8 U**	**< 4.8 U**	**< 5.1 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 120 U**	**< 4.8 U**	**< 4.8 U**	**< 4.7 U**	**< 4.8 U**
100-02-7	4-NITROPHENOL	---	---	< 24 U	< 4.9 U	< 4.8 U	< 4.8 U	< 5.1 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 120 U	< 4.8 U	< 4.8 U	< 4.7 U	< 4.8 U
83-32-9	ACENAPHTHENE	530	---	1.7	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	0.42	< 0.18 U	< 4.5 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
208-96-8	ACENAPHTHYLENE	---	---	< 0.9 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 4.5 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
98-86-2	ACETOPHENONE	1,900	---	< 4.8 U	< 0.98 U	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	< 0.95 U	0.56 J	0.097 J	< 24 U	< 0.95 U	0.24 J	< 0.94 U	0.12 J
120-12-7	ANTHRACENE	1,800	---	< 0.9 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 4.5 U	0.072 J	< 0.18 U	< 0.18 U	< 0.18 U
1912-24-9	ATRAZINE	0.3	3	**< 4.8 U**	**< 0.98 U**	**< 0.95 U**	**< 0.95 U**	0.26 J	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	0.14 J	**< 24 U**	**< 0.95 U**	0.49 J	1.5	0.46 J
100-52-7	BENZALDEHYDE	19	---	< 4.8 U	< 0.98 U	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 24 U	< 0.95 U	< 0.96 U	< 0.94 U	< 0.95 U
56-55-3	BENZO[A]ANTHRACENE	0.03	---	**< 0.9 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	0.068 J	**< 4.5 U**	0.43	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**
50-32-8	BENZO[A]PYRENE	0.025	0.2	**< 0.9 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 4.5 U**	0.15 J	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**
205-99-2	BENZO[B]FLUORANTHENE	0.25	---	< 0.9 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	0.13 J	**< 4.5 U**	0.24	< 0.18 U	< 0.18 U	< 0.18 U
191-24-2	BENZO[G,H,I]PERYLENE	---	---	< 0.9 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	0.12 J	< 4.5 U	0.051 J	< 0.18 U	< 0.18 U	< 0.18 U
207-08-9	BENZO[K]FLUORANTHENE	2.5	---	< 0.9 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	0.12 J	**< 4.5 U**	0.17 J	< 0.18 U	< 0.18 U	< 0.18 U
85-68-7	BENZYL BUTYL PHTHALATE	16	---	< 4.8 U	0.17 J	< 0.95 U	< 0.95 U	< 1 U	0.17 J	< 0.95 U	0.32 J	< 0.96 U	< 24 U	< 0.95 U	0.34 J	< 0.94 U	0.57 J
92-52-4	BIPHENYL	0.83	---	**< 4.8 U**	**< 0.98 U**	**< 0.95 U**	**< 0.95 U**	**< 1 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 24 U**	**< 0.95 U**	**< 0.96 U**	**< 0.94 U**	**< 0.95 U**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	59	---	< 4.8 U	< 0.98 U	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 24 U	< 0.95 U	< 0.96 U	< 0.94 U	< 0.95 U
111-44-4	BIS(2-CHLOROETHYL) ETHER	0.014	---	**< 0.9 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 4.5 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.6	6	< 9.5 U	1.6 J	< 1.9 U	< 1.9 U	2.7	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	**< 48 U**	< 1.9 U	1.7 J	< 1.9 U	1.3 J
105-60-2	CAPROLACTAM	9,900	---	< 24 U	8.9	< 4.8 U	< 4.8 U	< 5.1 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 120 U	< 4.8 U	26	< 4.7 U	1.8 J
86-74-8	CARBAZOLE	---	---	0.55 J	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 4.5 U	0.17 J	< 0.18 U	< 0.18 U	< 0.18 U
218-01-9	CHRYSENE	25	---	< 0.9 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	0.093 J	< 4.5 U	0.37	< 0.18 U	< 0.18 U	< 0.18 U
53-70-3	DIBENZ[A,H]ANTHRACENE	0.025	---	**< 0.9 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	0.13 J	**< 4.5 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**
132-64-9	DIBENZOFURAN	7.9	---	0.6 J	< 0.98 U	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	< 0.95 U	0.17 J	< 0.96 U	< 24 U	0.13 J	< 0.96 U	< 0.94 U	< 0.95 U
84-66-2	DIETHYL PHTHALATE	15,000	---	< 4.8 U	0.18 J	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	0.15 J	< 0.96 U	< 0.96 U	< 24 U	0.18 J	0.35 J	< 0.94 U	0.23 J
131-11-3	DIMETHYL PHTHALATE		---	< 4.8 U	< 0.98 U	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 24 U	< 0.95 U	< 0.96 U	< 0.94 U	< 0.95 U
84-74-2	DI-N-BUTYL PHTHALATE	900	---	< 4.8 U	< 0.98 U	0.22 J	0.19 J	< 1 U	0.16 J	< 0.95 U	0.19 J	< 0.96 U	< 24 U	< 0.95 U	0.19 J	< 0.94 U	0.18 J
117-84-0	DI-N-OCTYL PHTHALATE	200	---	< 4.8 U	< 0.98 U	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 24 U	< 0.95 U	< 0.96 U	< 0.94 U	< 0.95 U
206-44-0	FLUORANTHENE	800	---	< 0.9 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 4.5 U	0.81	< 0.18 U	< 0.18 U	< 0.18 U
86-73-7	FLUORENE	290	---	1.6	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	0.3	< 0.18 U	< 4.5 U	0.11 J	< 0.18 U	< 0.18 U	< 0.18 U
118-74-1	HEXACHLOROBENZENE	0.0098	1	**< 0.9 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 4.5 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**
87-68-3	HEXACHLOROBUTADIENE	0.14	---	**< 0.9 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 4.5 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**
77-47-4	HEXACHLOROCYCLOPENTADIENE	0.41	50	**< 4.8 U**	**< 0.98 U**	**< 0.95 U**	**< 0.95 U**	**< 1 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 24 U**	**< 0.95 U**	**< 0.96 U**	**< 0.94 U**	**< 0.95 U**
67-72-1	HEXACHLOROETHANE	0.33	---	**< 4.8 U**	**< 0.98 U**	**< 0.95 U**	**< 0.95 U**	**< 1 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 24 U**	**< 0.95 U**	**< 0.96 U**	**< 0.94 U**	**< 0.95 U**
193-39-5	INDENO[1,2,3-CD]PYRENE	0.25	---	**< 0.9 U**	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	0.11 J	**< 4.5 U**	0.059 J	< 0.18 U	< 0.18 U	< 0.18 U
78-59-1	ISOPHORONE	78	---	< 4.8 U	< 0.98 U	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 24 U	< 0.95 U	< 0.96 U	< 0.94 U	< 0.95 U
91-20-3	NAPHTHALENE	0.17	---	**< 0.9 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 4.5 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**
98-95-3	NITROBENZENE	0.14	---	**< 9.5 U**	**< 2 U**	**< 1.9 U**	**< 1.9 U**	**< 2 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 48 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.011	---	**< 0.9 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 4.5 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**
86-30-6	N-NITROSODIPHENYLAMINE	12	---	< 4.8 U	< 0.98 U	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	**< 24 U**	< 0.95 U	< 0.96 U	< 0.94 U	< 0.95 U
87-86-5	PENTACHLOROPHENOL	0.041	1	**< 4.8 U**	**< 0.98 U**	**< 0.95 U**	**< 0.95 U**	**< 1 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 24 U**	**< 0.95 U**	**< 0.96 U**	**< 0.94 U**	**< 0.95 U**
85-01-8	PHENANTHRENE	---	---	< 0.9 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 4.5 U	0.24	< 0.18 U	< 0.18 U	< 0.18 U
108-95-2	PHENOL	5,800	---	< 4.8 U	< 0.98 U	< 0.95 U	< 0.95 U	< 1 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 24 U	< 0.95 U	< 0.96 U	< 0.94 U	< 0.95 U
129-00-0	PYRENE	120	---	< 0.9 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 4.5 U	0.55	< 0.18 U	< 0.18 U	< 0.18 U

Table 5-15
October-November 2016 (1st Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-J-71 11/11/2016 MWJ-71-111116	MW-K-80 11/3/2016 MWK-80-110316	MW-K-440 11/4/2016 MWK-440-110416	MW-K-440 11/4/2016 DUP-110416	MW-L-48 11/2/2016 MWL-48-110216	MW-L-250 11/7/2016 MWL-250-110716	MW-M-50 11/10/2016 MWM-50-111016	MW-N-83 11/9/2016 MWN-83-110916	MW-N-113 11/9/2016 MWN-113-110916	MW-O-145 11/10/2016 MWO-145-111016	MW-P-235 11/7/2016 MWP-235-110716	MW-Q-150 11/8/2016 MWQ-150-110816	MW-R-330 11/10/2016 MWR-330-111016	MW-R-600 11/8/2016 MWR-600-110816
VOLATILE ORGANIC COMPOUNDS in ug/L																	
71-55-6	1,1,1-TRICHLOROETHANE	8,000	200	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 50 U	< 1 U	< 1 U	< 7 U	< 1 U
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.076	---	**< 25 U J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 5 U J**	**< 1 U**	**< 1 U**	**< 7 U J**	**< 1 U**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10,000	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 50 U	< 1 U	< 1 U	< 7 U	< 1 U
79-00-5	1,1,2-TRICHLOROETHANE	0.28	5	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 1 U**	**< 1 U**	**< 7 U**	**< 1 U**
75-34-3	1,1-DICHLOROETHANE	2.8	---	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 5 U**	< 1 U	< 1 U	**< 50 U**	< 1 U	< 1 U	**< 7 U**	< 1 U
75-35-4	1,1-DICHLOROETHYLENE	280	7	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	**< 50 U**	< 1 U	< 1 U	< 7 U	< 1 U
120-82-1	1,2,4-TRICHLOROBENZENE	1.2	70	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	3.4 J	1.6	< 1 U	**< 50 U**	6.4	0.52 J	**< 7 U**	< 1 U
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	0.00033	0.2	**< 25 U J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 1 U**	**< 1 U**	**< 7 U**	**< 1 U**
106-93-4	1,2-DIBROMOETHANE	0.0075	0.05	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 1 U**	**< 1 U**	**< 7 U**	**< 1 U**
95-50-1	1,2-DICHLOROBENZENE	300	600	80	5.1	< 1 U	< 1 U	< 1 U	< 1 U	4.5 J	4.8	3	68	33	2	9.3	< 1 U
107-06-2	1,2-DICHLOROETHANE	0.17	5	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	2 J	0.39 J	0.5 J	**< 50 U**	1.6	0.34 J	6.6 J	1.8
78-87-5	1,2-DICHLOROPROPANE	0.85	5	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 1 U**	**< 1 U**	**< 7 U**	**< 1 U**
541-73-1	1,3-DICHLOROBENZENE	---	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	0.91 J	0.34 J	< 50 U	3.6	0.28 J	< 7 U	< 1 U
106-46-7	1,4-DICHLOROBENZENE	0.48	75	83	4	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	9.7	14	5.9	64	100	5.9	22	0.83 J
78-93-3	2-BUTANONE	5,600	---	< 130 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 25 U	< 5 U	< 5 U	< 250 U	< 5 U	< 5 U	< 35 U	< 5 U
591-78-6	2-HEXANONE	38	---	**< 130 U**	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 25 U	< 5 U	< 5 U	**< 250 U**	< 5 U	< 5 U	< 35 U	< 5 U
108-10-1	4-METHYL-2-PENTANONE	6,300	---	< 130 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U J	< 25 U	< 5 U	< 5 U	< 250 U	< 5 U J	< 5 U	< 35 U	< 5 U
67-64-1	ACETONE	14,000	---	< 130 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 25 U	< 5 U	< 5 U	< 250 U	< 5 U	3.1 J	< 35 U	< 5 U
71-43-2	BENZENE	0.46	5	57	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	2.9 J	2.1	1.2	90	24	1.1	**< 7 U**	**< 1 U**
75-27-4	BROMODICHLOROMETHANE	0.13	80	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U J**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 7 U**	**< 1 U**
75-25-2	BROMOFORM	3.3	80	**< 25 U J**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 5 U J**	< 1 U	< 1 U	**< 5 U**	< 1 U	< 1 U	**< 7 U J**	< 1 U
74-83-9	BROMOMETHANE	7.5	---	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	**< 50 U**	< 1 U	< 1 U	< 7 U	< 1 U
75-15-0	CARBON DISULFIDE	810	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 50 U	< 1 U	< 1 U	< 7 U	< 1 U
56-23-5	CARBON TETRACHLORIDE	0.46	5	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 1 U**	**< 1 U**	**< 7 U**	**< 1 U**
108-90-7	CHLOROBENZENE	78	100	870	17	< 1 U	< 1 U	< 1 U	< 1 U	55	68	44	1000	420	38	94	< 1 U
75-00-3	CHLOROETHANE	21,000	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 50 U	< 1 U	< 1 U	< 7 U	< 1 U
67-66-3	CHLOROFORM	0.22	80	**< 25 U**	**< 1 U**	0.63 J	0.72 J	0.55 J	0.84 J	**< 5 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 1 U**	**< 1 U**	**< 7 U**	0.56 J
74-87-3	CHLOROMETHANE	190	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 50 U	< 1 U	< 1 U	< 7 U	< 1 U
156-59-2	CIS-1,2-DICHLOROETHENE	36	70	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	**< 50 U**	< 1 U	< 1 U	< 7 U	< 1 U
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	---	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 50 U	< 1 U	< 1 U	< 7 U	< 1 U
110-82-7	CYCLOHEXANE	13,000	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 50 U	< 1 U	< 1 U	< 7 U	< 1 U
124-48-1	DIBROMOCHLOROMETHANE	0.87	---	**< 25 U J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U J**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 7 U J**	**< 1 U**
75-71-8	DICHLORODIFLUOROMETHANE	200	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 50 U	< 1 U	< 1 U	< 7 U	< 1 U
100-41-4	ETHYLBENZENE	1.5	700	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 5 U**	0.55 J	< 1 U	**< 50 U**	< 1 U	< 1 U	**< 7 U**	< 1 U
98-82-8	ISOPROPYLBENZENE (CUMENE)	450	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	2.1	0.22 J	< 50 U	0.38 J	< 1 U	< 7 U	< 1 U
79-20-9	METHYL ACETATE	20,000	---	< 130 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 25 U	< 5 U	< 5 U	< 250 U	< 5 U	< 5 U	< 35 U	< 5 U
1634-04-4	METHYL TERT-BUTYL ETHER	14	---	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	**< 50 U**	0.96 J	< 1 U	< 7 U	< 1 U
108-87-2	METHYLCYLOHEXANE	---	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	0.37 J	< 1 U	< 50 U	< 1 U	< 1 U	< 7 U	< 1 U
75-09-2	METHYLENE CHLORIDE	11	5	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	**< 50 U**	< 1 U	< 1 U	**< 7 U**	< 1 U
100-42-5	STYRENE (MONOMER)	1,200	100	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 50 U	< 1 U	< 1 U	< 7 U	< 1 U
127-18-4	TETRACHLOROETHYLENE	11	5	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	**< 50 U**	< 1 U	< 1 U	**< 7 U**	< 1 U
108-88-3	TOLUENE	1,100	1,000	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 50 U	< 1 U	< 1 U	< 7 U	< 1 U
156-60-5	TRANS-1,2-DICHLOROETHENE	360	100	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 50 U	< 1 U	< 1 U	< 7 U	< 1 U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	---	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 50 U	< 1 U	< 1 U	< 7 U	< 1 U
79-01-6	TRICHLOROETHYLENE	0.49	5	**< 25 U**	**< 1 U**	1.4	1.6	**< 1 U**	0.26 J	**< 5 U**	0.21 J	0.27 J	**< 50 U**	**< 1 U**	**< 1 U**	**< 7 U**	0.45 J
75-69-4	TRICHLOROFLUOROMETHANE	5,200	---	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U	< 1 U	< 1 U	< 50 U	< 1 U	< 1 U	< 7 U	< 1 U
75-01-4	VINYL CHLORIDE	0.019	2	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 1 U**	**< 1 U**	**< 7 U**	**< 1 U**
XYLENES	Xylenes, Total	190	10000	< 50 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 10 U	0.4 J	< 2 U	< 100 U	< 2 U	< 2 U	< 14 U	< 2 U

Notes:
USEPA RSL for TAP WATER (latest version, November 2017)
USEPA MCL (latest version, November 2017)
(1) No RSL exists, MCL utilized
U - The analyte was not detected above the reporting limit (RL).
UJ - The reporting limit is estimated due to minor quality control anomaly.
J - Result is either less than the RL but greater than or equal to the method detection limit (MDL) o
B - Parameter was detected in associated laboratory method blank.
R - Based on data quality review, result is rejected by validator and considered unusable due to a n
NJ - Result was tentatively identified in a Tentatively Identified Compound (TIC) scan.
Bold indicates the reporting limit was above the RSL and/or MCL.
Red bolded detected concentration exceeds RSL
Red bolded and highlighted detected concentration exceeds MCL

Table 5-15
October-November 2016 (1st Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	EW-1-110 11/11/2016 EW1-110-111116	OW-1-62 10/24/2016 OW1-62-102416	OW-1-105 10/24/2016 OW1-105-102416	OW-2-65 10/26/2016 OW2-65-102516	OW-2-65 10/26/2016 DUP-102616	OW-2-115 10/25/2016 OW2-115-102516	OW-3-55 10/27/2016 OW3-55-102716	OW-3-105 10/27/2016 OW3-105-102716	OW-4-70 10/28/2016 OW4-70-102816	OW-5-90 10/31/2016 OW5-90-103116	OW-7-242 11/3/2016 OW7-242-110316	OW-7-410 11/3/2016 OW7-410-110316	OW-8-230 10/28/2016 OW8-230-102816	OW-9-125 10/26/2016 OW9-125-102616
TOTAL METALS in ug/L																	
7429-90-5	ALUMINUM	20,000	---	76	3300	70	760 B	710 B	240	21000 B	1600 J	210 B	470	68	< 30 U	9.1 J B	200 B
7440-36-0	ANTIMONY	7.8	6	< 2 U	< 2 U	< 2 U	< 2 U		< 2 U	0.79 J B	< 2 U	0.56 J B	0.68 J B	< 2 U	< 2 U	< 2 U	< 2 U
7440-38-2	ARSENIC	0.052	10	**0.34 J**	**1.4**	**0.12 J**	**0.48 J**	**0.51 J**	**0.44 J**	**7.8**	**1.8**	**0.35 J**	**< 1 U**	**3.6**	**0.16 J**	**0.31 J**	**0.31 J**
7440-39-3	BARIUM	3,800	2,000	27	140 J	130 J	47	49	27	500	130 J	34	66	67	35	23	91
7440-41-7	BERYLLIUM	25	4	< 1 U	0.46 J	< 1 U	< 1 U	< 1 U	< 1 U	4.6	0.1 J	< 1 U	0.74 J	< 1 U	< 1 U	< 1 U	< 1 U
7440-43-9	CADMIUM	9.2	5	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.27 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-70-2	CALCIUM METAL	---	---	540000	130000	170000	190000	200000	350000	150000	84000 J	210000	260000	110000	320000	410000	170000
7440-47-3	CHROMIUM[1]	---	100	< 2 U	2.6	0.7 J	0.85 J	0.93 J	0.43 J	34	14 J	0.72 J	2.3	0.55 J	0.42 J	< 2 U	1.8 J
7440-48-4	COBALT	6	---	0.11 J	1.4	< 0.5 U	0.17 J	0.16 J	**12 J**	5	1 J	0.34 J	0.3 J	< 0.5 U	< 0.5 U	0.34 J	0.093 J
7440-50-8	COPPER	800	1,300	< 2 U	2.4	< 2 U	0.93 J	0.96 J	2.5 J	20	13 J	1.3 J	1.1 J	< 2 U	< 2 U	0.7 J	0.83 J
7439-89-6	IRON	14,000	---	**36000**	2100 B	< 50 U	740	740	**20000 J**	**23000**	2800 J	140 B	330	890	< 50 U	33 J	740
7439-92-1	LEAD	15	15	0.18 J	5.1	0.24 J	1.4	1.8	**180**	**29**	4.5	4.7	3.1	0.46 J	< 1 U	< 1 U	**25**
7439-95-4	MAGNESIUM	---	---	28000	24000	16000	17000	18000	26000	22000	15000 J	46000	23000	49000	59000	59000	17000
7439-96-5	MANGANESE	430	---	**4900**	130 B	< 6.6 U	9.5	8.4	**3700 J**	290	180 J	65	110	43	6.6	320	1.9 J
7440-02-0	NICKEL	390	---	0.51 J	1.9	0.54 J	0.75 J	0.78 J	8 J	13	6.6 J	2.2	1.4	< 1 U	1.3	1.8	0.95 J
7440-09-7	POTASSIUM	---	---	8400	4900	1900	2600	2700	5200	4800	2000 J	15000	19000	25000	4700	2100	1900
7782-49-2	SELENIUM	100	50	0.42 J	0.41 J	< 5 U	0.4 J	0.45 J	< 5 U J	7.4	< 5 U J	< 5 U	0.58 J	< 5 U	< 5 U	< 5 U	< 5 U
7440-22-4	SILVER	94	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U J	0.27 J	< 1 U J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-23-5	SODIUM	---	---	17000	660000	47000	36000	39000	58000	34000	260000	46000	19000	93000	16000	37000	47000
7440-28-0	THALLIUM	0.2	2	**< 1 U**	**< 1 U**	**< 1 U**	0.05 J	0.052 J	**< 1 U**	**0.46 J**	**< 1 U**	**0.26 J**	0.15 J	**< 1 U**	0.11 J	**0.23 J**	**< 1 U**
7440-62-2	VANADIUM	86	---	< 1 U	3.5	< 1 U	1.1	1.1	< 1 U	30	4.5 J	0.89 J	1.3	< 1 U	< 1 U	0.61 J	0.73 J
7440-66-6	ZINC	6,000	---	13	16	40	11	13	53 J	54	110 J	3.5 J	< 5 U	< 5 U	< 5 U	3 J	28
57-12-5	CYANIDE	1.5	200	**3.4 J**	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	**97**	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
7439-97-6	MERCURY	0.63	2	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	0.19 J	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L																	
16887-00-6	CHLORIDE	---	---	49	820	120	71	68	92	76	410	95	15	24	53	88	90
14797-55-8	NITRATE AS N	32	10	< 0.1 U	0.53	3.5	1.3	1.3	< 0.1 U	3.7	0.13	7.6	6.8	< 0.1 U	**11**	0.39	2.7
14808-79-8	SULFATE	---	---	1100	160	40	140	130	670	45	25	360	200	270	590	1000	91
ALKB	BICARBONATE ALKALINITY	---	---	380	550	380	470	510	460	400	270	420	510	450	390	380	460
ALKC	CARBONATE ALKALINITY	---	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	---	380	550	380	470	510	460	400	270	420	510	450	390	380	460
PESTICIDES in ug/L																	
957-51-7	DIPHENAMID	530		48	< 0.95 U	< 0.94 U	< 0.95 U	< 0.0012 U	35	< 0.97 U	< 0.96 U	< 0.97 U	0.22 J	2.8	18	22	< 0.98 U
53-19-0	2,4'-DDD	0.032		**< 0.063 U**	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.025 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	0.013 J	< 0.0013 U	< 0.0013 U
3424-82-6	2,4'-DDE	0.046		0.034 J	0.00082 J	0.0072	< 0.0013 U	< 0.0012 U	< 0.025 U	< 0.0012 U	< 0.0013 U	< 0.025 U	0.035	0.017 J	< 0.0012 U	< 0.0013 U	0.0053
789-02-6	2,4'-DDT	0.23		< 0.063 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.025 U	0.00068 J	0.0053	< 0.0012 U	0.0048	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
72-54-8	4,4'-DDD	0.032		**< 0.063 U**	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.025 U	0.0011 J	0.0088	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
72-55-9	4,4'-DDE	0.046		**< 0.063 U**	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.025 U	0.00084 J	0.0043	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	0.0012 J
50-29-3	4,4'-DDT	0.23		< 0.063 U	0.0011	0.00047 J	< 0.0013 U	< 0.0012 U	0.024 J p	0.0032 J	0.027	< 0.0012 U	< 0.0012 U	< 0.0012 U	0.004 J	< 0.0013 U	< 0.0013 U
309-00-2	ALDRIN	0.00092		**0.088 J**	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.025 U	< 0.0012 U	< 0.0013 U	**0.025 J**	**0.0092 J**	**0.011 J**	**0.02 J**	< 0.0013 U	< 0.0013 U
319-84-6	ALPHA-BHC	0.0072		**< 0.063 U**	< 0.0013 U	0.0051	**0.008**	**0.0075**	**0.086**	< 0.0012 U	< 0.0013 U	**1.1**	**0.3 J**	**0.17**	**2.1**	**0.033**	0.0049
5103-71-9	ALPHA-CHLORDANE	0.02	2	**< 0.063 U**	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	**< 0.025 U**	0.0023 J	0.00058 J p	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
319-85-7	BETA-BHC	0.025		**2.1**	0.0011 J	0.019	**0.042**	**0.042**	**0.31**	< 0.0012 U	< 0.0013 U	**3**	**0.92**	**0.39**	**1.5**	**0.15 J**	**0.1**
319-86-8	DELTA-BHC	0.025		**14**	< 0.0013 U	0.0028	**0.12**	**0.1**	**5.5**	< 0.0012 U	< 0.0013 U	**0.74**	**0.62**	**0.32 B**	**2.2 B**	**2.9**	**0.029**
60-57-1	DIELDRIN	0.0018		**< 0.063 U**	< 0.0013 U	0.0015 J	< 0.0013 U	< 0.0012 U	**< 0.025 U**	**0.0021**	< 0.0013 U	**0.093 J**	**0.023**	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
959-98-8	ENDOSULFAN I	100		< 0.063 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.025 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	0.00088 J	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
33213-65-9	ENDOSULFAN II	100		< 0.063 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.062 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
1031-07-8	ENDOSULFAN SULFATE	---	---	0.36 J	< 0.0013 U	< 0.0012 U	0.0027 J	< 0.0012 UJ	< 0.025 U	< 0.0012 U	< 0.0013 U	0.091 J	< 0.0012 U	< 0.0012 U	0.071 J	< 0.0013 U	< 0.0013 U
72-20-8	ENDRIN	2.3	2	< 0.063 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.025 U	< 0.0012 U	< 0.0013 U	0.042	< 0.0012 U	< 0.0012 U	0.0085 J	< 0.0013 U	< 0.0013 U
7421-93-4	ENDRIN ALDEHYDE	---	---	< 0.063 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.025 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
53494-70-5	ENDRIN KETONE	---	---	< 0.063 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.025 U	< 0.0012 U	< 0.0013 U	0.11	0.018	< 0.0012 U	0.019 J	< 0.0013 U	< 0.0013 U
58-89-9	GAMMA-BHC (LINDANE)	0.042	0.2	**< 0.063 U**	< 0.0013 U	0.0022	< 0.0013 U	< 0.0012 U	< 0.025 U	< 0.0012 U	< 0.0013 U	**0.52**	**0.4**	0.035 J	**0.86**	< 0.0013 U	< 0.0013 U
12789-03-6	gamma-Chlordane	0.02	2	**< 0.063 U**	< 0.0013 U	0.00071 J	0.0013 J	0.0022 J	**< 0.025 U**	0.0028 J	< 0.0013 U	0.017 J	0.0035	< 0.0012 U	0.0055 J	< 0.0013 U	0.0013
76-44-8	HEPTACHLOR	0.0014	0.4	**< 0.063 U**	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	**< 0.025 U**	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	**0.16 J**	< 0.0013 U
1024-57-3	HEPTACHLOR EPOXIDE	0.0014	0.2	**< 0.063 U**	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	**< 0.025 U**	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	**0.0019 J**	< 0.0013 U	< 0.0013 U
72-43-5	METHOXYCHLOR	37	40	< 0.063 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.025 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
8001-35-2	TOXAPHENE	0.071	3	**< 4.8 U**	**< 0.097 U**	**< 0.095 U**	**< 0.097 U**	**< 0.094 U**	**< 1.9 U**	**< 0.095 U**	**< 0.097 U**	**< 0.095 U**	**< 0.095 U**	**< 0.095 U**	**< 0.095 U**	**< 0.096 U**	**< 0.096 U**
HERBICIDES in ug/L																	
94-75-7	2,4-D	170	70	< 3.8 U	< 3.9 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U
93-76-5	2,4,5-T	160	---	< 0.95 U	< 0.97 U	< 0.95 U	< 0.96 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.95 U

Table 5-15
October-November 2016 (1st Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	EW-1-110 11/11/2016 EW1-110-111116	OW-1-62 10/24/2016 OW1-62-102416	OW-1-105 10/24/2016 OW1-105-102416	OW-2-65 10/26/2016 OW2-65-102516	OW-2-65 10/26/2016 DUP-102616	OW-2-115 10/25/2016 OW2-115-102516	OW-3-55 10/27/2016 OW3-55-102716	OW-3-105 10/27/2016 OW3-105-102716	OW-4-70 10/28/2016 OW4-70-102816	OW-5-90 10/31/2016 OW5-90-103116	OW-7-242 11/3/2016 OW7-242-110316	OW-7-410 11/3/2016 OW7-410-110316	OW-8-230 10/28/2016 OW8-230-102816	OW-9-125 10/26/2016 OW9-125-102616
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L																	
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	710	---	< 0.72 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
95-95-4	2,4,5-TRICHLOROPHENOL	1,200	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.94 U	< 0.96 U	< 0.99 U	< 0.98 U
88-06-2	2,4,6-TRICHLOROPHENOL	4.1	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.94 U	< 0.96 U	< 0.99 U	< 0.98 U
120-83-2	2,4-DICHLOROPHENOL	46	---	0.79	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	0.16 J	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
105-67-9	2,4-DIMETHYLPHENOL	360	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.94 U	< 0.96 U	< 0.99 U	< 0.98 U
51-28-5	2,4-DINITROPHENOL	39	---	< 19 U	< 4.8 U	< 4.7 U	< 4.8 U	< 4.9 U	< 4.9 U	< 4.9 U	< 4.8 U	< 4.9 U	< 4.9 U	< 4.7 U	< 4.8 U	< 5 U	< 4.9 U
121-14-2	2,4-DINITROTOLUENE	0.24	---	**< 3.8 U**	**< 0.95 U**	**< 0.94 U**	**< 0.95 U**	**< 0.98 U**	**< 0.97 U**	**< 0.97 U**	**< 0.96 U**	**< 0.97 U**	**< 0.98 U**	**< 0.94 U**	**< 0.96 U**	**< 0.99 U**	**< 0.98 U**
606-20-2	2,6-DINITROTOLUENE	0.049	---	**< 3.8 U**	**< 0.95 U**	**< 0.94 U**	**< 0.95 U**	**< 0.98 U**	**< 0.97 U**	**< 0.97 U**	**< 0.96 U**	**< 0.97 U**	**< 0.98 U**	**< 0.94 U**	**< 0.96 U**	**< 0.99 U**	**< 0.98 U**
91-58-7	2-CHLORONAPHTHALENE	750	---	< 0.72 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
95-57-8	2-CHLOROPHENOL	91	---	0.92 J	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	1	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.94 U	< 0.96 U	< 0.99 U	< 0.98 U
95-48-7	2-METHLYPHENOL	930	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.98 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.98 U
91-57-6	2-METHYLNAPHTHALENE	36	---	< 0.72 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.19 U	< 0.94 U	< 0.96 U	< 0.99 U	< 0.19 U
88-74-4	2-NITROANILINE	190	---	< 19 U	< 4.8 U	< 4.7 U	< 4.8 U	< 4.8 U	< 4.9 U	< 4.9 U	< 4.8 U	< 4.9 U	< 4.9 U	< 4.7 U	< 4.8 U	< 5 U	< 4.9 U
88-75-5	2-NITROPHENOL	---	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.94 U	< 0.96 U	< 0.99 U	< 0.98 U
91-94-1	3,3`-DICHLOROBENZIDINE	0.13	---	**< 3.8 U**	**< 0.95 U**	**< 0.94 U**	**< 0.95 U**	**< 0.98 U**	**< 0.97 U**	**< 0.97 U**	**< 0.96 U**	**< 0.97 U**	**< 0.98 U**	**< 0.94 U**	**< 0.96 U**	**< 0.99 U**	**< 0.98 U**
99-09-2	3-NITROANILINE	---	---	< 19 U	< 4.8 U	< 4.7 U	< 4.8 U	< 4.8 U	< 4.9 U	< 4.9 U	< 4.8 U	< 4.9 U	< 4.9 U	< 4.7 U	< 4.8 U	< 5 U	< 4.9 U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	1.5	---	**< 19 U**	**< 4.8 U**	**< 4.7 U**	**< 4.8 U**	**< 4.9 U**	**< 4.9 U**	**< 4.9 U**	**< 4.8 U**	**< 4.9 U**	**< 4.9 U**	**< 4.7 U**	**< 4.8 U**	**< 5 U**	**< 4.9 U**
101-55-3	4-BROMOPHENYL PHENYL ETHER	---	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.94 U	< 0.96 U	< 0.99 U	0.37 J
59-50-7	4-CHLORO-3-METHYLPHENOL	1,400	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.94 U	< 0.96 U	< 0.99 U	< 0.98 U
106-47-8	4-CHLOROANILINE	0.37	---	**< 3.8 U**	**< 0.95 U**	**< 0.94 U**	**< 0.95 U**	< 0.98 U	0.17 J	**< 0.97 U**	**< 0.96 U**	**< 0.97 U**	**< 0.98 U**	**< 0.94 U**	**< 0.96 U**	**< 0.99 U**	**< 0.98 U**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	---	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.94 U	< 0.96 U	< 0.99 U	< 0.98 U
106-44-5	4-METHLYPHENOL	1,900	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.94 U	< 0.96 U	< 0.99 U	< 0.98 U
100-01-6	4-NITROANILINE	3.8	---	**< 19 U**	**< 4.8 U**	**< 4.7 U**	**< 4.8 U**	**< 4.9 U**	**< 4.9 U**	**< 4.9 U**	**< 4.8 U**	**< 4.9 U**	**< 4.9 U**	**< 4.7 U**	**< 4.8 U**	**< 5 U**	**< 4.9 U**
100-02-7	4-NITROPHENOL	---	---	< 19 U	< 4.8 U	< 4.7 U	< 4.8 U	< 4.8 U	< 4.9 U	< 4.9 U	< 4.8 U	< 4.9 U	< 4.9 U	< 4.7 U	< 4.8 U	< 5 U	< 4.9 U
83-32-9	ACENAPHTHENE	530	---	0.85	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
208-96-8	ACENAPHTHYLENE	---	---	< 0.72 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
98-86-2	ACETOPHENONE	1,900	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.94 U	< 0.96 U	< 0.99 U	< 0.98 U
120-12-7	ANTHRACENE	1,800	---	< 0.72 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
1912-24-9	ATRAZINE	0.3	3	**< 3.8 U**	**< 0.95 U**	**< 0.94 U**	**< 0.95 U**	**< 0.98 U**	**< 0.97 U**	**< 0.97 U**	**< 0.96 U**	**< 0.97 U**	0.22 J	**0.79 J**	**0.9 J**	**< 0.99 U**	**< 0.98 U**
100-52-7	BENZALDEHYDE	19	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.94 U	< 0.96 U	< 0.99 U	< 0.98 U
56-55-3	BENZO[A]ANTHRACENE	0.03	---	**< 0.72 U**	**< 0.18 U**	**< 0.18 U**	**0.05 J**	**0.05 J**	**< 0.18 U**	**0.051 J**	**0.033 J**	**< 0.18 U**	**< 0.19 U**	**0.33**	**< 0.18 U**	**< 0.19 U**	**0.036 J**
50-32-8	BENZO[A]PYRENE	0.025	0.2	**< 0.72 U**	**< 0.18 U**	**< 0.18 U**	**0.043 J**	**0.043 J**	**< 0.18 U**	**0.039 J**	**0.036 J**	**< 0.18 U**	**< 0.19 U**	**0.28**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**
205-99-2	BENZO[B]FLUORANTHENE	0.25	---	**< 0.72 U**	< 0.18 U	< 0.18 U	**0.085 J**	**0.085 J**	< 0.18 U	**0.084 J**	**0.072 J**	< 0.18 U	< 0.19 U	**0.42**	< 0.18 U	< 0.19 U	< 0.19 U
191-24-2	BENZO[G,H,I]PERYLENE	---	---	< 0.72 U	< 0.18 U	< 0.18 U	0.083 J	0.083 J	< 0.18 U	0.071 J	0.061 J	< 0.18 U	< 0.19 U	0.43	< 0.18 U	< 0.19 U	< 0.19 U
207-08-9	BENZO[K]FLUORANTHENE	2.5	---	< 0.72 U	< 0.18 U	< 0.18 U	0.092 J	0.092 J	< 0.18 U	0.078 J	< 0.18 U	< 0.18 U	< 0.19 U	**0.44**	< 0.18 U	< 0.19 U	< 0.19 U
85-68-7	BENZYL BUTYL PHTHALATE	16	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	0.17 J	0.2 J	0.18 J	< 0.98 U	< 0.94 U	0.36 J	0.16 J	< 0.98 U
92-52-4	BIPHENYL	0.83	---	**< 3.8 U**	**< 0.95 U**	**< 0.94 U**	**< 0.95 U**	**< 0.98 U**	**< 0.97 U**	**< 0.97 U**	**< 0.96 U**	**< 0.97 U**	**< 0.98 U**	**< 0.94 U**	**< 0.96 U**	**< 0.99 U**	**< 0.98 U**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	59	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.94 U	< 0.96 U	< 0.99 U	< 0.98 U
111-44-4	BIS(2-CHLOROETHYL) ETHER	0.014	---	**< 0.72 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.6	6	< 7.6 U	< 1.9 U	< 1.9 U	3	3	< 1.9 U	2.8	2.5	1.3 J	3.3	< 1.9 U	< 1.9 U	< 2 U	< 2 U
105-60-2	CAPROLACTAM	9,900	---	< 19 U	< 4.8 U	< 4.7 U	< 4.8 U	< 4.9 U	< 4.9 U	< 4.9 U	< 4.8 U	< 4.9 U	< 4.9 U	77	< 4.8 U	< 5 U	< 4.9 U
86-74-8	CARBAZOLE	---	---	< 0.72 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
218-01-9	CHRYSENE	25	---	< 0.72 U	< 0.18 U	< 0.18 U	0.082 J	0.082 J	< 0.18 U	0.076 J	0.052 J	< 0.18 U	< 0.19 U	0.4	< 0.18 U	< 0.19 U	0.041 J
53-70-3	DIBENZ[A,H]ANTHRACENE	0.025	---	**< 0.72 U**	**< 0.18 U**	**< 0.18 U**	**0.089 J**	**0.089 J**	**< 0.18 U**	**0.082 J**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**0.52**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**
132-64-9	DIBENZOFURAN	7.9	---	0.49 J	< 0.95 U	< 0.94 U	< 0.18 U	< 0.19 U	< 0.97 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.94 U	< 0.96 U	< 0.99 U	< 0.98 U
84-66-2	DIETHYL PHTHALATE	15,000	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	0.97 U	< 0.96 U	< 0.97 U	0.18 J	0.16	0.17 J	< 0.99 U	< 0.98 U
131-11-3	DIMETHYL PHTHALATE		---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.94 U	< 0.96 U	< 0.99 U	< 0.98 U
84-74-2	DI-N-BUTYL PHTHALATE	900	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	0.13 J	< 0.96 U	< 0.97 U	< 0.98 U	0.19 J	< 0.96 U	0.25 J	0.23 J
117-84-0	DI-N-OCTYL PHTHALATE	200	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	0.26 J	< 0.96 U	< 0.99 U	< 0.98 U
206-44-0	FLUORANTHENE	800	---	< 0.72 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	0.085 J	< 0.18 U	0.07 J	< 0.18 U	< 0.19 U	0.072 J	< 0.18 U	< 0.19 U	0.048 J
86-73-7	FLUORENE	290	---	0.68 J	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
118-74-1	HEXACHLOROBENZENE	0.0098	1	**< 0.72 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**
87-68-3	HEXACHLOROBUTADIENE	0.14	---	**< 0.72 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**
77-47-4	HEXACHLOROCYCLOPENTADIENE	0.41	50	**< 3.8 U**	**< 0.95 U**	**< 0.94 U**	**< 0.95 U**	**< 0.98 U**	**< 0.97 U**	**< 0.97 U**	**< 0.96 U**	**< 0.97 U**	**< 0.98 U**	**< 0.94 U**	**< 0.96 U**	**< 0.99 U**	**< 0.98 U**
67-72-1	HEXACHLOROETHANE	0.33	---	**< 3.8 U**	**< 0.95 U**	**< 0.94 U**	**< 0.95 U**	**< 0.98 U**	**< 0.97 U**	**< 0.97 U**	**< 0.96 U**	**< 0.97 U**	**< 0.98 U**	**< 0.94 U**	**< 0.96 U**	**< 0.99 U**	**< 0.98 U**
193-39-5	INDENO[1,2,3-CD]PYRENE	0.25	---	**< 0.72 U**	< 0.18 U	< 0.18 U	**0.078 J**	**0.078 J**	< 0.18 U	**0.071 J**	**0.037 J**	< 0.18 U	< 0.19 U	**0.46**	< 0.18 U	**< 0.99 U**	< 0.19 U
78-59-1	ISOPHORONE	78	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.94 U	< 0.96 U	< 0.19 U	< 0.98 U
91-20-3	NAPHTHALENE	0.17	---	**< 0.72 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.99 U**	**< 0.19 U**
98-95-3	NITROBENZENE	0.14	---	**< 7.6 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 2 U**	**< 1.9 U**	**< 1.9 U**	**< 2 U**	**< 2 U**
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.011	---	**< 0.72 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**
86-30-6	N-NITROSODIPHENYLAMINE	12	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.94 U	< 0.96 U	< 0.99 U	< 0.98 U
87-86-5	PENTACHLOROPHENOL	0.041	1	**< 3.8 U**	**< 0.95 U**	**< 0.94 U**	**< 0.95 U**	**< 0.98 U**	**< 0.97 U**	**< 0.97 U**	**< 0.96 U**	**< 0.97 U**	**0.27 J**	**< 0.94 U**	**2**	**< 0.99 U**	**< 0.98 U**
85-01-8	PHENANTHRENE	---	---	< 0.72 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U
108-95-2	PHENOL	5,800	---	< 3.8 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.98 U	< 0.97 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.94 U	< 0.96 U	< 0.19 U	< 0.98 U
129-00-0	PYRENE	120	---	< 0.72 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	0.051 J	< 0.18 U	0.055 J	< 0.18 U	< 0.19 U	0.057 J	< 0.18 U	< 0.19 U	0.036 J

Table 5-15
October-November 2016 (1st Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	EW-1-110 11/11/2016 EW1-110-111116	OW-1-62 10/24/2016 OW1-62-102416	OW-1-105 10/24/2016 OW1-105-102416	OW-2-65 10/26/2016 OW2-65-102516	OW-2-65 10/26/2016 DUP-102616	OW-2-115 10/25/2016 OW2-115-102516	OW-3-55 10/27/2016 OW3-55-102716	OW-3-105 10/27/2016 OW3-105-102716	OW-4-70 10/28/2016 OW4-70-102816	OW-5-90 10/31/2016 OW5-90-103116	OW-7-242 11/3/2016 OW7-242-110316	OW-7-410 11/3/2016 OW7-410-110316	OW-8-230 10/28/2016 OW8-230-102816	OW-9-125 10/26/2016 OW9-125-102616
VOLATILE ORGANIC COMPOUNDS in ug/L																	
71-55-6	1,1,1-TRICHLOROETHANE	8,000	200	< 15 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.076	---	**< 15 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 3 U**	**< 1 U**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10,000	---	< 15 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
79-00-5	1,1,2-TRICHLOROETHANE	0.28	5	**< 15 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 3 U**	**< 1 U**
75-34-3	1,1-DICHLOROETHANE	2.8	---	**< 15 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	**< 3 U**	< 1 U
75-35-4	1,1-DICHLOROETHYLENE	280	7	**< 15 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
120-82-1	1,2,4-TRICHLOROBENZENE	1.2	70	**< 15 U**	< 1 U J	< 1 U J	< 1 U	< 1 U	0.49 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 2 U**	**< 3 U**	< 1 U
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	0.00033	0.2	**< 15 U**	**< 1 U J**	**< 1 U J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 3 U**	**< 1 U**
106-93-4	1,2-DIBROMOETHANE	0.0075	0.05	**< 15 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 3 U**	**< 1 U**
95-50-1	1,2-DICHLOROBENZENE	300	600	16	< 1 U	< 1 U	< 1 U	< 1 U	11	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	3.3	2.2 J	< 1 U
107-06-2	1,2-DICHLOROETHANE	0.17	5	**< 15 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**0.9 J**	**< 1 U**	**0.62 J**	**8.4**	**< 3 U**	**< 1 U**
78-87-5	1,2-DICHLOROPROPANE	0.85	5	**< 15 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 3 U**	**< 1 U**
541-73-1	1,3-DICHLOROBENZENE	---	---	< 15 U	< 1 U	< 1 U	< 1 U	< 1 U	0.68 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
106-46-7	1,4-DICHLOROBENZENE	0.48	75	**42**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**15**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**7.3**	**2.6 J**	**< 1 U**
78-93-3	2-BUTANONE	5,600	---	< 75 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 10 U	< 15 U	< 5 U
591-78-6	2-HEXANONE	38	---	**< 75 U**	< 5 U J	< 5 U J	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 10 U	< 15 U	< 5 U
108-10-1	4-METHYL-2-PENTANONE	6,300	---	< 75 U	< 5 U J	< 5 U J	< 5 U	< 5 U	< 5 U J	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 10 U	< 15 U	< 5 U
67-64-1	ACETONE	14,000	---	< 75 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 10 U	< 15 U	4.6 J
71-43-2	BENZENE	0.46	5	**6.3 J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 3 U**	**< 1 U**
75-27-4	BROMODICHLOROMETHANE	0.13	80	**< 15 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 3 U**	**< 1 U**
75-25-2	BROMOFORM	3.3	80	**< 15 U**	< 1 U J	< 1 U J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
74-83-9	BROMOMETHANE	7.5	---	**< 15 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
75-15-0	CARBON DISULFIDE	810	---	< 15 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
56-23-5	CARBON TETRACHLORIDE	0.46	5	**< 15 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 3 U**	**< 1 U**
108-90-7	CHLOROBENZENE	78	100	**220**	< 1 U	< 1 U	< 1 U	< 1 U	**210**	< 1 U	< 1 U	< 1 U	< 1 U	0.2 J	51	65	< 1 U
75-00-3	CHLOROETHANE	21,000	---	< 15 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
67-66-3	CHLOROFORM	0.22	80	**< 15 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**0.36 J**	**0.32 J**	**< 1 U**	**0.7 J**	**< 3 U**	**1.4**
74-87-3	CHLOROMETHANE	190	---	< 15 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
156-59-2	CIS-1,2-DICHLOROETHENE	36	70	< 15 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	---	---	< 15 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
110-82-7	CYCLOHEXANE	13,000	---	< 15 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
124-48-1	DIBROMOCHLOROMETHANE	0.87	---	**< 15 U**	**< 1 U J**	**< 1 U J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 3 U**	**< 1 U**
75-71-8	DICHLORODIFLUOROMETHANE	200	---	< 15 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
100-41-4	ETHYLBENZENE	1.5	700	**< 15 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 2 U**	**< 3 U**	< 1 U
98-82-8	ISOPROPYLBENZENE (CUMENE)	450	---	< 15 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
79-20-9	METHYL ACETATE	20,000	---	< 75 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 10 U	< 15 U	< 5 U
1634-04-4	METHYL TERT-BUTYL ETHER	14	---	**< 15 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.55 J	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
108-87-2	METHYLCYLOHEXANE	---	---	< 15 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
75-09-2	METHYLENE CHLORIDE	11	5	**< 15 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
100-42-5	STYRENE (MONOMER)	1,200	100	< 15 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
127-18-4	TETRACHLOROETHYLENE	11	5	**< 15 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.36 J	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
108-88-3	TOLUENE	1,100	1,000	< 15 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.1 J	< 3 U	< 1 U
156-60-5	TRANS-1,2-DICHLOROETHENE	360	100	< 15 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	---	---	< 15 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
79-01-6	TRICHLOROETHYLENE	0.49	5	**< 15 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**0.91**	**< 3 U**	**< 1 U**
75-69-4	TRICHLOROFLUOROMETHANE	5,200	---	< 15 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 3 U	< 1 U
75-01-4	VINYL CHLORIDE	0.019	2	**< 15 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 3 U**	**< 1 U**
XYLENES	Xylenes, Total	190	10000	< 30 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 4 U	< 6 U	< 2 U

Notes:
USEPA RSL for TAP WATER (latest version, November 2017)
USEPA MCL (latest version, November 2017)
(1) No RSL exists, MCL utilized
U - The analyte was not detected above the reporting limit (RL).
UJ - The reporting limit is estimated due to minor quality control anomaly.
J - Result is either less than the RL but greater than or equal to the method detection limit (MDL) o
B - Parameter was detected in associated laboratory method blank.
R - Based on data quality review, result is rejected by validator and considered unusable due to a n
NJ - Result was tentatively identified in a Tentatively Identified Compound (TIC) scan.
Bold indicates the reporting limit was above the RSL and/or MCL.
Red bolded detected concentration exceeds RSL
Red bolded and highlighted detected concentration exceeds MCL

Table 5-15
October-November 2016 (1st Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	OW-10-250 10/26/2016 OW10-250-102616	OW-11-240 11/2/2016 OW11-240-110216	OW-11-600 11/1/2016 OW11-600-110116	OW-12-232 10/31/2016 OW12-232-103116	OW-13-250 11/034/2016 OW13-250-110316	OW-14-96 10/31/2016 OW14-96-103116	OW-14-235 11/2/2016 OW14-235-110216	OW-15-202 11/2/2016 OW15-202-110216	OW-16-448 10/27/2016 OW16-448-102716	OW-16-448 10/27/2016 DUP-102716	OW-17-600 10/25/2016 OW17-600-102516	OW-18-597 10/31/2016 OW18-597-103116	OW-19-450 10/25/2016 OW19-450-102516
TOTAL METALS in ug/L																
7429-90-5	ALUMINUM	20,000	---	< 30 U	90	< 30 U	89	370	260	190	42	35 B	17 JB	9 J	< 30 U	< 30 U
7440-36-0	ANTIMONY	7.8	6	< 2 U	0.05 J B	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	0.32 JB	< 2 U	< 2 U	< 2 U
7440-38-2	ARSENIC	0.052	10	**0.14 J**	**< 1 U**	**< 1 U**	**1.7**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**0.53 J**	**0.55 J**	**< 1 U**	**< 1 U**	**< 1 U**
7440-39-3	BARIUM	3,800	2,000	88	110	120	64	170	120	130	170	120	120	120	18	120
7440-41-7	BERYLLIUM	25	4	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.12 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-43-9	CADMIUM	9.2	5	< 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 U
7440-70-2	CALCIUM METAL	---	---	130000	130000 J	100000	93000	90000	130000	120000	100000 J	120000	110000	120000	190000	120000
7440-47-3	CHROMIUM[1]	---	100	2.5	< 2 U	0.64 J	< 2 U	0.88 J	< 2 U	< 2 U	< 2 U	2.5	2.5	< 2 U	< 2 U	0.44 J
7440-48-4	COBALT	6	---	0.078 J	2.3 J	< 0.5 U	0.15 J	< 0.5 U	0.14 J	< 0.5 U	< 0.5 U	0.13 J	0.16 J	< 0.5 U	< 0.5 U	< 0.5 U
7440-50-8	COPPER	800	1,300	< 2 U	< 2 U	< 2 U	0.45 J	0.75 J	< 2 U	< 2 U	< 2 U	0.72 J	< 2 U	< 2 U	< 2 U	< 2 U
7439-89-6	IRON	14,000	---	8.6 J	960 J	< 50 U	1500	< 50 U	310	< 50 U	< 50 U	30 J	42 J	< 50 U	< 50 U	< 50 U
7439-92-1	LEAD	15	15	< 1 U	< 1 U	< 1 U	0.076 J	0.068 J	1.8	< 1 U	< 1 U	0.21 J	< 1 U	0.46 J	< 1 U	< 1 U
7439-95-4	MAGNESIUM	---	---	14000	14000 J	19000	22000	20000	18000	19000 J	27000 J	13000	12000	20000	56000	14000
7439-96-5	MANGANESE	430	---	< 5 U	**640 J**	< 5 U	27	< 5 U	8.7	< 5 U	< 5 U	9.2	9.9	7.6	< 5 U	< 5 U
7440-02-0	NICKEL	390	---	< 1 U	3.7 J	< 1 U	0.98 J	< 1 U	< 1 U	< 1 U	< 1 U	0.8 J	0.77 J	< 1 U	< 1 U	< 1 U
7440-09-7	POTASSIUM	---	---	2100	2200 J	1100	3100	9700	1500	1700 J	2200 J	4500	4700	1200	1600	1200
7782-49-2	SELENIUM	100	50	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	0.57 J	< 5 U	< 5 U	1.3 J	1.2 J	< 5 U	< 5 U	< 5 U
7440-22-4	SILVER	94	---	< 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 U
7440-23-5	SODIUM	---	---	49000	26000 J	2000	76000	18000	6600	2400 J	2500 J	23000	23000	3300	7100	5600
7440-28-0	THALLIUM	0.2	2	**< 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 U**
7440-62-2	VANADIUM	86	---	0.51 J	2.8 J	< 1 U	< 1 U	< 1 U	< 1 U	2.6 J	2.2 J	1.9	1.9	< 1 U	< 1 U	0.31 J
7440-66-6	ZINC	6,000	---	3 J	5.3 J	3.5 J	< 5 U	2.8 J	< 5 U	< 5 U	5.1 J	27	25	6.3	< 5 U	2.8 J
57-12-5	CYANIDE	1.5	200	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
7439-97-6	MERCURY	0.63	2	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L																
16887-00-6	CHLORIDE	---	---	99	22	10	33	16	18	9.5	2.7	58	57	6.3	19	24
14797-55-8	NITRATE AS N	32	10	2.1	0.12	4.9	0.1	3.1	3.4	2.6	2.5	4.8	4.7	1.9	4.4	3.7
14808-79-8	SULFATE	---	---	34	29	31	130	16	48	65	8.5	43	41	35	290	16
ALKB	BICARBONATE ALKALINITY	---	---	370	430	370	420	360	350	350	420	290	290	380	410	380
ALKC	CARBONATE ALKALINITY	---	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	---	370	430	370	420	360	350	350	420	290	290	380	410	380
PESTICIDES in ug/L																
957-51-7	DIPHENAMID	530		< 1 U	< 0.95 U	< 0.96 U	< 1 U	0.24 J	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
53-19-0	2,4'-DDD	0.032		< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U J	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
3424-82-6	2,4'-DDE	0.046		0.0013	< 0.0012 U	0.0059	< 0.0012 U	< 0.0012 U J	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	0.0059	0.028	0.00088 J
789-02-6	2,4'-DDT	0.23		< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U J	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
72-54-8	4,4'-DDD	0.032		< 0.0012 U	0.00067 J	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
72-55-9	4,4'-DDE	0.046		< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
50-29-3	4,4'-DDT	0.23		< 0.0012 U	0.0024	< 0.0013 U	< 0.0012 U	0.00072 J	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	0.00059 J	< 0.0013 U	0.0024
309-00-2	ALDRIN	0.00092		< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	**0.0085 J**	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
319-84-6	ALPHA-BHC	0.0072		< 0.0012 U	< 0.0012 U	**0.024**	< 0.0012 U	< 0.0012 U	**0.026**	**0.02**	< 0.0012 U	< 0.0012 U	< 0.0012 U	**0.011**	**0.031 J**	< 0.0013 U
5103-71-9	ALPHA-CHLORDANE	0.02	2	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
319-85-7	BETA-BHC	0.025		0.0091	< 0.0012 U	**0.097**	< 0.0012 U	0.00062 J	**0.58 J**	**0.56**	< 0.0012 U	< 0.0012 U	< 0.0012 U	**0.11**	**0.43**	< 0.0013 U
319-86-8	DELTA-BHC	0.025		< 0.0012 U	< 0.0012 U	0.017	< 0.0012 U	< 0.0012 U	0.023 J	**0.05**	< 0.0012 U	< 0.0012 U	< 0.0012 U	0.022	**0.034**	< 0.0013 U
60-57-1	DIELDRIN	0.0018		< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	**0.019 J**	**0.0056**	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	0.0017 J
959-98-8	ENDOSULFAN I	100		< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
33213-65-9	ENDOSULFAN II	100		< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
1031-07-8	ENDOSULFAN SULFATE	---	---	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	0.0016	0.0044	< 0.0013 U
72-20-8	ENDRIN	2.3	2	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
7421-93-4	ENDRIN ALDEHYDE	---	---	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	0.0019 J	0.0023	< 0.0012 U	< 0.0013 U	< 0.0013 U
53494-70-5	ENDRIN KETONE	---	---	< 0.0012 U	< 0.0012 U	0.001 J	< 0.0012 U	< 0.0012 U	0.027 J	0.019	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	0.0023	< 0.0013 U
58-89-9	GAMMA-BHC (LINDANE)	0.042	0.2	< 0.0012 U	< 0.0012 U	0.0061	< 0.0012 U	< 0.0012 U	0.013 J	0.0074	< 0.0012 U	< 0.0012 U	< 0.0012 U	0.0019 J	< 0.0013 U	< 0.0013 U
12789-03-6	gamma-Chlordane	0.02	2	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	0.0026 J	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
76-44-8	HEPTACHLOR	0.0014	0.4	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U
1024-57-3	HEPTACHLOR EPOXIDE	0.0014	0.2	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	0.00069 J
72-43-5	METHOXYCHLOR	37	40	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0064 U	< 0.0013 U
8001-35-2	TOXAPHENE	0.071	3	**< 0.095 U**	**< 0.095 U**	**< 0.097 U**	**< 0.095 U**	**< 0.095 U**	**< 0.096 U**	**< 0.095 U**	< 0.0012 U	**< 0.095 U**	**< 0.095 U**	**< 0.095 U**	**< 0.098 U**	**< 0.096 U**
HERBICIDES in ug/L																
94-75-7	2,4-D	170	70	**2.1 J**	< 3.8 U	< 3.8 U	< 4 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U
93-76-5	2,4,5-T	160	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.99 U	< 0.95 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 0.95 U

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SEMIVOLATILE ORGANIC COMPOUNDS in ug/L																
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	710	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U
95-95-4	2,4,5-TRICHLOROPHENOL	1,200	---	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
88-06-2	2,4,6-TRICHLOROPHENOL	4.1	---	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
120-83-2	2,4-DICHLOROPHENOL	46	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U
105-67-9	2,4-DIMETHYLPHENOL	360	---	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
51-28-5	2,4-DINITROPHENOL	39	---	< 5.1 U	< 4.8 U	< 4.8 U	< 5.2 U	< 4.8 U	< 4.9 U	< 4.8 U	< 4.9 U	< 4.8 U	< 4.8 U	< 4.9 U	< 5 U	< 4.9 U
121-14-2	2,4-DINITROTOLUENE	0.24	---	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.95 U**	**< 0.98 U**	**< 0.96 U**	**< 0.98 U**	**< 0.96 U**	**< 0.96 U**	**< 0.97 U**	**< 0.99 U**	**< 0.97 U**
606-20-2	2,6-DINITROTOLUENE	0.049	---	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.95 U**	**< 0.98 U**	**< 0.96 U**	**< 0.98 U**	**< 0.96 U**	**< 0.96 U**	**< 0.97 U**	**< 0.99 U**	**< 0.97 U**
91-58-7	2-CHLORONAPHTHALENE	750	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U
95-57-8	2-CHLOROPHENOL	91	---	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
95-48-7	2-METHLYPHENOL	930	---	< 1 U	< 0.18 U	< 0.18 U	< 1 U	< 0.18 U	< 0.98 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.97 U	< 0.99 U	< 0.97 U
91-57-6	2-METHYLNAPHTHALENE	36	---	< 0.19 U	< 0.95 U	< 0.96 U	< 0.2 U	< 0.95 U	< 0.19 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.18 U	< 0.19 U	< 0.18 U
88-74-4	2-NITROANILINE	190	---	< 5.1 U	< 4.8 U	< 4.8 U	< 5.2 U	< 4.8 U	< 4.9 U	< 4.8 U	< 4.9 U	< 4.8 U	< 4.8 U	< 4.9 U	< 5 U	< 4.9 U
88-75-5	2-NITROPHENOL	---	---	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
91-94-1	3,3 '-DICHLOROBENZIDINE	0.13	---	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.95 U**	**< 0.98 U**	**< 0.96 U**	**< 0.98 U**	**< 0.96 U**	**< 0.96 U**	**< 0.97 U**	**< 0.99 U**	**< 0.97 U**
99-09-2	3-NITROANILINE	---	---	< 5.1 U	< 4.8 U	< 4.8 U	< 5.2 U	< 4.8 U	< 4.9 U	< 4.8 U	< 4.9 U	< 4.8 U	< 4.8 U	< 4.9 U	< 5 U	< 4.9 U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	1.5	---	**< 5.1 U**	**< 4.8 U**	**< 4.8 U**	**< 5.2 U**	**< 4.8 U**	**< 4.9 U**	**< 4.8 U**	**< 4.9 U**	**< 4.8 U**	**< 4.8 U**	**< 4.9 U**	**< 5 U**	**< 4.9 U**
101-55-3	4-BROMOPHENYL PHENYL ETHER	---	---	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
59-50-7	4-CHLORO-3-METHYLPHENOL	1,400	---	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
106-47-8	4-CHLOROANILINE	0.37	---	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.95 U**	**< 0.98 U**	**< 0.96 U**	**< 0.98 U**	**< 0.96 U**	**< 0.96 U**	**< 0.97 U**	**< 0.99 U**	**< 0.97 U**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	---	---	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
106-44-5	4-METHLYPHENOL	1,900	---	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
100-01-6	4-NITROANILINE	3.8	---	**< 5.1 U**	**< 4.8 U**	**< 4.8 U**	**< 5.2 U**	**< 4.8 U**	**< 4.9 U**	**< 4.8 U**	**< 4.9 U**	**< 4.8 U**	**< 4.8 U**	**< 4.9 U**	**< 5 U**	**< 4.9 U**
100-02-7	4-NITROPHENOL	---	---	< 5.1 U	< 4.8 U	< 4.8 U	< 5.2 U	< 4.8 U	< 4.9 U	< 4.8 U	< 4.9 U	< 4.8 U	< 4.8 U	< 4.9 U	< 5 U	< 4.9 U
83-32-9	ACENAPHTHENE	530	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U
208-96-8	ACENAPHTHYLENE	---	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U
98-86-2	ACETOPHENONE	1,900	---	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
120-12-7	ANTHRACENE	1,800	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U
1912-24-9	ATRAZINE	0.3	3	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.95 U**	**< 0.98 U**	**< 0.96 U**	**< 0.98 U**	**< 0.96 U**	**< 0.96 U**	**< 0.97 U**	**< 0.99 U**	**< 0.97 U**
100-52-7	BENZALDEHYDE	19	---	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
56-55-3	BENZO[A]ANTHRACENE	0.03	---	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**
50-32-8	BENZO[A]PYRENE	0.025	0.2	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**
205-99-2	BENZO[B]FLUORANTHENE	0.25	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U
191-24-2	BENZO[G,H,I]PERYLENE	---	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U
207-08-9	BENZO[K]FLUORANTHENE	2.5	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U
85-68-7	BENZYL BUTYL PHTHALATE	16	---	0.21 J	< 0.95 U	< 0.96 U	< 1 U	0.19 J	< 0.98 U	< 0.96 U	< 0.98 U	0.23 J	0.18 J	< 0.97 U	< 0.99 U	< 0.97 U
92-52-4	BIPHENYL	0.83	---	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.95 U**	**< 0.98 U**	**< 0.96 U**	**< 0.98 U**	**< 0.96 U**	**< 0.96 U**	**< 0.97 U**	**< 0.99 U**	**< 0.97 U**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	59	---	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
111-44-4	BIS(2-CHLOROETHYL) ETHER	0.014	---	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.6	6	< 2 U	< 1.9 U	< 1.9 U	< 2.1 U	3	< 2 U	< 1.9 U	< 2 U	1.2 J	< 1.9 U	< 1.9 U	2.4	< 1.9 U
105-60-2	CAPROLACTAM	9,900	---	< 5.1 U	< 4.8 U	< 4.8 U	< 5.2 U	< 4.8 U	< 4.9 U	< 4.8 U	< 4.9 U	< 4.8 U	< 4.8 U	< 4.9 U	< 5 U	< 4.9 U
86-74-8	CARBAZOLE	---	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U
218-01-9	CHRYSENE	25	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U
53-70-3	DIBENZ[A,H]ANTHRACENE	0.025	---	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**
132-64-9	DIBENZOFURAN	7.9	---	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
84-66-2	DIETHYL PHTHALATE	15,000	---	< 1 U	< 0.95 U	< 0.96 U	0.22 J	0.14 J	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
131-11-3	DIMETHYL PHTHALATE		---	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
84-74-2	DI-N-BUTYL PHTHALATE	900	---	< 1 U	0.12 J	< 0.96 U	0.3 J	0.15 J	< 0.98 U	0.19 J	0.24 J	0.29 J	0.29 J	< 0.97 U	< 0.99 U	< 0.97 U
117-84-0	DI-N-OCTYL PHTHALATE	200	---	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
206-44-0	FLUORANTHENE	800	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U
86-73-7	FLUORENE	290	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U
118-74-1	HEXACHLOROBENZENE	0.0098	1	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**
87-68-3	HEXACHLOROBUTADIENE	0.14	---	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**
77-47-4	HEXACHLOROCYCLOPENTADIENE	0.41	50	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.95 U**	**< 0.98 U**	**< 0.96 U**	**< 0.98 U**	**< 0.96 U**	**< 0.96 U**	**< 0.97 U**	**< 0.99 U**	**< 0.97 U**
67-72-1	HEXACHLOROETHANE	0.33	---	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.95 U**	**< 0.98 U**	**< 0.96 U**	**< 0.98 U**	**< 0.96 U**	**< 0.96 U**	**< 0.97 U**	**< 0.99 U**	**< 0.97 U**
193-39-5	INDENO[1,2,3-CD]PYRENE	0.25	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U
78-59-1	ISOPHORONE	78	---	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
91-20-3	NAPHTHALENE	0.17	---	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**
98-95-3	NITROBENZENE	0.14	---	**< 2 U**	**< 1.9 U**	**< 1.9 U**	**< 2.1 U**	**< 1.9 U**	**< 2 U**	**< 1.9 U**	**< 2 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 2 U**	**< 1.9 U**
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.011	---	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**
86-30-6	N-NITROSODIPHENYLAMINE	12	---	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
87-86-5	PENTACHLOROPHENOL	0.041	1	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.95 U**	**< 0.98 U**	**< 0.96 U**	**< 0.98 U**	**< 0.96 U**	**< 0.96 U**	**< 0.97 U**	**< 0.99 U**	**< 0.97 U**
85-01-8	PHENANTHRENE	---	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U
108-95-2	PHENOL	5,800	---	< 1 U	< 0.95 U	< 0.96 U	< 1 U	< 0.95 U	< 0.98 U	< 0.96 U	< 0.98 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.99 U	< 0.97 U
129-00-0	PYRENE	120	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U

Table 5-15
October-November 2016 (1st Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	OW-10-250 10/26/2016 OW10-250-102616	OW-11-240 11/2/2016 OW11-240-110216	OW-11-600 11/1/2016 OW11-600-110116	OW-12-232 10/31/2016 OW12-232-103116	OW-13-250 11/034/2016 OW13-250-110316	OW-14-96 10/31/2016 OW14-96-103116	OW-14-235 11/2/2016 OW14-235-110216	OW-15-202 11/2/2016 OW15-202-110216	OW-16-448 10/27/2016 OW16-448-102716	OW-16-448 10/27/2016 DUP-102716	OW-17-600 10/25/2016 OW17-600-102516	OW-18-597 10/31/2016 OW18-597-103116	OW-19-450 10/25/2016 OW19-450-102516
VOLATILE ORGANIC COMPOUNDS in ug/L																
71-55-6	1,1,1-TRICHLOROETHANE	8,000	200	< 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 U
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.076	---	**< 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 U**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10,000	---	< 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 U
79-00-5	1,1,2-TRICHLOROETHANE	0.28	5	**< 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 U**
75-34-3	1,1-DICHLOROETHANE	2.8	---	< 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 U
75-35-4	1,1-DICHLOROETHYLENE	280	7	< 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 U
120-82-1	1,2,4-TRICHLOROBENZENE	1.2	70	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	0.00033	0.2	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U J**	**< 1 U**	**< 1 U J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
106-93-4	1,2-DIBROMOETHANE	0.0075	0.05	**< 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 U**
95-50-1	1,2-DICHLOROBENZENE	300	600	< 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 U
107-06-2	1,2-DICHLOROETHANE	0.17	5	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	0.47 J	**< 1 U**
78-87-5	1,2-DICHLOROPROPANE	0.85	5	**< 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 U**
541-73-1	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 U
106-46-7	1,4-DICHLOROBENZENE	0.48	75	**< 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 U**
78-93-3	2-BUTANONE	5,600	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
591-78-6	2-HEXANONE	38	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
108-10-1	4-METHYL-2-PENTANONE	6,300	---	< 5 U	< 5 U	< 5 U	< 5 U J	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
67-64-1	ACETONE	14,000	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	3.1 J	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
71-43-2	BENZENE	0.46	5	**< 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 U**
75-27-4	BROMODICHLOROMETHANE	0.13	80	**< 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 U**
75-25-2	BROMOFORM	3.3	80	< 1 U	< 1 U	< 1 U	< 1 U J	< 1 U	< 1 U J	< 1 U	< 1 U	< 1 U J	< 1 U	< 1 U	< 1 U	< 1 U
74-83-9	BROMOMETHANE	7.5	---	< 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 U
75-15-0	CARBON DISULFIDE	810	---	< 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 U
56-23-5	CARBON TETRACHLORIDE	0.46	5	**< 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 U**
108-90-7	CHLOROBENZENE	78	100	< 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 U
75-00-3	CHLOROETHANE	21,000	---	< 1 U	< 1 U	< 1 U	< 1 U J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
67-66-3	CHLOROFORM	0.22	80	2.7	**< 1 U**	0.71 J	**< 1 U**	**< 1 U**	2.8	1.9	**< 1 U**	4.2	4.2	**< 1 U**	0.5 J	2.7
74-87-3	CHLOROMETHANE	190	---	< 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 U
156-59-2	CIS-1,2-DICHLOROETHENE	36	70	< 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 U
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	---	---	< 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 U
110-82-7	CYCLOHEXANE	13,000	---	< 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 U
124-48-1	DIBROMOCHLOROMETHANE	0.87	---	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-71-8	DICHLORODIFLUOROMETHANE	200	---	< 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 U
100-41-4	ETHYLBENZENE	1.5	700	< 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 U
98-82-8	ISOPROPYLBENZENE (CUMENE)	450	---	< 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 U
79-20-9	METHYL ACETATE	20,000	---	< 5 U	1.7 J	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1634-04-4	METHYL TERT-BUTYL ETHER	14	---	< 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 U
108-87-2	METHYLCYLOHEXANE	---	---	< 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 U
75-09-2	METHYLENE CHLORIDE	11	5	< 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 U
100-42-5	STYRENE (MONOMER)	1,200	100	< 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 U
127-18-4	TETRACHLOROETHYLENE	11	5	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.8	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
108-88-3	TOLUENE	1,100	1,000	< 1 U	0.48 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
156-60-5	TRANS-1,2-DICHLOROETHENE	360	100	< 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 U
10061-02-6	TRANS-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	< 1 U
79-01-6	TRICHLOROETHYLENE	0.49	5	**< 1 U**	0.4 J	**< 1 U**	0.23 J	**< 1 U**	0.31 J	0.66 J	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-69-4	TRICHLOROFLUOROMETHANE	5,200	---	< 1 U	< 1 U	< 1 U	< 1 U J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-01-4	VINYL CHLORIDE	0.019	2	**< 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 U**
XYLENES	Xylenes, Total	190	10000	< 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 U

Notes:
USEPA RSL for TAP WATER (latest version, November 2017)
USEPA MCL (latest version, November 2017)
(1) No RSL exists, MCL utilized
U - The analyte was not detected above the reporting limit (RL).
UJ - The reporting limit is estimated due to minor quality control anomaly.
J - Result is either less than the RL but greater than or equal to the method detection limit (MDL) o
B - Parameter was detected in associated laboratory method blank.
R - Based on data quality review, result is rejected by validator and considered unusable due to a m
NJ - Result was tentatively identified in a Tentatively Identified Compound (TIC) scan.
Bold indicates the reporting limit was above the RSL and/or MCL.
Red bolded detected concentration exceeds RSL
Red bolded and highlighted detected concentration exceeds MCL

Table 5-16
January-February 2017 (2nd Quarter) Groundwater Sampling Field Parameter Data
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Monitoring Well	Sample Date	Temperature (ºC)	Dissolved Oxygen (mg/L)	pH (Std.Units)	Turbidity (NTUs)	Conductivity (mS/cm)	Oxygen Reduction Potential (mV)	Rate (mL/min)	Depth to Water (ft below top of PVC)
On Site Monitoring Wells									
MW-A-51	2/8/2017	12.64	1.42	6.51	61.1	1.60	50	130	46.54
MW-B-55	1/30/2017	5.04	3.74	7.09	1.8	0.968	167	100	47.75
MW-B-400	2/2/2017	11.76	0.58	6.73	0.0	1.42	-22	285	56.57
MW-B-598	2/2/2017	12.19	1.07	6.90	0.0	0.837	49	310	55.80
MW-C-40	2/6/2017	11.19	2.59	6.58	10.2	0.957	226	205	31.63
MW-D-77	1/31/2017	12.46	0.64	6.78	18.7	2.15	228	110	31.98
MW-E-46	2/2/2017	12.46	2.45	6.31	0.0	2.45	186	110	31.30
MW-F-70	2/1/2017	9.77	0.69	6.78	0.0	1.03	-147	100	50.80
MW-G-35	1/31/2017	9.08	4.20	4.29	6.1	3.04	372	100	22.54
MW-G-360	1/25/2017	13.26	0.68	6.74	0.2	1.98	116	275	34.21
MW-G-600	1/25/2017	12.40	1.71	6.90	0.8	1.08	90	320	35.82
MW-H-65	2/7/2017	13.20	0.38	6.52	0.0	2.52	-57	260	34.02
MW-I-55	2/8/2017	13.71	0.49	6.64	0.0	1.68	-74	335	36.58
MW-J-71	2/8/2017	13.29	0.72	6.53	0.0	2.71	-88	340	45.28
MW-K-80	2/2/2017	8.93	5.74	6.52	2.3	1.34	-22	100	44.66
MW-K-440	2/6/2017	12.05	4.76	7.05	0.0	0.757	150	405	64.10
MW-L-48	2/1/2017	12.19	0.61	6.46	0.0	1.64	19	250	31.84
MW-L-250	2/3/2017	11.86	4.32	7.00	0.0	0.656	63	285	54.83
MW-M-50	2/8/2017	14.01	0.63	6.41	3.0	2.50	-48	95	36.16
MW-N-83	2/7/2017	11.92	0.64	6.43	0.0	1.75	-79	245	42.20
MW-N-113	2/7/2017	12.58	0.69	6.65	0.0	1.73	-66	240	42.70
MW-O-145	2/6/2017	16.59	0.85	7.19	5.0	2.56	-95	100	60.51
MW-P-235	2/7/2017	11.51	1.32	6.91	0.0	2.55	-101	150	57.38
MW-Q-150	2/6/2017	15.02	0.78	6.80	14.6	1.95	-64	100	56.34
MW-R-330	2/6/2017	13.57	0.92	6.59	0.0	2.09	-21	250	53.28
MW-R-600	2/6/2017	13.81	2.42	7.03	0.0	1.05	-126	350	55.17
EW-1-110	2/8/2017	13.42	0.59	6.67	0.0	2.42	-95	330	35.09
Off Site Monitoring Wells									
OW-1-62	--	Not sampled due to insufficient water volume							
OW-1-105	1/23/2017	10.39	9.19	7.09	19.6	1.03	238	180	58.85
OW-2-65	1/24/2017	12.74	1.52	6.55	6.9	1.31	190	395	46.95
OW-2-115	1/24/2017	11.20	0.86	6.47	22.1	1.780	-5	120	52.54
OW-3-55	1/26/2017	12.12	5.80	6.84	5.0	1.04	126	120	49.92
OW-3-105	1/26/2017	11.94	0.58	7.25	9.1	1.79	-163	105	54.46
OW-4-70	1/30/2017	6.76	0.73	6.87	7.9	1.62	165	100	39.63
OW-5-90	1/25/2017	15.50	0.63	6.74	31.6	1.63	150	90	44.53
OW-7-242	1/31/2017	5.90	2.02	7.21	0.0	1.16	-126	85	49.18
OW-7-410	1/31/2017	14.03	0.60	6.75	0.0	1.70	61	435	41.39
OW-8-230	1/23/2017	9.28	1.14	6.74	1.2	2.30	37	120	--
OW-9-125	1/25/2017	12.28	3.12	6.73	91.8	1.190	164	190	32.72
OW-10-250	1/24/2017	12.42	3.01	6.98	0.4	0.955	-13	150	38.16
OW-11-240	1/30/2017	10.16	1.88	6.94	1.8	0.788	-70	80	--
OW-11-600	1/30/2017	12.36	5.07	6.95	0.0	0.690	36	415	54.20
OW-12-232	1/24/2017	10.17	2.39	7.27	0.9	0.938	-108	95	65.11
OW-13-250	1/26/2017	12.66	1.91	7.18	0.5	0.644	112	190	20.26
OW-14-96	1/27/2017	11.76	6.02	0.98	159	0.72	211	315	26.33
OW-14-235	1/26/2017	13.87	4.34	6.99	0.1	0.679	171	290	25.14
OW-15-202	1/26/2017	12.68	4.83	7.02	0.0	0.619	154	220	26.75
OW-16-448	1/27/2017	13.00	2.98	6.99	0.0	0.787	105	300	49.72
OW-17-600	2/1/2017	9.99	4.05	7.00	0.0	0.602	9	195	46.98
OW-18-597	2/1/2017	12.63	0.69	6.88	0.0	1.160	92	490	42.77
OW-19-450	1/23/2017	12.00	5.45	7.00	0.2	0.675	128	320	60.51

Notes:
mg/L - milligrams per liter

Table 5-17
January-February 2017 (2nd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-A-51 2/8/2017 MWA-51-020817	MW-B-55 1/30/2017 MWB-55-013017	MW-B-400 2/2/2017 MWB-400-020217	MW-B-598 2/2/2017 MWB-598-020217	MW-C-40 2/6/2017 MWC-40-020617	MW-D-77 1/31/2017 MWD-77-013117	MW-E-46 2/2/2017 MWE-46-020217	MW-F-70 2/1/2017 MWF-70-020117	MW-G-35 1/31/2017 MWG-35-013117	MW-G-360 1/25/2017 MWG-360-012517	MW-G-360 1/25/2017 DUP-012517	MW-G-600 1/25/2017 MWG-600-012517
TOTAL METALS in ug/L															
7429-90-5	ALUMINUM	20,000	---	790	61	< 30 U	< 30 U	1300	150	< 30 U	< 30 U	100000	< 30 U	< 30 U	< 30 U
7440-36-0	ANTIMONY	7.8	6	0.49 J	< 2 U g	< 2 U g	< 2 U g	0.79 J	< 2 U g	< 2 U g	< 2 U g	< 2 U g	< 2 U	< 2 U	< 2 U
7440-38-2	ARSENIC	0.052	10	1	**< 1 U**	0.25 J	**< 1 U**	2.6	0.6 J	6.4	0.36 J	14	**< 1 U**	**< 1 U**	**< 1 U**
7440-39-3	BARIUM	3,800	2,000	19	50	39	130	3.6 J	39	1.7 J	29	15	40	39	58
7440-41-7	BERYLLIUM	25	4	1.1	< 1 U	< 1 U	< 1 U	0.71 J	< 1 U	< 1 U	< 1 U	16	< 1 U	< 1 U	< 1 U
7440-43-9	CADMIUM	9.2	5	< 1 Uh	0.099 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	5.1	< 1 U	< 1 U	< 1 U
7440-70-2	CALCIUM METAL	---	---	320000	130000	230000	130000	170000 B	410000	630000	350000	510000	290000	290000	170000
7440-47-3	CHROMIUM[1]	---	100	3.8	0.83 J	< 2 U	< 2 U	4.2	0.45 J	0.63 J	< 2 U	4.6	< 2 U	< 2 U	< 2 U
7440-48-4	COBALT	6	---	4.4	< 0.5 U	0.56	1.5	< 0.5 U	2.1	0.28 J	< 0.5 U	130	0.26 J	0.32 J	0.12 J
7440-50-8	COPPER	800	1,300	30	1.4 J	< 2 U	< 2 U	1.5 J	1 J	1 J	< 2 U	130	< 2 U	< 2 U	< 2 U
7439-89-6	IRON	14,000	---	8200	48 J	480	< 50 U	59	330	27 J	1100	1500	< 50 U	< 50 U	< 50 U
7439-92-1	LEAD	---	15	0.59 J	0.48 J	< 1 U	< 1 U	< 1 U	0.55 J	< 1 U	< 1 U	1.5	< 1 U	< 1 U	< 1 U
7439-95-4	MAGNESIUM	---	---	45000	48000	65000	33000	20000	110000	23000	51000	62000	89000	91000	33000
7439-96-5	MANGANESE	430	---	590	< 5 U	110	20	< 5 U	280	13	9.6	2300	60	60	18
7440-02-0	NICKEL	390	---	15 B	0.47 J	2	1.1	1.5	9	1.3	< 1 U	220	1.8 B	1.7 B	< 1 U g
7440-09-7	POTASSIUM	---	---	8500	3000	2400	1400	8900	21000	7900	2100	21000	19000	19000	2100
7782-49-2	SELENIUM	100	50	1.4 J	< 5 U	< 5 U	< 5 U	3.2 J	< 5 U	1.3 J	< 5 U	45	< 5 U	< 5 U	< 5 U
7440-22-4	SILVER	94	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-23-5	SODIUM	---	---	6800	5300	16000	17000	3600	24000	25000	7300	13000	31000	31000	7400
7440-28-0	THALLIUM	0.2	2	**< 1 U**	**< 1 U**	0.074 J	**< 1 U**	0.059 J	0.13 J	0.21 J	**< 1 U**	0.48 J	0.38 J	0.35 J	0.07 J
7440-62-2	VANADIUM	86	---	1.6	0.83 J	0.77 J	0.58 J	7	0.84 U j	8.1	0.66 J	< 1 U	< 1 U	< 1 U	< 1 U
7440-66-6	ZINC	6,000	---	180	< 5 U	< 5 U	4.4 J	4.5 J	7.6	< 5 U	< 5 U	660	< 5 U	< 5 U	7.9
57-12-5	CYANIDE	1.5	200	**< 10 U**	**< 10 U**	5.7 J	2 J	**< 10 U**	**< 10 U**	7.6 J	2.9 J	3.8 J	**< 10 U**	2.5 J	**< 10 U**
7439-97-6	MERCURY	0.63	2	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L															
16887-00-6	CHLORIDE	---	---	73	5.7	37	12	3.9	50	12	18	18	63	80	19
14797-55-8	NITRATE AS N	32	10	5.2	7.3	6.7	3.5	5.9	0.6	1.7	< 0.1 U	9.6	28	27	4.4
14808-79-8	SULFATE	---	---	530	63	400	86	190	850	1400	170	1800	560	560	210
ALKB	BICARBONATE ALKALINITY	---	---	560	510	450	440	300	390	250	500	< 5 U	470	480	350
ALKC	CARBONATE ALKALINITY	---	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	---	560	510	450	440	300	390	250	500	< 5 U	470	480	350
PESTICIDES in ug/L															
957-51-7	DIPHENAMID	530		30	< 0.98 U	2.3	< 1.1 U	< 0.96 U	1.3	< 0.96 U	0.56 J	< 0.95 U	23	22	0.9 J
53-19-0	2,4'-DDD	0.032	---	0.25 J t	< 0.0012 U	0.0012 J t	0.0039 J t	< 0.0012 U	**< 0.12 U**	< 0.0013 U	0.0052	**< 0.063 U**	**< 0.13 U**	**< 0.13 U**	< 0.0012 U
3424-82-6	2,4'-DDE	0.046	---	**< 0.12 U**	0.0091	0.0042 J t	0.017	0.02	**< 0.12 U**	< 0.063 U	0.0069 J t	0.27 J t	0.19	0.18	0.03
789-02-6	2,4'-DDT	0.23	---	< 0.12 U	0.0055	< 0.00013 U	< 0.0013 U	< 0.0012 U	< 0.12 U	< 0.0013 U	< 0.0012 U	< 0.063 U	< 0.13 U	< 0.13 U	< 0.0012 U
72-54-8	4,4'-DDD	0.032	---	0.39	< 0.0012 U	< 0.00013 U	< 0.0013 U	0.016 J t	**< 0.12 U**	0.03 J t	< 0.0012 U	**< 0.063 U**	**< 0.13 U**	**< 0.13 U**	< 0.0012 U
72-55-9	4,4'-DDE	0.046	---	**< 0.12 U**	< 0.0012 U	< 0.00013 U	< 0.0013 U	0.0059 J t	**< 0.12 U**	< 0.0013 U	0.0036	**< 0.063 U**	**< 0.13 U**	**< 0.13 U**	< 0.0012 U
50-29-3	4,4'-DDT	0.23	---	< 0.12 U	0.0088	< 0.00013 U	< 0.0013 U	0.011	< 0.12 U	< 0.0013 U	0.0068 J t	< 0.063 U	< 0.13 U	< 0.13 U	0.014 J t
309-00-2	ALDRIN	0.00092	---	**< 0.12 U**	**< 0.0012 U**	< 0.00013 U	**< 0.0013 U**	**< 0.0012 U**	**< 0.12 U**	0.037 J t	**< 0.0012 U**	**< 0.063 U**	**< 0.13 U**	**< 0.13 U**	**< 0.0012 U**
319-84-6	ALPHA-BHC	0.0072	---	1.1 J t	0.016	0.072	0.029 J t	0.024	3.7	0.058	0.01	1.8	6	5.3	0.17
5103-71-9	ALPHA-CHLORDANE	0.02	2	**< 0.12 U**	< 0.0012 U	< 0.00013 U	< 0.0013 U	< 0.0012 U	**< 0.12 U**	< 0.0013 U	< 0.0012 U	**< 0.063 U**	**< 0.13 U**	**< 0.13 U**	< 0.0012 U
319-85-7	BETA-BHC	0.025	---	44	0.25	0.2	0.49	1.2	1.6	4	0.13	5.8	3.2	2.9	0.52
319-86-8	DELTA-BHC	0.025	---	12 B	0.0068	0.081 B	0.038 B	0.018	5.4	0.069 B	0.51	2.6	7	6.6	0.42
60-57-1	DIELDRIN	0.0018	---	**< 0.12 U**	0.0029	< 0.00013 U	< 0.0013 U	0.018	**< 0.12 U**	1.1	< 0.0012 U	**< 0.063 U**	**< 0.13 U**	**< 0.13 U**	0.011 J t
959-98-8	ENDOSULFAN I	100	---	< 0.12 U	< 0.0012 U	< 0.00013 U	< 0.0013 U	< 0.0012 U	< 0.12 U	< 0.0013 U	< 0.0012 U	< 0.063 U	< 0.13 U	< 0.13 U	< 0.0012 U
33213-65-9	ENDOSULFAN II	100	---	< 0.12 U	< 0.0012 U	< 0.00013 U	< 0.0013 U	< 0.0012 U	< 0.12 U	0.033 J t	< 0.0012 U	< 0.063 U	< 0.13 U	< 0.13 U	< 0.0012 U
1031-07-8	ENDOSULFAN SULFATE	---	---	< 0.12 U	< 0.0012 U	< 0.00013 U	0.0031 J t	< 0.0012 U	< 0.12 U	< 0.0013 U	< 0.0012 U	< 0.063 U	< 0.13 U	< 0.13 U	< 0.0012 U
72-20-8	ENDRIN	2.3	2	< 0.12 U	< 0.0012 U	< 0.00013 U	< 0.0013 U	< 0.0012 U	< 0.12 U	< 0.0013 U	0.0015 J t	< 0.063 U	< 0.13 U	< 0.13 U	< 0.0012 U
7421-93-4	ENDRIN ALDEHYDE	---	---	< 0.12 U	< 0.0012 U	< 0.00013 U	< 0.0013 U	< 0.0012 U	< 0.12 U	< 0.0013 U	0.014 J t	< 0.063 U	< 0.13 U	< 0.13 U	< 0.0012 U
53494-70-5	ENDRIN KETONE	---	---	0.1 J	0.0019	0.00089	0.002 J t	0.006	< 0.12 U	0.18	0.0068	< 0.063 U	< 0.13 U	< 0.13 U	0.0079
58-89-9	GAMMA-BHC (LINDANE)	0.042	0.2	0.24 J t	0.0043	0.034	< 0.0013 U	0.0098	5.1	0.035	< 0.0012 U	0.4	6.2	5.7	0.098
12789-03-6	gamma-Chlordane	0.02	2	**< 0.12 U**	< 0.0012 U	0.00068	0.0015	< 0.0012 U	**< 0.12 U**	< 0.0013 U	< 0.0012 U	< 0.063 U	**< 0.13 U**	**< 0.13 U**	0.0084
76-44-8	HEPTACHLOR	0.0014	0.4	**< 0.12 U**	< 0.0012 U	< 0.00013 U	< 0.0013 U	< 0.0012 U	**< 0.12 U**	< 0.0013 U	< 0.0012 U	**< 0.063 U**	**< 0.13 U**	**< 0.13 U**	< 0.0012 U
1024-57-3	HEPTACHLOR EPOXIDE	0.0014	0.2	**< 0.12 U**	**< 0.0012 U**	< 0.00013 U	< 0.0013 U	0.003	**< 0.12 U**	< 0.0013 U	< 0.0012 U	**< 0.063 U**	**< 0.13 U**	**< 0.13 U**	< 0.0012 U
72-43-5	METHOXYCHLOR	37	40	< 0.12 U	< 0.0012 U	< 0.00013 U	< 0.0013 U	< 0.0012 U	< 0.12 U	< 0.0013 U	< 0.0012 U	< 0.063 U	< 0.13 U	< 0.13 U	< 0.0012 U
8001-35-2	TOXAPHENE	0.071	3	**< 9.5 U**	**< 0.095 U**	**< 0.0099 U**	**< 0.1 U**	**< 0.095 U**	**< 9.5 U**	**< 0.096 U**	**< 0.095 U**	**< 4.8 U**	**< 9.8 U**	**< 9.8 U**	**< 0.094 U**
HERBICIDES in ug/L															
94-75-7	2,4-D	170	70	< 3.8 U	< 3.8 U	0.61 J t	< 3.9 U	< 3.8 U	< 4 U	< 3.8 U	< 3.8 U	< 4 U	0.86 J t	0.87 J t	< 3.8 U
93-76-5	2,4,5-T	160	---	< 0.95 U	< 0.95 U	< 0.96 U	< 0.97 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 1 U	< 0.94 U	< 0.94 U	< 0.96 U
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L															
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	710	---	< 0.18 U	< 0.19 U	< 0.18 U	< 0.21 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.19 U
95-95-4	2,4,5-TRICHLOROPHENOL	1,200	---	0.19 J	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.95 U	0.35 J	**0.35 J**	< 1 U
88-06-2	2,4,6-TRICHLOROPHENOL	4.1	---	< 0.96 U	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	0.49 J	< 0.96 U	< 0.97 U	< 0.95 U	< 1.1 U	< 1 U	< 1 U
120-83-2	2,4-DICHLOROPHENOL	46	---	0.16 J	< 0.19 U	< 0.18 U	< 0.21 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.19 U
105-67-9	2,4-DIMETHYLPHENOL	360	---	< 0.96 U	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.95 U	< 1.1 U	< 1 U	< 1 U
51-28-5	2,4-DINITROPHENOL	39	---	< 4.8 U	< 4.9 U	< 4.8 U	< 5.4 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.9 U	< 4.8 U	< 5.3 U	< 5 U	< 5.1 U
121-14-2	2,4-DINITROTOLUENE	0.24	---	**< 0.96 U**	**< 0.98 U**	**< 0.96 U**	**< 1.1 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 0.97 U**	**< 0.95 U**	**< 1.1 U**	< 1 U	**< 1 U**
606-20-2	2,6-DINITROTOLUENE	0.049	---	**< 0.96 U**	**< 0.98 U**	**< 0.96 U**	**< 1.1 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 0.97 U**	**< 0.95 U**	**< 1.1 U**	< 1 U	**< 1 U**
91-58-7	2-CHLORONAPHTHALENE	750	---	< 0.18 U	< 0.19 U	< 0.18 U	< 0.21 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.19 U
95-57-8	2-CHLOROPHENOL	91	---	< 0.96 U	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.95 U	< 1.1 U	< 1 U	< 1 U
95-48-7	2-METHLYPHENOL	930	---	< 0.96 U	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.95 U	< 1.1 U	< 0.19 U	< 1 U
91-57-6	2-METHYLNAPHTHALENE	36	---	< 0.18 U	< 0.19 U	< 0.18 U	< 0.21 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.2 U	< 1 U	< 0.19 U
88-74-4	2-NITROANILINE	190	---	< 4.8 U	< 4.9 U	< 4.8 U	< 5.4 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.9 U	< 4.8 U	< 5.3 U	< 5 U	< 5.1 U
88-75-5	2-NITROPHENOL	---	---	< 0.96 U	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.95 U	< 1.1 U	< 1 U	< 1 U

Table 5-17
January-February 2017 (2nd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-A-51 2/8/2017 MWA-51-020817	MW-B-55 1/30/2017 MWB-55-013017	MW-B-400 2/2/2017 MWB-400-020217	MW-B-598 2/2/2017 MWB-598-020217	MW-C-40 2/6/2017 MWC-40-020617	MW-D-77 1/31/2017 MWD-77-013117	MW-E-46 2/2/2017 MWE-46-020217	MW-F-70 2/1/2017 MWF-70-020117	MW-G-35 1/31/2017 MWG-35-013117	MW-G-360 1/25/2017 MWG-360-012517	MW-G-360 1/25/2017 DUP-012517	MW-G-600 1/25/2017 MWG-600-012517
91-94-1	3,3`-DICHLOROBENZIDINE	0.13	---	**< 0.96 U**	**< 0.98 U**	**< 0.96 U**	**< 1.1 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 0.97 U**	**< 0.95 U**	**< 1.1 U**	< 1 U	**< 1 U**
99-09-2	3-NITROANILINE	---	---	< 4.8 U	< 4.9 U	< 4.8 U	< 5.4 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.9 U	< 4.8 U	< 5.3 U	< 5 U	< 5.1 U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	1.5	---	**< 4.8 U**	**< 4.9 U**	**< 4.8 U**	**< 5.4 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.9 U**	**< 4.8 U**	**< 5.3 U**	< 5 U	**< 5.1 U**
101-55-3	4-BROMOPHENYL PHENYL ETHER	---	---	< 0.96 U	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.95 U	< 1.1 U	< 1 U	< 1 U
59-50-7	4-CHLORO-3-METHYLPHENOL	1,400	---	< 0.96 U	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.95 U	< 1.1 U	< 1 U	< 1 U
106-47-8	4-CHLOROANILINE	0.37	---	**< 0.96 U**	**< 0.98 U**	**< 0.96 U**	**< 1.1 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 0.97 U**	**< 0.95 U**	**< 1.1 U**	< 1 U	**< 1 U**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	---	---	< 0.96 U	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.95 U	< 1.1 U	< 1 U	< 1 U
106-44-5	4-METHLYPHENOL	1,900	---	< 0.96 U	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.95 U	< 1.1 U	< 1 U	< 1 U
100-01-6	4-NITROANILINE	3.8	---	**< 4.8 U**	**< 4.9 U**	**< 4.8 U**	**< 5.4 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.9 U**	**< 4.8 U**	**< 5.3 U**	< 5 U	**< 5.1 U**
100-02-7	4-NITROPHENOL	---	---	< 4.8 U	< 4.9 U	< 4.8 U	< 5.4 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.9 U	< 4.8 U	< 5.3 U	< 5 U	< 5.1 U
83-32-9	ACENAPHTHENE	530	---	< 0.18 U	< 0.19 U	< 0.18 U	< 0.21 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.19 U
208-96-8	ACENAPHTHYLENE	---	---	< 0.18 U	< 0.19 U	< 0.18 U	< 0.21 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.19 U
98-86-2	ACETOPHENONE	1,900	---	< 0.96 U	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.95 U	< 1.1 U	< 1 U	< 1 U
120-12-7	ANTHRACENE	1,800	---	< 0.18 U	< 0.19 U	< 0.18 U	< 0.21 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.19 U
1912-24-9	ATRAZINE	0.3	3	**< 0.96 U**	**< 0.98 U**	**1.8**	**< 1.1 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 0.97 U**	**< 0.95 U**	**1.3**	**1.4**	**0.15 J**
100-52-7	BENZALDEHYDE	19	---	< 0.96 U	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.95 U	< 1.1 U	< 1 U	< 1 U
56-55-3	BENZO[A]ANTHRACENE	0.03	---	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.21 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	< 0.19 U	**< 0.19 U**
50-32-8	BENZO[A]PYRENE	0.025	0.2	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.21 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	< 0.19 U	**< 0.19 U**
205-99-2	BENZO[B]FLUORANTHENE	0.25	---	< 0.18 U	< 0.19 U	< 0.18 U	< 0.21 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.19 U
191-24-2	BENZO[G,H,I]PERYLENE	---	---	< 0.18 U	< 0.19 U	< 0.18 U	< 0.21 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.19 U
207-08-9	BENZO[K]FLUORANTHENE	2.5	---	< 0.18 U	< 0.19 U	< 0.18 U	< 0.21 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.19 U
85-68-7	BENZYL BUTYL PHTHALATE	16	---	< 0.96 U	0.27 J	< 0.96 U	0.36 J	0.95 J	< 0.96 U j	< 0.96 U	0.17 J	< 0.95 U j	< 1.1 U	< 1 U	< 1 U
92-52-4	BIPHENYL	0.83	---	**< 0.96 U**	**< 0.98 U**	**< 0.96 U**	**< 1.1 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 0.97 U**	**< 0.95 U**	**< 1.1 U**	< 1 U	**< 1 U**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	59	---	< 0.96 U	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.95 U	< 1.1 U	< 1 U	< 1 U
111-44-4	BIS(2-CHLOROETHYL) ETHER	0.014	---	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.21 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	< 0.19 U	**< 0.19 U**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.6	6	< 1.9 U	< 2 U	< 1.9 U	< 2.2 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 2 U	< 2 U	< 2 U
105-60-2	CAPROLACTAM	9,900	---	< 4.8 U	< 4.9 U	< 4.8 U	< 5.4 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.9 U	< 4.8 U	< 5.3 U	< 5 U	< 5.1 U
86-74-8	CARBAZOLE	---	---	< 0.18 U	< 0.19 U	< 0.18 U	< 0.21 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.19 U
218-01-9	CHRYSENE	25	---	< 0.18 U	< 0.19 U	< 0.18 U	< 0.21 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.19 U
53-70-3	DIBENZ[A,H]ANTHRACENE	0.025	---	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.21 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	< 0.19 U	**< 0.19 U**
132-64-9	DIBENZOFURAN	7.9	---	< 0.96 U	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.95 U	< 1.1 U	< 1 U	< 1 U
84-66-2	DIETHYL PHTHALATE	15,000	---	< 0.96 U g	< 0.98 U	< 0.96 U	< 1.1 U	0.19 J	< 0.96 U	< 0.96 U	< 0.97 U	0.14 J	< 1.1 U	< 1 U	< 1 U
131-11-3	DIMETHYL PHTHALATE	---	---	< 0.96 U	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.95 U	< 1.1 U	< 1 U	< 1 U
84-74-2	DI-N-BUTYL PHTHALATE	900	---	< 0.96 U	0.14 J	0.13 J	< 1.1 U	0.3 J	< 0.96 U	0.17 J	< 0.97 U	0.13 J	0.16 J	**0.12 J**	< 1 U
117-84-0	DI-N-OCTYL PHTHALATE	200	---	< 0.96 U	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.95 U	< 1.1 U	< 1 U	< 1 U
206-44-0	FLUORANTHENE	800	---	0.057 J	< 0.19 U	< 0.18 U	< 0.21 U	0.034 J	< 0.18 U	< 0.18 U	< 0.18 U	0.038 J	< 0.2 U	< 0.19 U	< 0.19 U
86-73-7	FLUORENE	290	---	< 0.18 U	< 0.19 U	< 0.18 U	< 0.21 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.19 U
118-74-1	HEXACHLOROBENZENE	0.0098	1	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.21 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	< 0.19 U	**< 0.19 U**
87-68-3	HEXACHLOROBUTADIENE	0.14	---	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.21 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	< 0.19 U	**< 0.19 U**
77-47-4	HEXACHLOROCYCLOPENTADIENE	0.41	50	**< 0.96 U**	**< 0.98 U**	**< 0.96 U**	**< 1.1 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 0.97 U**	**< 0.95 U**	**< 1.1 U**	< 1 U	**< 1 U**
67-72-1	HEXACHLOROETHANE	0.33	---	**< 0.96 U**	**< 0.98 U**	**< 0.96 U**	**< 1.1 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 0.97 U J f**	**< 0.95 U**	**< 1.1 U**	< 1 U	**< 1 U**
193-39-5	INDENO[1,2,3-CD]PYRENE	0.25	---	< 0.18 U	< 0.19 U	< 0.18 U	< 0.21 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.19 U
78-59-1	ISOPHORONE	78	---	< 0.96 U	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.95 U	< 1.1 U	< 1 U	< 1 U
91-20-3	NAPHTHALENE	0.17	---	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.21 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	< 0.19 U	**< 0.19 U**
98-95-3	NITROBENZENE	0.14	---	**< 1.9 U**	**< 2 U**	**< 1.9 U**	**< 2.2 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U J f**	**< 1.9 U**	**< 2 U**	< 2 U	**< 2 U**
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.011	---	< 0.18 U	< 0.19 U	< 0.18 U	< 0.21 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.19 U
86-30-6	N-NITROSODIPHENYLAMINE	12	---	< 0.96 U	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.95 U	< 1.1 U	< 1 U	< 1 U
87-86-5	PENTACHLOROPHENOL	0.041	1	**3.8**	**< 0.98 U**	**6.3**	**< 1.1 U**	**< 0.96 U**	**< 0.96 U**	**< 0.96 U**	**< 0.97 U**	**< 0.95 U**	**4.5**	**4.3**	**0.62 J**
85-01-8	PHENANTHRENE	---	---	< 0.96 U	< 0.19 U	< 0.18 U	< 0.21 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	0.075 J	< 0.2 U	< 0.19 U	< 0.19 U
108-95-2	PHENOL	5,800	---	0.14 J	< 0.98 U	< 0.96 U	< 1.1 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.97 U	< 0.95 U	< 1.1 U	< 1 U	< 1 U
129-00-0	PYRENE	120	---	0.038 J	< 0.19 U	< 0.18 U	< 0.21 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	0.027 J	< 0.2 U	< 0.19 U	< 0.19 U
VOLATILE ORGANIC COMPOUNDS in ug/L															
71-55-6	1,1,1-TRICHLOROETHANE	8,000	200	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.076	---	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10,000	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-00-5	1,1,2-TRICHLOROETHANE	0.28	5	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-34-3	1,1-DICHLOROETHANE	2.8	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-35-4	1,1-DICHLOROETHYLENE	280	7	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
120-82-1	1,2,4-TRICHLOROBENZENE	1.2	70	0.63 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	0.00033	0.2	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
106-93-4	1,2-DIBROMOETHANE	0.0075	0.05	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
95-50-1	1,2-DICHLOROBENZENE	300	600	1.1	< 1 U	< 1 U	< 1 U	< 1 U	0.32 J	< 1 U	0.26 J	< 1 U	0.89 J	0.87 J	0.26 J
107-06-2	1,2-DICHLOROETHANE	0.17	5	**< 1 U**	**< 1 U**	**0.62 J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**0.41 J**	**0.43 J**	**0.39 J**
78-87-5	1,2-DICHLOROPROPANE	0.85	5	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
541-73-1	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
106-46-7	1,4-DICHLOROBENZENE	0.48	75	**1.2**	**< 1 U**	0.43 J	**< 1 U**	**< 1 U**	0.34 J	**< 1 U**	0.36 J	**< 1 U**	**1.4**	**1.4**	**0.67 J**
78-93-3	2-BUTANONE	5,600	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
591-78-6	2-HEXANONE	38	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
108-10-1	4-METHYL-2-PENTANONE	6,300	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
67-64-1	ACETONE	14,000	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	5.6	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
71-43-2	BENZENE	0.46	5	**0.64 J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**0.66 J**	**< 1 U**	**0.6 J**	< 1 U	< 1 U	< 1 U	< 1 U
75-27-4	BROMODICHLOROMETHANE	0.13	80	**< 1 U**	**< 1 U**	**< 1 U J f**	**< 1 U J f**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-25-2	BROMOFORM	3.3	80	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
74-83-9	BROMOMETHANE	7.5	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-15-0	CARBON DISULFIDE	810	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
56-23-5	CARBON TETRACHLORIDE	0.46	5	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**

Table 5-17
January-February 2017 (2nd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-A-51 2/8/2017 MWA-51-020817	MW-B-55 1/30/2017 MWB-55-013017	MW-B-400 2/2/2017 MWB-400-020217	MW-B-598 2/2/2017 MWB-598-020217	MW-C-40 2/6/2017 MWC-40-020617	MW-D-77 1/31/2017 MWD-77-013117	MW-E-46 2/2/2017 MWE-46-020217	MW-F-70 2/1/2017 MWF-70-020117	MW-G-35 1/31/2017 MWG-35-013117	MW-G-360 1/25/2017 MWG-360-012517	MW-G-360 1/25/2017 DUP-012517	MW-G-600 1/25/2017 MWG-600-012517
108-90-7	CHLOROBENZENE	78	100	4.5	< 1 U	1.2	< 1 U	< 1 U	5.6	< 1 U	11	< 1 U	12	12	1.9
75-00-3	CHLOROETHANE	21,000	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
67-66-3	CHLOROFORM	0.22	80	**28**	**< 1 U**	**0.75 J**	**0.41 J**	**< 1 U**	**2.3**	**0.4 J**	**< 1 U**	**0.71 J**	**1**	**0.98 J**	**0.53 J**
74-87-3	CHLOROMETHANE	190	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
156-59-2	CIS-1,2-DICHLOROETHENE	36	70	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	---	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
110-82-7	CYCLOHEXANE	13,000	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
124-48-1	DIBROMOCHLOROMETHANE	0.87	---	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-71-8	DICHLORODIFLUOROMETHANE	200	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
100-41-4	ETHYLBENZENE	1.5	700	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
98-82-8	ISOPROPYLBENZENE (CUMENE)	450	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-20-9	METHYL ACETATE	20,000	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1634-04-4	METHYL TERT-BUTYL ETHER	14	---	< 1 U	< 1 U	0.22 J	< 1 U	< 1 U	< 1 U	< 1 U	1.8	< 1 U	< 1 U	< 1 U	< 1 U
108-87-2	METHYLCYLOHEXANE	---	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-09-2	METHYLENE CHLORIDE	11	5	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
100-42-5	STYRENE (MONOMER)	1,200	100	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
127-18-4	TETRACHLOROETHYLENE	11	5	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
108-88-3	TOLUENE	1,100	1,000	< 1 U	< 1 U	< 1 U	0.74 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
156-60-5	TRANS-1,2-DICHLOROETHENE	360	100	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
10061-02-6	TRANS-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
79-01-6	TRICHLOROETHYLENE	0.49	5	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-69-4	TRICHLOROFLUOROMETHANE	5,200	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-01-4	VINYL CHLORIDE	0.019	2	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
XYLENES	Xylenes, Total	190	10000	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

Notes:

(1) No RSL exists, MCL utilized.

B - Laboratory-applied qualifier. Parameter was detected in associated laboratory method blank.

J - Result is either less than the RL but greater than or equal to the method detection limit (MDL).

J r – Parent and field duplicate pair were qualified due to field duplicate imprecision.

J t – Results from primary and confirmation column displayed imprecision greater than 25%. The lesser of the two column concentrations is reported.

U - The analyte was not detected above the reporting limit.

U g – Result was qualified as non-detect either at the RL or at the sample concentration due to potential laboratory/preparation blank contamination.

U h - Result was qualified as non-detect either at the RL or at the sample concentration due to potential initial/continuing blank contamination.

U j - Result was qualified as non-detect either at the RL or at the sample concentration due to potential rinse blank contamination.

U J b - Beta-BHC re-extracted five days outside of the recommended holding time of 7 days. The re-extracted and re-analyzed beta-BHC was reported (Sample OW16-448-012717).

U J f – Non-detect result (RL) was qualified due to continuing calibration verification (CCV) anomaly. Percent deviation (%D) between initial calibration and continuing calibration greater than USEPA National Functional Guidelines criteria.

U J m, J m, R m – Results were qualified due to sample Matrix Spike/Matrix Spike Duplicate (MS/MSD) recovery anomalies or Relative Percent Difference (RPD) value anomalies.

Bold indicates the reporting limit was above the RSL and/or MCL.

Red bolded detected concentration exceeds RSL

Red bolded and highlighted detected concentration exceeds MCL.

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Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-H-65 2/7/2017 MWH-65-020717	MW-I-55 2/8/2017 MWI-55-020817	MW-J-71 2/8/2017 MWJ-71-020817	MW-K-80 2/2/2017 MWK-80-020217	MW-K-440 2/6/2017 MWK-440-020617	MW-L-48 2/1/2017 MWL-48-020117	MW-L-250 2/3/2017 MWL-250-020317	MW-M-50 2/8/2017 MWM-50-020817	MW-N-83 2/7/2017 MWN-83-020717	MW-N-113 2/7/2017 MWN-113-020717	MW-O-145 2/6/2017 MWO-145-020617	MW-P-235 2/7/2017 MWP-235-020717
TOTAL METALS in ug/L															
7429-90-5	ALUMINUM	20,000	---	370 B	< 30 U	110	160	< 30 U	< 30 U	< 30 U	26 J	47 U g	< 30 U g	100	< 30 U
7440-36-0	ANTIMONY	7.8	6	< 2 U	0.47 J	0.53 J	< 2 U g	0.69 J	< 2 U	0.63 J	0.5 J	< 2 U	< 2 U	0.6 J	< 2 U
7440-38-2	ARSENIC	0.052	10	**2.5 B**	**1.1**	**0.77 J**	**0.58 J**	**< 1 U**	**< 1 U**	**< 1 U**	**1**	**1.4 B**	**2.8 B**	**0.56 J**	**1.3 B**
7440-39-3	BARIUM	3,800	2,000	19	40	16	24	110	18	100	21	31	19	19	19
7440-41-7	BERYLLIUM	25	4	0.59 J	< 1 U	1.1	< 1 U	< 1 U	< 1 U	< 1 U	0.14 J	< 1 U	< 1 U	< 1 U	< 1 U
7440-43-9	CADMIUM	9.2	5	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-70-2	CALCIUM METAL	---	---	580000 B	420000	580000	290000	140000 B	350000	120000 B	630000	400000 B	400000 B	590000 B	600000 B
7440-47-3	CHROMIUM[1]	---	100	< 2 U	< 2 U	< 2 U	0.66 J	0.69 J	< 2 U	< 2 U	0.4 J	< 2 U	0.42 J	0.61 J	< 2 U
7440-48-4	COBALT	6	---	0.73	< 0.5 U	0.45 J	0.37 J	< 0.5 U	0.53	< 0.5 U	**6.8**	0.1 J	0.2 J	0.29 J	< 0.5 U
7440-50-8	COPPER	800	1,300	1.6 J	< 2 U	< 2 U	< 2 U	< 2 U	2.2	< 2 U	< 2 U	1.9 J	3.2	< 2 U	1.5 J
7439-89-6	IRON	14,000	---	13000	**21000**	**44000**	6300	< 50 U	2000	21 J	**18000**	**15000**	14000	14000	4900
7439-92-1	LEAD	---	15	< 1 U	< 1 U	14	**16**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.7 J	< 1 U
7439-95-4	MAGNESIUM	---	---	52000 B	21000	48000	15000	20000	42000	14000	28000	18000 B	23000 B	40000	46000 B
7439-96-5	MANGANESE	430	---	**6800**	**3200**	**5700**	**2200**	< 5 U	**540**	< 5 U	**2500**	**3000**	**6400**	**2600**	**3500**
7440-02-0	NICKEL	390	---	2.1	< 1 U	< 1 U g	0.66 J	0.88 J	1.3	0.52 J	4 B	0.42 J	0.32 J	0.83 J	0.55 J
7440-09-7	POTASSIUM	---	---	12000	6900	13000	6900	3400	7300	1200	15000	21000	13000	9400	3900
7782-49-2	SELENIUM	100	50	< 5 U	< 5 U	< 5 U	< 5 U	1.4 J	< 5 U	2.1 J	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
7440-22-4	SILVER	94	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-23-5	SODIUM	---	---	32000 B	11000	22000	12000	3500	5500	3400	3800	9000 B	6600 B	57000	41000 B
7440-28-0	THALLIUM	0.2	2	**< 1 U**	**< 1 U**	**< 1 U g**	**< 1 U**	**< 1 U**	0.14 J	**0.21 J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
7440-62-2	VANADIUM	86	---	< 1 U	< 1 U	0.84 J	0.99 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.73 J	< 1 U
7440-66-6	ZINC	6,000	---	17	13	13	6.6	< 5 U	< 5 U	4.9 J	3.9 J	< 5 U	< 5 U	53	20
57-12-5	CYANIDE	1.5	200	**< 10 U**	**< 10 U**	**< 10 U**	**1.7 J**	**< 10 U**	**4.4 J**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**2.1 J**	**< 10 U**
7439-97-6	MERCURY	0.63	2	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L															
16887-00-6	CHLORIDE	---	---	34	28	42	23	16	24	21	20	21	21	62	52
14797-55-8	NITRATE AS N	32	10	< 0.1 U	< 0.1 U	0.17 J	< 0.1 U	3.4	1.8	3.6	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U
14808-79-8	SULFATE	---	---	1200	810	1500	370	94	510	32	1300	670	670	1400	1300
ALKB	BICARBONATE ALKALINITY	---	---	410	420	340	440	340	460	360	400	480	430	170	170
ALKC	CARBONATE ALKALINITY	---	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	---	410	420	340	440	340	460	360	400	480	430	170	170
PESTICIDES in ug/L															
957-51-7	DIPHENAMID	530		260	19	93	0.3 J	< 1 U	< 0.96 U	< 1 U	4.2	4.3	2.4	320	160
53-19-0	2,4'-DDD	0.032	---	< 0.13 U	**< 0.13 U**	**< 0.13 U**	< 0.0012 U	< 0.0013 U	**< 0.063 U**	< 0.0013 U	**< 0.12 U**	**< 0.12 U**	< 0.0012 U	**< 0.12 U**	**< 0.13 U**
3424-82-6	2,4'-DDE	0.046	---	**0.11 J t**	**< 0.13 U**	**0.052 J t**	< 0.0012 U	0.012 J t	**4.4**	0.0059	**0.11 J t**	**0.3**	**0.28**	**< 0.12 U**	**< 0.13 U**
789-02-6	2,4'-DDT	0.23	---	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0012 U	< 0.0013 U	< 0.063 U	< 0.0013 U	< 0.12 U	< 0.12 U	< 0.0012 U	< 0.12 U	< 0.13 U
72-54-8	4,4'-DDD	0.032	---	**< 0.13 U**	**< 0.13 U**	**< 0.13 U**	0.019 J t	< 0.0013 U	**0.13**	< 0.0013 U	**< 0.12 U**	**< 0.12 U**	**0.066**	**< 0.12 U**	**< 0.13 U**
72-55-9	4,4'-DDE	0.046	---	**< 0.13 U**	**< 0.13 U**	**< 0.13 U**	< 0.0012 U	< 0.0013 U	**< 0.063 U**	< 0.0013 U	**< 0.12 U**	**< 0.12 U**	< 0.0012 U	**< 0.12 U**	**< 0.13 U**
50-29-3	4,4'-DDT	0.23	---	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0012 U	0.0017 J t	< 0.063 U	< 0.0013 U	< 0.12 U	< 0.12 U	< 0.0012 U	< 0.12 U	< 0.13 U
309-00-2	ALDRIN	0.00092	---	**< 0.13 U**	**0.093 J t**	**< 0.13 U**	**0.021 J t**	**< 0.0013 U**	**< 0.063 U**	**< 0.0013 U**	**< 0.12 U**	**< 0.12 U**	**0.074 J t**	**< 0.12 U**	**0.12 J t**
319-84-6	ALPHA-BHC	0.0072	---	< 0.13 U	**0.27**	**0.36**	**0.19**	**0.038**	**0.38**	**0.021**	**2.6**	**2.8**	**2**	< 0.12 U	**0.14**
5103-71-9	ALPHA-CHLORDANE	0.02	2	**< 0.13 U**	**< 0.13 U**	**< 0.13 U**	< 0.0012 U	< 0.0013 U	**< 0.063 U**	< 0.0013 U	**< 0.12 U**	**0.051 J t**	< 0.0012 U	**< 0.12 U**	**< 0.13 U**
319-85-7	BETA-BHC	0.025	---	**1.6**	**2.6**	**1.8**	**1**	**0.17**	**21**	**0.07**	**6.3**	**5.5**	**2.4**	< 0.12 U	**0.27**
319-86-8	DELTA-BHC	0.025	---	**5.6**	**6.8 B**	**27 B**	**2.7 B**	**0.085**	**0.77 J t**	0.0086	**12 B**	**10**	**5.9**	**4**	**2.3**
60-57-1	DIELDRIN	0.0018	---	**< 0.13 U**	**0.81**	**< 0.13 U**	**0.064 J t**	**0.0079**	**0.71**	**0.0033**	**0.23**	**< 0.12 U**	**0.028 J t**	**< 0.12 U**	**< 0.13 U**
959-98-8	ENDOSULFAN I	100	---	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0012 U	< 0.0013 U	< 0.063 U	< 0.0013 U	< 0.12 U	< 0.12 U	< 0.0012 U	< 0.12 U	< 0.13 U
33213-65-9	ENDOSULFAN II	100	---	< 0.13 U	< 0.13 U	< 0.13 U	0.014 J t	< 0.0013 U	0.18 J t	< 0.0013 U	< 0.12 U	< 0.12 U	0.057 J t	< 0.12 U	< 0.13 U
1031-07-8	ENDOSULFAN SULFATE	---	---	< 0.13 U	0.15	< 0.13 U	< 0.0012 U	< 0.0013 U	< 0.063 U	< 0.0013 U	< 0.12 U	< 0.12 U	< 0.0012 U	0.34 J t	0.38 J t
72-20-8	ENDRIN	2.3	2	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0012 U	< 0.0013 U	0.26	< 0.0013 U	< 0.12 U	< 0.12 U	0.032 J t	< 0.12 U	< 0.13 U
7421-93-4	ENDRIN ALDEHYDE	---	---	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0012 U	< 0.0013 U	< 0.063 U	< 0.0013 U	< 0.12 U	< 0.12 U	< 0.0012 U	0.14 J t	0.11 J t
53494-70-5	ENDRIN KETONE	---	---	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0012 U	< 0.0013 U	3.5	0.00091 J t	< 0.12 U	< 0.12 U	< 0.0012 U	< 0.12 U	< 0.13 U
58-89-9	GAMMA-BHC (LINDANE)	0.042	0.2	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0012 U	0.011 J t	**0.068**	0.0065	< 0.12 U	< 0.12 U	< 0.0012 U	< 0.12 U	< 0.13 U
12789-03-6	gamma-Chlordane	0.02	2	**< 0.13 U**	**< 0.13 U**	**< 0.13 U**	**0.03 J t**	0.003 J t	**< 0.063 U**	0.0009 J t	**< 0.12 U**	**0.084 J**	**0.076 J t**	**< 0.12 U**	**< 0.13 U**
76-44-8	HEPTACHLOR	0.0014	0.4	**< 0.13 U**	**< 0.13 U**	**< 0.13 U**	< 0.0012 U	< 0.0013 U	**< 0.063 U**	< 0.0013 U	**< 0.12 U**	**< 0.12 U**	< 0.0012 U	**< 0.12 U**	**< 0.13 U**
1024-57-3	HEPTACHLOR EPOXIDE	0.0014	0.2	**< 0.13 U**	**< 0.13 U**	**< 0.13 U**	< 0.0012 U	< 0.0013 U	**< 0.063 U**	< 0.0013 U	**< 0.12 U**	**< 0.12 U**	< 0.0012 U	**< 0.12 U**	**< 0.13 U**
72-43-5	METHOXYCHLOR	37	40	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0012 U	< 0.0013 U	< 0.063 U	< 0.0013 U	< 0.12 U	< 0.12 U	< 0.0012 U	< 0.12 U	< 0.13 U
8001-35-2	TOXAPHENE	0.071	3	**< 9.9 U**	**< 9.8 U**	**< 9.8 U**	**< 0.095 U**	**< 0.1 U**	**< 4.8 U**	**< 0.1 U**	**< 9.5 U**	**< 9.5 U**	**< 0.095 U**	**< 9.5 U**	**< 9.9 U**
HERBICIDES in ug/L															
94-75-7	2,4-D	170	70	< 4 U	< 3.9 U	< 3.9 U	< 3.8 U	< 4 U	< 3.9 U	< 4 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 4 U
93-76-5	2,4,5-T	160	---	< 0.99 U	< 0.97 U	< 0.98 U	< 0.95 U	< 1 U	< 0.97 U	< 1 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.95 U	< 1 U
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L															
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	710	---	< 1.9 U	< 0.19 U	< 0.95 U	< 0.19 U	< 0.2 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 3.7 U	< 2.1 U
95-95-4	2,4,5-TRICHLOROPHENOL	1,200	---	7.9 J	< 1 U	< 5 U	< 1 U	< 1 U	< 0.96 U	< 1 U	0.78 J	< 0.97 U	< 0.96 U	< 19 U	< 11 U
88-06-2	2,4,6-TRICHLOROPHENOL	4.1	---	**21**	< 1 U	**< 5 U**	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.97 U	< 0.97 U	< 0.96 U	**< 19 U**	**< 11 U**
120-83-2	2,4-DICHLOROPHENOL	46	---	3	0.73	0.93 J	< 0.19 U	< 0.2 U	< 0.18 U	< 0.2 U	1.9	< 0.18 U	0.12 J	< 3.7 U	< 2.1 U
105-67-9	2,4-DIMETHYLPHENOL	360	---	< 9.8 U	< 1 U	< 5 U	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.97 U	< 0.97 U	< 0.96 U	< 19 U	< 11 U
51-28-5	2,4-DINITROPHENOL	39	---	< 49 U	< 5 U	< 25 U	< 5 U	< 5.2 U	< 4.8 U	< 5.2 U	< 4.9 U	< 4.9 U	< 4.8 U	< 97 U	< 56 U
121-14-2	2,4-DINITROTOLUENE	0.24	---	**< 9.8 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 0.97 U**	**< 0.97 U**	**< 0.96 U**	**< 19 U**	**< 11 U**
606-20-2	2,6-DINITROTOLUENE	0.049	---	**< 9.8 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 0.97 U**	**< 0.97 U**	**< 0.96 U**	**< 19 U**	**< 11 U**
91-58-7	2-CHLORONAPHTHALENE	750	---	< 1.9 U	< 0.19 U	< 0.95 U	< 0.19 U	< 0.2 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 3.7 U	< 2.1 U
95-57-8	2-CHLOROPHENOL	91	---	< 9.8 U	1.3	2.9 J	< 1 U	< 1 U	< 0.96 U	< 1 U	0.18 J	0.2 J	< 0.96 U	< 19 U	< 11 U
95-48-7	2-METHLYPHENOL	930	---	< 9.8 U	< 1 U	< 5 U	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.97 U	< 0.97 U	< 0.96 U	< 19 U	< 11 U
91-57-6	2-METHYLNAPHTHALENE	36	---	< 1.9 U	< 0.19 U	< 0.95 U	< 0.19 U	< 0.2 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 3.7 U	< 2.1 U
88-74-4	2-NITROANILINE	190	---	< 49 U	< 5 U	< 25 U	< 5 U	< 5.2 U	< 4.8 U	< 5.2 U	< 4.9 U	< 4.9 U	< 4.8 U	< 97 U	< 56 U
88-75-5	2-NITROPHENOL	---	---	< 9.8 U	< 1 U	< 5 U	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.97 U	< 0.97 U	< 0.96 U	< 19 U	< 11 U

Table 5-17
January-February 2017 (2nd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-H-65 2/7/2017 MWH-65-020717	MW-I-55 2/8/2017 MWI-55-020817	MW-J-71 2/8/2017 MWJ-71-020817	MW-K-80 2/2/2017 MWK-80-020217	MW-K-440 2/6/2017 MWK-440-020617	MW-L-48 2/1/2017 MWL-48-020117	MW-L-250 2/3/2017 MWL-250-020317	MW-M-50 2/8/2017 MWM-50-020817	MW-N-83 2/7/2017 MWN-83-020717	MW-N-113 2/7/2017 MWN-113-020717	MW-O-145 2/6/2017 MWO-145-020617	MW-P-235 2/7/2017 MWP-235-020717
91-94-1	3,3`-DICHLOROBENZIDINE	0.13	---	**< 9.8 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 0.97 U**	**< 0.97 U**	**< 0.96 U**	**< 19 U**	**< 11 U**
99-09-2	3-NITROANILINE	---	---	< 49 U	< 5 U	< 25 U	< 5 U	< 5.2 U	< 4.8 U	< 5.2 U	< 4.9 U	< 4.9 U	< 4.8 U	< 97 U	< 56 U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	1.5	---	**< 49 U**	**< 5 U**	**< 25 U**	**< 5 U**	**< 5.2 U**	**< 4.8 U**	**< 5.2 U**	**< 4.9 U**	**< 4.9 U**	**< 4.8 U**	**< 97 U**	**< 56 U**
101-55-3	4-BROMOPHENYL PHENYL ETHER	---	---	< 9.8 U	< 1 U	< 5 U	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.97 U	< 0.97 U	< 0.96 U	< 19 U	< 11 U
59-50-7	4-CHLORO-3-METHYLPHENOL	1,400	---	< 9.8 U	< 1 U	< 5 U	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.97 U	< 0.97 U	< 0.96 U	< 19 U	< 11 U
106-47-8	4-CHLOROANILINE	0.37	---	**< 9.8 U**	**< 1 U**	1 J	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	0.24 J	**< 0.97 U**	**< 0.96 U**	4.3 J	1.8 J
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	---	---	< 9.8 U	< 1 U	< 5 U	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.97 U	< 0.97 U	< 0.96 U	< 19 U	< 11 U
106-44-5	4-METHLYPHENOL	1,900	---	< 9.8 U	< 1 U	< 5 U	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.97 U	< 0.97 U	< 0.96 U	< 19 U	< 11 U
100-01-6	4-NITROANILINE	3.8	---	**< 49 U**	**< 5 U**	**< 25 U**	**< 5 U**	**< 5.2 U**	**< 4.8 U**	**< 5.2 U**	**< 4.9 U**	**< 4.9 U**	**< 4.8 U**	**< 97 U**	**< 56 U**
100-02-7	4-NITROPHENOL	---	---	< 49 U	< 5 U	< 25 U	< 5 U	< 5.2 U	< 4.8 U	< 5.2 U	< 4.9 U	< 4.9 U	< 4.8 U	< 97 U	< 56 U
83-32-9	ACENAPHTHENE	530	---	< 1.9 U	0.15 J	1.5	< 0.19 U	< 0.2 U	< 0.18 U	< 0.2 U	< 0.18 U	0.44	< 0.18 U	0.57 J	< 2.1 U
208-96-8	ACENAPHTHYLENE	---	---	< 1.9 U	< 0.19 U	< 0.95 U	< 0.19 U	< 0.2 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 3.7 U	< 2.1 U
98-86-2	ACETOPHENONE	1,900	---	< 9.8 U	< 1 U	< 5 U	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.97 U	0.34 J	< 0.96 U	< 19 U	< 11 U
120-12-7	ANTHRACENE	1,800	---	< 1.9 U	< 0.19 U	< 0.95 U	< 0.19 U	< 0.2 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 3.7 U	< 2.1 U
1912-24-9	ATRAZINE	0.3	3	**< 9.8 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 0.97 U**	**< 0.97 U**	**< 0.96 U**	**< 19 U**	**< 11 U**
100-52-7	BENZALDEHYDE	19	---	< 9.8 U	< 1 U	< 5 U	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.97 U	< 0.97 U	< 0.96 U	< 19 U	< 11 U
56-55-3	BENZO[A]ANTHRACENE	0.03	---	**< 1.9 U**	**< 0.19 U**	**< 0.95 U**	0.034 J	**< 0.2 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 3.7 U**	**< 2.1 U**
50-32-8	BENZO[A]PYRENE	0.025	0.2	**< 1.9 U**	**< 0.19 U**	**< 0.95 U**	**< 0.19 U**	**< 0.2 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 3.7 U**	**< 2.1 U**
205-99-2	BENZO[B]FLUORANTHENE	0.25	---	< 1.9 U	< 0.19 U	< 0.95 U	0.38	< 0.2 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	**< 3.7 U**	**< 2.1 U**
191-24-2	BENZO[G,H,I]PERYLENE	---	---	< 1.9 U	< 0.19 U	< 0.95 U	< 0.19 U	< 0.2 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 3.7 U	< 2.1 U
207-08-9	BENZO[K]FLUORANTHENE	2.5	---	< 1.9 U	< 0.19 U	< 0.95 U	0.18 J	< 0.2 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	**< 3.7 U**	< 2.1 U
85-68-7	BENZYL BUTYL PHTHALATE	16	---	< 9.8 U	< 1 U	< 5 U	0.17 J	< 1 U	< 0.96 U	< 1 U	< 0.97 U	< 0.97 U	0.24 J	< 19 U	< 11 U
92-52-4	BIPHENYL	0.83	---	**< 9.8 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 0.97 U**	**< 0.97 U**	**< 0.96 U**	**< 19 U**	**< 11 U**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	59	---	< 9.8 U	< 1 U	< 5 U	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.97 U	< 0.97 U	< 0.96 U	< 19 U	< 11 U
111-44-4	BIS(2-CHLOROETHYL) ETHER	0.014	---	**< 1.9 U**	**< 0.19 U**	**< 0.95 U**	**< 0.19 U**	**< 0.2 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 3.7 U**	**< 2.1 U**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.6	6	**< 20 U**	< 2 U	**< 10 U**	< 2 U	< 2.1 U	< 1.9 U	< 2.1 U	< 1.9 U	1.3 J	< 1.9 U	**< 39 U**	**< 22 U**
105-60-2	CAPROLACTAM	9,900	---	< 49 U	< 5 U	< 25 U	< 5 U	< 5.2 U	< 4.8 U	< 5.2 U	< 4.9 U	< 4.9 U	< 4.8 U	< 97 U	< 56 U
86-74-8	CARBAZOLE	---	---	0.68 J	< 0.19 U	0.47 J	< 0.19 U	< 0.2 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 3.7 U	< 2.1 U
218-01-9	CHRYSENE	25	---	< 1.9 U	< 0.19 U	< 0.95 U	0.15 J	< 0.2 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 3.7 U	< 2.1 U
53-70-3	DIBENZ[A,H]ANTHRACENE	0.025	---	**< 1.9 U**	**< 0.19 U**	**< 0.95 U**	**< 0.19 U**	**< 0.2 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 3.7 U**	**< 2.1 U**
132-64-9	DIBENZOFURAN	7.9	---	**< 9.8 U**	0.22 J	0.51 J	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.97 U	0.25 J	< 0.96 U	**< 19 U**	**< 11 U**
84-66-2	DIETHYL PHTHALATE	15,000	---	< 9.8 U	1 B	< 5 U g	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.97 U g	< 0.97 U	< 0.96 U	< 19 U	< 11 U
131-11-3	DIMETHYL PHTHALATE	---	---	< 9.8 U	< 1 U	< 5 U	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.97 U	< 0.97 U	< 0.96 U	< 19 U	< 11 U
84-74-2	DI-N-BUTYL PHTHALATE	900	---	< 9.8 U	< 1 U	< 5 U	0.14 J	0.13 J	< 0.96 U	0.24 J	< 0.97 U	< 0.97 U	0.12 J	< 19 U	< 11 U
117-84-0	DI-N-OCTYL PHTHALATE	200	---	< 9.8 U	< 1 U	< 5 U	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.97 U	< 0.97 U	< 0.96 U	< 19 U	< 11 U
206-44-0	FLUORANTHENE	800	---	< 1.9 U	< 0.19 U	< 0.95 U	0.097 J	< 0.2 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 3.7 U	< 2.1 U
86-73-7	FLUORENE	290	---	0.68 J	0.14 J	1.6	< 0.19 U	< 0.2 U	< 0.18 U	< 0.2 U	< 0.18 U	0.33	< 0.18 U	< 3.7 U	< 2.1 U
118-74-1	HEXACHLOROBENZENE	0.0098	1	**< 1.9 U**	**< 0.19 U**	**< 0.95 U**	**< 0.19 U**	**< 0.2 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 3.7 U**	**< 2.1 U**
87-68-3	HEXACHLOROBUTADIENE	0.14	---	**< 1.9 U**	**< 0.19 U**	**< 0.95 U**	**< 0.19 U**	**< 0.2 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 3.7 U**	**< 2.1 U**
77-47-4	HEXACHLOROCYCLOPENTADIENE	0.41	50	**< 9.8 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 0.97 U**	**< 0.97 U**	**< 0.96 U**	**< 19 U**	**< 11 U**
67-72-1	HEXACHLOROETHANE	0.33	---	**< 9.8 U**	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 0.96 U J f**	**< 1 U**	**< 0.97 U**	**< 0.97 U**	**< 0.96 U**	**< 19 U**	**< 11 U**
193-39-5	INDENO[1,2,3-CD]PYRENE	0.25	---	< 1.9 U	< 0.19 U	**< 0.95 U**	0.34	< 0.2 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	**< 3.7 U**	**< 2.1 U**
78-59-1	ISOPHORONE	78	---	< 9.8 U	< 1 U	< 5 U	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.97 U	< 0.97 U	< 0.96 U	< 19 U	< 11 U
91-20-3	NAPHTHALENE	0.17	---	**< 1.9 U**	**< 0.19 U**	**< 0.95 U**	**< 0.19 U**	**< 0.2 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 3.7 U**	**< 2.1 U**
98-95-3	NITROBENZENE	0.14	---	**< 20 U**	**< 2 U**	**< 10 U**	**< 2 U**	**< 2.1 U**	**< 1.9 U J f**	**< 2.1 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 39 U**	**< 22 U**
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.011	---	< 1.9 U	< 0.19 U	< 0.95 U	< 0.19 U	< 0.2 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 3.7 U	< 2.1 U
86-30-6	N-NITROSODIPHENYLAMINE	12	---	< 9.8 U	< 1 U	< 5 U	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.97 U	< 0.97 U	< 0.96 U	**< 19 U**	< 11 U
87-86-5	PENTACHLOROPHENOL	0.041	1	210	**< 1 U**	**< 5 U**	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 0.97 U**	**< 0.97 U**	**< 0.96 U**	**< 19 U**	**< 11 U**
85-01-8	PHENANTHRENE	---	---	< 1.9 U	< 0.19 U	< 0.95 U	< 0.19 U	< 0.2 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 3.7 U	< 2.1 U
108-95-2	PHENOL	5,800	---	< 9.8 U	< 1 U	0.6 J	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.97 U	< 0.97 U	< 0.96 U	< 19 U	< 11 U
129-00-0	PYRENE	120	---	< 1.9 U	< 0.19 U	< 0.95 U	0.074 J	< 0.2 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 3.7 U	< 2.1 U
VOLATILE ORGANIC COMPOUNDS in ug/L															
71-55-6	1,1,1-TRICHLOROETHANE	8,000	200	< 10 U	< 2.5 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 1 U
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.076	---	**< 10 U**	**< 2.5 U**	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 1 U**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10,000	---	< 10 U	< 2.5 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 1 U
79-00-5	1,1,2-TRICHLOROETHANE	0.28	5	**< 10 U**	**< 2.5 U**	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 1 U**
75-34-3	1,1-DICHLOROETHANE	2.8	---	**< 10 U**	< 2.5 U	**< 25 U**	< 1 U	< 1 U	1.8	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 1 U
75-35-4	1,1-DICHLOROETHYLENE	280	7	< 10 U	< 2.5 U	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 50 U**	< 1 U
120-82-1	1,2,4-TRICHLOROBENZENE	1.2	70	**< 10 U**	1.2 J	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	2.8	0.9 J	0.57 J	**< 50 U**	3.4
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	0.00033	0.2	**< 10 U**	**< 2.5 U**	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 1 U**
106-93-4	1,2-DIBROMOETHANE	0.0075	0.05	**< 10 U**	**< 2.5 U**	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 1 U**
95-50-1	1,2-DICHLOROBENZENE	300	600	22	10	35	2.2	< 1 U	< 1 U	< 1 U	2.9	2.5	2.4	45 J	24
107-06-2	1,2-DICHLOROETHANE	0.17	5	**< 10 U**	**< 2.5 U**	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	0.77 J	0.25 J	0.36 J	< 50 U	1
78-87-5	1,2-DICHLOROPROPANE	0.85	5	**< 10 U**	**< 2.5 U**	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 1 U**
541-73-1	1,3-DICHLOROBENZENE	---	---	< 10 U	1 J	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	0.42 J	0.45 J	0.22 J	< 50 U	2.4
106-46-7	1,4-DICHLOROBENZENE	0.48	75	34	22	38	1.9	**< 1 U**	0.33 J	**< 1 U**	6.6	6.9	4.7	48 J	48
78-93-3	2-BUTANONE	5,600	---	< 50 U	< 13 U	< 130 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 250 U	< 5 U
591-78-6	2-HEXANONE	38	---	**< 50 U**	< 13 U	**< 130 U**	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	**< 250 U**	< 5 U
108-10-1	4-METHYL-2-PENTANONE	6,300	---	< 50 U	< 13 U	< 130 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 250 U	< 5 U
67-64-1	ACETONE	14,000	---	< 50 U	< 13 U	< 130 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 250 U	< 5 U
71-43-2	BENZENE	0.46	5	7.5 J	1.8 J	17 J	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	1.4	0.89 J	0.58 J	52	18
75-27-4	BROMODICHLOROMETHANE	0.13	80	**< 10 U**	**< 2.5 U**	**< 25 U**	**< 1 U J f**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 1 U**
75-25-2	BROMOFORM	3.3	80	**< 10 U**	**< 2.5 U**	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 50 U**	< 1 U
74-83-9	BROMOMETHANE	7.5	---	< 10 U	< 2.5 U	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 50 U**	< 1 U
75-15-0	CARBON DISULFIDE	810	---	< 10 U	< 2.5 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 1 U
56-23-5	CARBON TETRACHLORIDE	0.46	5	**< 10 U**	**< 2.5 U**	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 1 U**

Table 5-17
January-February 2017 (2nd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-H-65 2/7/2017 MWH-65-020717	MW-I-55 2/8/2017 MWI-55-020817	MW-J-71 2/8/2017 MWJ-71-020817	MW-K-80 2/2/2017 MWK-80-020217	MW-K-440 2/6/2017 MWK-440-020617	MW-L-48 2/1/2017 MWL-48-020117	MW-L-250 2/3/2017 MWL-250-020317	MW-M-50 2/8/2017 MWM-50-020817	MW-N-83 2/7/2017 MWN-83-020717	MW-N-113 2/7/2017 MWN-113-020717	MW-O-145 2/6/2017 MWO-145-020617	MW-P-235 2/7/2017 MWP-235-020717
108-90-7	CHLOROBENZENE	78	100	**180**	71	**300**	8.5	< 1 U	1.6	< 1 U	24	36	23	**570**	**260**
75-00-3	CHLOROETHANE	21,000	---	< 10 U	< 2.5 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 1 U
67-66-3	CHLOROFORM	0.22	80	**< 10 U**	**< 2.5 U**	**< 25 U**	**< 1 U**	**0.47 J**	**4**	**0.5 J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 1 U**
74-87-3	CHLOROMETHANE	190	---	< 10 U	< 2.5 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 1 U
156-59-2	CIS-1,2-DICHLOROETHENE	36	70	< 10 U	< 2.5 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 50 U**	0.46 J
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	---	---	< 10 U	< 2.5 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 1 U
110-82-7	CYCLOHEXANE	13,000	---	< 10 U	< 2.5 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 1 U
124-48-1	DIBROMOCHLOROMETHANE	0.87	---	**< 10 U**	**< 2.5 U**	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 1 U**
75-71-8	DICHLORODIFLUOROMETHANE	200	---	< 10 U	< 2.5 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 1 U
100-41-4	ETHYLBENZENE	1.5	700	**< 10 U**	**< 2.5 U**	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 50 U**	< 1 U
98-82-8	ISOPROPYLBENZENE (CUMENE)	450	---	< 10 U	< 2.5 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.2	< 1 U	< 50 U	0.51 J
79-20-9	METHYL ACETATE	20,000	---	< 50 U	< 13 U	< 130 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 250 U	< 5 U
1634-04-4	METHYL TERT-BUTYL ETHER	14	---	< 10 U	< 2.5 U	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 50 U**	0.68 J
108-87-2	METHYLCYLOHEXANE	---	---	< 10 U	< 2.5 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.22 J	< 1 U	< 50 U	< 1 U
75-09-2	METHYLENE CHLORIDE	11	5	< 10 U	< 2.5 U	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 50 U**	< 1 U
100-42-5	STYRENE (MONOMER)	1,200	100	< 10 U	< 2.5 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 1 U
127-18-4	TETRACHLOROETHYLENE	11	5	< 10 U	< 2.5 U	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 50 U**	< 1 U
108-88-3	TOLUENE	1,100	1,000	< 10 U	< 2.5 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	0.32 J
156-60-5	TRANS-1,2-DICHLOROETHENE	360	100	< 10 U	< 2.5 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 1 U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	---	---	< 10 U	< 2.5 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 1 U
79-01-6	TRICHLOROETHYLENE	0.49	5	**< 10 U**	**< 2.5 U**	**< 25 U**	**< 1 U**	**1.1**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 1 U**
75-69-4	TRICHLOROFLUOROMETHANE	5,200	---	< 10 U	< 2.5 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 1 U
75-01-4	VINYL CHLORIDE	0.019	2	**< 10 U**	**< 2.5 U**	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 1 U**
XYLENES	Xylenes, Total	190	10000	< 20 U	< 5 U	< 50 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 100 U	< 2 U

Notes:

(1) No RSL exists, MCL utilized.

B - Laboratory-applied qualifier. Parameter was detected in associated laboratory method blank.

J - Result is either less than the RL but greater than or equal to the method detection limit (MDL).

J r – Parent and field duplicate pair were qualified due to field duplicate imprecision.

J t – Results from primary and confirmation column displayed imprecision greater than 25%. The lesser of the two column concentrations is reported.

U - The analyte was not detected above the reporting limit.

U g – Result was qualified as non-detect either at the RL or at the sample concentration due to potential laboratory/preparation blank contamination.

U h - Result was qualified as non-detect either at the RL or at the sample concentration due to potential initial/continuing blank contamination.

U j - Result was qualified as non-detect either at the RL or at the sample concentration due to potential rinse blank contamination.

U J b - Beta-BHC re-extracted five days outside of the recommended holding time of 7 days. The re-extracted and re-analyzed beta-BHC was reported (Sample OW16-448-012717).

U J f – Non-detect result (RL) was qualified due to continuing calibration verification (CCV) anomaly. Percent deviation (%D) between initial calibration and continuing calibration greater than USEPA National Functional Guidelines criteria.

U J m, J m, R m – Results were qualified due to sample Matrix Spike/Matrix Spike Duplicate (MS/MSD) recovery anomalies or Relative Percent Difference (RPD) value anomalies.

Bold indicates the reporting limit was above the RSL and/or MCL.

Red bolded detected concentration exceeds RSL

Red bolded and highlighted detected concentration exceeds MCL.

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Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-Q-150 2/6/2017 MWQ-150-020617	MW-R-330 2/6/2017 MWR-330-020617	MW-R-600 2/6/2017 MWR-600-020617	EW-1-110 2/8/2017 EW1-110-020817	OW-1-105 1/23/2017 OW1-105-012317	OW-2-65 1/24/2017 OW2-65-012417	OW-2-115 1/24/2017 OW2-115-012417	OW-3-55 1/26/2017 OW3-55-012617	OW-3-105 1/26/2017 OW3-105-012617	OW-4-70 1/30/2017 OW4-70-013017	OW-5-90 1/25/2017 OW5-90-012517	OW-7-242 1/31/2017 OW7-242-013117
TOTAL METALS in ug/L															
7429-90-5	ALUMINUM	20,000	---	190	270	20 J	96	280	96	550	86	450	140	900	89
7440-36-0	ANTIMONY	7.8	6	3.1	0.62 J	0.66 J	< 2 U	0.48 J	< 2 U	0.96 J	< 2 U	< 2 U	< 2 U g	< 2 U	< 2 U
7440-38-2	ARSENIC	0.052	10	**11**	**< 1 U**	**2.1**	**0.25 J**	**< 1 U**	**0.23 J**	**0.88 J**	**< 1 U**	**0.97 J**	**0.24 J**	**0.37 J**	**4.2**
7440-39-3	BARIUM	3,800	2,000	28	22	69	26	120	47	31	110	140	33	100	58
7440-41-7	BERYLLIUM	25	4	< 1 U	0.31 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.7 J	< 1 U
7440-43-9	CADMIUM	9.2	5	< 1 U	0.09 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-70-2	CALCIUM METAL	---	---	470000 B	430000 B	160000 B	570000	140000	200000	340000	140000	77000	240000	240000	120000
7440-47-3	CHROMIUM[1]	---	100	0.5 J	< 2 U	< 2 U	< 2 U	0.99 J	< 2 U	0.99 J	0.74 J	3.2	< 2 U	1.9 J	0.77 J
7440-48-4	COBALT	6	---	3	4.6	2	< 0.5 U	0.1 J	0.13 U j	**11**	< 0.5 U	0.43 J	0.27 J	0.32 J	< 0.5 U
7440-50-8	COPPER	800	1,300	< 2 U	< 2 U	< 2 U	2.1	1.2 J	1.6 J	5.3	1.6 J	5.1	1.3 J	1.2 J	< 2 U
7439-89-6	IRON	14,000	---	**21000**	480	3600	**32000**	200	52	**17000**	52	1000	86	380	1500
7439-92-1	LEAD	---	15	**100**	< 1 U	< 1 U	< 1 U	0.43 J	< 1 U	**180**	< 1 U	1.2	4.1	6.7	1.2
7439-95-4	MAGNESIUM	---	---	24000	46000	29000	26000	14000	17000	26000	14000	12000	40000	32000	46000
7439-96-5	MANGANESE	430	---	**4600**	**2100**	**810**	**4800**	10	3.1 J	**3300**	1.6 J	120	67	140	39
7440-02-0	NICKEL	390	---	5.7	3.2	1.9	< 1 U g	0.51 J	< 1 U g	7.8 B	< 1 U	1.8 B	2.1	1.8 B	0.55 J
7440-09-7	POTASSIUM	---	---	19000	14000	2300	8100	1800	2500	5500	3000	2000	21000	16000	23000
7782-49-2	SELENIUM	100	50	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	1.7 J
7440-22-4	SILVER	94	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-23-5	SODIUM	---	---	12000	16000	30000	21000	41000	49000	61000	53000	260000	52000	17000	84000
7440-28-0	THALLIUM	0.2	2	**< 1 U**	**1.3**	**< 1 U**	**< 1 U**	0.062 J	**< 1 U j**	**< 1 U j**	**< 1 U**	**< 1 U**	**0.5 J**	0.18 J	**< 1 U**
7440-62-2	VANADIUM	86	---	< 1 U	< 1 U	0.68 J	< 1 U	0.65 J	< 1 U	0.91 J	< 1 U	0.76 J	0.69 J	1.1	< 1 U j
7440-66-6	ZINC	6,000	---	34	6	< 5 U	11	25	7.6	74	< 5 U	40	< 5 U	< 5 U	< 5 U
57-12-5	CYANIDE	1.5	200	**< 10 U**	**< 10 U**	**< 10 U**	**1.8 J**	**< 10 U g**	**< 10 U g**	**< 10 U g**	**3.5 J**	**7.4 J**	**1.9 J**	**< 10 U**	**2.9 J**
7439-97-6	MERCURY	0.63	2	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L															
16887-00-6	CHLORIDE	---	---	18	47	19	45	87	54	69	92	320	93	16	22
14797-55-8	NITRATE AS N	32	10	< 0.1 U	0.23	0.069 J	< 0.1 U	3.2	1.2	< 0.1 U	3.3	0.32	8.5	8.6	< 0.1 U
14808-79-8	SULFATE	---	---	800	810	200	1200	37	96	590	40	22	330	250	190
ALKB	BICARBONATE ALKALINITY	---	---	410	470	380	350	400	550	470	350	280	400	480	440
ALKC	CARBONATE ALKALINITY	---	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	---	410	470	380	350	400	550	470	350	280	400	480	440
PESTICIDES in ug/L															
957-51-7	DIPHENAMID	530		9	18	2.4	33	< 0.96 U	< 0.97 U	33	< 0.97 U	< 0.98 U	2.5	3	2.9
53-19-0	2,4'-DDD	0.032	---	**< 0.062 U**	**< 0.12 U**	< 0.0013 U	**< 0.13 U**	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	**< 0.13 U**	**< 0.12 U**	< 0.0064 U
3424-82-6	2,4'-DDE	0.046	---	**0.19**	**0.11 J t**	0.015	0.045 J t	0.0068	0.03	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.13 U	**0.11 J**	0.012 J t
789-02-6	2,4'-DDT	0.23	---	< 0.062 U	< 0.12 U	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	0.0088	< 0.0012 U	0.002 J t	< 0.13 U	< 0.12 U	< 0.0064 U
72-54-8	4,4'-DDD	0.032	---	**< 0.062 U**	**< 0.12 U**	0.004 J t	**< 0.13 U**	0.0011 J t	< 0.0013 U	0.0023 J t	< 0.0012 U	0.0033	**< 0.13 U**	**< 0.12 U**	< 0.0064 U
72-55-9	4,4'-DDE	0.046	---	**< 0.062 U**	**< 0.12 U**	< 0.0013 U	**< 0.13 U**	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	0.0014	**< 0.13 U**	**< 0.12 U**	< 0.0064 U
50-29-3	4,4'-DDT	0.23	---	< 0.062 U	< 0.12 U	< 0.0013 U	< 0.13 U	0.0014 J t	0.0023 J t	0.12 J t	< 0.0012 U	0.0083	< 0.13 U	< 0.12 U	< 0.0064 U
309-00-2	ALDRIN	0.00092	---	**< 0.062 U**	**< 0.12 U**	**< 0.0013 U**	**0.19 J t**	**< 0.0013 U**	**< 0.0013 U**	**< 0.0012 U**	**< 0.0012 U**	**< 0.0012 U**	**< 0.13 U**	**< 0.12 U**	**< 0.0064 U**
319-84-6	ALPHA-BHC	0.0072	---	**0.97**	**2.9**	**0.16**	**0.12 J**	0.0046	**0.0087 J t**	**0.046**	0.0021	0.00077 J	**1.4**	**4.2**	**0.19**
5103-71-9	ALPHA-CHLORDANE	0.02	2	**< 0.062 U**	**< 0.12 U**	< 0.0013 U	**< 0.13 U**	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	**< 0.13 U**	**< 0.12 U**	< 0.0064 U
319-85-7	BETA-BHC	0.025	---	**3**	**3.1**	**0.29**	**1.4**	0.018	**0.061 J m**	**0.29**	0.0036	0.00085 J t	**3.4**	**2.8**	**0.46**
319-86-8	DELTA-BHC	0.025	---	**5.6**	**4.5**	**0.4**	**7.7 B**	0.0021	**0.16**	**4.8**	0.01 B	0.0032 U g	**0.75**	**7.5**	**0.39**
60-57-1	DIELDRIN	0.0018	---	**< 0.062 U**	**< 0.12 U**	< 0.0013 U	**< 0.13 U**	0.0011 J t	< 0.0013 U	< 0.0012 U	0.00083 J t	< 0.0012 U	**0.16**	**< 0.12 U**	< 0.0064 U
959-98-8	ENDOSULFAN I	100	---	< 0.062 U	< 0.12 U	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.13 U	< 0.12 U	< 0.0064 U
33213-65-9	ENDOSULFAN II	100	---	< 0.062 U	< 0.12 U	< 0.0013 U	< 0.13 U	< 0.0013 U	0.022	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.13 U	< 0.12 U	< 0.0064 U
1031-07-8	ENDOSULFAN SULFATE	---	---	< 0.062 U	< 0.12 U	< 0.0013 U	0.18 J t	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.13 U	< 0.12 U	< 0.0064 U
72-20-8	ENDRIN	2.3	2	< 0.062 U	< 0.12 U	< 0.0013 U	< 0.13 U	< 0.0013 U	0.0096 J m	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.13 U	< 0.12 U	< 0.0064 U
7421-93-4	ENDRIN ALDEHYDE	---	---	< 0.062 U	< 0.12 U	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 R m	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.13 U	< 0.12 U	< 0.0064 U
53494-70-5	ENDRIN KETONE	---	---	< 0.062 U	< 0.12 U	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	0.11 J	< 0.12 U	< 0.0064 U
58-89-9	GAMMA-BHC (LINDANE)	0.042	0.2	< 0.062 U	**0.069 J t**	0.011 J t	< 0.13 U	0.0022	< 0.0013 U	< 0.0012 U	0.0028	0.001 J	**0.61**	**5.7**	**0.057**
12789-03-6	gamma-Chlordane	0.02	2	**0.048 J**	**< 0.12 U**	0.0046	**< 0.13 U**	0.00053 J t	**0.035**	< 0.0012 U	< 0.0012 U	0.00057 J t	**< 0.13 U**	**< 0.12 U**	< 0.0064 U
76-44-8	HEPTACHLOR	0.0014	0.4	**< 0.062 U**	**< 0.12 U**	< 0.0013 U	**< 0.13 U**	< 0.0013 U	< 0.0013 R m	**0.13 J t**	< 0.0012 U	0.00075 J	**< 0.13 U**	**< 0.12 U**	**< 0.0064 U**
1024-57-3	HEPTACHLOR EPOXIDE	0.0014	0.2	**< 0.062 U**	**< 0.12 U**	< 0.0013 U	**< 0.13 U**	< 0.0013 U	< 0.0013 R m	< 0.0012 U	< 0.0012 U	0.00065 J	**< 0.13 U**	**< 0.12 U**	< 0.0064 U
72-43-5	METHOXYCHLOR	37	40	< 0.062 U	< 0.12 U	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.13 U	< 0.12 U	< 0.0064 U
8001-35-2	TOXAPHENE	0.071	3	**< 4.8 U**	**< 9.5 U**	**< 0.096 U**	**< 9.8 U**	**< 0.096 U**	**< 0.096 U**	**< 0.095 U**	**< 0.095 U**	**< 0.095 U**	**< 9.6 U**	**< 9.5 U**	**< 0.49 U**
HERBICIDES in ug/L															
94-75-7	2,4-D	170	70	< 3.8 U	< 3.8 U	< 3.8 U	3.4 J t	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 4 U
93-76-5	2,4,5-T	160	---	< 0.95 U	< 0.95 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.96 U	< 0.95 U	< 1 U
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L															
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	710	---	< 0.18 U	< 0.19 U	< 0.19 U	< 0.58 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U
95-95-4	2,4,5-TRICHLOROPHENOL	1,200	---	< 0.95 U	0.22 J	< 0.99 U	< 3 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	0.47 J	< 1 U
88-06-2	2,4,6-TRICHLOROPHENOL	4.1	---	< 0.95 U	< 0.98 U	< 0.99 U	< 3 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U
120-83-2	2,4-DICHLOROPHENOL	46	---	< 0.18 U	< 0.19 U	< 0.19 U	0.79	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U
105-67-9	2,4-DIMETHYLPHENOL	360	---	< 0.95 U	< 0.98 U	< 0.99 U	< 3 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U
51-28-5	2,4-DINITROPHENOL	39	---	< 4.8 U	< 4.9 U	< 5 U	< 15 U	< 4.8 U	< 4.9 U	< 4.8 U	< 4.9 U	< 4.9 U	< 4.8 U	< 4.8 U	< 5.2 U
121-14-2	2,4-DINITROTOLUENE	0.24	---	**< 0.95 U**	**< 0.98 U**	**< 0.99 U**	**< 3 U**	**< 0.96 U**	**< 0.97 U**	**< 0.96 U**	**< 0.97 U**	**< 0.98 U**	**< 0.96 U**	**< 0.95 U**	**< 1 U**
606-20-2	2,6-DINITROTOLUENE	0.049	---	**< 0.95 U**	**< 0.98 U**	**< 0.99 U**	**< 3 U**	**< 0.96 U**	**< 0.97 U**	**< 0.96 U**	**< 0.97 U**	**< 0.98 U**	**< 0.96 U**	**< 0.95 U**	**< 1 U**
91-58-7	2-CHLORONAPHTHALENE	750	---	< 0.18 U	< 0.19 U	< 0.19 U	< 0.58 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U
95-57-8	2-CHLOROPHENOL	91	---	< 0.95 U	< 0.98 U	< 0.99 U	1.9 J	< 0.96 U	< 0.97 U	0.34 J	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U
95-48-7	2-METHLYPHENOL	930	---	< 0.95 U	< 0.98 U	< 0.99 U	< 3 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U
91-57-6	2-METHYLNAPHTHALENE	36	---	< 0.18 U	< 0.19 U	< 0.19 U	< 0.58 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U
88-74-4	2-NITROANILINE	190	---	< 4.8 U	< 4.9 U	< 5 U	< 15 U	< 4.8 U	< 4.9 U	< 4.8 U	< 4.9 U	< 4.9 U	< 4.8 U	< 4.8 U	< 5.2 U
88-75-5	2-NITROPHENOL	---	---	< 0.95 U	< 0.98 U	< 0.99 U	< 3 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U

Table 5-17
January-February 2017 (2nd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-Q-150 2/6/2017 MWQ-150-020617	MW-R-330 2/6/2017 MWR-330-020617	MW-R-600 2/6/2017 MWR-600-020617	EW-1-110 2/8/2017 EW1-110-020817	OW-1-105 1/23/2017 OW1-105-012317	OW-2-65 1/24/2017 OW2-65-012417	OW-2-115 1/24/2017 OW2-115-012417	OW-3-55 1/26/2017 OW3-55-012617	OW-3-105 1/26/2017 OW3-105-012617	OW-4-70 1/30/2017 OW4-70-013017	OW-5-90 1/25/2017 OW5-90-012517	OW-7-242 1/31/2017 OW7-242-013117
91-94-1	3,3`-DICHLOROBENZIDINE	0.13	---	**< 0.95 U**	**< 0.98 U**	**< 0.99 U**	**< 3 U**	**< 0.96 U**	**< 0.97 U**	**< 0.96 U**	**< 0.97 U**	**< 0.98 U**	**< 0.96 U**	**< 0.95 U**	**< 1 U**
99-09-2	3-NITROANILINE	---	---	< 4.8 U	< 4.9 U	< 5 U	< 15 U	< 4.8 U	< 4.9 U	< 4.8 U	< 4.9 U	< 4.9 U	< 4.8 U	< 4.8 U	< 5.2 U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	1.5	---	**< 4.8 U**	**< 4.9 U**	**< 5 U**	**< 15 U**	**< 4.8 U**	**< 4.9 U**	**< 4.8 U**	**< 4.9 U**	**< 4.9 U**	**< 4.8 U**	**< 4.8 U**	**< 5.2 U**
101-55-3	4-BROMOPHENYL PHENYL ETHER	---	---	< 0.95 U	< 0.98 U	< 0.99 U	< 3 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U
59-50-7	4-CHLORO-3-METHYLPHENOL	1,400	---	< 0.95 U	< 0.98 U	< 0.99 U	< 3 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U
106-47-8	4-CHLOROANILINE	0.37	---	**< 0.95 U**	**< 0.98 U**	**< 0.99 U**	**< 3 U**	**< 0.96 U**	**< 0.97 U**	**< 0.96 U**	**< 0.97 U**	**< 0.98 U**	**< 0.96 U**	**< 0.95 U**	**< 1 U**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	---	---	< 0.95 U	< 0.98 U	< 0.99 U	< 3 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U
106-44-5	4-METHLYPHENOL	1,900	---	< 0.95 U	< 0.98 U	< 0.99 U	< 3 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U
100-01-6	4-NITROANILINE	3.8	---	**< 4.8 U**	**< 4.9 U**	**< 5 U**	**< 15 U**	**< 4.8 U**	**< 4.9 U**	**< 4.8 U**	**< 4.9 U**	**< 4.9 U**	**< 4.8 U**	**< 4.8 U**	**< 5.2 U**
100-02-7	4-NITROPHENOL	---	---	< 4.8 U	< 4.9 U	< 5 U	< 15 U	< 4.8 U	< 4.9 U	< 4.8 U	< 4.9 U	< 4.9 U	< 4.8 U	< 4.8 U	< 5.2 U
83-32-9	ACENAPHTHENE	530	---	< 0.18 U	< 0.19 U	< 0.19 U	0.59	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U
208-96-8	ACENAPHTHYLENE	---	---	< 0.18 U	< 0.19 U	< 0.19 U	< 0.58 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U
98-86-2	ACETOPHENONE	1,900	---	0.15 J	< 0.98 U	< 0.99 U	< 3 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U
120-12-7	ANTHRACENE	1,800	---	< 0.18 U	0.017 J	< 0.19 U	< 0.58 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U
1912-24-9	ATRAZINE	0.3	3	**< 0.95 U**	**2**	**0.5 J**	**< 3 U**	**< 0.96 U**	**< 0.97 U**	**< 0.96 U**	**< 0.97 U**	**< 0.98 U**	**1.1**	**0.65 J**	**0.86 J**
100-52-7	BENZALDEHYDE	19	---	< 0.95 U	< 0.98 U	< 0.99 U	< 3 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U
56-55-3	BENZO[A]ANTHRACENE	0.03	---	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.58 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U j**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**
50-32-8	BENZO[A]PYRENE	0.025	0.2	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.58 U**	**< 0.18 U**	**< 0.18 U**	**0.11 J**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**
205-99-2	BENZO[B]FLUORANTHENE	0.25	---	< 0.18 U	< 0.19 U	< 0.19 U	< 0.58 U	< 0.18 U	< 0.18 U	0.29 U j	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U
191-24-2	BENZO[G,H,I]PERYLENE	---	---	< 0.18 U	< 0.19 U	< 0.19 U	< 0.58 U	< 0.18 U	< 0.18 U	< 0.18 U j	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U
207-08-9	BENZO[K]FLUORANTHENE	2.5	---	< 0.18 U	< 0.19 U	< 0.19 U	< 0.58 U	< 0.18 U	< 0.18 U	< 0.18 U j	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U
85-68-7	BENZYL BUTYL PHTHALATE	16	---	< 0.95 U	< 0.98 U	< 0.99 U	< 3 U	< 0.96 U	0.14 J	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U j
92-52-4	BIPHENYL	0.83	---	**< 0.95 U**	**< 0.98 U**	**< 0.99 U**	**< 3 U**	**< 0.96 U**	**< 0.97 U**	**< 0.96 U**	**< 0.97 U**	**< 0.98 U**	**< 0.96 U**	**< 0.95 U**	**< 1 U**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	59	---	< 0.95 U	< 0.98 U	< 0.99 U	< 3 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U
111-44-4	BIS(2-CHLOROETHYL) ETHER	0.014	---	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.58 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.6	6	< 1.9 U	< 2 U	< 2 U	**< 6.1 U**	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 2 U	< 1.9 U	< 1.9 U	< 2.1 U
105-60-2	CAPROLACTAM	9,900	---	1.3 J	< 4.9 U	1.9 J	< 15 U	< 4.8 U	< 4.9 U	< 4.8 U	< 4.9 U	< 4.9 U	< 4.8 U	< 4.8 U	10
86-74-8	CARBAZOLE	---	---	< 0.18 U	< 0.19 U	< 0.19 U	< 0.58 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U
218-01-9	CHRYSENE	25	---	< 0.18 U	< 0.19 U	< 0.19 U	< 0.58 U	< 0.18 U	< 0.18 U	0.2 U j	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U
53-70-3	DIBENZ[A,H]ANTHRACENE	0.025	---	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.58 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**
132-64-9	DIBENZOFURAN	7.9	---	< 0.95 U	< 0.98 U	< 0.99 U	0.4 J	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U
84-66-2	DIETHYL PHTHALATE	15,000	---	< 0.95 U	< 0.98 U	0.15 J	< 3 U g	< 0.96 U	< 0.97 U j	< 0.96 U j	0.16 J	< 0.98 U	< 0.96 U	< 0.95 U	0.15 J
131-11-3	DIMETHYL PHTHALATE	---	---	< 0.95 U	< 0.98 U	< 0.99 U	< 3 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U
84-74-2	DI-N-BUTYL PHTHALATE	900	---	< 0.95 U	< 0.98 U	0.16 J	< 3 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	0.32 J
117-84-0	DI-N-OCTYL PHTHALATE	200	---	< 0.95 U	< 0.98 U	< 0.99 U	< 3 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U
206-44-0	FLUORANTHENE	800	---	< 0.18 U	< 0.19 U	< 0.19 U	< 0.58 U	< 0.18 U	< 0.18 U	0.25	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U
86-73-7	FLUORENE	290	---	< 0.18 U	< 0.19 U	< 0.19 U	0.6	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U
118-74-1	HEXACHLOROBENZENE	0.0098	1	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.58 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**
87-68-3	HEXACHLOROBUTADIENE	0.14	---	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.58 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**
77-47-4	HEXACHLOROCYCLOPENTADIENE	0.41	50	**< 0.95 U**	**< 0.98 U**	**< 0.99 U**	**< 3 U**	**< 0.96 U**	**< 0.97 U J m**	**< 0.96 U**	**< 0.97 U**	**< 0.98 U**	**< 0.96 U**	**< 0.95 U**	**< 1 U**
67-72-1	HEXACHLOROETHANE	0.33	---	**< 0.95 U**	**< 0.98 U**	**< 0.99 U**	**< 3 U**	**< 0.96 U**	**< 0.97 U**	**< 0.96 U**	**< 0.97 U**	**< 0.98 U**	**< 0.96 U**	**< 0.95 U**	**< 1 U**
193-39-5	INDENO[1,2,3-CD]PYRENE	0.25	---	< 0.18 U	< 0.19 U	< 0.19 U	< 0.58 U	< 0.18 U	< 0.18 U	< 0.18 U j	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U
78-59-1	ISOPHORONE	78	---	< 0.95 U	< 0.98 U	< 0.99 U	< 3 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U
91-20-3	NAPHTHALENE	0.17	---	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.58 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**
98-95-3	NITROBENZENE	0.14	---	**< 1.9 U**	**< 2 U**	**< 2 U**	**< 6.1 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 2 U**	**< 1.9 U**	**< 1.9 U**	**< 2.1 U**
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.011	---	< 0.18 U	< 0.19 U	< 0.19 U	< 0.58 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U
86-30-6	N-NITROSODIPHENYLAMINE	12	---	< 0.95 U	< 0.98 U	< 0.99 U	< 3 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U
87-86-5	PENTACHLOROPHENOL	0.041	1	**< 0.95 U**	**< 0.98 U**	**< 0.99 U**	**< 3 U**	**< 0.96 U**	**< 0.97 U**	**< 0.96 U**	**< 0.97 U**	**< 0.98 U**	**< 0.96 U**	**2.5**	**< 1 U**
85-01-8	PHENANTHRENE	---	---	< 0.18 U	< 0.19 U	< 0.19 U	< 0.58 U	< 0.18 U	< 0.18 U	0.095 J	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U
108-95-2	PHENOL	5,800	---	< 0.95 U	< 0.98 U	< 0.99 U	< 3 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.96 U	< 0.95 U	< 1 U
129-00-0	PYRENE	120	---	< 0.18 U	< 0.19 U	< 0.19 U	< 0.58 U	< 0.18 U	< 0.18 U	0.22	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U
VOLATILE ORGANIC COMPOUNDS in ug/L															
71-55-6	1,1,1-TRICHLOROETHANE	8,000	200	< 1 U	< 2 U	< 1 U	< 3 U	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.076	---	**< 1 U**	**< 2 U**	**< 1 U**	**< 3 U**	**< 1 U**	**< 1 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10,000	---	< 1 U	< 2 U	< 1 U	< 3 U	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-00-5	1,1,2-TRICHLOROETHANE	0.28	5	**< 1 U**	**< 2 U**	**< 1 U**	**< 3 U**	**< 1 U**	**< 1 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-34-3	1,1-DICHLOROETHANE	2.8	---	< 1 U	< 2 U	< 1 U	< 3 U	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-35-4	1,1-DICHLOROETHYLENE	280	7	< 1 U	< 2 U	< 1 U	< 3 U	< 1 U	< 1 U	**< 10 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
120-82-1	1,2,4-TRICHLOROBENZENE	1.2	70	0.51 J	**1.3 J**	< 1 U J m	**< 3 U**	< 1 U J f	< 1 U	**< 10 U J f**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	0.00033	0.2	**< 1 U**	**< 2 U**	**< 1 U**	**< 3 U**	**< 1 U J f**	**< 1 U**	**< 10 U J f**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
106-93-4	1,2-DIBROMOETHANE	0.0075	0.05	**< 1 U**	**< 2 U**	**< 1 U J m**	**< 3 U**	**< 1 U**	**< 1 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
95-50-1	1,2-DICHLOROBENZENE	300	600	1.7	6.7	< 1 U J m	5.9	< 1 U	< 1 U	5.9 J	< 1 U	< 1 U	< 1 U	0.32 J	< 1 U
107-06-2	1,2-DICHLOROETHANE	0.17	5	**0.33 J**	**4.7**	**1.2 J m**	**< 3 U**	**< 1 U**	**< 1 U**	**< 10 U**	**< 1 U**	**< 1 U**	**0.82 J**	**< 1 U**	**0.51 J**
78-87-5	1,2-DICHLOROPROPANE	0.85	5	**< 1 U**	**< 2 U**	**< 1 U**	**< 3 U**	**< 1 U**	**< 1 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
541-73-1	1,3-DICHLOROBENZENE	---	---	0.26 J	0.61 J	< 1 U J m	0.64 J	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
106-46-7	1,4-DICHLOROBENZENE	0.48	75	**4.8**	**14**	0.48 J m	**13**	**< 1 U**	**< 1 U**	**9.2 J**	**< 1 U**	**< 1 U**	0.28 J	**0.66 J**	**< 1 U**
78-93-3	2-BUTANONE	5,600	---	< 5 U	< 10 U	< 5 U	< 15 U	< 5 U	< 5 U	< 50 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
591-78-6	2-HEXANONE	38	---	< 5 U	< 10 U	< 5 U	< 15 U	< 5 U J f	< 5 U	**< 50 U J f**	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
108-10-1	4-METHYL-2-PENTANONE	6,300	---	< 5 U	< 10 U	< 5 U	< 15 U	< 5 U J f	< 5 U	< 50 U J f	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
67-64-1	ACETONE	14,000	---	< 5 U	< 10 U	< 5 U	< 15 U	< 5 U	< 5 U	< 50 U	< 5 U	3.7 J	< 5 U	< 5 U	< 5 U
71-43-2	BENZENE	0.46	5	**0.81 J**	**0.71 J**	**< 1 U**	**0.73 J**	**< 1 U**	**< 1 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-27-4	BROMODICHLOROMETHANE	0.13	80	**< 1 U**	**< 2 U**	**< 1 U**	**< 3 U**	**< 1 U J f**	**< 1 U**	**< 10 U J f**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-25-2	BROMOFORM	3.3	80	< 1 U	< 2 U	< 1 U	< 3 U	< 1 U J f	< 1 U	**< 10 U J f**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
74-83-9	BROMOMETHANE	7.5	---	< 1 U	< 2 U	< 1 U J m	< 3 U	< 1 U	< 1 U	**< 10 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-15-0	CARBON DISULFIDE	810	---	< 1 U	< 2 U	< 1 U	< 3 U	< 1 U J f	< 1 U	< 10 U J f	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
56-23-5	CARBON TETRACHLORIDE	0.46	5	**< 1 U**	**< 2 U**	**< 1 U**	**< 3 U**	**< 1 U**	**< 1 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**

Table 5-17
January-February 2017 (2nd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-Q-150 2/6/2017 MWQ-150-020617	MW-R-330 2/6/2017 MWR-330-020617	MW-R-600 2/6/2017 MWR-600-020617	EW-1-110 2/8/2017 EW1-110-020817	OW-1-105 1/23/2017 OW1-105-012317	OW-2-65 1/24/2017 OW2-65-012417	OW-2-115 1/24/2017 OW2-115-012417	OW-3-55 1/26/2017 OW3-55-012617	OW-3-105 1/26/2017 OW3-105-012617	OW-4-70 1/30/2017 OW4-70-013017	OW-5-90 1/25/2017 OW5-90-012517	OW-7-242 1/31/2017 OW7-242-013117
108-90-7	CHLOROBENZENE	78	100	28	58	< 1 U J m	53	< 1 U	< 1 U	**120**	< 1 U	< 1 U	< 1 U	1.5	0.22 J
75-00-3	CHLOROETHANE	21,000	---	< 1 U	< 2 U	< 1 U	< 3 U	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
67-66-3	CHLOROFORM	0.22	80	**< 1 U**	**< 2 U**	**0.31 J m**	**< 3 U**	**< 1 U**	**< 1 U**	**< 10 U**	**< 1 U**	**< 1 U**	**0.29 J**	**0.62 J**	**< 1 U**
74-87-3	CHLOROMETHANE	190	---	< 1 U	< 2 U	< 1 U	< 3 U	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
156-59-2	CIS-1,2-DICHLOROETHENE	36	70	< 1 U	1 J	< 1 U J m	< 3 U	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	---	---	< 1 U	< 2 U	< 1 U	< 3 U	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
110-82-7	CYCLOHEXANE	13,000	---	< 1 U	< 2 U	< 1 U	< 3 U	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
124-48-1	DIBROMOCHLOROMETHANE	0.87	---	**< 1 U**	**< 2 U**	**< 1 U J m**	**< 3 U**	**< 1 U**	**< 1 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-71-8	DICHLORODIFLUOROMETHANE	200	---	< 1 U	< 2 U	< 1 U	< 3 U	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
100-41-4	ETHYLBENZENE	1.5	700	< 1 U	**< 2 U**	< 1 U J m	**< 3 U**	< 1 U	< 1 U	**< 10 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
98-82-8	ISOPROPYLBENZENE (CUMENE)	450	---	0.41 J	< 2 U	< 1 U	< 3 U	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-20-9	METHYL ACETATE	20,000	---	< 5 U	< 10 U	< 5 U	< 15 U	< 5 U	< 5 U	< 50 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1634-04-4	METHYL TERT-BUTYL ETHER	14	---	0.21 J	0.85 J	< 1 U	< 3 U	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	0.44 J	< 1 U	< 1 U
108-87-2	METHYLCYLOHEXANE	---	---	< 1 U	< 2 U	< 1 U	< 3 U	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-09-2	METHYLENE CHLORIDE	11	5	< 1 U	< 2 U	< 1 U	< 3 U	< 1 U	< 1 U	**< 10 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
100-42-5	STYRENE (MONOMER)	1,200	100	< 1 U	< 2 U	< 1 U	< 3 U	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
127-18-4	TETRACHLOROETHYLENE	11	5	< 1 U	< 2 U	< 1 U	< 3 U	< 1 U	< 1 U	**< 10 U**	< 1 U	< 1 U	0.31 J	< 1 U	< 1 U
108-88-3	TOLUENE	1,100	1,000	0.17 J	< 2 U	0.19 J	< 3 U	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
156-60-5	TRANS-1,2-DICHLOROETHENE	360	100	< 1 U	< 2 U	< 1 U	< 3 U	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	---	---	< 1 U	< 2 U	< 1 U	< 3 U	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-01-6	TRICHLOROETHYLENE	0.49	5	**< 1 U**	**0.56 J**	**< 1 U J m**	**< 3 U**	**< 1 U**	**< 1 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-69-4	TRICHLOROFLUOROMETHANE	5,200	---	< 1 U	< 2 U	< 1 U	< 3 U	< 1 U J f	< 1 U	< 10 U J f	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-01-4	VINYL CHLORIDE	0.019	2	**< 1 U**	**< 2 U**	**< 1 U**	**< 3 U**	**< 1 U**	**< 1 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
XYLENES	Xylenes, Total	190	10000	< 2 U	< 4 U	< 2 U	< 6 U	< 2 U	< 2 U	< 20 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

Notes:

(1) No RSL exists, MCL utilized.

B - Laboratory-applied qualifier. Parameter was detected in associated laboratory method blank.

J - Result is either less than the RL but greater than or equal to the method detection limit (MDL).

J r – Parent and field duplicate pair were qualified due to field duplicate imprecision.

J t – Results from primary and confirmation column displayed imprecision greater than 25%. The lesser of the two column concentrations is reported.

U - The analyte was not detected above the reporting limit.

U g – Result was qualified as non-detect either at the RL or at the sample concentration due to potential laboratory/preparation blank contamination.

U h - Result was qualified as non-detect either at the RL or at the sample concentration due to potential initial/continuing blank contamination.

U j - Result was qualified as non-detect either at the RL or at the sample concentration due to potential rinse blank contamination.

U J b - Beta-BHC re-extracted five days outside of the recommended holding time of 7 days. The re-extracted and re-analyzed beta-BHC was reported (Sample OW16-448-012717).

U J f – Non-detect result (RL) was qualified due to continuing calibration verification (CCV) anomaly. Percent deviation (%D) between initial calibration and continuing calibration greater than USEPA National Functional Guidelines criteria.

U J m, J m, R m – Results were qualified due to sample Matrix Spike/Matrix Spike Duplicate (MS/MSD) recovery anomalies or Relative Percent Difference (RPD) value anomalies.

Bold indicates the reporting limit was above the RSL and/or MCL.

Red bolded detected concentration exceeds RSL

Red bolded and highlighted detected concentration exceeds MCL.

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Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	OW-7-410 1/31/2017 OW7-410-013117	OW-8-230 1/23/2017 OW8-230-012317	OW-9-125 1/25/2017 OW9-125-012517	OW-10-250 1/24/2017 OW10-250-012417	OW-11-240 1/30/2017 OW11-240-013017	OW-11-600 1/30/2017 OW11-600-013017	OW-12-232 1/24/2017 OW12-232-012417	OW-13-250 1/26/2017 OW13-250-012617	OW-14-96 1/27/2017 OW14-96-012717	OW-14-235 1/26/2017 OW14-235-012617	OW-15-202 1/26/2017 OW15-202-012617	OW-16-448 1/27/2017 OW16-448-012717
TOTAL METALS in ug/L															
7429-90-5	ALUMINUM	20,000	---	< 30 U	54	320	24 J	16 J	< 30 U	970	210	1200	41	37	< 30 U
7440-36-0	ANTIMONY	7.8	6	< 2 U g	0.64 J	< 2 U	< 2 U	< 2 U g	< 2 U g	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
7440-38-2	ARSENIC	0.052	10	**< 1 U**	**< 1 U**	**0.25 J**	**< 1 U**	**0.72 J**	**< 1 U**	**1.6**	**< 1 U**	**0.53 J**	**< 1 U**	**< 1 U**	**0.31 J**
7440-39-3	BARIUM	3,800	2,000	30	25	100	96	110	110	73	160	140	130	170	120
7440-41-7	BERYLLIUM	25	4	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-43-9	CADMIUM	9.2	5	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-70-2	CALCIUM METAL	---	---	310000	400000	180000	130000	120000	120000	92000	90000	110000	120000	98000	120000
7440-47-3	CHROMIUM[1]	---	100	< 2 U	< 2 U	1.4 J	1.7 J	< 2 U	0.48 J	0.4 J	0.76 J	1.7 J	0.39 J	< 2 U	1 J
7440-48-4	COBALT	6	---	< 0.5 U	0.32 J	0.1 J	< 0.5 U j	2	< 0.5 U	< 0.5 U j	< 0.5 U	0.22 J	< 0.5 U	< 0.5 U	0.14 J
7440-50-8	COPPER	800	1,300	< 2 U	1.6 J	< 2 U	< 2 U	< 2 U	< 2 U	3.2	1.9 J	1.3 U g	1.1 J	< 2 U	< 2 U
7439-89-6	IRON	14,000	---	< 50 U	90	360	< 50 U	990	< 50 U	1400	< 50 U	1000 J m	< 50 U	< 50 U	< 50 U
7439-92-1	LEAD	---	15	< 1 U	< 1 U	7.9	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.3	< 1 U	< 1 U	< 1 U
7439-95-4	MAGNESIUM	---	---	56000	63000	19000	15000	13000	22000	24000	19000	17000	19000	26000	13000
7439-96-5	MANGANESE	430	---	4 J	330	1.8 J	< 5 U	**490**	< 5 U	25	< 5 U	8.3	< 5 U	< 5 U	3 J
7440-02-0	NICKEL	390	---	0.6 J	1.9	< 1 U g	< 1 U g	3.1	< 1 U	< 1 U g	< 1 U g	0.93 J	< 1 U	< 1 U	0.58 J
7440-09-7	POTASSIUM	---	---	4200	2200	2100	2200	1700	1200	2700	7600	1500	1300	1600	2200
7782-49-2	SELENIUM	100	50	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
7440-22-4	SILVER	94	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-23-5	SODIUM	---	---	16000	38000	52000	51000	26000	2300	68000	14000	5300	2200	1900	19000
7440-28-0	THALLIUM	0.2	2	0.11 J	0.2 J	**< 1 U**	**< 1 U j**	**< 1 U**	0.072 J	0.085 J	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
7440-62-2	VANADIUM	86	---	< 1 U j	0.67 J	< 1 U	0.51 J	0.69 J	0.52 J	< 1 U	< 1 U	0.96 J	< 1 U	< 1 U	0.85 J
7440-66-6	ZINC	6,000	---	3.6 J	3.7 J	16	12	3.4 J	< 5 U	3.2 J	< 5 U	4 J	< 5 U	< 5 U	28
57-12-5	CYANIDE	1.5	200	**2.1 J**	**< 10 U g**	**3.1 J**	**< 10 U g**	**1.9 J**	**2.1 J**	**< 10 U g**	**2 J**	**2.1 J**	**2.2 J**	**5.9 J**	**3 J**
7439-97-6	MERCURY	0.63	2	0.22	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L															
16887-00-6	CHLORIDE	---	---	51	92	95	78	26	9.7	21	8.5	11 J m	7.2	1.9	35
14797-55-8	NITRATE AS N	32	10	**12**	< 0.1 U	2.5	2.1	0.17	5.5	< 0.1 U	3	3.1	2.5	2.3	4.5
14808-79-8	SULFATE	---	---	540	1000	92	32	32	32	100	12	47	75	7	28
ALKB	BICARBONATE ALKALINITY	---	---	360	460	460	380	420	380	390	350	330	350	390	340
ALKC	CARBONATE ALKALINITY	---	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	---	360	460	460	380	420	380	390	350	330	350	390	340
PESTICIDES in ug/L															
957-51-7	DIPHENAMID	530		25	22	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
53-19-0	2,4'-DDD	0.032	---	**< 0.064 U**	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U
3424-82-6	2,4'-DDE	0.046	---	**0.064 J t**	< 0.0013 U	0.0053	0.0012 J	< 0.0013 U	0.0043	< 0.0012 U	< 0.0013 U	0.012	0.032	< 0.0012 U	< 0.0012 U
789-02-6	2,4'-DDT	0.23	---	< 0.064 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U
72-54-8	4,4'-DDD	0.032	---	**< 0.064 U**	< 0.0013 U	< 0.0013 U	0.00087 J	< 0.0013 U	< 0.0013 U	0.00066 J	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U
72-55-9	4,4'-DDE	0.046	---	< 0.064 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U
50-29-3	4,4'-DDT	0.23	---	< 0.064 U	0.0015 J t	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.00034 J t	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U
309-00-2	ALDRIN	0.00092	---	**< 0.064 U**	**0.039 J t**	**< 0.0013 U**	**< 0.0013 U**	**< 0.0013 U**	**< 0.0013 U**	**< 0.0012 U**	**< 0.0013 U**	**< 0.0012 R m**	**< 0.0013 U**	**< 0.0012 U**	**< 0.0012 U**
319-84-6	ALPHA-BHC	0.0072	---	**3**	**0.032 J t**	**0.0083 J t**	< 0.0013 U	< 0.0013 U	**0.024**	< 0.0012 U	< 0.0013 U	**0.016**	**0.025**	< 0.0012 U	< 0.0012 U
5103-71-9	ALPHA-CHLORDANE	0.02	2	< 0.064 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U
319-85-7	BETA-BHC	0.025	---	**2**	**0.079 J t**	**0.13**	0.011	< 0.0013 U	**0.098**	< 0.0012 U	0.0021 J t	**0.39 B**	**0.65**	< 0.0012 U	0.0053 U J b
319-86-8	DELTA-BHC	0.025	---	**3**	**2.7**	**0.054**	< 0.0013 U	< 0.0013 U	0.016	< 0.0012 U	< 0.0013 U	0.018	**0.057 B**	< 0.0012 U	< 0.0012 U
60-57-1	DIELDRIN	0.0018	---	**< 0.064 U**	< 0.0013 U	0.0016 J t	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	**0.012**	**0.007 J t**	< 0.0012 U	0.00085 J t
959-98-8	ENDOSULFAN I	100	---	< 0.064 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U
33213-65-9	ENDOSULFAN II	100	---	< 0.064 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U
1031-07-8	ENDOSULFAN SULFATE	---	---	< 0.064 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U
72-20-8	ENDRIN	2.3	2	< 0.064 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U
7421-93-4	ENDRIN ALDEHYDE	---	---	< 0.064 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U
53494-70-5	ENDRIN KETONE	---	---	< 0.064 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.0011 J	< 0.0012 U	< 0.0013 U	0.013	0.023	< 0.0012 U	< 0.0012 U
58-89-9	GAMMA-BHC (LINDANE)	0.042	0.2	**1.3**	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.0062	< 0.0012 U	< 0.0013 U	0.0081	0.009	< 0.0012 U	< 0.0012 U
12789-03-6	gamma-Chlordane	0.02	2	**< 0.064 U**	0.0031 J t	0.0018 J t	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	0.0019 J t	0.002 J t	< 0.0012 U	< 0.0012 U
76-44-8	HEPTACHLOR	0.0014	0.4	**< 0.064 U**	**0.14 J t**	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U
1024-57-3	HEPTACHLOR EPOXIDE	0.0014	0.2	**< 0.064 U**	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.001 J	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U
72-43-5	METHOXYCHLOR	37	40	< 0.064 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.0012 U
8001-35-2	TOXAPHENE	0.071	3	**< 4.9 U**	**< 0.098 U**	**< 0.096 U**	**< 0.096 U**	**< 0.097 U**	**< 0.096 U**	**< 0.095 U**	**< 0.096 U**	**< 0.095 U**	**< 0.098 U**	**< 0.094 U**	**< 0.095 U**
HERBICIDES in ug/L															
94-75-7	2,4-D	170	70	< 4 U	< 4 U	< 3.8 U	< 4 U	< 3.9 U	< 3.9 U	< 3.9 U	< 3.9 U	< 3.8 U	< 3.9 U	< 3.9 U	< 3.8 U
93-76-5	2,4,5-T	160	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	< 0.98 U	< 0.98 U	< 0.95 U
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L															
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	710	---	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U
95-95-4	2,4,5-TRICHLOROPHENOL	1,200	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
88-06-2	2,4,6-TRICHLOROPHENOL	4.1	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
120-83-2	2,4-DICHLOROPHENOL	46	---	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U
105-67-9	2,4-DIMETHYLPHENOL	360	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
51-28-5	2,4-DINITROPHENOL	39	---	< 5.1 U	< 5.1 U	< 4.8 U	< 5.1 U	< 5.3 U	< 5 U	< 5.2 U	< 5 U	< 4.8 U	< 5 U	< 5 U	< 4.9 U
121-14-2	2,4-DINITROTOLUENE	0.24	---	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 1.1 U**	**< 1 U**	**< 1 U**	**< 0.99 U**	**< 0.95 U**	**< 0.99 U**	**< 1 U**	**< 0.97 U**
606-20-2	2,6-DINITROTOLUENE	0.049	---	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 1.1 U**	**< 1 U**	**< 1 U**	**< 0.99 U**	**< 0.95 U**	**< 0.99 U**	**< 1 U**	**< 0.97 U**
91-58-7	2-CHLORONAPHTHALENE	750	---	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U
95-57-8	2-CHLOROPHENOL	91	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
95-48-7	2-METHLYPHENOL	930	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
91-57-6	2-METHYLNAPHTHALENE	36	---	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U
88-74-4	2-NITROANILINE	190	---	< 5.1 U	< 5.1 U	< 4.8 U	< 5.1 U	< 5.3 U	< 5 U	< 5.2 U	< 5 U	< 4.8 U	< 5 U	< 5 U	< 4.9 U
88-75-5	2-NITROPHENOL	---	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U

Table 5-17
January-February 2017 (2nd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	OW-7-410 1/31/2017 OW7-410-013117	OW-8-230 1/23/2017 OW8-230-012317	OW-9-125 1/25/2017 OW9-125-012517	OW-10-250 1/24/2017 OW10-250-012417	OW-11-240 1/30/2017 OW11-240-013017	OW-11-600 1/30/2017 OW11-600-013017	OW-12-232 1/24/2017 OW12-232-012417	OW-13-250 1/26/2017 OW13-250-012617	OW-14-96 1/27/2017 OW14-96-012717	OW-14-235 1/26/2017 OW14-235-012617	OW-15-202 1/26/2017 OW15-202-012617	OW-16-448 1/27/2017 OW16-448-012717
91-94-1	3,3`-DICHLOROBENZIDINE	0.13	---	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 1.1 U**	**< 1 U**	**< 1 U**	**< 0.99 U**	**< 0.95 U**	**< 0.99 U**	**< 1 U**	**< 0.97 U**
99-09-2	3-NITROANILINE	---	---	< 5.1 U	< 5.1 U	< 4.8 U	< 5.1 U	< 5.3 U	< 5 U	< 5.2 U	< 5 U	< 4.8 U	< 5 U	< 5 U	< 4.9 U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	1.5	---	**< 5.1 U**	**< 5.1 U**	**< 4.8 U**	**< 5.1 U**	**< 5.3 U**	**< 5 U**	**< 5.2 U**	**< 5 U**	**< 4.8 U**	**< 5 U**	**< 5 U**	**< 4.9 U**
101-55-3	4-BROMOPHENYL PHENYL ETHER	---	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
59-50-7	4-CHLORO-3-METHYLPHENOL	1,400	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
106-47-8	4-CHLOROANILINE	0.37	---	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 1.1 U**	**< 1 U**	**< 1 U**	**< 0.99 U**	**< 0.95 U**	**< 0.99 U**	**< 1 U**	**< 0.97 U**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	---	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
106-44-5	4-METHLYPHENOL	1,900	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
100-01-6	4-NITROANILINE	3.8	---	**< 5.1 U**	**< 5.1 U**	**< 4.8 U**	**< 5.1 U**	**< 5.3 U**	**< 5 U**	**< 5.2 U**	**< 5 U**	**< 4.8 U**	**< 5 U**	**< 5 U**	**< 4.9 U**
100-02-7	4-NITROPHENOL	---	---	< 5.1 U	< 5.1 U	< 4.8 U	< 5.1 U	< 5.3 U	< 5 U	< 5.2 U	< 5 U	< 4.8 U	< 5 U	< 5 U	< 4.9 U
83-32-9	ACENAPHTHENE	530	---	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U
208-96-8	ACENAPHTHYLENE	---	---	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U
98-86-2	ACETOPHENONE	1,900	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
120-12-7	ANTHRACENE	1,800	---	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U
1912-24-9	ATRAZINE	0.3	3	**1.2**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 1.1 U**	**< 1 U**	**< 1 U**	**< 0.99 U**	**< 0.95 U**	**< 0.99 U**	**< 1 U**	**< 0.97 U**
100-52-7	BENZALDEHYDE	19	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
56-55-3	BENZO[A]ANTHRACENE	0.03	---	**< 0.19 U**	**< 0.19 U**	**0.19**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.2 U**	**0.11 J**	**0.17 J**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**
50-32-8	BENZO[A]PYRENE	0.025	0.2	**< 0.19 U**	**< 0.19 U**	**0.13 J**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.2 U**	**0.072 J**	**0.11 J**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**
205-99-2	BENZO[B]FLUORANTHENE	0.25	---	< 0.19 U	< 0.19 U	**0.29**	< 0.19 U	< 0.2 U	< 0.19 U	< 0.2 U	**0.15 J**	**0.29**	< 0.19 U	< 0.19 U	< 0.18 U
191-24-2	BENZO[G,H,I]PERYLENE	---	---	< 0.19 U	< 0.19 U	0.27	< 0.19 U	< 0.2 U	< 0.19 U	< 0.2 U	0.11 J	0.26	< 0.19 U	< 0.19 U	< 0.18 U
207-08-9	BENZO[K]FLUORANTHENE	2.5	---	< 0.19 U	< 0.19 U	0.28	< 0.19 U	< 0.2 U	< 0.19 U	< 0.2 U	0.13 J	0.28	< 0.19 U	< 0.19 U	< 0.18 U
85-68-7	BENZYL BUTYL PHTHALATE	16	---	< 1 U j	< 1 U	0.14 J	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
92-52-4	BIPHENYL	0.83	---	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 1.1 U**	**< 1 U**	**< 1 U**	**< 0.99 U**	**< 0.95 U**	**< 0.99 U**	**< 1 U**	**< 0.97 U**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	59	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
111-44-4	BIS(2-CHLOROETHYL) ETHER	0.014	---	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.6	6	< 2 U	< 2 U	< 1.9 U	< 2 U	< 2.1 U	< 2 U	< 2 U	< 2 U	< 1.9 U	< 2 U	< 2 U	< 1.9 U
105-60-2	CAPROLACTAM	9,900	---	< 5.1 U	< 5.1 U	< 4.8 U	< 5.1 U	< 5.3 U	< 5 U	< 5.2 U	< 5 U	< 4.8 U	< 5 U	< 5 U	< 4.9 U
86-74-8	CARBAZOLE	---	---	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U
218-01-9	CHRYSENE	25	---	< 0.19 U	< 0.19 U	0.25	< 0.19 U	< 0.2 U	< 0.19 U	< 0.2 U	0.11 J	0.23	< 0.19 U	< 0.19 U	< 0.18 U
53-70-3	DIBENZ[A,H]ANTHRACENE	0.025	---	**< 0.19 U**	**< 0.19 U**	**0.32**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.2 U**	**0.13 J**	**0.33**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**
132-64-9	DIBENZOFURAN	7.9	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
84-66-2	DIETHYL PHTHALATE	15,000	---	0.17 J	0.2 J	< 0.96 U	< 1 U	< 1.1 U	< 1 U	0.37 J	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
131-11-3	DIMETHYL PHTHALATE	---	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
84-74-2	DI-N-BUTYL PHTHALATE	900	---	0.2 J	0.18 J	0.18 J	< 1 U	0.32 J	< 1 U	0.2 J	0.18 J	< 0.95 U	0.14 J	< 1 U	< 0.97 U
117-84-0	DI-N-OCTYL PHTHALATE	200	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	0.33 J	< 0.99 U	< 1 U	< 0.97 U
206-44-0	FLUORANTHENE	800	---	< 0.19 U	0.03 J	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.2 U	< 0.19 U	0.038 J	< 0.19 U	< 0.19 U	< 0.18 U
86-73-7	FLUORENE	290	---	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U
118-74-1	HEXACHLOROBENZENE	0.0098	1	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**
87-68-3	HEXACHLOROBUTADIENE	0.14	---	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**
77-47-4	HEXACHLOROCYCLOPENTADIENE	0.41	50	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 1.1 U**	**< 1 U J m**	**< 1 U**	**< 0.99 U**	**< 0.95 U J m**	**< 0.99 U**	**< 1 U**	**< 0.97 U**
67-72-1	HEXACHLOROETHANE	0.33	---	**< 1 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 1.1 U**	**< 1 U**	**< 1 U**	**< 0.99 U**	**< 0.95 U**	**< 0.99 U**	**< 1 U**	**< 0.97 U**
193-39-5	INDENO[1,2,3-CD]PYRENE	0.25	---	< 0.19 U	< 0.19 U	**0.28**	< 0.19 U	< 0.2 U	< 0.19 U	< 0.2 U	**0.12 J**	**0.3**	< 0.19 U	< 0.19 U	< 0.18 U
78-59-1	ISOPHORONE	78	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
91-20-3	NAPHTHALENE	0.17	---	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**
98-95-3	NITROBENZENE	0.14	---	**< 2 U**	**< 2 U**	**< 1.9 U**	**< 2 U**	**< 2.1 U**	**< 2 U**	**< 2 U**	**< 2 U**	**< 1.9 U**	**< 2 U**	**< 2 U**	**< 1.9 U**
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.011	---	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U
86-30-6	N-NITROSODIPHENYLAMINE	12	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
87-86-5	PENTACHLOROPHENOL	0.041	1	**3**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 1.1 U**	**< 1 U**	**< 1 U**	**< 0.99 U**	**< 0.95 U**	**< 0.99 U**	**< 1 U**	**< 0.97 U**
85-01-8	PHENANTHRENE	---	---	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U
108-95-2	PHENOL	5,800	---	< 1 U	< 1 U	< 0.96 U	< 1 U	< 1.1 U	< 1 U	< 1 U	< 0.99 U	< 0.95 U	< 0.99 U	< 1 U	< 0.97 U
129-00-0	PYRENE	120	---	< 0.19 U	0.03 J	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U
VOLATILE ORGANIC COMPOUNDS in ug/L															
71-55-6	1,1,1-TRICHLOROETHANE	8,000	200	< 1 U	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.076	---	**< 1 U**	**< 3 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10,000	---	< 1 U	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-00-5	1,1,2-TRICHLOROETHANE	0.28	5	**< 1 U**	**< 3 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-34-3	1,1-DICHLOROETHANE	2.8	---	0.42 J	**< 3 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-35-4	1,1-DICHLOROETHYLENE	280	7	< 1 U	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
120-82-1	1,2,4-TRICHLOROBENZENE	1.2	70	< 1 U	< 3 U J f	< 1 U	< 1 U J f	< 1 U	< 1 U	< 1 U J f	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	0.00033	0.2	**< 1 U**	**< 3 U J f**	**< 1 U**	**< 1 U J f**	**< 1 U**	**< 1 U**	**< 1 U J f**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
106-93-4	1,2-DIBROMOETHANE	0.0075	0.05	**< 1 U**	**< 3 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
95-50-1	1,2-DICHLOROBENZENE	300	600	3.6	2.3 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
107-06-2	1,2-DICHLOROETHANE	0.17	5	**7**	**< 3 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
78-87-5	1,2-DICHLOROPROPANE	0.85	5	**0.52 J**	**< 3 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
541-73-1	1,3-DICHLOROBENZENE	---	---	0.32 J	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
106-46-7	1,4-DICHLOROBENZENE	0.48	75	**8.7**	**2.9 J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
78-93-3	2-BUTANONE	5,600	---	< 5 U	< 15 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
591-78-6	2-HEXANONE	38	---	< 5 U	< 15 U J f	< 5 U	< 5 U J f	< 5 U	< 5 U	< 5 U J f	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
108-10-1	4-METHYL-2-PENTANONE	6,300	---	< 5 U	< 15 U J f	< 5 U	< 5 U J f	< 5 U	< 5 U	< 5 U J f	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
67-64-1	ACETONE	14,000	---	< 5 U	< 15 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
71-43-2	BENZENE	0.46	5	0.24 J	**< 3 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-27-4	BROMODICHLOROMETHANE	0.13	80	**< 1 U**	**< 3 U J f**	**< 1 U**	**< 1 U J f**	**< 1 U**	**< 1 U**	**< 1 U J f**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-25-2	BROMOFORM	3.3	80	< 1 U	< 3 U J f	< 1 U	< 1 U J f	< 1 U	< 1 U	< 1 U J f	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
74-83-9	BROMOMETHANE	7.5	---	< 1 U	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-15-0	CARBON DISULFIDE	810	---	< 1 U	< 3 U J f	< 1 U	< 1 U J f	< 1 U	< 1 U	< 1 U J f	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
56-23-5	CARBON TETRACHLORIDE	0.46	5	**< 1 U**	**< 3 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**

Table 5-17
January-February 2017 (2nd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	OW-7-410 1/31/2017 OW7-410-013117	OW-8-230 1/23/2017 OW8-230-012317	OW-9-125 1/25/2017 OW9-125-012517	OW-10-250 1/24/2017 OW10-250-012417	OW-11-240 1/30/2017 OW11-240-013017	OW-11-600 1/30/2017 OW11-600-013017	OW-12-232 1/24/2017 OW12-232-012417	OW-13-250 1/26/2017 OW13-250-012617	OW-14-96 1/27/2017 OW14-96-012717	OW-14-235 1/26/2017 OW14-235-012617	OW-15-202 1/26/2017 OW15-202-012617	OW-16-448 1/27/2017 OW16-448-012717
108-90-7	CHLOROBENZENE	78	100	48	61	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-00-3	CHLOROETHANE	21,000	---	< 1 U	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
67-66-3	CHLOROFORM	0.22	80	**0.59 J**	**< 3 U**	**1.3**	**2.5**	**< 1 U**	**0.63 J**	**< 1 U**	**< 1 U**	**3**	**1.5**	**< 1 U**	**3.7**
74-87-3	CHLOROMETHANE	190	---	< 1 U	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
156-59-2	CIS-1,2-DICHLOROETHENE	36	70	< 1 U	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	---	---	< 1 U	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
110-82-7	CYCLOHEXANE	13,000	---	< 1 U	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
124-48-1	DIBROMOCHLOROMETHANE	0.87	---	**< 1 U**	**< 3 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-71-8	DICHLORODIFLUOROMETHANE	200	---	< 1 U	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
100-41-4	ETHYLBENZENE	1.5	700	< 1 U	**< 3 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
98-82-8	ISOPROPYLBENZENE (CUMENE)	450	---	< 1 U	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-20-9	METHYL ACETATE	20,000	---	< 5 U	< 15 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1634-04-4	METHYL TERT-BUTYL ETHER	14	---	< 1 U	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
108-87-2	METHYLCYLOHEXANE	---	---	< 1 U	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-09-2	METHYLENE CHLORIDE	11	5	< 1 U	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
100-42-5	STYRENE (MONOMER)	1,200	100	< 1 U	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
127-18-4	TETRACHLOROETHYLENE	11	5	< 1 U	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.5	< 1 U	< 1 U	< 1 U
108-88-3	TOLUENE	1,100	1,000	1.2	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	0.21 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
156-60-5	TRANS-1,2-DICHLOROETHENE	360	100	< 1 U	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	---	---	< 1 U	< 3 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-01-6	TRICHLOROETHYLENE	0.49	5	**0.89 J**	**< 3 U**	**< 1 U**	**< 1 U**	**0.25 J**	**< 1 U**	**0.5 J**	**< 1 U**	0.41 J	0.46 J	**< 1 U**	**< 1 U**
75-69-4	TRICHLOROFLUOROMETHANE	5,200	---	< 1 U	< 3 U J f	< 1 U	< 1 U J f	< 1 U	< 1 U	< 1 U J f	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-01-4	VINYL CHLORIDE	0.019	2	**< 1 U**	**< 3 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
XYLENES	Xylenes, Total	190	10000	< 2 U	< 6 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

Notes:

(1) No RSL exists, MCL utilized.

B - Laboratory-applied qualifier. Parameter was detected in associated laboratory method blank.

J - Result is either less than the RL but greater than or equal to the method detection limit (MDL).

J r – Parent and field duplicate pair were qualified due to field duplicate imprecision.

J t – Results from primary and confirmation column displayed imprecision greater than 25%. The lesser of the two column concentrations is reported.

U - The analyte was not detected above the reporting limit.

U g – Result was qualified as non-detect either at the RL or at the sample concentration due to potential laboratory/preparation blank contamination.

U h - Result was qualified as non-detect either at the RL or at the sample concentration due to potential initial/continuing blank contamination.

U j - Result was qualified as non-detect either at the RL or at the sample concentration due to potential rinse blank contamination.

U J b - Beta-BHC re-extracted five days outside of the recommended holding time of 7 days. The re-extracted and re-analyzed beta-BHC was reported (Sample OW16-448-012717).

U J f – Non-detect result (RL) was qualified due to continuing calibration verification (CCV) anomaly. Percent deviation (%D) between initial calibration and continuing calibration greater than USEPA National Functional Guidelines criteria.

U J m, J m, R m – Results were qualified due to sample Matrix Spike/Matrix Spike Duplicate (MS/MSD) recovery anomalies or Relative Percent Difference (RPD) value anomalies.

Bold indicates the reporting limit was above the RSL and/or MCL.

Red bolded detected concentration exceeds RSL

Red bolded and highlighted detected concentration exceeds MCL.

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Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	OW-17-600 2/1/2017 OW17-600-020117	OW-17-600 2/1/2017 DUP-020117	OW-18-597 2/1/2017 OW18-597-020117	OW-19-450 1/23/2017 OW19-450-012317	OW-19-450 1/23/2017 DUP-012317
TOTAL METALS in ug/L								
7429-90-5	ALUMINUM	20,000	---	< 30 U	< 30 U	< 30 U	< 30 U	< 30 U
7440-36-0	ANTIMONY	7.8	6	< 2 U g	< 2 U,g	< 2 U g	0.66 J	0.47 J
7440-38-2	ARSENIC	0.052	10	**< 1 U**	< 1 U	**< 1 U**	**< 1 U**	< 1 U
7440-39-3	BARIUM	3,800	2,000	120	120	16	120	120
7440-41-7	BERYLLIUM	25	4	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-43-9	CADMIUM	9.2	5	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-70-2	CALCIUM METAL	---	---	110000	110000	190000	110000	110000
7440-47-3	CHROMIUM[1]	---	100	< 2 U	< 2 U	< 2 U	0.4 J	0.4 J
7440-48-4	COBALT	6	---	< 0.5 U	< 0.5 U	< 0.5 U	0.11 J	< 0.5 U
7440-50-8	COPPER	800	1,300	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
7439-89-6	IRON	14,000	---	25 J	23 J	< 50 U	< 50 U	< 50 U
7439-92-1	LEAD	---	15	1	1.1	< 1 U	< 1 U	< 1 U
7439-95-4	MAGNESIUM	---	---	18000	18000	54000	12000	12000
7439-96-5	MANGANESE	430	---	5.1	5.4	< 5 U	< 5 U	< 5 U
7440-02-0	NICKEL	390	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-09-7	POTASSIUM	---	---	1300	1300	1600	1200	1100
7782-49-2	SELENIUM	100	50	< 5 U	< 5 U	< 5 U	1.4 J	< 5 U
7440-22-4	SILVER	94	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-23-5	SODIUM	---	---	2100	2100	7300	5200	5200
7440-28-0	THALLIUM	0.2	2	**< 1 U**	**< 1 U**	**< 1 U**	0.19 J	< 1 U
7440-62-2	VANADIUM	86	---	0.95 J	0.95 J	0.71 J	0.79 J	0.78 J
7440-66-6	ZINC	6,000	---	18	20	< 5 U	< 5 U	< 5 U
57-12-5	CYANIDE	1.5	200	**1.7 J**	**1.8 J**	**2.7 J**	**< 10 U g**	**< 10 U g**
7439-97-6	MERCURY	0.63	2	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L								
16887-00-6	CHLORIDE	---	---	4.4	4.4	27	17	20
14797-55-8	NITRATE AS N	32	10	1.7	1.7	4.4	4	3.9
14808-79-8	SULFATE	---	---	16	16	270	14	13
ALKB	BICARBONATE ALKALINITY	---	---	370	390	390	370	340
ALKC	CARBONATE ALKALINITY	---	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	---	370	390	390	370	340
PESTICIDES in ug/L								
957-51-7	DIPHENAMID	530		< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U
53-19-0	2,4'-DDD	0.032	---	< 0.0013 U	< 0.0013 U	0.0072	< 0.0013 U	< 0.0013 U
3424-82-6	2,4'-DDE	0.046	---	0.00086 J t	0.0014 J t	0.032	< 0.0013 U	0.00095 J t
789-02-6	2,4'-DDT	0.23	---	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
72-54-8	4,4'-DDD	0.032	---	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
72-55-9	4,4'-DDE	0.046	---	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
50-29-3	4,4'-DDT	0.23	---	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
309-00-2	ALDRIN	0.00092	---	**< 0.0013 U**	**< 0.0013 U**	**< 0.0013 U**	**< 0.0013 U**	**< 0.0013 U**
319-84-6	ALPHA-BHC	0.0072	---	0.0023 J t	0.0023 J t	**0.063 J t**	< 0.0013 U	< 0.0013 U
5103-71-9	ALPHA-CHLORDANE	0.02	2	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
319-85-7	BETA-BHC	0.025	---	0.02 J r	0.033 J r	**0.89**	< 0.0013 U	< 0.0013 U
319-86-8	DELTA-BHC	0.025	---	0.0045 J r	0.0069 J r	**0.11**	< 0.0013 U	< 0.0013 U
60-57-1	DIELDRIN	0.0018	---	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.0014	0.0014
959-98-8	ENDOSULFAN I	100	---	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
33213-65-9	ENDOSULFAN II	100	---	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
1031-07-8	ENDOSULFAN SULFATE	---	---	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
72-20-8	ENDRIN	2.3	2	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
7421-93-4	ENDRIN ALDEHYDE	---	---	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
53494-70-5	ENDRIN KETONE	---	---	< 0.0013 U	< 0.0013 U	0.0038	< 0.0013 U	< 0.0013 U
58-89-9	GAMMA-BHC (LINDANE)	0.042	0.2	< 0.0013 U	< 0.0013 U	0.013 J t	< 0.0013 U	< 0.0013 U
12789-03-6	gamma-Chlordane	0.02	2	< 0.0013 U	< 0.0013 U	0.003	< 0.0013 U	< 0.0013 U
76-44-8	HEPTACHLOR	0.0014	0.4	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
1024-57-3	HEPTACHLOR EPOXIDE	0.0014	0.2	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
72-43-5	METHOXYCHLOR	37	40	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
8001-35-2	TOXAPHENE	0.071	3	**< 0.1 U**	**< 0.097 U**	**< 0.096 U**	**< 0.1 U**	**< 0.1 U**
HERBICIDES in ug/L								
94-75-7	2,4-D	170	70	< 4 U	< 4 U	< 3.8 U	< 4 U	< 4 U
93-76-5	2,4,5-T	160	---	< 0.99 U	< 1 U	< 0.96 U	< 1 U	< 0.99 U
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L								
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	710	---	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U
95-95-4	2,4,5-TRICHLOROPHENOL	1,200	---	< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U
88-06-2	2,4,6-TRICHLOROPHENOL	4.1	---	< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U
120-83-2	2,4-DICHLOROPHENOL	46	---	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U
105-67-9	2,4-DIMETHYLPHENOL	360	---	< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U
51-28-5	2,4-DINITROPHENOL	39	---	< 5 U	< 5 U	< 5.1 U	< 5.1 U	< 5.1 U
121-14-2	2,4-DINITROTOLUENE	0.24	---	**< 1 U**	**< 0.99 U**	**< 1 U**	**< 1 U**	**< 1 U**
606-20-2	2,6-DINITROTOLUENE	0.049	---	**< 1 U**	**< 0.99 U**	**< 1 U**	**< 1 U**	**< 1 U**
91-58-7	2-CHLORONAPHTHALENE	750	---	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U
95-57-8	2-CHLOROPHENOL	91	---	< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U
95-48-7	2-METHLYPHENOL	930	---	< 1 U	< 0.19 U	< 1 U	< 1 U	< 1 U
91-57-6	2-METHYLNAPHTHALENE	36	---	< 0.19 U	< 0.99 U	0.025 J	< 0.19 U	< 0.19 U
88-74-4	2-NITROANILINE	190	---	< 5 U	< 5 U	< 5.1 U	< 5.1 U	< 5.1 U
88-75-5	2-NITROPHENOL	---	---	< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U

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Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	OW-17-600 2/1/2017 OW17-600-020117	OW-17-600 2/1/2017 DUP-020117	OW-18-597 2/1/2017 OW18-597-020117	OW-19-450 1/23/2017 OW19-450-012317	OW-19-450 1/23/2017 DUP-012317
91-94-1	3,3`-DICHLOROBENZIDINE	0.13	---	**< 1 U**	**< 0.99 U**	**< 1 U**	**< 1 U**	**< 1 U**
99-09-2	3-NITROANILINE	---	---	< 5 U	< 5 U	< 5.1 U	< 5.1 U	< 5.1 U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	1.5	---	**< 5 U**	**< 5 U**	**< 5.1 U**	**< 5.1 U**	**< 5.1 U**
101-55-3	4-BROMOPHENYL PHENYL ETHER	---	---	< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U
59-50-7	4-CHLORO-3-METHYLPHENOL	1,400	---	< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U
106-47-8	4-CHLOROANILINE	0.37	---	**< 1 U**	**< 0.99 U**	**< 1 U**	**< 1 U**	**< 1 U**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	---	---	< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U
106-44-5	4-METHLYPHENOL	1,900	---	< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U
100-01-6	4-NITROANILINE	3.8	---	**< 5 U**	**< 5 U**	**< 5.1 U**	**< 5.1 U**	**< 5.1 U**
100-02-7	4-NITROPHENOL	---	---	< 5 U	< 5 U	< 5.1 U	< 5.1 U	< 5.1 U
83-32-9	ACENAPHTHENE	530	---	< 0.19 U	< 0.19 U	0.079 J	< 0.19 U	< 0.19 U
208-96-8	ACENAPHTHYLENE	---	---	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U
98-86-2	ACETOPHENONE	1,900	---	< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U
120-12-7	ANTHRACENE	1,800	---	< 0.19 U	< 0.19 U	0.035 J	< 0.19 U	< 0.19 U
1912-24-9	ATRAZINE	0.3	3	**< 1 U**	**< 0.99 U**	**< 1 U**	**< 1 U**	**< 1 U**
100-52-7	BENZALDEHYDE	19	---	< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U
56-55-3	BENZO[A]ANTHRACENE	0.03	---	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**
50-32-8	BENZO[A]PYRENE	0.025	0.2	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**
205-99-2	BENZO[B]FLUORANTHENE	0.25	---	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U
191-24-2	BENZO[G,H,I]PERYLENE	---	---	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U
207-08-9	BENZO[K]FLUORANTHENE	2.5	---	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U
85-68-7	BENZYL BUTYL PHTHALATE	16	---	0.17 J	0.25 J	0.21 J	< 1 U	< 1 U
92-52-4	BIPHENYL	0.83	---	**< 1 U**	**< 0.99 U**	**< 1 U**	**< 1 U**	**< 1 U**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	59	---	< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U
111-44-4	BIS(2-CHLOROETHYL) ETHER	0.014	---	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.6	6	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
105-60-2	CAPROLACTAM	9,900	---	< 5 U	< 5 U	< 5.1 U	< 5.1 U	< 5.1 U
86-74-8	CARBAZOLE	---	---	< 0.19 U	< 0.19 U	0.043 J	< 0.19 U	< 0.19 U
218-01-9	CHRYSENE	25	---	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U
53-70-3	DIBENZ[A,H]ANTHRACENE	0.025	---	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**
132-64-9	DIBENZOFURAN	7.9	---	< 1 U	< 0.99 U	0.063 J	< 1 U	< 1 U
84-66-2	DIETHYL PHTHALATE	15,000	---	0.21 J	0.24 J	< 1 U	< 1 U	< 1 U
131-11-3	DIMETHYL PHTHALATE	---	---	< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U
84-74-2	DI-N-BUTYL PHTHALATE	900	---	< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U
117-84-0	DI-N-OCTYL PHTHALATE	200	---	< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U
206-44-0	FLUORANTHENE	800	---	< 0.19 U	< 0.19 U	0.14 J	< 0.19 U	< 0.19 U
86-73-7	FLUORENE	290	---	< 0.19 U	< 0.19 U	0.096 J	< 0.19 U	< 0.19 U
118-74-1	HEXACHLOROBENZENE	0.0098	1	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**
87-68-3	HEXACHLOROBUTADIENE	0.14	---	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**
77-47-4	HEXACHLOROCYCLOPENTADIENE	0.41	50	**< 1 U**	**< 0.99 U**	**< 1 U**	**< 1 U**	**< 1 U**
67-72-1	HEXACHLOROETHANE	0.33	---	**< 1 U**	**< 0.99 UJ,f**	**< 1 U**	**< 1 U**	**< 1 U**
193-39-5	INDENO[1,2,3-CD]PYRENE	0.25	---	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U
78-59-1	ISOPHORONE	78	---	< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U
91-20-3	NAPHTHALENE	0.17	---	**< 0.19 U**	**< 0.19 U**	0.054 J	**< 0.19 U**	**< 0.19 U**
98-95-3	NITROBENZENE	0.14	---	**< 2 U**	**< 2 UJ,f**	**< 2 U J f**	**< 2 U**	**< 2 U**
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.011	---	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.19 U
86-30-6	N-NITROSODIPHENYLAMINE	12	---	< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U
87-86-5	PENTACHLOROPHENOL	0.041	1	**< 1 U**	**< 0.99 U**	**< 1 U**	**< 1 U**	**< 1 U**
85-01-8	PHENANTHRENE	---	---	< 0.19 U	< 0.19 U	0.38	< 0.19 U	< 0.19 U
108-95-2	PHENOL	5,800	---	< 1 U	< 0.99 U	< 1 U	< 1 U	< 1 U
129-00-0	PYRENE	120	---	< 0.19 U	< 0.19 U	0.087 J	< 0.19 U	< 0.19 U
VOLATILE ORGANIC COMPOUNDS in ug/L								
71-55-6	1,1,1-TRICHLOROETHANE	8,000	200	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.076	---	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10,000	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-00-5	1,1,2-TRICHLOROETHANE	0.28	5	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-34-3	1,1-DICHLOROETHANE	2.8	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-35-4	1,1-DICHLOROETHYLENE	280	7	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
120-82-1	1,2,4-TRICHLOROBENZENE	1.2	70	< 1 U	< 1 U	< 1 U	< 1 U J f	< 1 U J f
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	0.00033	0.2	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U J f**	**< 1 U J f**
106-93-4	1,2-DIBROMOETHANE	0.0075	0.05	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
95-50-1	1,2-DICHLOROBENZENE	300	600	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
107-06-2	1,2-DICHLOROETHANE	0.17	5	**< 1 U**	**< 1 U**	**0.51 J**	**< 1 U**	**< 1 U**
78-87-5	1,2-DICHLOROPROPANE	0.85	5	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
541-73-1	1,3-DICHLOROBENZENE	---	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
106-46-7	1,4-DICHLOROBENZENE	0.48	75	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
78-93-3	2-BUTANONE	5,600	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
591-78-6	2-HEXANONE	38	---	< 5 U	< 5 U	< 5 U	< 5 U J f	< 5 U J f
108-10-1	4-METHYL-2-PENTANONE	6,300	---	< 5 U	< 5 U	< 5 U	< 5 U J f	< 5 U J f
67-64-1	ACETONE	14,000	---	< 5 U	3.4 J	< 5 U	< 5 U	< 5 U
71-43-2	BENZENE	0.46	5	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-27-4	BROMODICHLOROMETHANE	0.13	80	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U J f**	**< 1 U J f**
75-25-2	BROMOFORM	3.3	80	< 1 U	< 1 U	< 1 U	< 1 U J f	< 1 U J f
74-83-9	BROMOMETHANE	7.5	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-15-0	CARBON DISULFIDE	810	---	< 1 U J f	< 1 U J f	< 1 U J f	< 1 U J f	< 1 U J f
56-23-5	CARBON TETRACHLORIDE	0.46	5	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**

Table 5-17
January-February 2017 (2nd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	OW-17-600 2/1/2017 OW17-600-020117	OW-17-600 2/1/2017 DUP-020117	OW-18-597 2/1/2017 OW18-597-020117	OW-19-450 1/23/2017 OW19-450-012317	OW-19-450 1/23/2017 DUP-012317
108-90-7	CHLOROBENZENE	78	100	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-00-3	CHLOROETHANE	21,000	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
67-66-3	CHLOROFORM	0.22	80	**< 1 U**	**< 1 U**	**0.54 J**	**2.7**	**2.5**
74-87-3	CHLOROMETHANE	190	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
156-59-2	CIS-1,2-DICHLOROETHENE	36	70	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	---	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
110-82-7	CYCLOHEXANE	13,000	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
124-48-1	DIBROMOCHLOROMETHANE	0.87	---	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-71-8	DICHLORODIFLUOROMETHANE	200	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
100-41-4	ETHYLBENZENE	1.5	700	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
98-82-8	ISOPROPYLBENZENE (CUMENE)	450	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-20-9	METHYL ACETATE	20,000	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1634-04-4	METHYL TERT-BUTYL ETHER	14	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
108-87-2	METHYLCYLOHEXANE	---	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-09-2	METHYLENE CHLORIDE	11	5	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
100-42-5	STYRENE (MONOMER)	1,200	100	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
127-18-4	TETRACHLOROETHYLENE	11	5	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
108-88-3	TOLUENE	1,100	1,000	< 1 U	< 1 U	0.18 J	< 1 U	0.16 J
156-60-5	TRANS-1,2-DICHLOROETHENE	360	100	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	---	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-01-6	TRICHLOROETHYLENE	0.49	5	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-69-4	TRICHLOROFLUOROMETHANE	5,200	---	< 1 U	< 1 U	< 1 U	< 1 U J f	< 1 U J f
75-01-4	VINYL CHLORIDE	0.019	2	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
XYLENES	Xylenes, Total	190	10000	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

Notes:

(1) No RSL exists, MCL utilized.

B - Laboratory-applied qualifier. Parameter was detected in associated laboratory method blank.

J - Result is either less than the RL but greater than or equal to the method detection limit (MDL).

J r – Parent and field duplicate pair were qualified due to field duplicate imprecision.

J t – Results from primary and confirmation column displayed imprecision greater than 25%. The lesser of the two column concentrations is reported.

U - The analyte was not detected above the reporting limit.

U g – Result was qualified as non-detect either at the RL or at the sample concentration due to potential laboratory/preparation blank contamination.

U h - Result was qualified as non-detect either at the RL or at the sample concentration due to potential initial/continuing blank contamination.

U j - Result was qualified as non-detect either at the RL or at the sample concentration due to potential rinse blank contamination.

U J b - Beta-BHC re-extracted five days outside of the recommended holding time of 7 days. The re-extracted and re-analyzed beta-BHC was reported (Sample OW16-448-012717).

U J f – Non-detect result (RL) was qualified due to continuing calibration verification (CCV) anomaly. Percent deviation (%D) between initial calibration and continuing calibration greater than USEPA National Functional Guidelines criteria.

U J m, J m, R m – Results were qualified due to sample Matrix Spike/Matrix Spike Duplicate (MS/MSD) recovery anomalies or Relative Percent Difference (RPD) value anomalies.

Bold indicates the reporting limit was above the RSL and/or MCL.

Red bolded detected concentration exceeds RSL

Red bolded and highlighted detected concentration exceeds MCL.

Table 5-18
April-May 2017 (3rd Quarter) Groundwater Sampling Field Parameter Data
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Monitoring Well	Sample Date	Temperature (ºC)	Dissolved Oxygen (mg/L)	pH (Std.Units)	Turbidity (NTUs)	Conductivity (mS/cm)	Oxygen Reduction Potential (mV)	Rate (mL/min)	Depth to Water (ft below top of PVC)
On Site Monitoring Wells									
MW-A-51	5/10/2017	18.36	0.00	6.51	51.8	2.70	-28	105	41.09
MW-B-55	5/1/2017	16.95	6.09	7.35	0.0	0.554	191	100	47.46
MW-B-400	5/3/2017	13.59	2.49	6.78	0.0	1.05	-19	500	56.80
MW-B-598	5/3/2017	13.79	0.22	6.86	0.0	0.624	32	500	55.56
MW-C-40	5/3/2017	13.07	7.85	6.54	7.6	0.597	185	180	29.42
MW-D-77	5/3/2017	14.94	0.15	7.29	59.2	1.63	119	140	32.80
MW-E-46	5/2/2017	15.84	1.25	6.58	0.0	2.14	148	80	27.74
MW-F-70	5/2/2017	17.73	0.19	7.09	0.0	0.674	-210	90	48.29
MW-G-35	5/1/2017	14.69	2.60	4.23	4.6	2.49	476	340	21.44
MW-G-360	5/4/2017	17.09	0.00	6.89	0.0	1.67	142	325	33.99
MW-G-600	5/3/2017	14.10	0.37	6.89	0.0	0.739	90	410	35.06
MW-H-65	5/3/2017	13.25	0.00	6.57	26.0	2.51	-40	405	32.73
MW-I-55	5/8/2017	13.81	0.00	6.64	8.9	0.817	-27	310	29.13
MW-J-71	5/8/2017	13.68	0.00	6.83	7.8	2.76	-119	330	39.31
MW-K-80	5/4/2017	13.51	0.16	6.96	9.9	0.854	-64	100	41.27
MW-K-440	5/8/2017	13.52	3.44	7.15	0.5	0.559	149	440	60.96
MW-L-48	5/4/2017	14.40	0.26	6.74	0.0	1.75	150	285	30.04
MW-L-250	5/9/2017	14.23	4.51	7.08	0.0	0.505	137	400	52.01
MW-M-50	5/9/2017	15.59	0.25	6.80	5.8	2.36	-20	110	28.08
MW-N-83	5/9/2017	13.54	0.00	6.86	36.4	1.67	-103	280	35.73
MW-N-113	5/9/2017	13.05	0.00	6.72	0.5	1.29	-94	300	36.35
MW-O-145	5/8/2017	13.30	0.37	7.44	10.6	2.53	-186	100	55.92
MW-P-235	5/8/2017	15.04	0.48	7.14	0.3	2.46	-102	240	53.06
MW-Q-150	5/9/2017	19.49	0.00	6.70	0.0	1.88	-99	90	50.96
MW-R-330	5/4/2017	16.73	0.00	6.73	0.0	1.91	26	430	52.98
MW-R-600	5/4/2017	17.88	0.00	7.03	0.1	0.692	-160	350	54.09
EW-1-110	5/10/2017	15.91	0.00	6.75	51.2	2.27	-102	320	27.83
Off Site Monitoring Wells									
OW-1-62	4/24/2017	14.56	6.18	6.85	14.3	1.37	183	<50	54.08
OW-1-105	4/24/2017	13.93	5.95	7.05	28.4	0.749	181	305	57.15
OW-2-65	4/26/2017	15.67	0.91	6.79	33.2	0.920	157	275	47.12
OW-2-115	4/26/2017	15.19	0.14	6.80	59.6	1.65	-61	145	52.68
OW-3-55	4/25/2017	14.78	4.08	7.12	7.2	0.602	78	125	48.77
OW-3-105	4/25/2017	14.51	0.28	7.62	5	1.08	-111	125	51.94
OW-4-70	4/27/2017	16.83	0.17	6.97	0.0	0.991	79	90	37.43
OW-5-90	4/27/2017	20.04	0.31	6.84	59.2	0.749	113	90	42.78
OW-7-242	4/25/2017	14.45	0.00	7.65	1.0	0.759	-202	100	56.47
OW-7-410	4/25/2017	14.79	0.00	7.08	0.0	1.17	163	445	40.52
OW-8-230	4/24/2017	15.80	0.05	7.08	0.7	2.19	91	200	60.21
OW-9-125	4/26/2017	15.53	3.54	7.02	16.5	0.786	152	190	32.46
OW-10-250	4/26/2017	14.75	3.40	7.00	0.2	0.665	99	360	39.31
OW-11-240	5/1/2017	25.02	0.28	6.45	0.8	0.532	-55	100	51.19
OW-11-600	5/1/2017	16.30	5.33	6.89	0.0	0.457	-19	460	54.00
OW-12-232	4/27/2017	22.67	0.45	7.26	1.3	0.602	-121	100	64.72
OW-13-250	4/27/2017	17.11	1.11	7.14	0.4	0.429	164	260	19.56
OW-14-96	4/28/2017	15.11	4.07	7.11	62.9	0.453	191	325	25.78
OW-14-235	4/26/2017	17.56	2.88	6.96	0.0	0.453	160	415	23.70
OW-15-202	4/26/2017	16.62	4.79	7.01	0.0	0.425	150	335	25.55
OW-16-448	4/27/2017	16.47	1.24	7.07	0.0	0.520	88	415	49.37
OW-17-600	5/2/2017	21.34	3.71	6.93	0.0	0.390	56	220	46.23
OW-18-597	5/2/2017	14.63	0.00	6.88	0.0	0.777	133	600	42.01
OW-19-450	4/24/2017	13.64	4.19	7.24	0.5	0.494	144	350	58.60
FHCC	5/4/2017	14.75	7.44	7.36	0.0	0.541	126	5 gal/min	42.92

Notes:
mg/L - milligrams per liter
FHCC - Fountain Head Country Club

Prepared by: JD 11/2/2017
Reviewed by:

Table 5-19
April-May 2017 (3rd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI) Remedial Investigation
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-A-51 5/10/2017 MWA-51-051017	MW-B-55 5/1/2017 MWB-55-050117	MW-B-400 5/3/2017 MWB-400-050317	MW-B-598 5/3/2017 MWB-598-050317	MW-C-40 5/3/2017 MWC-40-050317	MW-D-77 5/3/2017 MWD-77-050317	MW-E-46 5/2/2017 MWE-46-050217	MW-F-70 5/2/2017 MWF-70-050217	MW-G-35 5/1/2017 MWG-35-050117	MW-G-360 5/4/2017 MWG-360-050417	MW-G-360 5/4/2017 DUP-050417	MW-G-600 5/3/2017 MWG-600-050317	MW-H-65 5/3/2017 MWH-65-050317
TOTAL METALS in ug/L																
7429-90-5	ALUMINUM	20,000	---	750	36	< 30 U	28 J	1300	210	< 30 U	< 30 U	98000	< 30 U	< 30 U	< 30 U	370
7440-36-0	ANTIMONY	7.8	6	< 2 U	< 2 U	1.2 J B	1.5 J B	1.2 J B	1.7 J B	< 2 U	< 2 U	< 2 U	0.73 J	0.58 J	1.3 J B	0.99 J B
7440-38-2	ARSENIC	0.052	10	1.1	0.3 J	0.46 J	0.53 J	2.2	0.78 J	5.1	0.43 J	1.8	0.38 J	0.48 J	0.31 J	1.8
7440-39-3	BARIUM	3,800	2,000	29	45	38	120	2.3 J	32	3.4 J	30	13	36	36	53	18
7440-41-7	BERYLLIUM	25	4	0.94 J	< 1 U	< 1 U	< 1 U	0.84 J	< 1 U	< 1 U	< 1 U	19	< 1 U	< 1 U	< 1 U	0.67 J
7440-43-9	CADMIUM	9.2	5	0.27 J	< 1 U	< 1 U	0.11 J	< 1 U	< 1 U	< 1 U	< 1 U	3.9	< 1 U	< 1 U	< 1 U	< 1 U
7440-70-2	CALCIUM METAL	---	---	600000	130000	210000	120000	150000	300000	640000	140000	540000	290000	290000	160000	500000
7440-47-3	CHROMIUM[1]	---	100	1.9 J	< 2 U	< 2 U	< 2 U	6.3	0.73 J	0.47 J	< 2 U	3.2	< 2 U	< 2 U	0.42 J	< 2 U
7440-48-4	COBALT	6	---	3.9	< 0.5 U	0.42 J	1.4	< 0.5 U	1.1	0.2 J	< 0.5 U	61	0.18 J	0.2 J	0.3 J	0.78
7440-50-8	COPPER	800	1,300	16	< 2 U	1.3 J	1.4 J	2.2	2.4	1.1 J	< 2 U	63	< 2 U	< 2 U	1.6 J	1.6 J
7439-89-6	IRON	14,000	---	36000	< 50 U	320	94	< 50 U	310	< 50 U	840	52	< 50 U	< 50 U	< 50 U	12000
7439-92-1	LEAD	15	15	0.36 J	< 1 U	< 1 U	< 1 U	< 1 U	1	< 1 U	< 1 U	1.1	< 1 U	< 1 U	< 1 U	< 1 U
7439-95-4	MAGNESIUM	---	---	100000	52000	59000	31000	17000	84000	19000	52000	55000	87000	85000	30000	47000
7439-96-5	MANGANESE	430	---	6000	< 5 U	89	39	< 5 U	90	6.7	8.9	1700	59	60	9.8	6200
7440-02-0	NICKEL	390	---	9.7	0.53 J	1.3	0.68 J	1.1	6.1	1.4	< 1 U	99	1.3	1.1	0.77 J	1.8
7440-09-7	POTASSIUM	---	---	37000	3300	2200	1400	6200	19000	7900	2100	17000	19000	19000	1800	11000
7782-49-2	SELENIUM	100	50	< 5 U	< 5 U	< 5 U	< 5 U	3.1 J	2.2 J	< 5 U	< 5 U	1.5 J	< 5 U	< 5 U	< 5 U	< 5 U
7440-22-4	SILVER	94		< 1 U	< 1 U	< 1 U	0.23 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-23-5	SODIUM	---	---	37000	6700	14000	10000	2300	21000	15000	7600	14000	31000	30000	7000	32000
7440-28-0	THALLIUM	0.2	2	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	0.11 J	0.2 J	**< 1 U**	0.33 J	0.38 J	0.45 J	**< 1 U**	**< 1 U**
7440-62-2	VANADIUM	86	---	0.61 J	1.1	1.1	0.74 J	7.4	1.5	6.1	1	0.84 J	< 1 U	< 1 U	1.2	0.81 J
7440-66-6	ZINC	6,000	---	220	< 5 U	< 5 U	3.9 J	< 5 U	7.7	< 5 U	< 5 U	260	< 5 U	< 5 U	6.1	15
57-12-5	CYANIDE	1.5	200	**< 10 U**	**< 10 U**	**< 10 U**	6.5 J	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**
7439-97-6	MERCURY	0.63	2	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L																
16887-00-6	CHLORIDE	---	---	88	5.5	29	9.9	3.9	35	7.7	13	16	66	67	19	37
14797-55-8	NITRATE AS N	32	10	1.1	6.5	7	3.3	6.8	4.8	2.3	< 0.1 U	9.4	30	30	4.9	< 0.1 U
14808-79-8	SULFATE	---	---	1400	62	400	97	140	790	1400	160	1800	570	570	210	1300
ALKB	BICARBONATE ALKALINITY	---	---	640	540	480	440	300	310	280	480	< 5 U	510	500	400	450
ALKC	CARBONATE ALKALINITY	---	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	---	640	540	480	440	300	310	280	480	< 5 U	510	500	400	450
PESTICIDES in ug/L																
957-51-7	DIPHENAMID	530	---	280	< 1 U	2.4	< 0.95 U	< 1.1 U	0.38 J	< 1.1 U	1.1 J	< 1 U	23	25	0.37 J	200
53-19-0	2,4'-DDD	0.032	---	0.11 J	< 0.0013 U	< 0.025 U	< 0.0012 U	< 0.0013 U	< 0.026 U	< 0.026 U	< 0.0065 U	< 0.025 U	**< 0.12 U**	**< 0.12 U**	< 0.0012 U	**< 0.13 U**
3424-82-6	2,4'-DDE	0.046	---	**< 0.12 U**	< 0.0013 U	0.053	0.017	0.02 J	0.011 J p	< 0.026 U	0.015	< 0.025 U	0.11 J	0.15	0.013	0.075 J p
789-02-6	2,4'-DDT	0.23	---	< 0.12 U	< 0.0013 U	< 0.025 U	< 0.0012 U	< 0.0013 U	0.017 J	< 0.026 U	< 0.0065 U	< 0.025 U	< 0.12 U	< 0.12 U	< 0.0012 U	< 0.13 U
72-54-8	4,4'-DDD	0.032	---	**< 0.12 U**	< 0.0013 U	< 0.025 U	< 0.0012 U	< 0.0013 U	< 0.026 U	< 0.026 U	< 0.0065 U	0.029	**< 0.12 U**	**< 0.12 U**	< 0.0012 U	**< 0.13 U**
72-55-9	4,4'-DDE	0.046	---	**< 0.12 U**	< 0.0013 U	< 0.025 U	< 0.0012 U	< 0.0013 U	0.038	< 0.026 U	< 0.0065 U	< 0.025 U	**< 0.12 U**	**< 0.12 U**	< 0.0012 U	**< 0.13 U**
50-29-3	4,4'-DDT	0.23	---	< 0.12 U	0.001 J	< 0.025 U	< 0.0012 U	< 0.0013 U	0.018 J	< 0.026 U	< 0.0065 U	< 0.025 U	< 0.12 U	< 0.12 U	0.0027	< 0.13 U
309-00-2	ALDRIN	0.00092	---	**< 0.12 U**	**< 0.0013 U**	**< 0.025 U**	**< 0.0012 U**	0.0015 p	**< 0.026 U**	**< 0.026 U**	0.011 p	**< 0.025 U**	**< 0.12 U**	**< 0.12 U**	0.011 p	**< 0.13 U**
319-84-6	ALPHA-BHC	0.0072	---	1.3 p	< 0.0013 U	0.66	0.022 p	0.019	1.2	0.062	0.016	0.49	6.3	6.8	0.094	**< 0.13 U**
5103-71-9	ALPHA-CHLORDANE	0.02	2	**< 0.12 U**	< 0.0013 U	**< 0.025 U**	< 0.0012 U	< 0.0013 U	**< 0.026 U**	**< 0.026 U**	< 0.0065 U	**< 0.025 U**	**< 0.12 U**	**< 0.12 U**	< 0.0012 U	**< 0.13 U**
319-85-7	BETA-BHC	0.025	---	14	0.0036	1.8	0.49	1.6	0.51	3.3	0.15	6.2	3.5	3.9	0.36	1.6
319-86-8	DELTA-BHC	0.025	---	38	< 0.0013 U	0.72 B	0.049 B	0.02 B	1.6 B	0.052	0.55	2.4	7.9	8.5	0.18 B	5.5 B
60-57-1	DIELDRIN	0.0018	---	**< 0.12 U**	< 0.0013 U	**< 0.025 U**	< 0.0012 U	0.018	**< 0.026 U**	0.63	**< 0.0065 U**	**< 0.025 U**	**< 0.12 U**	**< 0.12 U**	0.0086	**< 0.13 U**
959-98-8	ENDOSULFAN I	100	---	< 0.12 U	< 0.0013 U	< 0.025 U	< 0.0012 U	< 0.0013 U	< 0.026 U	< 0.026 U	< 0.0065 U	< 0.025 U	< 0.12 U	< 0.12 U	< 0.0012 U	< 0.13 U
33213-65-9	ENDOSULFAN II	100	---	< 0.12 U	< 0.0013 U	< 0.025 U	< 0.0012 U	< 0.0013 U	< 0.026 U	0.044 p	< 0.0065 U	< 0.025 U	< 0.12 U	< 0.12 U	< 0.0012 U	< 0.13 U
1031-07-8	ENDOSULFAN SULFATE	---	---	< 0.12 U	< 0.0013 U	< 0.025 U	< 0.0012 U	< 0.0013 U	< 0.026 U	< 0.026 U	< 0.0065 U	< 0.025 U	< 0.12 U	< 0.12 U	< 0.0012 U	< 0.13 U
72-20-8	ENDRIN	2.3	2	< 0.12 U	< 0.0013 U	< 0.025 U	< 0.0012 U	0.0069 p	< 0.026 U	< 0.026 U	< 0.0065 U	< 0.025 U	< 0.12 U	< 0.12 U	< 0.0012 U	< 0.13 U
7421-93-4	ENDRIN ALDEHYDE	---	---	< 0.12 U	< 0.0013 U	< 0.025 U	< 0.0012 U	< 0.0013 U	< 0.026 U	< 0.026 U	0.0089 p	< 0.025 U	< 0.12 U	< 0.12 U	0.0068	< 0.13 U
53494-70-5	ENDRIN KETONE	---	---	< 0.12 U	< 0.0013 U	< 0.025 U	0.0018	0.0055	< 0.026 U	0.19	< 0.0065 U	< 0.025 U	< 0.12 U	< 0.12 U	0.0043	< 0.13 U
58-89-9	GAMMA-BHC (LINDANE)	0.042	0.2	**< 0.12 U**	< 0.0013 U	0.29	0.0077 p	0.0081	1.4	0.046	< 0.0065 U	0.15	7.5	8.2	0.047	**< 0.13 U**
12789-03-6	gamma-Chlordane	0.02	2	< 0.12 U	< 0.0013 U	< 0.025 U	< 0.0012 U	< 0.0013 U	< 0.026 U	< 0.026 U	< 0.0065 U	< 0.025 U	< 0.12 U	< 0.12 U	0.0021	< 0.13 U
76-44-8	HEPTACHLOR	0.0014	0.4	**< 0.12 U**	< 0.0013 U	**< 0.025 U**	< 0.0012 U	< 0.0013 U	**< 0.026 U**	**< 0.026 U**	**< 0.0065 U**	**< 0.025 U**	**< 0.12 U**	**< 0.12 U**	< 0.0012 U	**< 0.13 U**
1024-57-3	HEPTACHLOR EPOXIDE	0.0014	0.2	**< 0.12 U**	< 0.0013 U	**< 0.025 U**	< 0.0012 U	0.0014 p	**< 0.026 U**	**< 0.026 U**	**< 0.0065 U**	**< 0.025 U**	**< 0.12 U**	**< 0.12 U**	< 0.0012 U	**< 0.13 U**
72-43-5	METHOXYCHLOR	37	40	< 0.12 U	< 0.0013 U	< 0.025 U	< 0.0012 U	< 0.0013 U	< 0.026 U	< 0.026 U	< 0.0065 U	< 0.025 U	< 0.12 U	< 0.12 U	< 0.0012 U	< 0.13 U
8001-35-2	TOXAPHENE	0.071	3	< 9.5 U	< 0.1 U	< 1.9 U	< 0.095 U	< 0.096 U	2 U	< 2 U	< 0.5 U	< 2 U	< 9.5 U	< 9.5 U	< 0.095 U	< 9.8 U
HERBICIDES in ug/L																
94-75-7	2,4-D	170	70	< 3.8 U	< 4 U	< 3.8 U	< 3.8 U	< 3.9 U	< 3.9 U	< 4 U	< 4 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.9 U
93-76-5	2,4,5-T	160	---	< 0.95 U	< 0.99 U	< 0.95 U	< 0.95 U	< 0.98 U	< 0.97 U	< 1 U	< 0.99 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.98 U
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L																
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	710	---	< 9.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
95-95-4	2,4,5-TRICHLOROPHENOL	1,200	---	< 49 U	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	0.3 J	0.41 J	< 0.95 U	6
88-06-2	2,4,6-TRICHLOROPHENOL	4.1	---	**< 49 U**	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	0.19 J	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	17
120-83-2	2,4-DICHLOROPHENOL	46	---	< 9.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	2.9
105-67-9	2,4-DIMETHYLPHENOL	360	---	< 49 U	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	< 1 U
51-28-5	2,4-DINITROPHENOL	39	---	**< 240 U**	< 5.1 U	< 4.8 U	< 4.8 U	< 5.3 U	< 5.3 U	< 5.3 U	< 5.4 U	< 5.1 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5 U

Table 5-19
April-May 2017 (3rd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI) Remedial Investigation
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-A-51 5/10/2017 MWA-51-051017	MW-B-55 5/1/2017 MWB-55-050117	MW-B-400 5/3/2017 MWB-400-050317	MW-B-598 5/3/2017 MWB-598-050317	MW-C-40 5/3/2017 MWC-40-050317	MW-D-77 5/3/2017 MWD-77-050317	MW-E-46 5/2/2017 MWE-46-050217	MW-F-70 5/2/2017 MWF-70-050217	MW-G-35 5/1/2017 MWG-35-050117	MW-G-360 5/4/2017 MWG-360-050417	MW-G-360 5/4/2017 DUP-050417	MW-G-600 5/3/2017 MWG-600-050317	MW-H-65 5/3/2017 MWH-65-050317
121-14-2	2,4-DINITROTOLUENE	0.24	---	**< 49 U**	**< 1 U**	**< 0.95 U**	**< 0.95 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1 U**	**< 0.96 U**	**< 0.96 U**	**< 0.95 U**	**< 1 U**
606-20-2	2,6-DINITROTOLUENE	0.049	---	**< 49 U**	**< 1 U**	**< 0.95 U**	**< 0.95 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1 U**	**< 0.96 U**	**< 0.96 U**	**< 0.95 U**	**< 1 U**
91-58-7	2-CHLORONAPHTHALENE	750	---	< 9.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
95-57-8	2-CHLOROPHENOL	91	---	< 49 U	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	0.68 J
95-48-7	2-METHLYPHENOL	930	---	< 49 U	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	< 1 U
91-57-6	2-METHYLNAPHTHALENE	36	---	< 9.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
88-74-4	2-NITROANILINE	190	---	< 240 U	< 5.1 U	< 4.8 U	< 4.8 U	< 5.3 U	< 5.3 U	< 5.3 U	< 5.4 U	< 5.1 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5 U
88-75-5	2-NITROPHENOL	---	---	< 49 U	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	< 1 U
91-94-1	3,3'-DICHLOROBENZIDINE	0.13	---	**< 49 U**	**< 1 U**	**< 0.95 U**	**< 0.95 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1 U**	**< 0.96 U**	**< 0.96 U**	**< 0.95 U**	**< 1 U**
99-09-2	3-NITROANILINE	---	---	< 240 U	< 5.1 U	< 4.8 U	< 4.8 U	< 5.3 U	< 5.3 U	< 5.3 U	< 5.4 U	< 5.1 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5 U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	1.5	---	**< 240 U**	**< 5.1 U**	**< 4.8 U**	**< 4.8 U**	**< 5.3 U**	**< 5.3 U**	**< 5.3 U**	**< 5.4 U**	**< 5.1 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 5 U**
101-55-3	4-BROMOPHENYL PHENYL ETHER	---	---	< 49 U	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	< 1 U
59-50-7	4-CHLORO-3-METHYLPHENOL	1,400	---	< 49 U	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	< 1 U
106-47-8	4-CHLOROANILINE	0.37	---	**< 49 U**	**< 1 U**	**< 0.95 U**	**< 0.95 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1 U**	**< 0.96 U**	**< 0.96 U**	**< 0.95 U**	**< 1 U**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	---	---	< 49 U	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	< 1 U
106-44-5	4-METHLYPHENOL	1,900	---	< 49 U	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	< 1 U
100-01-6	4-NITROANILINE	3.8	---	**< 240 U**	**< 5.1 U**	**< 4.8 U**	**< 4.8 U**	**< 5.3 U**	**< 5.3 U**	**< 5.3 U**	**< 5.4 U**	**< 5.1 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 5 U**
100-02-7	4-NITROPHENOL	---	---	< 240 U	< 5.1 U	< 4.8 U	< 4.8 U	< 5.3 U	< 5.3 U	< 5.3 U	< 5.4 U	< 5.1 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5 U
83-32-9	ACENAPHTHENE	530	---	< 9.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
208-96-8	ACENAPHTHYLENE	---	---	< 9.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
98-86-2	ACETOPHENONE	1,900	---	< 49 U	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	< 1 U
120-12-7	ANTHRACENE	1,800	---	< 9.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
1912-24-9	ATRAZINE	0.3	3	**< 49 U**	**< 1 U**	1.8	0.13 J	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1 U**	1.4	1.7	0.086 J	**< 1 U**
100-52-7	BENZALDEHYDE	19	---	**< 49 U**	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	< 1 U
56-55-3	BENZO[A]ANTHRACENE	0.03	---	**< 9.2 U**	0.033 J	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.2 U**	**< 0.2 U**	**< 0.2 U**	0.048 J	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**
50-32-8	BENZO[A]PYRENE	0.025	0.2	**< 9.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.2 U**	**< 0.2 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**
205-99-2	BENZO[B]FLUORANTHENE	0.25	---	**< 9.2 U**	0.061 J	< 0.18 U	< 0.18 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	0.076 J	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
191-24-2	BENZO[G,H,I]PERYLENE	---	---	< 9.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
207-08-9	BENZO[K]FLUORANTHENE	2.5	---	**< 9.2 U**	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	0.069 J	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
85-68-7	BENZYL BUTYL PHTHALATE	16	---	**< 49 U**	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	< 1 U
92-52-4	BIPHENYL	0.83	---	**< 49 U**	**< 1 U**	**< 0.95 U**	**< 0.95 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1 U**	**< 0.96 U**	**< 0.96 U**	**< 0.95 U**	**< 1 U**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	59	---	< 49 U	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	< 1 U
111-44-4	BIS(2-CHLOROETHYL) ETHER	0.014	---	**< 9.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.2 U**	**< 0.2 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.6	6	**< 97 U**	< 2 U	< 1.9 U	< 1.9 U	< 2.1 U	< 2.1 U	< 2.1 U	< 2.2 U	< 2 U	< 1.9 U	< 1.9 U	< 1.9 U	< 2 U
105-60-2	CAPROLACTAM	9,900	---	< 240 U	< 5.1 U	< 4.8 U	< 4.8 U	< 5.3 U	< 5.3 U	< 5.3 U	< 5.4 U	< 5.1 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5 U
86-74-8	CARBAZOLE	---	---	< 9.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	0.36
218-01-9	CHRYSENE	25	---	< 9.2 U	0.051 J	< 0.18 U	< 0.18 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	0.054 J	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
53-70-3	DIBENZ[A,H]ANTHRACENE	0.025	---	**< 9.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.2 U**	**< 0.2 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**
132-64-9	DIBENZOFURAN	7.9	---	**< 49 U**	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	0.29 J
84-66-2	DIETHYL PHTHALATE	15,000	---	< 49 U	< 1 U	< 0.95 U	0.16 J	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	0.16 J	< 1 U
131-11-3	DIMETHYL PHTHALATE	---	---	< 49 U	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	< 1 U
84-74-2	DI-N-BUTYL PHTHALATE	900	---	< 49 U	0.18 J	< 0.95 U	0.14 J	< 1.1 U	0.13 J	0.16 J	0.21 J	< 1 U	0.2 J	< 0.96 U	< 0.95 U	< 1 U
117-84-0	DI-N-OCTYL PHTHALATE	200	---	< 49 U	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	< 1 U
206-44-0	FLUORANTHENE	800	---	< 9.2 U	0.033	< 0.18 U	< 0.18 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	0.03 J	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
86-73-7	FLUORENE	290	---	< 9.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	0.41
118-74-1	HEXACHLOROBENZENE	0.0098	1	**< 9.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.2 U**	**< 0.2 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**
87-68-3	HEXACHLOROBUTADIENE	0.14	---	**< 9.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.2 U**	**< 0.2 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**
77-47-4	HEXACHLOROCYCLOPENTADIENE	0.41	50	**< 49 U**	**< 1 U**	**< 0.95 U**	**< 0.95 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1 U**	**< 0.96 U**	**< 0.96 U**	**< 0.95 U**	**< 1 U**
67-72-1	HEXACHLOROETHANE	0.33	---	**< 49 U**	**< 1 U**	**< 0.95 U**	**< 0.95 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1 U**	**< 0.96 U**	**< 0.96 U**	**< 0.95 U**	**< 1 U**
193-39-5	INDENO[1,2,3-CD]PYRENE	0.25	---	**< 9.2 U**	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
78-59-1	ISOPHORONE	78	---	< 49 U	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	< 1 U
91-20-3	NAPHTHALENE	0.17	---	**< 9.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.2 U**	**< 0.2 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**
98-95-3	NITROBENZENE	0.14	---	**< 97 U**	**< 2 U**	**< 1.9 U**	**< 1.9 U**	**< 2.1 U**	**< 2.1 U**	**< 2.1 U**	**< 2.2 U**	**< 2 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 2 U**
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.011	---	**< 9.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.2 U**	**< 0.2 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**
86-30-6	N-NITROSODIPHENYLAMINE	12	---	**< 49 U**	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	< 1 U
87-86-5	PENTACHLOROPHENOL	0.041	1	17 J	**< 1 U**	7.4	**< 0.95 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1.1 U**	**< 1 U**	4.7	5.6	0.077 J	160
85-01-8	PHENANTHRENE	---	---	< 9.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
108-95-2	PHENOL	5,800	---	< 49 U	< 1 U	< 0.95 U	< 0.95 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1 U	< 0.96 U	< 0.96 U	< 0.95 U	< 1 U
129-00-0	PYRENE	120	---	< 9.2 U	0.03 J	< 0.18 U	< 0.18 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	0.025 J	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
VOLATILE ORGANIC COMPOUNDS in ug/L																
71-55-6	1,1,1-TRICHLOROETHANE	8,000	200	< 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 U
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.076		**< 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 U**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10,000		< 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 U
79-00-5	1,1,2-TRICHLOROETHANE	0.28	5	**< 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 U**
75-34-3	1,1-DICHLOROETHANE	2.8	---	< 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 U
75-35-4	1,1-DICHLOROETHYLENE	280	7	< 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 U
120-82-1	1,2,4-TRICHLOROBENZENE	1.2	70	1.1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	0.00033	0.2	**< 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 U**

Table 5-19
April-May 2017 (3rd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI) Remedial Investigation
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-A-51 5/10/2017 MWA-51-051017	MW-B-55 5/1/2017 MWB-55-050117	MW-B-400 5/3/2017 MWB-400-050317	MW-B-598 5/3/2017 MWB-598-050317	MW-C-40 5/3/2017 MWC-40-050317	MW-D-77 5/3/2017 MWD-77-050317	MW-E-46 5/2/2017 MWE-46-050217	MW-F-70 5/2/2017 MWF-70-050217	MW-G-35 5/1/2017 MWG-35-050117	MW-G-360 5/4/2017 MWG-360-050417	MW-G-360 5/4/2017 DUP-050417	MW-G-600 5/3/2017 MWG-600-050317	MW-H-65 5/3/2017 MWH-65-050317
106-93-4	1,2-DIBROMOETHANE	0.0075	0.05	**< 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 U**
95-50-1	1,2-DICHLOROBENZENE	300	600	23	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.73 J	0.86 J	< 1 U	14
107-06-2	1,2-DICHLOROETHANE	0.17	5	< 1 U	< 1 U	**0.59 J**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**0.39 J**	**0.42 J**	< 1 U	< 1 U
78-87-5	1,2-DICHLOROPROPANE	0.85	5	**< 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 U**
541-73-1	1,3-DICHLOROBENZENE	---	---	0.78 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.99 J
106-46-7	1,4-DICHLOROBENZENE	0.48	75	**18**	**< 1 U**	0.35 J	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**1.3**	**1.4**	0.24 J	**20**
78-93-3	2-BUTANONE	5,600	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
591-78-6	2-HEXANONE	38	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
108-10-1	4-METHYL-2-PENTANONE	6,300	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
67-64-1	ACETONE	14,000	---	7.6	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
71-43-2	BENZENE	0.46	5	**24**	0.19 J	0.23 J	**< 1 U**	**< 1 U**	**< 1 U**	0.25 J	**0.7 J**	0.19 J	0.31 J	0.29 J	0.36 J	**5.2**
75-27-4	BROMODICHLOROMETHANE	0.13	80	**< 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 U**
75-25-2	BROMOFORM	3.3	80	< 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 U
74-83-9	BROMOMETHANE	7.5	---	< 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 U
75-15-0	CARBON DISULFIDE	810	---	< 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 U
56-23-5	CARBON TETRACHLORIDE	0.46	5	**< 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 U**
108-90-7	CHLOROBENZENE	78	100	**140**	< 1 U	1.4	< 1 U	< 1 U	0.73 J	< 1 U	5.1	< 1 U	8.6	8.2	0.35 J	**120**
75-00-3	CHLOROETHANE	21,000	---	< 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 U
67-66-3	CHLOROFORM	0.22	80	**19**	**< 1 U**	**0.41 J**	**< 1 U**	**< 1 U**	**1**	**< 1 U**	**< 1 U**	**< 1 U**	**0.73 J**	**0.73 J**	**0.32 J**	< 1 U
74-87-3	CHLOROMETHANE	190	---	< 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 U
156-59-2	CIS-1,2-DICHLOROETHENE	36	70	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.46 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	---	---	< 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 U
110-82-7	CYCLOHEXANE	13,000	---	< 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 U
124-48-1	DIBROMOCHLOROMETHANE	0.87	---	**< 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 U**
75-71-8	DICHLORODIFLUOROMETHANE	200	---	< 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 U
100-41-4	ETHYLBENZENE	1.5	700	0.6 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.31 J
98-82-8	ISOPROPYLBENZENE (CUMENE)	450	---	< 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 U
79-20-9	METHYL ACETATE	20,000	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1634-04-4	METHYL TERT-BUTYL ETHER	14	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.7	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
108-87-2	METHYLCYLOHEXANE	---	---	< 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 U
75-09-2	METHYLENE CHLORIDE	11	5	< 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 U
100-42-5	STYRENE (MONOMER)	1,200	100	< 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 U
127-18-4	TETRACHLOROETHYLENE	11	5	< 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 U
108-88-3	TOLUENE	1,100	1,000	0.19 J	< 1 U	< 1 U	0.16 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
156-60-5	TRANS-1,2-DICHLOROETHENE	360	100	< 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 U
10061-02-6	TRANS-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	< 1 U
79-01-6	TRICHLOROETHYLENE	0.49	5	**< 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 U**
75-69-4	TRICHLOROFLUOROMETHANE	5,200	---	< 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 U
75-01-4	VINYL CHLORIDE	0.019	2	**< 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 U**
XYLENES	Xylenes, Total	190	10000	0.27 J	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

Notes:
USEPA RSL for TAP WATER (latest version, November 2017)
USEPA MCL (latest version, November 2017)
(1) No RSL exists, MCL utilized.
B - Parameter was detected in associated laboratory method blank.
J - Result is either less than the RL but greater than or equal to the method detection limit (MDL). Concentration is estimated.
U - Compound not detected above specified reporting limit.
p - Sample results on the front and rear chromatography column exhibited imprecision greater than 40%. The lower value has been reported.
Bold indicates the reporting limit was above the RSL and/or MCL.
Red bolded detected concentration exceeds RSL
Red bolded and highlighted detected concentration exceeds MCL

Table 5-19
April-May 2017 (3rd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI) Remedial Investigation
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-I-55 5/8/2017 MWI-55-050817	MW-J-71 5/8/2017 MWJ-71-050817	MW-K-80 5/4/2017 MWK-80-050417	MW-K-440 5/8/2017 MWK-440-050817	MW-L-48 5/4/2017 MWL-48-050417	MW-L-250 5/9/2017 MWL-250-050917	MW-M-50 5/9/2017 MWM-50-050917	MW-N-83 5/9/2017 MWN-83-050917	MW-N-113 5/9/2017 MWN-113-050917	MW-O-145 5/8/2017 MWO-145-050817	MW-P-235 5/8/2017 MWP-235-050817	MW-Q-150 5/9/2017 MWQ-150-050917	MW-R-330 5/4/2017 MWR-330-050417	MW-R-600 5/4/2017 MWR-600-050417	EW-1-110 5/10/2017 EW1-110-051017
TOTAL METALS in ug/L																		
7429-90-5	ALUMINUM	20,000	---	< 30 U	79	120	< 30 U	< 30 U	< 30 U	< 30 U	160	< 30 U	< 30 U	< 30 U	14 J	260	< 30 U	1400
7440-36-0	ANTIMONY	7.8	6	0.64 J B	0.84 J B	1.4 J	0.65 J B	0.55 J	< 2 U	< 2 U	< 2 U	< 2 U	0.83 J B	0.9 J B	1.5 J	0.57 J	< 2 U	< 2 U
7440-38-2	ARSENIC	0.052	10	**0.45 J**	**0.64 J**	**0.59 J**	**0.3 J**	**0.54 J**	**0.29 J**	**0.62 J**	**0.81 J**	**2**	**1.3**	**0.44 J**	**8.8**	**0.8 J**	**1.7**	**1.1**
7440-39-3	BARIUM	3,800	2,000	36	16	28	100	22	110	13	33	20	17	18	21	23	65	77
7440-41-7	BERYLLIUM	25	4	< 1 U	0.64 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.18 J	< 1 U	< 1 U	< 1 U	< 1 U	0.33 J	< 1 U	0.16 J
7440-43-9	CADMIUM	9.2	5	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.18 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-70-2	CALCIUM METAL	---	---	250000	580000	290000	130000	460000	120000	660000	420000	400000	540000	540000	470000	440000	150000	570000
7440-47-3	CHROMIUM[1]	---	100	< 2 U	0.42 J	0.41 J	0.75 J	< 2 U	0.4 J	< 2 U	< 2 U	< 2 U	0.44 J	< 2 U	< 2 U	< 2 U	< 2 U	0.46 J
7440-48-4	COBALT	6	---	< 0.5 U	0.21 J	0.22 J	0.096 J	< 0.5 U	< 0.5 U	5.9	0.16 J	0.23 J	0.29 J	< 0.5 U	2.7	3.7	1.2	0.18 J
7440-50-8	COPPER	800	1,300	1.7 J	1.9 J	< 2 U	3	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	1.9 J	2.2	2.2	< 2 U	< 2 U	< 2 U
7439-89-6	IRON	14,000	---	3000	**27000**	4700	79	< 50 U	< 50 U	1000	13000	12000	4900	4100	**17000**	190	2000	**26000**
7439-92-1	LEAD	15	15	< 1 U	14	13	0.33 J	< 1 U	< 1 U	< 1 U	0.49 J	< 1 U	< 1 U	< 1 U	**64**	< 1 U	< 1 U	3
7439-95-4	MAGNESIUM	---	---	12000	50000	14000	18000	56000	15000	17000	19000	23000	31000	42000	23000	44000	27000	25000
7439-96-5	MANGANESE	430	---	**1500**	**5900**	**2400**	1.5 J	130	1.4 J B	310 B	**3100 B**	**6400 B**	**1800**	**3200**	**4700 B**	**2400**	**680**	**4800**
7440-02-0	NICKEL	390	---	0.67 J	0.43 J	0.55 J	< 1 U	1	< 1 U	7.2	0.33 J	< 1 U	0.69 J	0.34 J	4.3	2.8	2	0.56
7440-09-7	POTASSIUM	---	---	5500	12000	6300	2200	8300	1300	4600	23000	14000	8200	3300	19000	15000	2100	8900
7782-49-2	SELENIUM	100	50	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
7440-22-4	SILVER	94		< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.68 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-23-5	SODIUM	---	---	5800	29000	12000	2500	6700	3500	2400	8200	7700	54000	37000	8700	15000	23000	19000
7440-28-0	THALLIUM	0.2	2	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	0.095 J	0.17 J	0.14 J	**0.43 J**	**< 1 U**	**< 1 U**	0.056 J	**1.4**	0.09 J	0.098
7440-62-2	VANADIUM	86	---	< 1 U	0.83 J	< 1 U	0.62 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.52 J	0.58 J	< 1 U	< 1 U	< 1 U	< 1 U
7440-66-6	ZINC	6,000	---	6.7	15	3 J	2.7 J	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	5.7	12	< 5 U	6.1	< 5 U	71
57-12-5	CYANIDE	1.5	200	**< 10 U**	**3.6 J**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**5.4 J**	**4.8 J**	**< 10 U**	**3.4 J**	**< 10 U**	**< 10 U**	**< 10 U**
7439-97-6	MERCURY	0.63	2	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L																		
16887-00-6	CHLORIDE	---	---	12	57	22	17	23	21	10	20	25	66	56	20	47	16	35
14797-55-8	NITRATE AS N	32	10	< 0.1 U	< 0.1 U	< 0.1 U	3.6	4	3.5	0.96	< 0.1 U	0.034 J	< 0.1 U	< 0.1 U	< 0.1 U	0.19	0.27	< 0.1 U
14808-79-8	SULFATE	---	---	390	1500	430	98	910	31	1400	670	720	1500	1500	880	850	160	1200
ALKB	BICARBONATE ALKALINITY	---	---	470	400	460	360	490	380	280	540	470	120	150	520	510	480	350
ALKC	CARBONATE ALKALINITY	---	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	---	470	400	460	360	490	380	280	540	470	120	150	520	510	480	350
PESTICIDES in ug/L																		
957-51-7	DIPHENAMID	530	---	1.3	77	0.34 J	< 0.95 U	< 1 U	< 0.96 U	0.22 J	3.6	1.1	160	53	5.3	18	2.2	14
53-19-0	2,4'-DDD	0.032	---	< 0.027 U	**< 0.13 U**	< 0.025 U	< 0.0012 U	**0.47 p**	< 0.0012 U	**< 0.064 U**	**< 0.064 U**	< 0.025 U	**< 0.13 U**	**< 0.12 U**	< 0.025 U	**0.11 J**	< 0.0012 U	**0.14 p**
3424-82-6	2,4'-DDE	0.046	---	**0.21**	**< 0.13 U**	**0.064**	0.017	**2.6**	0.0045	**< 0.064 U**	**0.09**	< 0.025 U	**< 0.13 U**	**< 0.12 U**	< 0.025 U	**0.25**	0.012 p	< 0.025 U
789-02-6	2,4'-DDT	0.23	---	< 0.027 U	< 0.13 U	< 0.025 U	< 0.0012 U	< 0.13 U	< 0.0012 U	< 0.064 U	< 0.064 U	< 0.025 U	< 0.13 U	< 0.12 U	< 0.025 U	< 0.12 U	< 0.0012 U	< 0.025 U
72-54-8	4,4'-DDD	0.032	---	< 0.027 U	**< 0.13 U**	< 0.025 U	< 0.0012 U	**0.12 J**	0.00072 J p	**< 0.064 U**	**< 0.064 U**	< 0.025 U	**< 0.13 U**	**< 0.12 U**	< 0.025 U	**< 0.12 U**	0.0032 p	< 0.025 U
72-55-9	4,4'-DDE	0.046	---	< 0.027 U	**< 0.13 U**	< 0.025 U	< 0.0012 U	**< 0.13 U**	< 0.0012 U	**< 0.064 U**	**< 0.064 U**	< 0.025 U	**< 0.13 U**	**< 0.12 U**	< 0.025 U	**< 0.12 U**	< 0.0012 U	< 0.025 U
50-29-3	4,4'-DDT	0.23	---	< 0.027 U	< 0.13 U	< 0.025 U	0.0048	< 0.13 U	< 0.0012 U	< 0.064 U	< 0.064 U	0.022 J p	< 0.13 U	< 0.12 U	< 0.025 U	< 0.12 U	0.0024	0.022 J p
309-00-2	ALDRIN	0.00092	---	**< 0.027 U**	**< 0.13 U**	**0.016 J p**	**< 0.0012 U**	**0.066 J p**	**< 0.0012 U**	**< 0.064 U**	**0.045 J p**	**0.03 p**	**< 0.13 U**	**< 0.12 U**	**0.027 p**	**0.064 J p**	**0.006 p**	**0.037 p**
319-84-6	ALPHA-BHC	0.0072	---	**0.17**	**< 0.13 U**	**0.14**	**0.031**	**0.2**	**0.017**	**0.52**	**2.7**	**2.2**	**< 0.13 U**	**0.09 J**	**0.97**	**3.8**	**0.18**	**0.14**
5103-71-9	ALPHA-CHLORDANE	0.02	2	**< 0.027 U**	**< 0.13 U**	**< 0.025 U**	< 0.0012 U	**< 0.13 U**	< 0.0012 U	**< 0.064 U**	**0.04 J p**	**< 0.025 U**	**< 0.13 U**	**< 0.12 U**	**0.059**	**< 0.12 U**	< 0.0012 U	**0.047**
319-85-7	BETA-BHC	0.025	---	**2.5**	**0.4**	**0.84**	**0.14**	**24**	**0.053**	**6.4**	**5.6**	**2.3**	**< 0.13 U**	**0.19**	**2.9**	**5.6**	**0.39**	**1.6**
319-86-8	DELTA-BHC	0.025	---	**1.8**	**13**	**2.1**	**0.06**	**0.5**	0.0049	**2.2**	**9.1**	**5.1**	**3**	**1.8**	**5.6**	**8.1**	**0.52**	**3.7**
60-57-1	DIELDRIN	0.0018	---	**0.4**	**< 0.13 U**	**0.028**	**0.0087**	**< 0.13 U**	**0.0019**	**0.44**	**< 0.064 U**	**0.033**	**< 0.13 U**	**< 0.12 U**	**0.04**	**< 0.12 U**	0.0014 p	**< 0.025 U**
959-98-8	ENDOSULFAN I	100	---	< 0.027 U	< 0.13 U	< 0.025 U	< 0.0012 U	< 0.13 U	< 0.0012 U	< 0.064 U	< 0.064 U	< 0.025 U	< 0.13 U	< 0.12 U	< 0.025 U	< 0.12 U	< 0.0012 U	< 0.025 U
33213-65-9	ENDOSULFAN II	100	---	< 0.027 U	< 0.13 U	0.021	< 0.0012 U	0.1 J	< 0.0012 U	< 0.064 U	< 0.064 U	0.034 p	< 0.13 U	< 0.12 U	< 0.025 U	< 0.12 U	< 0.0012 U	< 0.025 U
1031-07-8	ENDOSULFAN SULFATE	---	---	< 0.027 U	< 0.13 U	< 0.025 U	< 0.0012 U	< 0.13 U	< 0.0012 U	< 0.064 U	< 0.064 U	< 0.025 U	0.21 p	< 0.12 U	< 0.025 U	< 0.12 U	< 0.0012 U	0.18 p
72-20-8	ENDRIN	2.3	2	< 0.027 U	< 0.13 U	< 0.025 U	< 0.0012 U	0.34	< 0.0012 U	< 0.064 U	< 0.064 U	< 0.025 U	< 0.13 U	< 0.12 U	< 0.025 U	< 0.12 U	< 0.0012 U	< 0.025 U
7421-93-4	ENDRIN ALDEHYDE	---	---	< 0.027 U	0.18	< 0.025 U	< 0.0012 U	< 0.13 U	< 0.0012 U	0.045	< 0.064 U	< 0.025 U	< 0.13 U	< 0.12 U	< 0.025 U	< 0.12 U	< 0.0012 U	0.043 p
53494-70-5	ENDRIN KETONE	---	---	0.017 J	< 0.13 U	< 0.025 U	< 0.0012 U	2.1	< 0.0012 U	0.2	< 0.064 U	< 0.025 U	< 0.13 U	< 0.12 U	< 0.025 U	< 0.12 U	< 0.0012 U	< 0.025 U
58-89-9	GAMMA-BHC (LINDANE)	0.042	0.2	< 0.027 U	**< 0.13 U**	< 0.025 U	0.0084 p	**0.072 J**	0.0056	**< 0.064 U**	**< 0.064 U**	0.0093 J p	**< 0.13 U**	**< 0.12 U**	< 0.025 U	**0.17**	0.0058 p	< 0.025 U
12789-03-6	gamma-Chlordane	0.02	2	< 0.027 U	< 0.13 U	0.019 J p	0.0031 p	< 0.13 U	< 0.0012 U	< 0.064 U	**0.067**	**0.04**	< 0.13 U	< 0.12 U	**0.075**	< 0.12 U	< 0.0012 U	< 0.025 U
76-44-8	HEPTACHLOR	0.0014	0.4	**< 0.027 U**	**< 0.13 U**	**< 0.025 U**	< 0.0012 U	**< 0.13 U**	< 0.0012 U	**< 0.064 U**	**< 0.064 U**	**< 0.025 U**	**< 0.13 U**	**< 0.12 U**	**< 0.025 U**	**< 0.12 U**	< 0.0012 U	**< 0.025 U**
1024-57-3	HEPTACHLOR EPOXIDE	0.0014	0.2	**< 0.027 U**	**< 0.13 U**	**< 0.025 U**	< 0.0012 U	**< 0.13 U**	< 0.0012 U	**< 0.064 U**	**< 0.064 U**	**< 0.025 U**	**< 0.13 U**	**< 0.12 U**	**< 0.025 U**	**< 0.12 U**	< 0.0012 U	**< 0.025 U**
72-43-5	METHOXYCHLOR	37	40	< 0.027 U	< 0.13 U	< 0.025 U	< 0.0012 U	< 0.13 U	< 0.0012 U	< 0.064 U	< 0.064 U	< 0.025 U	< 0.13 U	< 0.12 U	< 0.025 U	< 0.12 U	< 0.0012 U	< 0.025 U
8001-35-2	TOXAPHENE	0.071	3	< 2 U	< 9.6 U	< 1.9 U	< 0.095 U	< 9.6 U	< 0.095 U	< 5 U	< 5 U	< 2 U	< 9.9 U	< 9.5 U	< 1.9 U	< 9.5 U	< 0.095 U	< 1.9 U
HERBICIDES in ug/L																		
94-75-7	2,4-D	170	70	< 3.9 U	< 3.8 U	< 4 U	< 3.8 U	< 3.8 U	< 3.8 U	< 4 U	< 4 U	< 3.9 U	< 4 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U
93-76-5	2,4,5-T	160	---	< 0.98 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.99 U	< 0.99 U	< 0.98 U	< 0.99 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.95 U
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L																		
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	710	---	< 0.19 U	< 0.94 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 4.9 U	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.72 U
95-95-4	2,4,5-TRICHLOROPHENOL	1,200	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	< 0.95 U	< 0.96 U	< 26 U	< 9.5 U	< 0.95 U	0.23 J	< 0.96 U	< 3.8 U
88-06-2	2,4,6-TRICHLOROPHENOL	4.1	---	< 0.99 U	**< 5 U**	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	< 0.95 U	< 0.96 U	**< 26 U**	**< 9.5 U**	< 0.95 U	< 0.96 U	< 0.96 U	< 3.8 U
120-83-2	2,4-DICHLOROPHENOL	46	---	< 0.19 U	< 0.94 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 4.9 U	0.47 J	< 0.18 U	< 0.18 U	< 0.18 U	0.21 J
105-67-9	2,4-DIMETHYLPHENOL	360	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	< 0.95 U	< 0.96 U	< 26 U	< 9.5 U	< 0.95 U	< 0.96 U	< 0.96 U	< 3.8 U
51-28-5	2,4-DINITROPHENOL	39	---	< 5 U	< 25 U	< 5.3 U	< 4.8 U	< 5.1 U	< 4.8 U	< 5.1 U	< 4.8 U	< 4.8 U	< 130 U	**< 48 U**	< 4.8 U	< 4.8 U	< 4.8 U	< 19 U

Table 5-19
April-May 2017 (3rd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI) Remedial Investigation
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-I-55 5/8/2017 MWI-55-050817	MW-J-71 5/8/2017 MWJ-71-050817	MW-K-80 5/4/2017 MWK-80-050417	MW-K-440 5/8/2017 MWK-440-050817	MW-L-48 5/4/2017 MWL-48-050417	MW-L-250 5/9/2017 MWL-250-050917	MW-M-50 5/9/2017 MWM-50-050917	MW-N-83 5/9/2017 MWN-83-050917	MW-N-113 5/9/2017 MWN-113-050917	MW-O-145 5/8/2017 MWO-145-050817	MW-P-235 5/8/2017 MWP-235-050817	MW-Q-150 5/9/2017 MWQ-150-050917	MW-R-330 5/4/2017 MWR-330-050417	MW-R-600 5/4/2017 MWR-600-050417	EW-1-110 5/10/2017 EW1-110-051017
121-14-2	2,4-DINITROTOLUENE	0.24	---	**< 0.99 U**	**< 5 U**	**< 1.1 U**	**< 0.95 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 26 U**	**< 9.5 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 3.8 U**
606-20-2	2,6-DINITROTOLUENE	0.049	---	**< 0.99 U**	**< 5 U**	**< 1.1 U**	**< 0.95 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 26 U**	**< 9.5 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 3.8 U**
91-58-7	2-CHLORONAPHTHALENE	750	---	< 0.19 U	< 0.94 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 4.9 U	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.72 U
95-57-8	2-CHLOROPHENOL	91	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	0.68 J	< 0.96 U	< 1 U	0.2 J	0.2 J	< 26 U	3.2 J	< 0.95 U	< 0.96 U	< 0.96 U	< 3.8 U
95-48-7	2-METHLYPHENOL	930	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	< 0.95 U	< 0.96 U	< 26 U	< 9.5 U	< 0.95 U	< 0.96 U	< 0.96 U	< 3.8 U
91-57-6	2-METHYLNAPHTHALENE	36	---	< 0.19 U	< 0.94 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 4.9 U	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.72 U
88-74-4	2-NITROANILINE	190	---	< 5 U	< 25 U	< 5.3 U	< 4.8 U	< 5.1 U	< 4.8 U	< 5.1 U	< 4.8 U	< 4.8 U	< 130 U	< 48 U	< 4.8 U	< 4.8 U	< 4.8 U	< 19 U
88-75-5	2-NITROPHENOL	---	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	< 0.95 U	< 0.96 U	< 26 U	< 9.5 U	< 0.95 U	< 0.96 U	< 0.96 U	< 3.8 U
91-94-1	3,3`-DICHLOROBENZIDINE	0.13	---	**< 0.99 U**	**< 5 U**	**< 1.1 U**	**< 0.95 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 26 U**	**< 9.5 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 3.8 U**
99-09-2	3-NITROANILINE	---	---	< 5 U	< 25 U	< 5.3 U	< 4.8 U	< 5.1 U	< 4.8 U	< 5.1 U	< 4.8 U	< 4.8 U	< 130 U	< 48 U	< 4.8 U	< 4.8 U	< 4.8 U	< 19 U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	1.5	---	**< 5 U**	**< 25 U**	**< 5.3 U**	**< 4.8 U**	**< 5.1 U**	**< 4.8 U**	**< 5.1 U**	**< 4.8 U**	**< 4.8 U**	**< 130 U**	**< 48 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 19 U**
101-55-3	4-BROMOPHENYL PHENYL ETHER	---	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	< 0.95 U	< 0.96 U	< 26 U	< 9.5 U	< 0.95 U	< 0.96 U	< 0.96 U	< 3.8 U
59-50-7	4-CHLORO-3-METHYLPHENOL	1,400	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	< 0.95 U	< 0.96 U	< 26 U	< 9.5 U	< 0.95 U	< 0.96 U	< 0.96 U	< 3.8 U
106-47-8	4-CHLOROANILINE	0.37	---	**< 0.99 U**	1.4 J	**< 1.1 U**	**< 0.95 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**	3.8 J	1.3 J	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 3.8 U**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	---	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	< 0.95 U	< 0.96 U	< 26 U	< 9.5 U	< 0.95 U	< 0.96 U	< 0.96 U	< 3.8 U
106-44-5	4-METHLYPHENOL	1,900	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	< 0.95 U	< 0.96 U	< 26 U	< 9.5 U	< 0.95 U	< 0.96 U	< 0.96 U	< 3.8 U
100-01-6	4-NITROANILINE	3.8	---	**< 5 U**	**< 25 U**	**< 5.3 U**	**< 4.8 U**	**< 5.1 U**	**< 4.8 U**	**< 5.1 U**	**< 4.8 U**	**< 4.8 U**	**< 130 U**	**< 48 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 19 U**
100-02-7	4-NITROPHENOL	---	---	< 5 U	< 25 U	< 5.3 U	< 4.8 U	< 5.1 U	< 4.8 U	< 5.1 U	< 4.8 U	< 4.8 U	< 130 U	< 48 U	< 4.8 U	< 4.8 U	< 4.8 U	< 19 U
83-32-9	ACENAPHTHENE	530	---	< 0.19 U	< 0.94 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	0.5	< 0.18 U	< 4.9 U	1.5 J	< 0.18 U	< 0.18 U	< 0.18 U	0.42 J
208-96-8	ACENAPHTHYLENE	---	---	< 0.19 U	< 0.94 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 4.9 U	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.72 U
98-86-2	ACETOPHENONE	1,900	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	0.4 J	0.081 J	< 26 U	< 9.5 U	0.22 J	< 0.96 U	< 0.96 U	< 3.8 U
120-12-7	ANTHRACENE	1,800	---	< 0.19 U	< 0.94 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 4.9 U	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.72 U
1912-24-9	ATRAZINE	0.3	3	**< 0.99 U**	**< 5 U**	**< 1.1 U**	**< 0.95 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 26 U**	**< 9.5 U**	**< 0.95 U**	2	0.52 J	**< 3.8 U**
100-52-7	BENZALDEHYDE	19	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	< 0.95 U	< 0.96 U	**< 26 U**	< 9.5 U	< 0.95 U	< 0.96 U	< 0.96 U	< 3.8 U
56-55-3	BENZO[A]ANTHRACENE	0.03	---	**< 0.19 U**	**< 0.94 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 4.9 U**	**< 1.8 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.72 U**
50-32-8	BENZO[A]PYRENE	0.025	0.2	**< 0.19 U**	**< 0.94 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 4.9 U**	**< 1.8 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.72 U**
205-99-2	BENZO[B]FLUORANTHENE	0.25	---	< 0.19 U	**< 0.94 U**	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	**< 4.9 U**	**< 1.8 U**	< 0.18 U	< 0.18 U	< 0.18 U	**< 0.72 U**
191-24-2	BENZO[G,H,I]PERYLENE	---	---	< 0.19 U	< 0.94 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 4.9 U	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.72 U
207-08-9	BENZO[K]FLUORANTHENE	2.5	---	< 0.19 U	< 0.94 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	**< 4.9 U**	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.72 U
85-68-7	BENZYL BUTYL PHTHALATE	16	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	< 0.95 U	< 0.96 U	< 26 U	< 9.5 U	< 0.95 U	< 0.96 U	< 0.96 U	< 3.8 U
92-52-4	BIPHENYL	0.83	---	**< 0.99 U**	**< 5 U**	**< 1.1 U**	**< 0.95 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 26 U**	**< 9.5 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 3.8 U**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	59	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	< 0.95 U	< 0.96 U	< 26 U	< 9.5 U	< 0.95 U	< 0.96 U	< 0.96 U	< 3.8 U
111-44-4	BIS(2-CHLOROETHYL) ETHER	0.014	---	**< 0.19 U**	**< 0.94 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 4.9 U**	**< 1.8 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.72 U**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.6	6	3.6	**< 9.9 U**	< 2.1 U	< 1.9 U	< 2 U	< 1.9 U	< 2 U	2.8	< 1.9 U	**< 52 U**	**< 19 U**	< 1.9 U	< 1.9 U	< 1.9 U	**< 7.6 U**
105-60-2	CAPROLACTAM	9,900	---	< 5 U	< 25 U	< 5.3 U	< 4.8 U	< 5.1 U	< 4.8 U	< 5.1 U	< 4.8 U	< 4.8 U	< 130 U	< 48 U	< 4.8 U	< 4.8 U	5.1	< 19 U
86-74-8	CARBAZOLE	---	---	< 0.19 U	< 0.94 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 4.9 U	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.72 U
218-01-9	CHRYSENE	25	---	< 0.19 U	< 0.94 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 4.9 U	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.72 U
53-70-3	DIBENZ[A,H]ANTHRACENE	0.025	---	**< 0.19 U**	**< 0.94 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 4.9 U**	**< 1.8 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.72 U**
132-64-9	DIBENZOFURAN	7.9	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	0.19 J	< 0.96 U	< 26 U	**< 9.5 U**	< 0.95 U	< 0.96 U	< 0.96 U	0.29 J
84-66-2	DIETHYL PHTHALATE	15,000	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	< 0.95 U	< 0.96 U	< 26 U	< 9.5 U	< 0.95 U	< 0.96 U	0.18 J	< 3.8 U
131-11-3	DIMETHYL PHTHALATE	---	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	< 0.95 U	< 0.96 U	< 26 U	< 9.5 U	< 0.95 U	< 0.96 U	< 0.96 U	< 3.8 U
84-74-2	DI-N-BUTYL PHTHALATE	900	---	0.56 J	< 5 U	0.4 J	< 0.95 U	0.23 J	0.15 J	< 1 U	0.59 J	< 0.96 U	< 26 U	< 9.5 U	0.12 J	< 0.96 U	0.18 J	< 3.8 U
117-84-0	DI-N-OCTYL PHTHALATE	200	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	< 0.95 U	< 0.96 U	< 26 U	< 9.5 U	< 0.95 U	< 0.96 U	< 0.96 U	< 3.8 U
206-44-0	FLUORANTHENE	800	---	< 0.19 U	< 0.94 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 4.9 U	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.72 U
86-73-7	FLUORENE	290	---	< 0.19 U	< 0.94 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	0.36	< 0.18 U	< 4.9 U	1.5 J	< 0.18 U	< 0.18 U	< 0.18 U	0.42 J
118-74-1	HEXACHLOROBENZENE	0.0098	1	**< 0.19 U**	**< 0.94 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 4.9 U**	**< 1.8 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.72 U**
87-68-3	HEXACHLOROBUTADIENE	0.14	---	**< 0.19 U**	**< 0.94 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 4.9 U**	**< 1.8 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.72 U**
77-47-4	HEXACHLOROCYCLOPENTADIENE	0.41	50	**< 0.99 U**	**< 5 U**	**< 1.1 U**	**< 0.95 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 26 U**	**< 9.5 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 3.8 U**
67-72-1	HEXACHLOROETHANE	0.33	---	**< 0.99 U**	**< 5 U**	**< 1.1 U**	**< 0.95 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 26 U**	**< 9.5 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 3.8 U**
193-39-5	INDENO[1,2,3-CD]PYRENE	0.25	---	< 0.19 U	**< 0.94 U**	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	**< 4.9 U**	**< 1.8 U**	< 0.18 U	< 0.18 U	< 0.18 U	**< 0.72 U**
78-59-1	ISOPHORONE	78	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	< 0.95 U	< 0.96 U	< 26 U	< 9.5 U	< 0.95 U	< 0.96 U	< 0.96 U	< 3.8 U
91-20-3	NAPHTHALENE	0.17	---	**< 0.19 U**	**< 0.94 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 4.9 U**	**< 1.8 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.72 U**
98-95-3	NITROBENZENE	0.14	---	**< 2 U**	**< 9.9 U**	**< 2.1 U**	**< 1.9 U**	**< 2 U**	**< 1.9 U**	**< 2 U**	**< 1.9 U**	**< 1.9 U**	**< 52 U**	**< 19 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 7.6 U**
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.011	---	**< 0.19 U**	**< 0.94 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 4.9 U**	**< 1.8 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.72 U**
86-30-6	N-NITROSODIPHENYLAMINE	12	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	< 0.95 U	< 0.96 U	< 26 U	< 9.5 U	< 0.95 U	< 0.96 U	< 0.96 U	< 3.8 U
87-86-5	PENTACHLOROPHENOL	0.041	1	**< 0.99 U**	**< 5 U**	**< 1.1 U**	**< 0.95 U**	**< 1 U**	**< 0.96 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**	**< 26 U**	**< 9.5 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 3.8 U**
85-01-8	PHENANTHRENE	---	---	< 0.19 U	< 0.94 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 4.9 U	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.72 U
108-95-2	PHENOL	5,800	---	< 0.99 U	< 5 U	< 1.1 U	< 0.95 U	< 1 U	< 0.96 U	< 1 U	< 0.95 U	< 0.96 U	< 26 U	< 9.5 U	< 0.95 U	< 0.96 U	< 0.96 U	< 3.8 U
129-00-0	PYRENE	120	---	< 0.19 U	< 0.94 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 4.9 U	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.72 U
VOLATILE ORGANIC COMPOUNDS in ug/L																		
71-55-6	1,1,1-TRICHLOROETHANE	8,000	200	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 10 U	< 1 U	< 1 U	< 1 U	< 5 U
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.076		**< 1 U**	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10,000		< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 10 U	< 1 U	< 1 U	< 1 U	< 5 U
79-00-5	1,1,2-TRICHLOROETHANE	0.28	5	**< 1 U**	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**
75-34-3	1,1-DICHLOROETHANE	2.8	---	< 1 U	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 50 U**	**< 10 U**	< 1 U	< 1 U	< 1 U	**< 5 U**
75-35-4	1,1-DICHLOROETHYLENE	280	7	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 10 U	< 1 U	< 1 U	< 1 U	< 5 U
120-82-1	1,2,4-TRICHLOROBENZENE	1.2	70	< 1 U	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	1.4	1.6	0.74 J	**< 50 U**	**< 10 U**	0.99 J	0.5 J	< 1 U	**< 5 U**
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	0.00033	0.2	**< 1 U**	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**

Table 5-19
April-May 2017 (3rd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI) Remedial Investigation
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-I-55 5/8/2017 MWI-55-050817	MW-J-71 5/8/2017 MWJ-71-050817	MW-K-80 5/4/2017 MWK-80-050417	MW-K-440 5/8/2017 MWK-440-050817	MW-L-48 5/4/2017 MWL-48-050417	MW-L-250 5/9/2017 MWL-250-050917	MW-M-50 5/9/2017 MWM-50-050917	MW-N-83 5/9/2017 MWN-83-050917	MW-N-113 5/9/2017 MWN-113-050917	MW-O-145 5/8/2017 MWO-145-050817	MW-P-235 5/8/2017 MWP-235-050817	MW-Q-150 5/9/2017 MWQ-150-050917	MW-R-330 5/4/2017 MWR-330-050417	MW-R-600 5/4/2017 MWR-600-050417	EW-1-110 5/10/2017 EW1-110-051017
106-93-4	1,2-DIBROMOETHANE	0.0075	0.05	**< 1 U**	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**
95-50-1	1,2-DICHLOROBENZENE	300	600	2	58	1.5	< 1 U	< 1 U	< 1 U	1.1	3.1	3	28 J	32	2.4	5.1	< 1 U	5.8
107-06-2	1,2-DICHLOROETHANE	0.17	5	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	**0.46 J**	< 1 U	**0.41 J**	< 50 U	< 10 U	**0.3 J**	**5.2**	**1.4**	< 5 U
78-87-5	1,2-DICHLOROPROPANE	0.85	5	**< 1 U**	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**
541-73-1	1,3-DICHLOROBENZENE	---	---	0.27 J	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.56 J	0.28 J	< 50 U	2.4 J	0.34 J	0.59 J	< 1 U	< 5 U
106-46-7	1,4-DICHLOROBENZENE	0.48	75	**5.9**	**61**	**1.5**	**< 1 U**	**< 1 U**	**< 1 U**	**2.5**	**9.6**	**5.5**	**20 J**	**68**	**6.8**	**12**	0.41 J	**16**
78-93-3	2-BUTANONE	5,600	---	< 5 U	< 130 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 250 U	< 50 U	< 5 U	< 5 U	< 5 U	< 25 U
591-78-6	2-HEXANONE	38	---	< 5 U	< 130 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 250 U	< 50 U	< 5 U	< 5 U	< 5 U	< 25 U
108-10-1	4-METHYL-2-PENTANONE	6,300	---	< 5 U	< 130 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 250 U	< 50 U	< 5 U	< 5 U	< 5 U	< 25 U
67-64-1	ACETONE	14,000	---	4.5 J	< 130 U	< 5 U	< 5 U	< 5 U	< 5 U	5.5	8.1	3.4 J	< 250 U	< 50 U	15	< 5 U	< 5 U	< 25 U
71-43-2	BENZENE	0.46	5	**< 1 U**	**19 J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	0.22 J	**1.1**	**0.83 J**	**43 J**	**14**	**0.85 J**	**< 1 U**	**< 1 U**	**< 5 U**
75-27-4	BROMODICHLOROMETHANE	0.13	80	**< 1 U**	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**
75-25-2	BROMOFORM	3.3	80	< 1 U	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 50 U**	**< 10 U**	< 1 U	< 1 U	< 1 U	**< 5 U**
74-83-9	BROMOMETHANE	7.5	---	< 1 U	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 50 U**	**< 10 U**	< 1 U	< 1 U	< 1 U	< 5 U
75-15-0	CARBON DISULFIDE	810	---	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 10 U	< 1 U	< 1 U	< 1 U	< 5 U
56-23-5	CARBON TETRACHLORIDE	0.46	5	**< 1 U**	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**
108-90-7	CHLOROBENZENE	78	100	15	**520**	7.1	< 1 U	< 1 U	< 1 U	8.7	45	39	**470**	**320**	38	49	< 1 U	65
75-00-3	CHLOROETHANE	21,000	---	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 10 U	< 1 U	< 1 U	< 1 U	< 5 U
67-66-3	CHLOROFORM	0.22	80	**0.28 J**	**< 25 U**	**< 1 U**	**0.39 J**	**3.1**	**0.62 J**	**2.1**	**< 1 U**	**< 1 U**	**< 50 U**	**< 10 U**	**< 1 U**	**< 1 U**	**0.4 J**	**< 5 U**
74-87-3	CHLOROMETHANE	190	---	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 10 U	< 1 U	< 1 U	< 1 U	< 5 U
156-59-2	CIS-1,2-DICHLOROETHENE	36	70	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 50 U**	< 10 U	< 1 U	0.52 J	< 1 U	< 5 U
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	---	---	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 10 U	< 1 U	< 1 U	< 1 U	< 5 U
110-82-7	CYCLOHEXANE	13,000	---	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 10 U	< 1 U	< 1 U	< 1 U	< 5 U
124-48-1	DIBROMOCHLOROMETHANE	0.87	---	**< 1 U**	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**
75-71-8	DICHLORODIFLUOROMETHANE	200	---	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 10 U	< 1 U	< 1 U	< 1 U	< 5 U
100-41-4	ETHYLBENZENE	1.5	700	< 1 U	**< 25 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.29 J	< 1 U	**< 50 U**	**< 10 U**	< 1 U	< 1 U	< 1 U	**< 5 U**
98-82-8	ISOPROPYLBENZENE (CUMENE)	450	---	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.7	< 1 U	< 50 U	< 10 U	0.55 J	< 1 U	< 1 U	< 5 U
79-20-9	METHYL ACETATE	20,000	---	< 5 U	< 130 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 250 U	< 50 U	< 5 U	< 5 U	< 5 U	< 25 U
1634-04-4	METHYL TERT-BUTYL ETHER	14	---	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.2 J	< 1 U	< 50 U	< 10 U	< 1 U	0.87 J	< 1 U	< 5 U
108-87-2	METHYLCYLOHEXANE	---	---	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.3 J	< 1 U	< 50 U	< 10 U	< 1 U	< 1 U	< 1 U	< 5 U
75-09-2	METHYLENE CHLORIDE	11	5	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 10 U	< 1 U	< 1 U	< 1 U	< 5 U
100-42-5	STYRENE (MONOMER)	1,200	100	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 10 U	< 1 U	< 1 U	< 1 U	< 5 U
127-18-4	TETRACHLOROETHYLENE	11	5	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 10 U	< 1 U	< 1 U	< 1 U	< 5 U
108-88-3	TOLUENE	1,100	1,000	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	0.17 J	< 1 U	< 1 U	< 1 U	< 50 U	< 10 U	< 1 U	< 1 U	< 1 U	< 5 U
156-60-5	TRANS-1,2-DICHLOROETHENE	360	100	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 10 U	< 1 U	< 1 U	< 1 U	< 5 U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	---	---	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 10 U	< 1 U	< 1 U	< 1 U	< 5 U
79-01-6	TRICHLOROETHYLENE	0.49	5	**< 1 U**	**< 25 U**	**< 1 U**	**0.76 J**	**< 1 U**	0.26 J	**< 1 U**	0.2 J	0.27 J	**< 50 U**	**< 10 U**	**< 1 U**	**0.53 J**	0.35 J	**< 5 U**
75-69-4	TRICHLOROFLUOROMETHANE	5,200	---	< 1 U	< 25 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 50 U	< 10 U	< 1 U	< 1 U	< 1 U	< 5 U
75-01-4	VINYL CHLORIDE	0.019	2	**< 1 U**	**< 25 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 50 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**
XYLENES	Xylenes, Total	190	10000	< 2 U	< 50 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 100 U	< 20 U	< 2 U	< 2 U	< 2 U	< 10 U

Notes:
USEPA RSL for TAP WATER (latest version, November 2017)
USEPA MCL (latest version, November 2017)
(1) No RSL exists, MCL utilized.
B - Parameter was detected in associated laboratory method blank.
J - Result is either less than the RL but greater than or equal to the method detection limit (MDL). Concen
U - Compound not detected above specified reporting limit.
p - Sample results on the front and rear chromatography column exhibited imprecision greater than 40%. T
Bold indicates the reporting limit was above the RSL and/or MCL.
Red bolded detected concentration exceeds RSL
Red bolded and highlighted detected concentration exceeds MCL

Table 5-19
April-May 2017 (3rd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI) Remedial Investigation
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	OW-1-62 4/24/2017 OW1-62-042417	OW-1-105 4/24/2017 OW1-105-042417	OW-2-65 4/26/2017 OW2-65-042617	OW-2-115 4/26/2017 OW2-115-042617	OW-3-55 4/25/2017 OW3-55-042517	OW-3-105 4/25/2017 OW3-105-042517	OW-4-70 4/27/2017 OW4-70-042717	OW-5-90 4/27/2017 OW5-90-042717	OW-7-242 4/25/2017 OW7-242-042517	OW-7-410 4/25/2017 OW7-410-042517	OW-7-410 4/25/2017 DUP-042517	OW-8-230 4/24/2017 OW8-230-042417	OW-9-125 4/26/2017 OW9-125-042617
TOTAL METALS in ug/L																
7429-90-5	ALUMINUM	20,000	---	50	210	270	550	55	150	27 J	300	24 J	< 30 U	< 30 U	25 J	37
7440-36-0	ANTIMONY	7.8	6	0.83 J	0.67 J	1.8 J	3.9	1.4 J	1.1 J	0.71 J	< 2 U	1 J	1.1 J	1.1 J	0.69 J	1.5 J
7440-38-2	ARSENIC	0.052	10	**0.42 J**	**0.35 J**	**0.41 J**	**1.2**	**0.28 J**	**0.95 J**	**0.31 J**	**0.27 J**	**3.7**	**0.3 J**	**0.28 J**	**0.31 J**	**0.31 J**
7440-39-3	BARIUM	3,800	2,000	97	120	47	31	90	120	28	54	57	33	31	24	88
7440-41-7	BERYLLIUM	25	4	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.67 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-43-9	CADMIUM	9.2	5	0.19 J	< 1 U	< 1 U	0.18 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-70-2	CALCIUM METAL	---	---	190000 B	150000 B	180000 B	260000 B	130000 B	83000 B	230000	220000	110000	290000 B	290000	420000 B	140000 B
7440-47-3	CHROMIUM[1]	---	100	0.72 J	1.2 J	0.78 J	1.9 J	0.69 J B	1.5 J B	< 2 U	0.83 J	< 2 U	< 2 U	< 2 U	< 2 U	0.65 J
7440-48-4	COBALT	6	---	0.33 J B	0.22 J B	0.13 J	**9.9**	< 0.5 U	0.39 J	0.3 J	0.19 J	< 0.5 U	< 0.5 U	< 0.5 U	0.41 J B	0.29 J
7440-50-8	COPPER	800	1,300	9.9	12	1.5 J	7.3	5.9	5.6	1.2 J	1.2 J	4.1	5.4	5.1	15	< 2 U
7439-89-6	IRON	14,000	---	99	200	360 B	17000 B	120	980	< 50 U	63	1100	96	71	81	39 J B
7439-92-1	LEAD	15	15	< 1 U	0.41 J	0.94 J	**170**	< 1 U	0.61 J	5.7	6.2	< 1 U	< 1 U	< 1 U	< 1 U	3.2
7439-95-4	MAGNESIUM	---	---	15000 B	15000 B	19000 B	21000 B	13000 B	13000 B	36000	23000	42000 B	55000 B	54000 B	61000 B	17000 B
7439-96-5	MANGANESE	430	---	1.6 J	9	11	**3400**	4.5 J B	150 B	62	84	34	4.6 J B	4.6 J B	360	< 5 U
7440-02-0	NICKEL	390	---	0.73 J B	0.68 J B	1.3	8.6	0.32 J	1.3	2	1.1	0.34 J	0.54 J	0.52 J	1.9 B	0.72 J
7440-09-7	POTASSIUM	---	---	3100	2000	2700	5200	2500	1700	27000	19000	22000	4200	4100	2300	1900
7782-49-2	SELENIUM	100	50	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
7440-22-4	SILVER	94		< 1 U	< 1 U	< 1 U	0.2 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
7440-23-5	SODIUM	---	---	100000	46000	70000 B	91000 B	34000	230000	48000	55000	76000	15000	15000	39000	50000 B
7440-28-0	THALLIUM	0.2	2	0.14 J	**< 1 U**	**< 1 U**	**0.24 J**	**< 1 U**	**< 1 U**	**0.38 J**	0.14 J	**< 1 U**	**< 1 U**	**< 1 U**	0.19 J	**< 1 U**
7440-62-2	VANADIUM	86	---	0.73 J	0.71 J	1.6	3.4	0.68 J	1.4	< 1 U	0.55 J	0.83 J	0.69 J	0.77 J	0.6 J	1.2
7440-66-6	ZINC	6,000	---	12	27	11	75	< 5 U	32	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	2.9 J	7.4
57-12-5	CYANIDE	1.5	200	**< 10 U**	**< 10 U**	**< 10 U**	**2.1 J**	**< 10 U**	**4.4 J**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**
7439-97-6	MERCURY	0.63	2	< 0.2 U	< 0.2 U	0.075 J	0.067 J	< 0.2 U	< 0.2 U	0.077 J	< 0.2 U	< 0.2 U	0.2	0.19 J	< 0.2 U	0.065 J
INORGANIC PROPERTIES in mg/L																
16887-00-6	CHLORIDE	---	---	190	110	100	170	74	330	100	18	21	53	53	93	100
14797-55-8	NITRATE AS N	32	10	3.9	3.2	1.3	0.062 J	3.7	0.23	9.3	6.4	< 0.1 U	**11**	**11**	< 0.25 U	2.6
14808-79-8	SULFATE	---	---	38	36	150	500	39	20	350	170	190	580	570	910	93
ALKB	BICARBONATE ALKALINITY	---	---	500	400	580	520	410	310	420	490	460	420	440	420	480
ALKC	CARBONATE ALKALINITY	---	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	---	500	400	580	520	410	310	420	490	460	420	440	420	480
PESTICIDES in ug/L																
957-51-7	DIPHENAMID	530	---	< 1.1 U	< 0.95 U	< 1 U	17	< 0.98 U	< 0.94 U	< 0.95 U	1 J	2.7	23	17	< 0.95 U	< 0.96 U
53-19-0	2,4'-DDD	0.032	---	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	**< 0.062 U**	< 0.025 U	< 0.0012 U
3424-82-6	2,4'-DDE	0.046	---	< 0.0013 U	0.0032	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	**0.1**	0.022	< 0.0012 U	**0.073 p**	**0.074 p**	< 0.025 U	0.0016 p
789-02-6	2,4'-DDT	0.23	---	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.0069	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.062 U	< 0.025 U	< 0.0012 U
72-54-8	4,4'-DDD	0.032	---	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.00077 J p	< 0.0012 U	**< 0.062 U**	< 0.025 U	< 0.0012 U
72-55-9	4,4'-DDE	0.046	---	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	**< 0.062 U**	< 0.025 U	< 0.0012 U
50-29-3	4,4'-DDT	0.23	---	0.00048 J	0.00071 J	0.00056 J p	0.052	0.00036 J	0.0014	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.062 U	< 0.025 U	< 0.0012 U
309-00-2	ALDRIN	0.00092	---	**< 0.0013 U**	**< 0.0013 U**	**< 0.0013 U**	**< 0.025 U**	**< 0.0013 U**	**< 0.0013 U**	**0.021 p**	**< 0.0013 U**	**< 0.0012 U**	**0.022 p**	**0.026 Jp**	**0.071 p**	**< 0.0012 U**
319-84-6	ALPHA-BHC	0.0072	---	< 0.0013 U	0.0052	0.004	**0.014**	< 0.0013 U	< 0.0013 U	**1.1**	**0.29 p**	**0.17**	**3**	**3.5**	**0.047**	**0.01**
5103-71-9	ALPHA-CHLORDANE	0.02	2	< 0.0013 U	< 0.0013 U	0.0024	0.00092 J p	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	**< 0.062 U**	**< 0.025 U**	< 0.0012 U
319-85-7	BETA-BHC	0.025	---	< 0.0013 U	0.016	0.025	**0.083**	< 0.0013 U	< 0.0013 U	**2.8**	**1.1**	**0.66**	**2.4**	**2.6**	**0.19**	**0.17**
319-86-8	DELTA-BHC	0.025	---	< 0.0013 U	0.0019	**0.085**	**1.7**	< 0.0013 U	0.0011 J	**0.59**	**0.54**	**0.52**	**3.6**	**3.9**	**2.5**	**0.062**
60-57-1	DIELDRIN	0.0018	---	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	**0.13**	**0.018**	**< 0.0012 U**	**0.022 J p**	**< 0.062 U**	**< 0.025 U**	0.0015
959-98-8	ENDOSULFAN I	100	---	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.062 U	< 0.025 U	< 0.0012 U
33213-65-9	ENDOSULFAN II	100	---	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.062 U	< 0.025 U	< 0.0012 U
1031-07-8	ENDOSULFAN SULFATE	---	---	< 0.0013 U	< 0.0013 U	0.0015 p	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	**< 0.062 U**	< 0.025 U	< 0.0012 U
72-20-8	ENDRIN	2.3	2	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.033	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.062 U	< 0.025 U	< 0.0012 U
7421-93-4	ENDRIN ALDEHYDE	---	---	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	**< 0.062 U**	< 0.025 U	< 0.0012 U
53494-70-5	ENDRIN KETONE	---	---	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.086	0.02	< 0.0012 U	< 0.0012 U	< 0.062 U	< 0.025 U	< 0.0012 U
58-89-9	GAMMA-BHC (LINDANE)	0.042	0.2	< 0.0013 U	0.0025	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	**0.48**	**0.28**	**0.051**	**1.2**	**1.4**	< 0.025 U	0.0035 p
12789-03-6	gamma-Chlordane	0.02	2	< 0.0013 U	< 0.0013 U	0.0047	0.00099 J	0.00056 J	< 0.0013 U	< 0.0013 U	0.0035	< 0.0012 U	0.013	**< 0.062 U**	< 0.025 U	0.0013
76-44-8	HEPTACHLOR	0.0014	0.4	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	**0.065 p**	< 0.0012 U	< 0.0012 U	**< 0.062 U**	**< 0.025 U**	< 0.0012 U
1024-57-3	HEPTACHLOR EPOXIDE	0.0014	0.2	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	**< 0.062 U**	**< 0.025 U**	< 0.0012 U
72-43-5	METHOXYCHLOR	37	40	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.062 U	< 0.025 U	< 0.0012 U
8001-35-2	TOXAPHENE	0.071	3	< 0.098 U	< 0.098 U	< 0.097 U	< 0.096 U	< 0.1 U	< 0.097 U	< 0.098 U	< 0.1 U	< 0.095 U	< 0.095 U	< 4.8 U	< 1.9 U	< 0.094 U
HERBICIDES in ug/L																
94-75-7	2,4-D	170	70	< 3.9 U	< 3.9 U	< 3.8 U	< 4 U	< 3.9 U	< 3.8 U	< 3.9 U	< 3.9 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 4 U
93-76-5	2,4,5-T	160	---	< 0.97 U	< 0.98 U	< 0.96 U	< 0.99 U	< 0.98 U	< 0.96 U	< 0.97 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.99 U
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L																
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	710	---	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
95-95-4	2,4,5-TRICHLOROPHENOL	1,200	---	< 1.1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
88-06-2	2,4,6-TRICHLOROPHENOL	4.1	---	< 1.1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
120-83-2	2,4-DICHLOROPHENOL	46	---	< 0.2 U	< 0.18 U	< 0.19 U	0.041 J	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
105-67-9	2,4-DIMETHYLPHENOL	360	---	< 1.1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
51-28-5	2,4-DINITROPHENOL	39	---	< 5.3 U	< 4.8 U	< 5.1 U	< 4.7 U	< 4.9 U	< 4.7 U	< 4.8 U	< 5.2 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U

Table 5-19
April-May 2017 (3rd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI) Remedial Investigation
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	OW-1-62 4/24/2017 OW1-62-042417	OW-1-105 4/24/2017 OW1-105-042417	OW-2-65 4/26/2017 OW2-65-042617	OW-2-115 4/26/2017 OW2-115-042617	OW-3-55 4/25/2017 OW3-55-042517	OW-3-105 4/25/2017 OW3-105-042517	OW-4-70 4/27/2017 OW4-70-042717	OW-5-90 4/27/2017 OW5-90-042717	OW-7-242 4/25/2017 OW7-242-042517	OW-7-410 4/25/2017 OW7-410-042517	OW-7-410 4/25/2017 DUP-042517	OW-8-230 4/24/2017 OW8-230-042417	OW-9-125 4/26/2017 OW9-125-042617
121-14-2	2,4-DINITROTOLUENE	0.24	---	**< 1.1 U**	**< 0.95 U**	**< 1 U**	**< 0.94 U**	**< 0.98 U**	**< 0.94 U**	**< 0.95 U**	**< 1 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**
606-20-2	2,6-DINITROTOLUENE	0.049	---	**< 1.1 U**	**< 0.95 U**	**< 1 U**	**< 0.94 U**	**< 0.98 U**	**< 0.94 U**	**< 0.95 U**	**< 1 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**
91-58-7	2-CHLORONAPHTHALENE	750	---	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
95-57-8	2-CHLOROPHENOL	91	---	< 1.1 U	< 0.95 U	< 1 U	0.22 J	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
95-48-7	2-METHLYPHENOL	930	---	< 1.1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
91-57-6	2-METHYLNAPHTHALENE	36	---	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
88-74-4	2-NITROANILINE	190	---	< 5.3 U	< 4.8 U	< 5.1 U	< 4.7 U	< 4.9 U	< 4.7 U	< 4.8 U	< 5.2 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U
88-75-5	2-NITROPHENOL	---	---	< 1.1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
91-94-1	3,3`-DICHLOROBENZIDINE	0.13	---	**< 1.1 U**	**< 0.95 U**	**< 1 U**	**< 0.94 U**	**< 0.98 U**	**< 0.94 U**	**< 0.95 U**	**< 1 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**
99-09-2	3-NITROANILINE	---	---	< 5.3 U	< 4.8 U	< 5.1 U	< 4.7 U	< 4.9 U	< 4.7 U	< 4.8 U	< 5.2 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	1.5	---	**< 5.3 U**	**< 4.8 U**	**< 5.1 U**	**< 4.7 U**	**< 4.9 U**	**< 4.7 U**	**< 4.8 U**	**< 5.2 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**
101-55-3	4-BROMOPHENYL PHENYL ETHER	---	---	< 1.1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
59-50-7	4-CHLORO-3-METHYLPHENOL	1,400	---	< 1.1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
106-47-8	4-CHLOROANILINE	0.37	---	**< 1.1 U**	**< 0.95 U**	**< 1 U**	**< 0.94 U**	**< 0.98 U**	**< 0.94 U**	**< 0.95 U**	**< 1 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	---	---	< 1.1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
106-44-5	4-METHLYPHENOL	1,900	---	< 1.1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
100-01-6	4-NITROANILINE	3.8	---	**< 5.3 U**	**< 4.8 U**	**< 5.1 U**	**< 4.7 U**	**< 4.9 U**	**< 4.7 U**	**< 4.8 U**	**< 5.2 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**
100-02-7	4-NITROPHENOL	---	---	< 5.3 U	< 4.8 U	< 5.1 U	< 4.7 U	< 4.9 U	< 4.7 U	< 4.8 U	< 5.2 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U
83-32-9	ACENAPHTHENE	530	---	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
208-96-8	ACENAPHTHYLENE	---	---	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
98-86-2	ACETOPHENONE	1,900	---	< 1.1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
120-12-7	ANTHRACENE	1,800	---	< 0.2 U	< 0.18 U	< 0.19 U	0.06 J	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
1912-24-9	ATRAZINE	0.3	3	**< 1.1 U**	**< 0.95 U**	**< 1 U**	**< 0.94 U**	**< 0.98 U**	**< 0.94 U**	**1**	0.27 J	**1.1**	**1.4**	**1.4**	**< 0.95 U**	**< 0.96 U**
100-52-7	BENZALDEHYDE	19	---	< 1.1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
56-55-3	BENZO[A]ANTHRACENE	0.03	---	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**0.34**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**
50-32-8	BENZO[A]PYRENE	0.025	0.2	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**0.42**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**
205-99-2	BENZO[B]FLUORANTHENE	0.25	---	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
191-24-2	BENZO[G,H,I]PERYLENE	---	---	< 0.2 U	< 0.18 U	< 0.19 U	0.92	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
207-08-9	BENZO[K]FLUORANTHENE	2.5	---	< 0.2 U	< 0.18 U	< 0.19 U	**0.86**	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
85-68-7	BENZYL BUTYL PHTHALATE	16	---	< 1.1 U	< 0.95 U	< 1 U	0.23 J	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
92-52-4	BIPHENYL	0.83	---	**< 1.1 U**	**< 0.95 U**	**< 1 U**	**< 0.94 U**	**< 0.98 U**	**< 0.94 U**	**< 0.95 U**	**< 1 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	59	---	< 1.1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
111-44-4	BIS(2-CHLOROETHYL) ETHER	0.014	---	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.6	6	< 2.1 U	< 1.9 U	< 2 U	< 1.9 U	1.2 J	< 1.9 U	< 1.9 U	<2.1 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U
105-60-2	CAPROLACTAM	9,900	---	170	25	15	2.8 J	36	35	< 4.8 U	< 5.2 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U
86-74-8	CARBAZOLE	---	---	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
218-01-9	CHRYSENE	25	---	< 0.2 U	< 0.18 U	0.054 J	1.1	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
53-70-3	DIBENZ[A,H]ANTHRACENE	0.025	---	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**0.62**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**
132-64-9	DIBENZOFURAN	7.9	---	< 1.1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
84-66-2	DIETHYL PHTHALATE	15,000	---	0.16 J	< 0.95 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	0.14 J	0.68 J	0.68 J	< 0.95 U	0.16 J
131-11-3	DIMETHYL PHTHALATE	---	---	< 1.1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
84-74-2	DI-N-BUTYL PHTHALATE	900	---	0.13 J	< 0.95 U	< 1 U	0.13 J	< 0.98 U	< 0.94 U	0.12 J	0.13 J	0.3 J	< 0.95 U	< 0.95 U	0.21 J	0.14 J
117-84-0	DI-N-OCTYL PHTHALATE	200	---	< 1.1 U	< 0.95 U	< 1 U	0.3 J	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
206-44-0	FLUORANTHENE	800	---	< 0.2 U	< 0.18 U	< 0.19 U	1.2	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
86-73-7	FLUORENE	290	---	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
118-74-1	HEXACHLOROBENZENE	0.0098	1	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**
87-68-3	HEXACHLOROBUTADIENE	0.14	---	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**
77-47-4	HEXACHLOROCYCLOPENTADIENE	0.41	50	**< 1.1 U**	**< 0.95 U**	**< 1 U**	**< 0.94 U**	**< 0.98 U**	**< 0.94 U**	**< 0.95 U**	**< 1 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**
67-72-1	HEXACHLOROETHANE	0.33	---	**< 1.1 U**	**< 0.95 U**	**< 1 U**	**< 0.94 U**	**< 0.98 U**	**< 0.94 U**	**< 0.95 U**	**< 1 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**
193-39-5	INDENO[1,2,3-CD]PYRENE	0.25	---	< 0.2 U	< 0.18 U	< 0.19 U	**0.89**	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
78-59-1	ISOPHORONE	78	---	< 1.1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
91-20-3	NAPHTHALENE	0.17	---	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**
98-95-3	NITROBENZENE	0.14	---	**< 2.1 U**	**< 1.9 U**	**< 2 U**	**< 1.9 U**	**< 2 U**	**< 1.9 U**	**< 1.9 U**	**<2.1 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.011	---	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**
86-30-6	N-NITROSODIPHENYLAMINE	12	---	< 1.1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
87-86-5	PENTACHLOROPHENOL	0.041	1	**< 1.1 U**	**< 0.95 U**	**< 1 U**	**< 0.94 U**	**< 0.98 U**	**< 0.94 U**	**< 0.95 U**	**< 1 U**	**< 0.96 U**	**3.2**	**2.6**	**< 0.95 U**	**< 0.96 U**
85-01-8	PHENANTHRENE	---	---	< 0.2 U	< 0.18 U	< 0.19 U	0.42	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
108-95-2	PHENOL	5,800	---	< 1.1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 0.95 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U
129-00-0	PYRENE	120	---	< 0.2 U	< 0.18 U	< 0.19 U	0.98	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
VOLATILE ORGANIC COMPOUNDS in ug/L																
71-55-6	1,1,1-TRICHLOROETHANE	8,000	200	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.076		**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 1 U**	**< 1 U**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10,000		< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
79-00-5	1,1,2-TRICHLOROETHANE	0.28	5	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 1 U**	**< 1 U**
75-34-3	1,1-DICHLOROETHANE	2.8	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.4 J	0.41 J	< 1 U	< 1 U
75-35-4	1,1-DICHLOROETHYLENE	280	7	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
120-82-1	1,2,4-TRICHLOROBENZENE	1.2	70	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	0.00033	0.2	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 1 U**	**< 1 U**

Table 5-19
April-May 2017 (3rd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI) Remedial Investigation
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	OW-1-62 4/24/2017 OW1-62-042417	OW-1-105 4/24/2017 OW1-105-042417	OW-2-65 4/26/2017 OW2-65-042617	OW-2-115 4/26/2017 OW2-115-042617	OW-3-55 4/25/2017 OW3-55-042517	OW-3-105 4/25/2017 OW3-105-042517	OW-4-70 4/27/2017 OW4-70-042717	OW-5-90 4/27/2017 OW5-90-042717	OW-7-242 4/25/2017 OW7-242-042517	OW-7-410 4/25/2017 OW7-410-042517	OW-7-410 4/25/2017 DUP-042517	OW-8-230 4/24/2017 OW8-230-042417	OW-9-125 4/26/2017 OW9-125-042617
106-93-4	1,2-DIBROMOETHANE	0.0075	0.05	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 1 U**	**< 1 U**
95-50-1	1,2-DICHLOROBENZENE	300	600	< 1 U	< 1 U	< 1 U	2,6	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	4.4	4.6	4.8	< 1 U
107-06-2	1,2-DICHLOROETHANE	0.17	5	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.64 J	< 1 U	0.62 J	7.8	8	0.4 J	< 1 U
78-87-5	1,2-DICHLOROPROPANE	0.85	5	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**0.5 J**	**0.58 J**	**< 1 U**	**< 1 U**
541-73-1	1,3-DICHLOROBENZENE	---	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.32 J	0.35 J	0.28 J	< 1 U
106-46-7	1,4-DICHLOROBENZENE	0.48	75	**< 1 U**	**< 1 U**	**< 1 U**	**3.1**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**9.9**	**10**	**5.6**	**< 1 U**
78-93-3	2-BUTANONE	5,600	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 5 U	< 5 U	< 5 U	< 10 U	< 5 U	< 5 U
591-78-6	2-HEXANONE	38	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 10 U	< 5 U	< 5 U
108-10-1	4-METHYL-2-PENTANONE	6,300	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 10 U	< 5 U	< 5 U
67-64-1	ACETONE	14,000	---	4.1 J	< 5 U	3.9 J	18	< 5 U	< 5 U	3.3 J	< 5 U	< 5 U	3.8 J	< 10 U	< 5 U	< 5 U
71-43-2	BENZENE	0.46	5	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 1 U**	**< 1 U**
75-27-4	BROMODICHLOROMETHANE	0.13	80	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 1 U**	**< 1 U**
75-25-2	BROMOFORM	3.3	80	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
74-83-9	BROMOMETHANE	7.5	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
75-15-0	CARBON DISULFIDE	810	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
56-23-5	CARBON TETRACHLORIDE	0.46	5	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 1 U**	**< 1 U**
108-90-7	CHLOROBENZENE	78	100	< 1 U	< 1 U	< 1 U	48	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	50	52 E	110	< 1 U
75-00-3	CHLOROETHANE	21,000	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
67-66-3	CHLOROFORM	0.22	80	**< 1 U**	0.27 J	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	0.27 J	**< 1 U**	0.62 J	0.68 J	**< 1 U**	1
74-87-3	CHLOROMETHANE	190	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
156-59-2	CIS-1,2-DICHLOROETHENE	36	70	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	---	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
110-82-7	CYCLOHEXANE	13,000	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
124-48-1	DIBROMOCHLOROMETHANE	0.87	---	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 1 U**	**< 1 U**
75-71-8	DICHLORODIFLUOROMETHANE	200	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
100-41-4	ETHYLBENZENE	1.5	700	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
98-82-8	ISOPROPYLBENZENE (CUMENE)	450	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
79-20-9	METHYL ACETATE	20,000	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 10 U	< 5 U	< 5 U
1634-04-4	METHYL TERT-BUTYL ETHER	14	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.44 J	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
108-87-2	METHYLCYLOHEXANE	---	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
75-09-2	METHYLENE CHLORIDE	11	5	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
100-42-5	STYRENE (MONOMER)	1,200	100	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
127-18-4	TETRACHLOROETHYLENE	11	5	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
108-88-3	TOLUENE	1,100	1,000	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.48 J	0.52 J	< 1 U	< 1 U
156-60-5	TRANS-1,2-DICHLOROETHENE	360	100	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	---	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
79-01-6	TRICHLOROETHYLENE	0.49	5	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	0.87 J	0.98 J	**< 1 U**	**< 1 U**
75-69-4	TRICHLOROFLUOROMETHANE	5,200	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 2 U	< 1 U	< 1 U
75-01-4	VINYL CHLORIDE	0.019	2	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 2 U**	**< 1 U**	**< 1 U**
XYLENES	Xylenes, Total	190	10000	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 4 U	< 2 U	< 2 U

Notes:
USEPA RSL for TAP WATER (latest version, November 2017)
USEPA MCL (latest version, November 2017)
(1) No RSL exists, MCL utilized.
B - Parameter was detected in associated laboratory method blank.
J - Result is either less than the RL but greater than or equal to the method detection limit (MDL). Concen
U - Compound not detected above specified reporting limit.
p - Sample results on the front and rear chromatography column exhibited imprecision greater than 40%. T
Bold indicates the reporting limit was above the RSL and/or MCL.
Red bolded detected concentration exceeds RSL
Red bolded and highlighted detected concentration exceeds MCL

Table 5-19
April-May 2017 (3rd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI) Remedial Investigation
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	OW-10-250 4/26/2017 OW10-250-042617	OW-11-240 5/1/2017 OW11-240-050117	OW-11-600 5/1/2017 OW11-600-050117	OW-12-232 4/27/2017 OW12-232-042717	OW-13-250 4/27/2017 OW13-250-042717	OW-14-96 4/28/2017 OW14-96-042817	OW-14-235 4/26/2017 OW14-235-042617	OW-15-202 4/26/2017 OW15-202-042617	OW-16-448 4/27/2017 OW16-448-042717	OW-17-600 5/2/2017 OW17-600-050217	OW-18-597 5/2/2017 OW18-597-050217	OW-19-450 4/24/2017 OW19-450-042417	OW-19-450 4/24/2017 DUP-042417	FHCC Well 5/4/2017 FHCC WELL-050417
TOTAL METALS in ug/L																	
7429-90-5	ALUMINUM	20,000	---	< 30 U	18 J	< 30 U	780	190	630	43	100	< 30 U	< 30 U	< 30 U	< 30 U	16 J	< 30 U
7440-36-0	ANTIMONY	7.8	6	2.5	< 2 U	< 2 U	< 2 U	< 2 U	0.62 J	1.6 J	4.2	< 2 U	0.68 J	< 2 U	1.9 J	1 J	0.65 J
7440-38-2	ARSENIC	0.052	10	**0.41 J**	**0.86 J**	**0.26 J**	**1.7**	**< 1 U**	**0.8 J**	**0.28 J**	**0.28 J**	**0.25 J**	**0.29 J**	**0.34 J**	**0.37 J**	**0.28 J**	**0.28 J**
7440-39-3	BARIUM	3,800	2,000	90	110	110	64	150	130	120	140	110	140	17	130	120	60
7440-41-7	BERYLLIUM	25	4	0.15 J	< 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 U
7440-43-9	CADMIUM	9.2	5	0.2 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.11 J	< 1 U	< 1 U	< 1 U	0.17 J	< 1 U	< 1 U
7440-70-2	CALCIUM METAL	---	---	110000 B F 1	130000	120000	97000	94000	130000 B	110000 B	98000	130000	100000	190000	110000 B	110000 B	140000
7440-47-3	CHROMIUM[1]	---	100	2.6	< 2 U	< 2 U	0.47 J	1 J	1.5 J	0.62	0.73 J	0.9 J	< 2 U	< 2 U	0.99 J	0.64 J	< 2 U
7440-48-4	COBALT	6	---	0.18 J	1.3	< 0.5 U	0.13 J	< 0.5 U	0.13 J B	< 0.5 U	0.98	0.1 J	< 0.5 U	< 0.5 U	1.4 B	0.5 B	< 0.5 U
7440-50-8	COPPER	800	1,300	1.1 J	< 2 U	< 2 U	3.2	1.1 J	1.6 J	< 2 U	< 2 U	1.8 J	< 2 U	< 2 U	8.9	10	6.9
7439-89-6	IRON	14,000	---	< 50 U	520	< 50 U	1000	75	730 B	64 B	< 50 U	< 50 U	98	< 50 U	100	85	< 50 U
7439-92-1	LEAD	15	15	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.63 J	< 1 U	< 1 U	< 1 U	0.95 J	< 1 U	< 1 U	< 1 U	< 1 U
7439-95-4	MAGNESIUM	---	---	14000 B	13000	23000	22000	17000	19000 B	16000 B	22000 B	12000	18000	57000	13000 B	13000 B	8600
7439-96-5	MANGANESE	430	---	< 5 U	350	< 5 U	26	< 5 U	4.2 J	< 5 U	2 J	3.9 J	3.9 J	< 5 U	2.5 J	1.6 J	< 5 U
7440-02-0	NICKEL	390	---	1.9	2.2	< 1 U	0.58 J	2.2	0.74 J	0.52 J	0.98 J	0.4 J	< 1 U	0.36 J	1.5 B	0.66 JB	0.59 J
7440-09-7	POTASSIUM	---	---	2100	1800	1200	5600	7400	1600 B	1200	1300	2700	1200	1600	1400	1300	2300
7782-49-2	SELENIUM	100	50	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
7440-22-4	SILVER	94		0.21 J	< 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 U
7440-23-5	SODIUM	---	---	48000 B	24000	2600	70000	11000	7000	2400 B	1700 B	20000	1400	7700	5400	5400	28000
7440-28-0	THALLIUM	0.2	2	0.075 J	0.15 J	**< 1 U**	0.068 J	**< 1 U**	0.089 J B	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	0.071 J	**< 1 U**	**< 1 U**
7440-62-2	VANADIUM	86	---	2.6	1	1	< 1 U	< 1 U	2.6	1.3	1.7	0.6 J	1.2	1.3	2.1	1.2	< 1 U
7440-66-6	ZINC	6,000	---	3.2 J	4.2 J	< 5 U	< 5 U	2.7 J	3.2 J	< 5 U	< 5 U	25	4.2 J	8.8	5.2	4.2 J	4.3 J
57-12-5	CYANIDE	1.5	200	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**1.9 J**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**
7439-97-6	MERCURY	0.63	2	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	0.066 J	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L																	
16887-00-6	CHLORIDE	---	---	100	26	8.4	32	13	18	8.1	2.4	52	1.6	21	24	24	57
14797-55-8	NITRATE AS N	32	10	2.1	0.27	4.6	0.031 J	3.5	3.5	2.4	2.5	4.6	1.7	4.6	3.7	3.7	3.8
14808-79-8	SULFATE	---	---	32	32	27	120	13	52	64	6.3	32	9.7	270	12	12	34
ALKB	BICARBONATE ALKALINITY	---	---	380	450	400	410	400	370	370	450	370	380	440	380	380	400
ALKC	CARBONATE ALKALINITY	---	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	---	380	450	400	410	400	370	370	450	370	380	440	380	380	400
PESTICIDES in ug/L																	
957-51-7	DIPHENAMID	530	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
53-19-0	2,4'-DDD	0.032	---	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0062 U	< 0.0087 U	< 0.0087 U	< 0.0013 U
3424-82-6	2,4'-DDE	0.046	---	< 0.0012 U	< 0.0012 U	0.003	< 0.0012 U	< 0.0012 U	0.019	0.018 p	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0062 U	0.0045 J p	0.0037 J p	< 0.0013 U
789-02-6	2,4'-DDT	0.23	---	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0062 U	< 0.0087 U	< 0.0087 U	< 0.0013 U
72-54-8	4,4'-DDD	0.032	---	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0062 U	0.0089	0.0084 J	< 0.0013 U
72-55-9	4,4'-DDE	0.046	---	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0062 U	< 0.0087 U	< 0.0087 U	< 0.0013 U
50-29-3	4,4'-DDT	0.23	---	< 0.0012 U	< 0.0012 U	< 0.0012 U	0.00036 J	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	0.0021	0.00037 J p	< 0.0062 U	0.013	0.022	< 0.0013 U
309-00-2	ALDRIN	0.00092	---	**< 0.0012 U**	**< 0.0012 U**	**< 0.0012 U**	**< 0.0012 U**	**< 0.0012 U**	**< 0.0012 U**	**< 0.0012 U**	**< 0.0012 U**	**0.00052 J p**	**< 0.0012 U**	**< 0.0062 U**	**< 0.0087 U**	**< 0.0087 U**	**< 0.0013 U**
319-84-6	ALPHA-BHC	0.0072	---	< 0.0012 U	< 0.0012 U	0.026	< 0.0012 U	< 0.0012 U	0.029	0.032	< 0.0012 U	< 0.0012 U	0.0038	0.06	< 0.0087 U	< 0.0087 U	< 0.0013 U
5103-71-9	ALPHA-CHLORDANE	0.02	2	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0062 U	< 0.0087 U	< 0.0087 U	0.0014 p
319-85-7	BETA-BHC	0.025	---	0.015	< 0.0012 U	0.1	< 0.0012 U	0.001 J	0.91	0.86	< 0.0012 U	< 0.0012 U	0.019	0.74	< 0.0087 U	< 0.0087 U	< 0.0013 U
319-86-8	DELTA-BHC	0.025	---	< 0.0012 U	< 0.0012 U	0.017	< 0.0012 U	< 0.0012 U	0.032	0.069	< 0.0012 U	0.001	0.0043	0.094	< 0.0087 U	< 0.0087 U	< 0.0013 U
60-57-1	DIELDRIN	0.0018	---	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	0.016	0.0075	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0062 U	0.013	0.013	0.013
959-98-8	ENDOSULFAN I	100	---	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0062 U	< 0.0087 U	< 0.0087 U	< 0.0013 U
33213-65-9	ENDOSULFAN II	100	---	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0062 U	< 0.0087 U	< 0.0087 U	< 0.0013 U
1031-07-8	ENDOSULFAN SULFATE	---	---	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0062 U	< 0.0087 U	< 0.0087 U	0.0013 p
72-20-8	ENDRIN	2.3	2	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0062 U	< 0.0087 U	< 0.0087 U	< 0.0013 U
7421-93-4	ENDRIN ALDEHYDE	---	---	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0062 U	< 0.0087 U	< 0.0087 U	0.002
53494-70-5	ENDRIN KETONE	---	---	< 0.0012 U	< 0.0012 U	0.00099 J p	< 0.0012 U	< 0.0012 U	0.019	0.028	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0062 U	< 0.0087 U	< 0.0087 U	< 0.0013 U
58-89-9	GAMMA-BHC (LINDANE)	0.042	0.2	< 0.0012 U	< 0.0012 U	0.0068	< 0.0012 U	< 0.0012 U	0.016	0.013	< 0.0012 U	< 0.0012 U	0.0015	0.013 p	< 0.0087 U	< 0.0087 U	< 0.0013 U
12789-03-6	gamma-Chlordane	0.02	2	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	0.00098 J p	0.0025	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0062 U	< 0.0087 U	< 0.0087 U	< 0.0013 U
76-44-8	HEPTACHLOR	0.0014	0.4	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	**< 0.0062 U**	**< 0.0087 U**	**< 0.0087 U**	< 0.0013 U
1024-57-3	HEPTACHLOR EPOXIDE	0.0014	0.2	< 0.0012 U	< 0.0012 U	< 0.0012 U	0.00094 J	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	**< 0.0062 U**	**0.0052 J**	**0.0052 J**	**0.0018 p**
72-43-5	METHOXYCHLOR	37	40	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0012 U	< 0.0062 U	< 0.0087 U	< 0.0087 U	< 0.0013 U
8001-35-2	TOXAPHENE	0.071	3	< 0.095 U	< 0.095 U	< 0.095 U	< 0.094 U	< 0.095 U	< 0.095 U	< 0.094 U	< 0.095 U	< 0.095 U	< 0.095 U	< 0.48 U	< 0.67 U	< 0.67 U	< 0.099 U
HERBICIDES in ug/L																	
94-75-7	2,4-D	170	70	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 4 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 3.8 U	< 4 U
93-76-5	2,4,5-T	160	---	< 0.95 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.95 U	< 0.99 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L																	
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	710	---	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
95-95-4	2,4,5-TRICHLOROPHENOL	1,200	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
88-06-2	2,4,6-TRICHLOROPHENOL	4.1	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
120-83-2	2,4-DICHLOROPHENOL	46	---	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
105-67-9	2,4-DIMETHYLPHENOL	360	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
51-28-5	2,4-DINITROPHENOL	39	---	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5.1 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5 U

Table 5-19
April-May 2017 (3rd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI) Remedial Investigation
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	OW-10-250 4/26/2017 OW10-250-042617	OW-11-240 5/1/2017 OW11-240-050117	OW-11-600 5/1/2017 OW11-600-050117	OW-12-232 4/27/2017 OW12-232-042717	OW-13-250 4/27/2017 OW13-250-042717	OW-14-96 4/28/2017 OW14-96-042817	OW-14-235 4/26/2017 OW14-235-042617	OW-15-202 4/26/2017 OW15-202-042617	OW-16-448 4/27/2017 OW16-448-042717	OW-17-600 5/2/2017 OW17-600-050217	OW-18-597 5/2/2017 OW18-597-050217	OW-19-450 4/24/2017 OW19-450-042417	OW-19-450 4/24/2017 DUP-042417	FHCC Well 5/4/2017 FHCC WELL-050417
121-14-2	2,4-DINITROTOLUENE	0.24	---	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 1 U**
606-20-2	2,6-DINITROTOLUENE	0.049	---	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	1.6	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 1 U**
91-58-7	2-CHLORONAPHTHALENE	750	---	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
95-57-8	2-CHLOROPHENOL	91	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
95-48-7	2-METHYLPHENOL	930	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
91-57-6	2-METHYLNAPHTHALENE	36	---	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
88-74-4	2-NITROANILINE	190	---	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5.1 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5 U
88-75-5	2-NITROPHENOL	---	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
91-94-1	3,3`-DICHLOROBENZIDINE	0.13	---	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 1 U**
99-09-2	3-NITROANILINE	---	---	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5.1 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5 U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	1.5	---	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 5.1 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 5 U**
101-55-3	4-BROMOPHENYL PHENYL ETHER	---	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
59-50-7	4-CHLORO-3-METHYLPHENOL	1,400	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
106-47-8	4-CHLOROANILINE	0.37	---	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 1 U**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	---	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
106-44-5	4-METHLYPHENOL	1,900	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
100-01-6	4-NITROANILINE	3.8	---	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 5.1 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 4.8 U**	**< 5 U**
100-02-7	4-NITROPHENOL	---	---	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5.1 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5 U
83-32-9	ACENAPHTHENE	530	---	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
208-96-8	ACENAPHTHYLENE	---	---	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
98-86-2	ACETOPHENONE	1,900	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
120-12-7	ANTHRACENE	1,800	---	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
1912-24-9	ATRAZINE	0.3	3	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 1 U**
100-52-7	BENZALDEHYDE	19	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
56-55-3	BENZO[A]ANTHRACENE	0.03	---	**< 0.18 U**	**< 0.18 U**	0.14 J	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**
50-32-8	BENZO[A]PYRENE	0.025	0.2	**< 0.18 U**	**< 0.18 U**	0.13 J	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**
205-99-2	BENZO[B]FLUORANTHENE	0.25	---	< 0.18 U	< 0.18 U	0.24	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
191-24-2	BENZO[G,H,I]PERYLENE	---	---	< 0.18 U	< 0.18 U	0.22	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
207-08-9	BENZO[K]FLUORANTHENE	2.5	---	< 0.18 U	< 0.18 U	0.27	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
85-68-7	BENZYL BUTYL PHTHALATE	16	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	0.14 J	0.14 J	< 1 U
92-52-4	BIPHENYL	0.83	---	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 1 U**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	59	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
111-44-4	BIS(2-CHLOROETHYL) ETHER	0.014	---	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.6	6	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 2 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 1.9 U	< 2 U
105-60-2	CAPROLACTAM	9,900	---	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5.1 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 4.8 U	< 5 U
86-74-8	CARBAZOLE	---	---	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
218-01-9	CHRYSENE	25	---	< 0.18 U	< 0.18 U	0.18	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
53-70-3	DIBENZ[A,H]ANTHRACENE	0.025	---	**< 0.18 U**	**< 0.18 U**	0.35	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**
132-64-9	DIBENZOFURAN	7.9	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
84-66-2	DIETHYL PHTHALATE	15,000	---	< 0.96 U	< 0.95 U	< 0.95 U	0.16 J	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
131-11-3	DIMETHYL PHTHALATE	---	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
84-74-2	DI-N-BUTYL PHTHALATE	900	---	< 0.96 U	0.2 J	< 0.95 U	0.21 J	0.15 J	< 1 U	0.14 J	0.13 J	< 0.95 U	0.13 J	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
117-84-0	DI-N-OCTYL PHTHALATE	200	---	< 0.96 U	< 0.95 U	0.2 J	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
206-44-0	FLUORANTHENE	800	---	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
86-73-7	FLUORENE	290	---	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
118-74-1	HEXACHLOROBENZENE	0.0098	1	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**
87-68-3	HEXACHLOROBUTADIENE	0.14	---	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**
77-47-4	HEXACHLOROCYCLOPENTADIENE	0.41	50	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 1 U**
67-72-1	HEXACHLOROETHANE	0.33	---	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 1 U**
193-39-5	INDENO[1,2,3-CD]PYRENE	0.25	---	< 0.18 U	< 0.18 U	0.25	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
78-59-1	ISOPHORONE	78	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
91-20-3	NAPHTHALENE	0.17	---	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**
98-95-3	NITROBENZENE	0.14	---	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 2 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 2 U**
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.011	---	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**
86-30-6	N-NITROSODIPHENYLAMINE	12	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
87-86-5	PENTACHLOROPHENOL	0.041	1	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 1 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 0.96 U**	**< 0.96 U**	**< 0.95 U**	**< 0.95 U**	**< 1 U**
85-01-8	PHENANTHRENE	---	---	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
108-95-2	PHENOL	5,800	---	< 0.96 U	< 0.95 U	< 0.95 U	< 0.95 U	< 0.96 U	< 1 U	< 0.96 U	< 0.95 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.95 U	< 0.95 U	< 1 U
129-00-0	PYRENE	120	---	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U
VOLATILE ORGANIC COMPOUNDS in ug/L																	
71-55-6	1,1,1-TRICHLOROETHANE	8,000	200	< 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 U	< 1 U
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.076		**< 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 U**	**< 1 U**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10,000		< 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 U	< 1 U
79-00-5	1,1,2-TRICHLOROETHANE	0.28	5	**< 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 U**	**< 1 U**
75-34-3	1,1-DICHLOROETHANE	2.8	---	< 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 U	< 1 U
75-35-4	1,1-DICHLOROETHYLENE	280	7	< 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 U	< 1 U
120-82-1	1,2,4-TRICHLOROBENZENE	1.2	70	< 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 U	< 1 U
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	0.00033	0.2	**< 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 U**	**< 1 U**

Table 5-19
April-May 2017 (3rd Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI) Remedial Investigation
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	OW-10-250 4/26/2017 OW10-250-042617	OW-11-240 5/1/2017 OW11-240-050117	OW-11-600 5/1/2017 OW11-600-050117	OW-12-232 4/27/2017 OW12-232-042717	OW-13-250 4/27/2017 OW13-250-042717	OW-14-96 4/28/2017 OW14-96-042817	OW-14-235 4/26/2017 OW14-235-042617	OW-15-202 4/26/2017 OW15-202-042617	OW-16-448 4/27/2017 OW16-448-042717	OW-17-600 5/2/2017 OW17-600-050217	OW-18-597 5/2/2017 OW18-597-050217	OW-19-450 4/24/2017 OW19-450-042417	OW-19-450 4/24/2017 DUP-042417	FHCC Well 5/4/2017 FHCC WELL-050417
106-93-4	1,2-DIBROMOETHANE	0.0075	0.05	**< 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 U**	**< 1 U**
95-50-1	1,2-DICHLOROBENZENE	300	600	< 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 U	< 1 U
107-06-2	1,2-DICHLOROETHANE	0.17	5	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.34 J	< 1 U	< 1 U	< 1 U
78-87-5	1,2-DICHLOROPROPANE	0.85	5	**< 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 U**	**< 1 U**
541-73-1	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 U	< 1 U
106-46-7	1,4-DICHLOROBENZENE	0.48	75	**< 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 U**	**< 1 U**
78-93-3	2-BUTANONE	5,600	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 5 U
591-78-6	2-HEXANONE	38	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 5 U
108-10-1	4-METHYL-2-PENTANONE	6,300	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 1 U	< 1 U	< 5 U
67-64-1	ACETONE	14,000	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	3.9 J	3.1 J	< 5 U
71-43-2	BENZENE	0.46	5	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	0.32 J	0.34 J	**< 1 U**	**< 1 U**	0.26 J
75-27-4	BROMODICHLOROMETHANE	0.13	80	**< 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 U**	**< 1 U**
75-25-2	BROMOFORM	3.3	80	< 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 U	< 1 U
74-83-9	BROMOMETHANE	7.5	---	< 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 U	< 1 U
75-15-0	CARBON DISULFIDE	810	---	< 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 U	< 1 U
56-23-5	CARBON TETRACHLORIDE	0.46	5	**< 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 U**	**< 1 U**
108-90-7	CHLOROBENZENE	78	100	< 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 U	< 1 U
75-00-3	CHLOROETHANE	21,000	---	< 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 U	< 1 U
67-66-3	CHLOROFORM	0.22	80	2.8	**< 1 U**	0.4 J	**< 1 U**	**< 1 U**	3.2	1.4	**< 1 U**	4	**< 1 U**	0.27 J	2.6	2.7	0.46 J
74-87-3	CHLOROMETHANE	190	---	< 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 U	< 1 U
156-59-2	CIS-1,2-DICHLOROETHENE	36	70	< 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 U	< 1 U
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	---	---	< 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 U	< 1 U
110-82-7	CYCLOHEXANE	13,000	---	< 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 U	< 1 U
124-48-1	DIBROMOCHLOROMETHANE	0.87	---	**< 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 U**	**< 1 U**
75-71-8	DICHLORODIFLUOROMETHANE	200	---	< 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 U	< 1 U
100-41-4	ETHYLBENZENE	1.5	700	< 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 U	< 1 U
98-82-8	ISOPROPYLBENZENE (CUMENE)	450	---	< 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 U	< 1 U
79-20-9	METHYL ACETATE	20,000	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1634-04-4	METHYL TERT-BUTYL ETHER	14	---	< 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 U	< 1 U
108-87-2	METHYLCYLOHEXANE	---	---	< 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 U	< 1 U
75-09-2	METHYLENE CHLORIDE	11	5	< 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 U	< 1 U
100-42-5	STYRENE (MONOMER)	1,200	100	< 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 U	< 1 U
127-18-4	TETRACHLOROETHYLENE	11	5	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.2	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
108-88-3	TOLUENE	1,100	1,000	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.2 J	< 1 U	< 1 U	< 1 U
156-60-5	TRANS-1,2-DICHLOROETHENE	360	100	< 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 U	< 1 U
10061-02-6	TRANS-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	< 1 U	< 1 U
79-01-6	TRICHLOROETHYLENE	0.49	5	**< 1 U**	**< 1 U**	**< 1 U**	0.55 J	**< 1 U**	0.36 J	0.57 J	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-69-4	TRICHLOROFLUOROMETHANE	5,200	---	< 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 U	< 1 U
75-01-4	VINYL CHLORIDE	0.019	2	**< 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 U**	**< 1 U**
XYLENES	Xylenes, Total	190	10000	< 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 U	< 2 U

Notes:
USEPA RSL for TAP WATER (latest version, November 2017)
USEPA MCL (latest version, November 2017)
(1) No RSL exists, MCL utilized.
B - Parameter was detected in associated laboratory method blank.
J - Result is either less than the RL but greater than or equal to the method detection limit (MDL). Concen
U - Compound not detected above specified reporting limit.
p - Sample results on the front and rear chromatography column exhibited imprecision greater than 40%. T
Bold indicates the reporting limit was above the RSL and/or MCL.
Red bolded detected concentration exceeds RSL
Red bolded and highlighted detected concentration exceeds MCL

Table 5-20
July-August 2017 (4th Quarter) Groundwater Sampling Field Parameter Data
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

Monitoring Well	Sample Date	Temperature (ºC)	Dissolved Oxygen (mg/L)	pH (Std.Units)	Turbidity (NTUs)	Conductivity (mS/cm)	Oxygen Reduction Potential (mV)	Rate (mL/min)	Depth to Water (ft below top of PVC)
On Site Monitoring Wells									
MW-A-51	8/9/2017	17.02	0.80	6.38	0.0	1.880	215	180	39.56
MW-B-55	8/9/2017	16.48	5.45	7.05	0.0	0.710	179	105	42.99
MW-B-400	8/7/2017	14.27	2.74	6.78	0.0	1.280	58	470	53.55
MW-B-598	8/7/2017	14.40	0.05	6.89	0.0	0.668	217	445	52.90
MW-C-40	8/8/2017	17.27	5.21	6.80	0.0	0.768	275	310	28.10
MW-D-77	8/3/2017	19.99	1.66	7.71	10.6	1.710	175	115	32.20
MW-E-46	8/3/2017	17.60	1.23	6.59	0.0	2.500	234	70	26.18
MW-F-70	8/3/2017	17.45	0.27	7.48	0.0	0.878	98	105	44.77
MW-G-35	8/4/2017	16.31	3.06	4.28	0.0	3.060	525	205	19.30
MW-G-360	8/7/2017	16.16	0.00	6.70	0.0	1.890	229	275	30.03
MW-G-600	8/9/2017	14.53	1.57	6.75	0.0	0.840	177	385	32.65
MW-H-65	8/8/2017	14.69	0.00	6.60	0.0	2.410	59	400	28.54
MW-I-55	8/8/2017	14.52	0.00	6.54	5.6	1.240	12	300	28.48
MW-J-71	8/9/2017	14.19	0.00	6.79	0.0	2.830	-30	300	39.37
MW-K-80	8/8/2017	18.20	2.89	6.73	3.5	1.470	26	70	38.18
MW-K-440	8/4/2017	13.57	4.01	7.00	0.0	0.634	210	420	60.62
MW-L-48	8/8/2017	15.07	0.29	6.88	0.0	1.780	244	300	27.98
MW-L-250	8/7/2017	14.25	4.34	6.87	0.0	0.548	255	280	51.18
MW-M-50	8/9/2017	15.68	0.12	6.48	0.0	2.440	133	165	27.82
MW-N-83	8/7/2017	14.61	0.00	6.90	0.0	1.740	-39	275	34.20
MW-N-113	8/7/2017	15.02	0.00	6.77	0.0	1.980	-40	275	34.89
MW-O-145	8/9/2017	15.75	0.00	7.25	0.0	2.720	-50	120	59.10
MW-P-235	8/8/2017	15.29	0.00	7.09	0.0	2.580	-44	240	52.10
MW-Q-150	8/9/2017	19.10	0.00	6.97	0.0	2.000	-5	115	50.78
MW-R-330	8/8/2017	15.63	0.00	6.70	0.0	2.000	64	332	48.49
MW-R-600	8/8/2017	15.17	0.00	7.14	38.9	0.747	-89	350	51.65
EW-1-110	8/9/2017	14.98	0.00	6.59	20.1	2.300	-54	290	27.20
Off Site Monitoring Wells									
OW-1-62	7/31/2017	17.89	5.15	7.08	0.6	1.93	218	375	48.82
OW-1-105	7/31/2017	21.11	3.71	7.23	1.4	0.903	222	120	50.35
OW-2-65	8/1/2017	16.43	1.41	6.83	10.5	1.220	218	440	42.99
OW-2-115	8/1/2017	18.89	0.00	6.81	2.7	1.650	25	225	49.5
OW-3-55	8/2/2017	18.46	2.80	7.38	0.0	0.693	251	225	46.48
OW-3-105	8/2/2017	22.02	0.08	7.67	0.0	1.380	89	80	49.45
OW-4-70	8/2/2017	17.75	1.44	7.43	0.0	1.320	186	190	33.80
OW-5-90	8/2/2017	20.19	0.27	6.69	14.8	1.020	196	115	39.30
OW-7-242	8/3/2017	21.22	0.00	7.36	0.0	0.835	-155	100	54.41
OW-7-410	8/3/2017	18.15	0.00	6.59	0.0	1.530	159	450	37.95
OW-8-230	7/31/2017	26.20	0.00	6.48	27.7	2.100	160	130	53.93
OW-9-125	8/1/2017	18.51	4.25	7.04	7.8	0.979	216	240	30.04
OW-10-250	8/1/2017	18.44	2.60	6.90	0.0	0.739	160	250	36.00
OW-11-240	8/8/2017	18.82	6.03	7.17	3.8	0.570	6	125	47.10
OW-11-600	8/4/2017	16.03	4.25	6.93	0.0	0.966	170	42	51.54
OW-12-232	8/1/2017	28.45	0.61	7.09	0.0	0.580	-28	105	69.38
OW-13-250	8/3/2017	21.55	1.05	7.17	0.0	0.479	193	240	16.40
OW-14-96	8/2/2017	18.16	4.59	6.92	33.0	0.540	237	290	22.80
OW-14-235	8/2/2017	18.85	2.32	6.80	0.0	0.545	243	350	21.18
OW-15-202	8/8/2017	16.40	7.26	7.17	0.0	0.466	178	310	23.50
OW-16-448	8/3/2017	15.61	0.95	7.27	0.0	0.611	204	350	46.90
OW-17-600	8/2/2017	27.20	5.51	7.20	0.0	0.465	209	150	44.38
OW-18-597	8/3/2017	16.18	0.00	7.17	0.0	0.920	198	465	39.33
OW-19-450	8/1/2017	17.21	8.99	6.87	0.0	0.525	264	350	56.49
FHCC	8/2/2017	16.55	13.02	6.58	0.0	0.670	225	3gal/min	-

Notes:
mg/L - milligrams per liter
FHCC - Fountain Head Country Club

Prepared by: CLE 8/14/2017
Reviewed by: JD 11/2/2017

Table 5-21
July-August 2017 (4th Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-A-51 8/9/2017 MWA-51-080917	MW-B-55 8/9/2017 MWB-55-080917	MW-B-400 8/7/2017 MWB-400-080717	MW-B-598 8/7/2017 MWB-598-080717	MW-C-40 8/8/2017 MWC-40-080817	MW-D-77 8/3/2017 MWD-77-080317	MW-E-46 8/3/2017 MWE-46-080317	MW-F-70 8/3/2017 MWF-70-080317	MW-G-35 8/4/2017 MWG-35-080417	MW-G-360 8/7/2017 MWG-360-080717	MW-G-600 8/9/2017 MWG-600-080917
TOTAL METALS in ug/L														
7429-90-5	ALUMINUM	20,000	---	97	< 30 U	< 30 U	< 30 U	1300	140	< 30 U	< 30 U	140000	< 30 U	23 J
7440-36-0	ANTIMONY	7.8	6	0.44 J	0.44 J	0.59 JB	0.52 JB	0.58 J	0.57 JB	0.59 JB	0.53 JB	0.51 JB	0.46 JB	0.51 J
7440-38-2	ARSENIC	0.052	10	0.46 J	0.39 J	0.43 J	0.32 J	2.2	0.52 JB	4	0.27 JB	11	0.37 J	0.3 J
7440-39-3	BARIUM	3,800	2,000	25	49	38	130	2.6 J	32	4.6 J	26	19 J	32	58
7440-41-7	BERYLLIUM	25	4	0.64 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	28	< 1 U	< 1 U
7440-43-9	CADMIUM	9.2	5	0.36 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	6.3	< 1 U	< 1 U
7440-70-2	CALCIUM METAL	---	---	390000	130000	220000	130000	170000	270000	580000	230000	520000	300000	160000
7440-47-3	CHROMIUM[1]	---	100	0.87 J	0.57 J	< 2 U	< 2 U	6.6	0.46 JB	< 2 U	< 2 U	2 B	< 2 U	0.55 J
7440-48-4	COBALT	6	---	9.1	< 0.5 U	0.51	1.6	< 0.5 U	1	0.17 J	< 0.5 U	160	0.25 J	0.24 J
7440-50-8	COPPER	800	1,300	8.9	1.8 J	2 B	1.6 JB	2.3	1.6 JB	1.8 JB	< 2 U	2 B	1.5 JB	1.4 J
7439-89-6	IRON	14,000	---	490	< 50 U	260	160	< 50 U	270	< 50 U	270	1400	< 50 U	< 50 U
7439-92-1	LEAD	15	15	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1	< 1 U	< 1 U	1.6	< 1 U	< 1 U
7439-95-4	MAGNESIUM	---	---	52000	51000	67000	33000	19000	82000	19000	43000	75000	89000	32000
7439-96-5	MANGANESE	430	---	210	< 5 U	94	32	< 5 U	94	21	7.1	2700	61	7.6
7440-02-0	NICKEL	390	---	25	1.3	1.6	0.58 J	1.6	6.4	1.9	0.31 J	290	1.2	0.92 J
7440-09-7	POTASSIUM	---	---	7400	3500	2300	1400	7700	500 B	500 B	500 B	500 B	19000	1900
7782-49-2	SELENIUM	100	50	< 5 U	< 5 U	< 5 U	< 5 U	2.9 J	1.7 J	< 5 U	< 5 U	29	< 5 U	< 5 U
7440-22-4	SILVER	94	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	5 U	< 1 U	< 1 U
7440-23-5	SODIUM	---	---	5000	13000	15000	12000	3100	500 B	500 B	500 B	500 B	31000	7300
7440-28-0	THALLIUM	0.2	2	**< 1 U**	1 U	0.14 JB	**< 1 U**	0.085 J	0.17 JB	0.21 JB	**< 1 U**	0.41 JB	0.45 JB	0.097 J
7440-62-2	VANADIUM	86	---	1.4	1.8	1.1	1.6	7.6	1 B	1 B	1 B	1 B	1.1	1.4
7440-66-6	ZINC	6,000	---	200	4.5 J	4.8 J	16	3.4 J	9.6	5 U	5 U	920	5.1	7.9
57-12-5	CYANIDE	1.5	200	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	4.4 J	**< 10 U**	**< 10 U**
7439-97-6	MERCURY	0.63	2	< 0.2 U	< 0.2 U	< 0.2 UF1	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L														
16887-00-6	CHLORIDE	---	---	100	5.9	30	10	4.5	35	11	13	19	67	20
14797-55-8	NITRATE AS N	32	10	7.5	6.3	6.5	3.3	5.7	4.6	1.4	0.064 J	8.9	31	4.6
14808-79-8	SULFATE	---	---	580	65	400	100	160	800	1400	150	2100	580	190
ALKB	BICARBONATE ALKALINITY	---	---	480	530	460	440	300	280	290	460	< 5 U	500	650
ALKC	CARBONATE ALKALINITY	---	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	---	480	530	460	440	300	280	290	460	< 5 U	500	650
PESTICIDES in ug/L														
957-51-7	DIPHENAMID	530	---	< 0.97U	< 1 U	3.8	< 0.98 U	< 0.94 U	< 1 U	< 0.94 U	< 0.97 U	< 1 U	16	< 0.94 U
53-19-0	2,4'-DDD	0.032	---	0.25	< 0.0013 U	0.0012 U	< 0.0013 U	< 0.0012 U	< 0.025 U	< 0.025 U	< 0.0012 U	**< 0.13 U**	**< 0.13 U**	< 0.0013 U
3424-82-6	2,4'-DDE	0.046	---	0.17 p	0.005	0.099	0.03	0.027	0.021 J	0.7	0.014	0.83	0.19	< 0.0013 U
789-02-6	2,4'-DDT	0.23	---	< 0.13 U	< 0.0013 U	< 0.0012 U	0.0039	< 0.0012 U	< 0.025 U	< 0.025 U	< 0.0012 U	< 0.13 U	< 0.13 U	< 0.0013 U
72-54-8	4,4'-DDD	0.032	---	0.42	< 0.0013 U	< 0.0012 UF1	< 0.0013 U	< 0.0012 U	< 0.025 U	< 0.025 U	< 0.0012 U	< 0.13 U	**< 0.13 U**	< 0.0013 U
72-55-9	4,4'-DDE	0.046	---	**< 0.13 U**	< 0.0013 U	< 0.0012 UF1	< 0.0013 U	< 0.0012 U	0.027	< 0.025 U	0.0021 p	**< 0.13 U**	**< 0.13 U**	< 0.0013 U
50-29-3	4,4'-DDT	0.23	---	< 0.13 U	0.0017	< 0.0012 UF1	0.015	< 0.0012 U	0.021 J	< 0.025 U	< 0.0012 U	0.095 J	< 0.13 U	0.0064 U
309-00-2	ALDRIN	0.00092	---	**< 0.13 U**	**< 0.0013 U**	0.0012 UF2F1	**< 0.0013 U**	**< 0.0012 U**	**< 0.025 U**	**< 0.025 U**	**< 0.0012 U**	**< 0.13 U**	**< 0.13 U**	**< 0.0013 U**
319-84-6	ALPHA-BHC	0.0072	---	**< 0.13 U**	0.0029	0.75	0.036	0.023	0.84	0.041 p	0.0097 p	1.1	4.9	0.088
5103-71-9	ALPHA-CHLORDANE	0.02	2	**< 0.13 U**	< 0.0013 U	< 0.0012 UF1	< 0.0013 U	< 0.0012 U	**0.025 U**	**0.025 U**	< 0.0012 U	**< 0.13 U**	**< 0.13 U**	< 0.0013 U
319-85-7	BETA-BHC	0.025	---	30	0.052	1.7	0.53	1.3	0.37	3	0.1	8.8	3.1	0.31
319-86-8	DELTA-BHC	0.025	---	6.4	0.0095	0.99	0.056	0.015	1.3	**< 0.025 U**	0.39	0.13 B	6.5	0.15
60-57-1	DIELDRIN	0.0018	---	**< 0.13 U**	0.0035	0.0052 pF1	< 0.0013 U	0.02	**< 0.025 U**	0.91	0.00077 JP	**< 0.13 U**	**< 0.13 U**	0.007
959-98-8	ENDOSULFAN I	100	---	< 0.13 U	< 0.0013 U	< 0.0012 UF2	0.0022 p	< 0.0012 U	< 0.025 U	< 0.025 U	< 0.0012 U	< 0.13 U	< 0.13 U	< 0.0013 U
33213-65-9	ENDOSULFAN II	100	---	< 0.13 U	< 0.0013 U	< 0.0012 UF1	< 0.0013 U	< 0.0012 U	< 0.025 U	< 0.025 U	0.0032	< 0.13 U	< 0.13 U	< 0.0013 U
1031-07-8	ENDOSULFAN SULFATE	---	---	< 0.13 U	< 0.0013 U	< 0.0012 UF1	< 0.0013 U	< 0.0012 U	< 0.025 U	< 0.025 U	< 0.0012 U	< 0.13 U	< 0.13 U	< 0.0013 U
72-20-8	ENDRIN	2.3	2.0	< 0.13 U	< 0.0013 U	< 0.0012 UF1	< 0.0013 U	< 0.0012 U	< 0.025 U	< 0.025 U	< 0.0012 U	< 0.13 U	< 0.13 U	< 0.0013 U
7421-93-4	ENDRIN ALDEHYDE	---	---	< 0.13 U	< 0.0013 U	0.0042 F1p	< 0.0013 U	< 0.0012 U	< 0.025 U	< 0.025 U	< 0.0012 U	< 0.13 U	< 0.13 U	< 0.0013 U
53494-70-5	ENDRIN KETONE	---	---	0.085 JP	0.00088 JP	0.011 p	0.0016 p	0.0055	< 0.025 U	0.24	< 0.0012 U	< 0.13 U	< 0.13 U	0.0024 p
58-89-9	GAMMA-BHC (LINDANE)	0.042	0.2	0.79	< 0.0013 U	0.31	< 0.0013 U	0.0075	1.1	0.036	< 0.0012 U	0.26	6	0.034
12789-03-6	gamma-Chlordane	0.02	2	**< 0.13 U**	< 0.0013 U	< 0.0012 UF2	< 0.0013 U	< 0.0012 U	**< 0.025 U**	**< 0.025 U**	< 0.0012 U	**< 0.13 U**	**< 0.13 U**	< 0.0013 U
76-44-8	HEPTACHLOR	0.0014	0.4	**< 0.13 U**	< 0.0013 U	< 0.0012 UF2F1	< 0.0013 U	< 0.0012 U	**< 0.025 U**	**< 0.025 U**	< 0.0012 U	**< 0.13 U**	**< 0.13 U**	< 0.0013 U
1024-57-3	HEPTACHLOR EPOXIDE	0.0014	0.2	**< 0.13 U**	< 0.0013 U	< 0.0012 UF1	< 0.0013 U	0.0022 p	**< 0.025 U**	0.12 p	< 0.0012 U	**< 0.13 U**	**< 0.13 U**	< 0.0013 U
72-43-5	METHOXYCHLOR	37	40	< 0.13 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0012 U	< 0.025 U	< 0.025 U	< 0.0012 U	< 0.13 U	< 0.13 U	< 0.0013 U
8001-35-2	TOXAPHENE	0.071	3	**< 9.8 U**	**< 0.099 U**	**< 0.095 U**	**< 0.096 U**	**< 0.095 U**	**< 2 U**	**< 1.9 U**	**< 0.095 U**	**< 10 U**	**< 9.8 U**	**< 0.099 U**
HERBICIDES in ug/L														
94-75-7	2,4-D	170	70	< 4 U	< 4 U	< 3.8 U	< 3.8 U	< 4 U	< 4 U	< 3.8 U	< 3.8 U	< 3.9 U	< 3.8 U	< 4 U
93-76-5	2,4,5-T	160	---	< 0.99 U	< 1 U	< 0.94 U	< 0.96 U	< 1 U	< 0.99 U	< 0.95 U	< 0.96 U	< 0.97 U	< 0.96 U	< 0.99 U

Table 5-21
July-August 2017 (4th Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-A-51 8/9/2017 MWA-51-080917	MW-B-55 8/9/2017 MWB-55-080917	MW-B-400 8/7/2017 MWB-400-080717	MW-B-598 8/7/2017 MWB-598-080717	MW-C-40 8/8/2017 MWC-40-080817	MW-D-77 8/3/2017 MWD-77-080317	MW-E-46 8/3/2017 MWE-46-080317	MW-F-70 8/3/2017 MWF-70-080317	MW-G-35 8/4/2017 MWG-35-080417	MW-G-360 8/7/2017 MWG-360-080717	MW-G-600 8/9/2017 MWG-600-080917
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L														
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	710	---	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U
95-95-4	2,4,5-TRICHLOROPHENOL	1,200	---	0.078 J	< 1 U	0.1 J	< 0.98 U	0.098 J	0.07 J	< 0.94 U	< 0.97 U	< 1 U	0.26 J	< 0.94 U
88-06-2	2,4,6-TRICHLOROPHENOL	4.1	---	0.28 J	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	0.15 J	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
120-83-2	2,4-DICHLOROPHENOL	46	---	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U
105-67-9	2,4-DIMETHYLPHENOL	360	---	< 0.97 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 1 U	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
51-28-5	2,4-DINITROPHENOL	39	---	< 9.7 U	< 10 U	< 9.4 U	< 9.8 U	< 9.4 U	< 10 U	< 9.4 U	< 9.7 U	< 10 U	< 9.7 U	< 9.4 U
121-14-2	2,4-DINITROTOLUENE	0.24	---	**< 0.97 U**	**< 1 U**	**< 0.94 U**	**< 0.98 U**	**< 0.94 U**	**< 1 U**	**< 0.94 U**	**< 0.97 U**	**< 1 U**	**< 0.97 U**	**< 0.94 U**
606-20-2	2,6-DINITROTOLUENE	0.049	---	**< 0.97 U**	**< 1 U**	**< 0.94 U**	**< 0.98 U**	**< 0.94 U**	**< 1 U**	**< 0.94 U**	**< 0.97 U**	**< 1 U**	**< 0.97 U**	**< 0.94 U**
91-58-7	2-CHLORONAPHTHALENE	750	---	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U
95-57-8	2-CHLOROPHENOL	91	---	< 0.97 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 1 U	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
95-48-7	2-METHLYPHENOL	930	---	< 0.97 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 1 U	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
91-57-6	2-METHYLNAPHTHALENE	36	---	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U
88-74-4	2-NITROANILINE	190	---	< 4.9 U	< 5.2 U	< 4.7 U	< 4.9 U	< 4.7 U	< 5.2 U	< 4.7 U	< 4.9 U	< 5.2 U	< 4.9 U	< 4.7 U
88-75-5	2-NITROPHENOL	---	---	< 0.97 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 1 U	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
91-94-1	3,3'-DICHLOROBENZIDINE	0.13	---	**< 0.97 U**	**< 1 U**	**< 0.94 U**	**< 0.98 U**	**< 0.94 U**	**< 1 U**	**< 0.94 U**	**< 0.97 U**	**< 1 U**	**< 0.97 U**	**< 0.94 U**
99-09-2	3-NITROANILINE	---	---	< 4.9 U	< 5.2 U	< 4.7 U	< 4.9 U	< 4.7 U	< 5.2 U	< 4.7 U	< 4.9 U	< 5.2 U	0.19 J	< 4.7 U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	1.5	---	< 4.9 U	**< 5.2 U**	**< 4.7 U**	**< 4.9 U**	**< 4.7 U**	**< 5.2 U**	**< 4.7 U**	**< 4.9 U**	**< 5.2 U**	**< 4.9 U**	**< 4.7 U**
101-55-3	4-BROMOPHENYL PHENYL ETHER	---	---	< 0.97 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 1 U	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
59-50-7	4-CHLORO-3-METHYLPHENOL	1,400	---	< 0.97 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 1 U	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
106-47-8	4-CHLOROANILINE	0.37	---	**< 0.97 U**	**< 1 U**	**< 0.94 U**	**< 0.98 U**	**< 0.94 U**	**< 1 U**	**< 0.94 U**	**< 0.97 U**	**< 1 U**	**< 0.97 U**	**< 0.94 U**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	---	---	< 0.97 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 1 U	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
106-44-5	4-METHLYPHENOL	1,900	---	< 0.97 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 1 U	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
100-01-6	4-NITROANILINE	3.8	---	**< 4.9 U**	**< 5.2 U**	**< 4.7 U**	**< 4.9 U**	**< 4.7 U**	**< 5.2 U**	**< 4.7 U**	**< 4.9 U**	**< 5.2 U**	**< 4.9 U**	**< 4.7 U**
100-02-7	4-NITROPHENOL	---	---	< 4.9 U	< 5.2 U	< 4.7 U	< 4.9 U	< 4.7 U	< 5.2 U	< 4.7 U	< 4.9 U	< 5.2 U	< 4.9 U	< 4.7 U
83-32-9	ACENAPHTHENE	530	---	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U
208-96-8	ACENAPHTHYLENE	---	---	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U
98-86-2	ACETOPHENONE	1,900	---	< 0.97 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 1 U	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
120-12-7	ANTHRACENE	1,800	---	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U
1912-24-9	ATRAZINE	0.3	3	**< 0.97 U**	**< 1 U**	3.9	**< 0.98 U**	**< 0.94 U**	**< 1 U**	**< 0.94 U**	**< 0.97 U**	**< 1 U**	1.6	**< 0.94 U**
100-52-7	BENZALDEHYDE	19	---	< 0.97 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 1 U	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
56-55-3	BENZO[A]ANTHRACENE	0.03	---	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U
50-32-8	BENZO[A]PYRENE	0.025	0.2	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**
205-99-2	BENZO[B]FLUORANTHENE	0.25	---	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U
191-24-2	BENZO[G,H,I]PERYLENE	---	---	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U
207-08-9	BENZO[K]FLUORANTHENE	2.5	---	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U
85-68-7	BENZYL BUTYL PHTHALATE	16	---	< 0.97 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 1 U	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
92-52-4	BIPHENYL	0.83	---	**< 0.97 U**	**< 1 U**	**< 0.94 U**	**< 0.98 U**	**< 0.94 U**	**< 1 U**	**< 0.94 U**	**< 0.97 U**	**< 1 U**	**< 0.97 U**	**< 0.94 U**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	59	---	< 0.97 U	< 1 U	< 0.94 UF1	< 0.98 U	< 0.94 U	< 1 U	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
111-44-4	BIS(2-CHLOROETHYL) ETHER	0.014	---	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.6	6	2.2	2.3	3.5	< 2 U	9.8	2.1 U	2	2.7	2.1 U	< 1.9 U	2.9
105-60-2	CAPROLACTAM	9,900	---	< 4.9 U	< 5.2 U	< 4.7 U	< 4.9 U	< 4.7 U	< 5.2 U	< 4.7 U	< 4.9 U	< 5.2 U	< 4.9 U	< 4.7 U
86-74-8	CARBAZOLE	---	---	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U
218-01-9	CHRYSENE	25	---	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U
53-70-3	DIBENZ[A,H]ANTHRACENE	0.025	---	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**
132-64-9	DIBENZOFURAN	7.9	---	< 0.97 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 1 U	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
84-66-2	DIETHYL PHTHALATE	15,000	---	< 0.97 U	< 1 U	< 0.94 U	0.18 J	0.2 J	0.13 J	< 0.94 U	< 0.97 U	< 1 U	0.16 J	0.16 J
131-11-3	DIMETHYL PHTHALATE	---	---	< 0.97 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 1 U	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
84-74-2	DI-N-BUTYL PHTHALATE	900	---	0.18 J	0.16 J	0.15 J	0.2 J	0.13 J	< 1 U	< 0.94 U	< 0.97 U	< 1 U	0.3 J	0.16 J
117-84-0	DI-N-OCTYL PHTHALATE	200	---	< 0.97 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 1 U	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
206-44-0	FLUORANTHENE	800	---	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U
86-73-7	FLUORENE	290	---	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U
118-74-1	HEXACHLOROBENZENE	0.0098	1	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**
87-68-3	HEXACHLOROBUTADIENE	0.14	---	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**
77-47-4	HEXACHLOROCYCLOPENTADIENE	0.41	50	**< 0.97 U**	**< 1 U**	**< 0.94 U**	**< 0.98 U**	**< 0.94 U**	**< 1 U**	**< 0.94 U**	**< 0.97 U**	**< 1 U**	**< 0.97 U**	**< 0.94 U**
67-72-1	HEXACHLOROETHANE	0.33	---	**< 0.97 U**	**< 1 U**	**< 0.94 U**	**< 0.98 U**	**< 0.94 U**	**< 1 U**	**< 0.94 U**	**< 0.97 U**	**< 1 U**	**< 0.97 U**	**< 0.94 U**
193-39-5	INDENO[1,2,3-CD]PYRENE	0.25	---	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U
78-59-1	ISOPHORONE	78	---	< 0.97 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	1 U	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
91-20-3	NAPHTHALENE	0.17	---	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**
98-95-3	NITROBENZENE	0.14	---	**< 1.9 U**	**< 2.1 U**	**< 1.9 U**	**< 2 U**	**< 1.9 U**	**< 2.1 U**	**< 1.9 U**	**< 1.9 U**	**< 2.1 U**	**< 1.9 U**	**< 1.9 U**
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.011	---	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.18 U**	**< 0.18 U**
86-30-6	N-NITROSODIPHENYLAMINE	12	---	< 0.97 U	< 1 U	< 0.94 U	< 0.98 U	< 0.94 U	< 1 U	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
87-86-5	PENTACHLOROPHENOL	0.041	1	**< 4.9 U**	**< 5.2 U**	10	**< 4.9 U**	**< 4.7 U**	**< 5.2 U**	**< 4.7 U**	**< 4.9 U**	**< 5.2 U**	3.2 J	**< 4.7 U**
85-01-8	PHENANTHRENE	---	---	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U
108-95-2	PHENOL	5,800	---	< 0.97 U	< 1 U	< 0.94 UF1	< 0.98 U	< 0.94 U	< 1 U	< 0.94 U	< 0.97 U	< 1 U	< 0.97 U	< 0.94 U
129-00-0	PYRENE	120	---	< 0.18 U	< 0.2 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.18 U	< 0.18 U

Table 5-21
July-August 2017 (4th Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	Maximum Contaminant Level (MCL)	MW-A-51 8/9/2017 MWA-51-080917	MW-B-55 8/9/2017 MWB-55-080917	MW-B-400 8/7/2017 MWB-400-080717	MW-B-598 8/7/2017 MWB-598-080717	MW-C-40 8/8/2017 MWC-40-080817	MW-D-77 8/3/2017 MWD-77-080317	MW-E-46 8/3/2017 MWE-46-080317	MW-F-70 8/3/2017 MWF-70-080317	MW-G-35 8/4/2017 MWG-35-080417	MW-G-360 8/7/2017 MWG-360-080717	MW-G-600 8/9/2017 MWG-600-080917
VOLATILE ORGANIC COMPOUNDS in ug/L														
71-55-6	1,1,1-TRICHLOROETHANE	8,000	200	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.076	---	**< 1 U**	**< 1 U**	**< 1 UF1**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10,000	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-00-5	1,1,2-TRICHLOROETHANE	0.28	5	**< 1 U**	**< 1 U**	**< 1 UF1**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-34-3	1,1-DICHLOROETHANE	2.8	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-35-4	1,1-DICHLOROETHYLENE	280	7	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
120-82-1	1,2,4-TRICHLOROBENZENE	1.2	70	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	0.00033	0.2	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
106-93-4	1,2-DIBROMOETHANE	0.0075	0.05	**< 1 U**	**< 1 U**	**< 1 UF1**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
95-50-1	1,2-DICHLOROBENZENE	300	600	0.25 J	< 1 U	0.41 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.9 J	< 1 U
107-06-2	1,2-DICHLOROETHANE	0.17	5	**< 1 U**	**< 1 U**	**0.64 J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**0.4 J**	**< 1 U**
78-87-5	1,2-DICHLOROPROPANE	0.85	5	**< 1 U**	**< 1 U**	**1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**1 U**	**< 1 U**
541-73-1	1,3-DICHLOROBENZENE	---	---	0.25 J	< 1 U	< 1 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
106-46-7	1,4-DICHLOROBENZENE	0.48	75	0.45 J	**< 1 U**	**0.74 JF1**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**1.4**	**< 1 U**
78-93-3	2-BUTANONE	5,600	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
591-78-6	2-HEXANONE	38	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
108-10-1	4-METHYL-2-PENTANONE	6,300	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
67-64-1	ACETONE	14,000	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	3.2 J
71-43-2	BENZENE	0.46	5	**0.74 J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-27-4	BROMODICHLOROMETHANE	0.13	80	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-25-2	BROMOFORM	3.3	80	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
74-83-9	BROMOMETHANE	7.5	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-15-0	CARBON DISULFIDE	810	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
56-23-5	CARBON TETRACHLORIDE	0.46	5	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
108-90-7	CHLOROBENZENE	78	100	1	< 1 U	3.4 F1	< 1 U	< 1 U	1.4	< 1 U	0.43 J	< 1 U	11	0.5 J
75-00-3	CHLOROETHANE	21,000	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
67-66-3	CHLOROFORM	0.22	80	**93**	**< 1 U**	**0.61 J**	**0.33 J**	**< 1 U**	**1.5**	**0.36 J**	**1 U**	**0.79 J**	**1**	**0.53 J**
74-87-3	CHLOROMETHANE	190	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
156-59-2	CIS-1,2-DICHLOROETHENE	36	70	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	---	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
110-82-7	CYCLOHEXANE	13,000	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
124-48-1	DIBROMOCHLOROMETHANE	0.87	---	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-71-8	DICHLORODIFLUOROMETHANE	200	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
100-41-4	ETHYLBENZENE	1.5	700	< 1 U	< 1 U	< 1 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
98-82-8	ISOPROPYLBENZENE (CUMENE)	450	---	< 1 U	< 1 U	< 1 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
79-20-9	METHYL ACETATE	20,000	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1634-04-4	METHYL TERT-BUTYL ETHER	14	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.4	< 1 U	< 1 U	< 1 U
108-87-2	METHYLCYLOHEXANE	---	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-09-2	METHYLENE CHLORIDE	11	5	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
100-42-5	STYRENE (MONOMER)	1,200	100	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
127-18-4	TETRACHLOROETHYLENE	11	5	< 1 U	< 1 U	< 1 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
108-88-3	TOLUENE	1,100	1,000	< 1 U	< 1 U	< 1 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
156-60-5	TRANS-1,2-DICHLOROETHENE	360	100	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
10061-02-6	TRANS-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
79-01-6	TRICHLOROETHYLENE	0.49	5	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-69-4	TRICHLOROFLUOROMETHANE	5,200	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-01-4	VINYL CHLORIDE	0.019	2	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
XYLENES	Xylenes, Total	190	10000	< 2 U	< 2 U	< 2 UF1	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

Notes:
USEPA RSL for TAP WATER (latest version, November 2017)
USEPA MCL (latest version, November 2017)
(1) No RSL exists, MCL utilized.
U - The analyte was not detected above the reporting limit (RL).
UJ - The reporting limit is estimated due to minor quality control anomaly.
J - Result is either less than the RL but greater than or equal to the method detection limit (MDL) or the result is estimated due to a minor quality control anomaly.
B - Parameter was detected in associated laboratory method blank.
NJ - Result is estimated due to a dual column imprecision greater than 100%.
Bold indicates the reporting limit was above the RSL and/or MCL.
Red bolded detected concentration exceeds RSL
Red bolded and highlighted detected concentration exceeds MCL

Table 5-21
July-August 2017 (4th Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	MW-H-65 8/8/2017 MWH-65-080817	MW-I-55 8/8/2017 MWI-55-080817	MW-J-71 8/9/2017 MWJ-71-080917	MW-K-80 8/8/2017 MWK-80-080817	MW-K-440 8/4/2017 MWK-440-080417	MW-L-48 8/8/2017 MWL-48-080817	MW-L-250 8/7/2017 MWL-250-080717	MW-L-250 8/7/2017 DUP-080717	MW-M-50 8/9/2017 MWM-50-080917	MW-N-83 8/7/2017 MWN-83-080717	MW-N-113 8/7/2017 MWN-113-080717	MW-O-145 8/9/2017 MWO-145-080917	MW-P-235 8/8/2017 MWP-235-080817	MW-Q-150 8/9/2017 MWQ-150-080917	MW-R-330 8/8/2017 MWR-330-080817
TOTAL METALS in ug/L																	
7429-90-5	ALUMINUM	20,000	390	32	35	37	< 30 U	< 30 U	< 30 U	< 30 U	< 30 U	28 JB	19 JB	< 30 U	< 30 U	< 30 U	240
7440-36-0	ANTIMONY	7.8	0.52 J	< 2 U	< 2 U	0.82 J	0.44 JB	< 2 U	0.5 JB	0.69 JB	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	1.6 J	0.5 J
7440-38-2	ARSENIC	0.052	1.2	0.75 J	0.48 J	0.42 J	0.24 JB	0.22 J	0.26 J	0.3 J	0.41 J	0.41 J	1.6	0.33 J	0.4 JB	7.7	0.39 J
7440-39-3	BARIUM	3,800	19	45	17	31	120	20	100	110	12	27	19	15	17	20	24
7440-41-7	BERYLLIUM	25	0.71 J	< 1 U	0.44 J	0.14 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.14 J	< 1 U	< 1 U	< 1 U	< 1 U	0.32 J
7440-43-9	CADMIUM	9.2	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.082 J	< 1 U	< 1 U	0.19 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.079 J
7440-70-2	CALCIUM METAL	---	540000	280000	620000	360000	130000	380000	110000	120000	630000	360000	400000	600000	550000	430000	430000
7440-47-3	CHROMIUM[1]	---	< 2 U	0.72 J	0.52 J	0.62 J	0.54 JB	< 2 U	1.3 J	3.3	0.4 J	< 2 U	< 2 U	0.52 J	< 2 U	0.42 J	0.55 J
7440-48-4	COBALT	6	0.98	0.35 J	0.19 J	0.21 J	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	5.6	< 0.5 U	0.18 J	< 0.5 U	< 0.5 U	3.2	4.8
7440-50-8	COPPER	800	1.5 J	1.6 J	1.5 J	1.8 J	< 2 U	1.8 J	1.4 JB	2.4 B	1.6 J	1.1 JB	1.1 JB	1.4 J	1.8 JB	1.4 J	1.9 J
7439-89-6	IRON	14,000	9300	8600	17000	8200	23 J	< 50 U	91	260	260	16000	16000	14000	5100	17000	640
7439-92-1	LEAD	15	< 1 U	< 1 U	22	57	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	61	< 1 U
7439-95-4	MAGNESIUM	---	49000	14000	48000	20000	20000	45000	14000	15000	18000	17000	25000	43000	46000	22000	46000
7439-96-5	MANGANESE	430	6500	1800	6300	3500	< 5 U	21	1.6 J	3 J	180	3000	6800	3200	3400	4500	2300
7440-02-0	NICKEL	390	2.8	2.8	0.54 J	0.66 J	0.49 J	1.2	0.36 J	0.43 J	6.4	1 U	1 U	0.62 J	< 1 U	5.1	3.8
7440-09-7	POTASSIUM	---	13000	6500	12000	6500	500 B	8600	1200	1300	3900	20000	14000	9400	3400	18000	16000
7782-49-2	SELENIUM	100	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
7440-22-4	SILVER	94	< 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 U	< 1 U	< 1 U
7440-23-5	SODIUM	---	91000	8400	29000	11000	500 B	6500	3200	3500	2200	6500	7900	57000	41000	8100	15000
7440-28-0	THALLIUM	0.2	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.056 J	0.054 JB	0.068 JB	0.11 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.5
7440-62-2	VANADIUM	86	0.61 J	0.91 J	1.3	0.99 J	1 B	0.69 J	0.71 J	0.98 J	0.99 J	1	0.76 J	1.1	0.98 JB	0.77 J	0.89 J
7440-66-6	ZINC	6,000	17	20	10	4.4 J	5 U	6	6.8	10	5 U	3.2 J	2.8 J	5.1	12	5 U	6.4
57-12-5	CYANIDE	1.5	< 10 U	< 10 U	6 J	< 10 U	3.5 J	< 10 U	< 10 U	< 10 U	3.5 J	< 10 U	5.1 J	4.7 J	3.4 J	< 10 U	3.9 J
7439-97-6	MERCURY	0.63	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L																	
16887-00-6	CHLORIDE	---	37	17	45	19	18	22	22	22	7.7	18	24	59	56	21	47
14797-55-8	NITRATE AS N	32	< 0.1 U	0.085 J	< 0.25 U	0.074 J	3.3	3.8	3.5	3.6	0.94	< 0.1 U	< 0.1 U	< 0.25 U	< 0.1 U	< 0.1 U	0.4
14808-79-8	SULFATE	---	1200	560	1400	580	92	700	32	32	1300	590	810	1500	1400	870	820
ALKB	BICARBONATE ALKALINITY	---	440	420	340	450	330	470	350	350	290	540	420	190	170	440	490
ALKC	CARBONATE ALKALINITY	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	440	420	340	450	330	470	350	350	290	540	420	190	170	440	490
PESTICIDES in ug/L																	
957-51-7	DIPHENAMID	530	260	3.7	110	< 1 U	< 0.98 U	< 0.98 U	< 0.98 U	< 0.98 U	< 0.95 U	2.8	3.4	200	150	7.5	11
53-19-0	2,4'-DDD	0.032	< 1.3 U	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.12 U	< 0.062 U	< 0.13 U	< 0.13 U	< 0.12 U	< 0.13 U
3424-82-6	2,4'-DDE	0.046	< 1.3 U	0.3	< 0.13 U	0.11 JP	0.037	2.8	0.0038 p	0.0037 p	0.34	< 0.12 U	0.2 p	< 0.13 U	< 0.13 U	0.28	0.22 p
789-02-6	2,4'-DDT	0.23	< 1.3 U	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.12 U	0.062 U	< 0.13 U	< 0.13 U	< 0.12 U	< 0.13 U
72-54-8	4,4'-DDD	0.032	< 1.3 U	< 0.13 U	< 0.13 U	< 0.13 U	0.0019	0.082 J	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.18 p	0.031 JP	< 0.13 U	< 0.13 U	< 0.12 U	< 0.13 U
72-55-9	4,4'-DDE	0.046	< 1.3 U	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.12 U	< 0.062 U	< 0.13 U	< 0.13 U	< 0.12 U	< 0.13 U
50-29-3	4,4'-DDT	0.23	< 1.3 U	< 0.13 U	< 0.13 U	< 0.13 U	0.0025	< 0.13 U	< 0.0013 U	0.00073 Jp	0.042	< 0.12 U	0.062 U	< 0.13 U	< 0.13 U	0.12 U	< 0.13 U
309-00-2	ALDRIN	0.00092	< 1.3 U	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.12 U	< 0.062 U	< 0.13 U	< 0.13 U	< 0.12 U	< 0.13 U
319-84-6	ALPHA-BHC	0.0072	< 1.3 U	0.49	0.12 JP	0.29	0.041 p	0.5	0.012	0.011	0.15	4.1	3.9	< 0.13 U	0.14 p	2.2	6
5103-71-9	ALPHA-CHLORDANE	0.02	< 1.3 U	< 0.13 U	< 0.13 U	< 0.13 U	0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.12 U	< 0.062 U	< 0.13 U	0.13 U	< 0.12 U	< 0.13 U
319-85-7	BETA-BHC	0.025	2.2	4.4	0.65 p	1.7	0.16	22	0.036	0.035	5.2	7.3	3.6	0.65	0.49 p	4.3	6.1
319-86-8	DELTA-BHC	0.025	5.3	3.5	9.4	5.1	0.0013 B	0.62	0.005	0.0028 p	0.53	13	8.3	6.1	2.6	8.7	8.6
60-57-1	DIELDRIN	0.0018	< 1.3 U	0.81	< 0.13 U	< 0.13 U	0.011	1.2	0.0014	0.0015	0.41	0.11 J	< 0.062 U	< 0.13 U	< 0.13 U	< 0.12 U	< 0.13 U
959-98-8	ENDOSULFAN I	100	< 1.3 U	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.12 U	< 0.062 U	< 0.13 U	< 0.13 U	< 0.12 U	< 0.13 U
33213-65-9	ENDOSULFAN II	100	< 1.3 U	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.12 U	< 0.062 U	< 0.13 U	< 0.13 U	< 0.12 U	< 0.13 U
1031-07-8	ENDOSULFAN SULFATE	---	< 1.3 U	< 0.13 U	0.46	< 0.13 U	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.12 U	< 0.062 U	0.3 p	0.27 p	< 0.12 U	< 0.13 U
72-20-8	ENDRIN	2.3	< 1.3 U	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0013 U	0.46	< 0.0013 U	0.00067 Jp	< 0.0013 U	0.068 JP	< 0.062 U	< 0.13 U	< 0.13 U	< 0.12 U	< 0.13 U
7421-93-4	ENDRIN ALDEHYDE	---	< 1.3 U	< 0.13 U	0.2	< 0.13 U	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.12 U	< 0.062 U	0.14 p	0.12 JP	< 0.12 U	< 0.13 U
53494-70-5	ENDRIN KETONE	---	< 1.3 U	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0013 U	1.6	< 0.0013 U	< 0.0013 U	0.19	< 0.12 U	< 0.062 U	< 0.13 U	< 0.13 U	< 0.12 U	< 0.13 U
58-89-9	GAMMA-BHC (LINDANE)	0.042	< 1.3 U	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0013 U	< 0.13 U	0.0033	0.003	0.026	0.12 U	< 0.062 U	< 0.13 U	< 0.13 U	< 0.12 U	0.16
12789-03-6	gamma-Chlordane	0.02	< 1.3 U	< 0.13 U	< 0.13 U	< 0.13 U	0.0059 p	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.12 U	0.04 JP	< 0.13 U	< 0.13 U	< 0.12 U	< 0.13 U
76-44-8	HEPTACHLOR	0.0014	< 1.3 U	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.12 U	< 0.062 U	< 0.13 U	< 0.13 U	< 0.12 U	< 0.13 U
1024-57-3	HEPTACHLOR EPOXIDE	0.0014	< 1.3 U	< 0.13 U	< 0.13 U	< 0.13 U	0.016 p	0.13	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.12 U	< 0.062 U	< 0.13 U	< 0.13 U	< 0.12 U	< 0.13 U
72-43-5	METHOXYCHLOR	37	< 1.3 U	< 0.13 U	< 0.13 U	< 0.13 U	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.12 U	< 0.062 U	< 0.13 U	< 0.13 U	< 0.12 U	< 0.13 U
8001-35-2	TOXAPHENE	0.071	< 97 U	< 9.9 U	< 9.9 U	< 9.7 U	< 0.096 U	< 9.8 U	< 0.1 U	< 0.1 U	< 0.097 U	< 9.4 U	< 4.8 U	< < 9.8 U	< 9.7 U	< < 9.4 U	< 9.6 U
HERBICIDES in ug/L																	
94-75-7	2,4-D	170	< 3.8 U	< 4 U	< 3.8 U	< 4 U	< 3.9 U	< 3.8 U	< 3.8 U	< 3.8 U	< 4 U	< 3.8 U	< 3.9 U	< 3.8 U	< 3.9 U	< 4 U	< 3.9 U
93-76-5	2,4,5-T	160	< 0.96 U	< 0.99 U	< 0.95 U	< 1 U	< 0.98 U	< 0.95 U	< 0.96 U	< 0.96 U	< 0.99 U	< 0.95 U	< 0.97 U	< 0.95 U	< 0.98 U	< 1 U	< 0.97 U

Table 5-21
July-August 2017 (4th Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	MW-H-65 8/8/2017 MWH-65-080817	MW-I-55 8/8/2017 MWI-55-080817	MW-J-71 8/9/2017 MWJ-71-080917	MW-K-80 8/8/2017 MWK-80-080817	MW-K-440 8/4/2017 MWK-440-080417	MW-L-48 8/8/2017 MWL-48-080817	MW-L-250 8/7/2017 MWL-250-080717	MW-L-250 8/7/2017 DUP-080717	MW-M-50 8/9/2017 MWM-50-080917	MW-N-83 8/7/2017 MWN-83-080717	MW-N-113 8/7/2017 MWN-113-080717	MW-O-145 8/9/2017 MWO-145-080917	MW-P-235 8/8/2017 MWP-235-080817	MW-Q-150 8/9/2017 MWQ-150-080917	MW-R-330 8/8/2017 MWR-330-080817
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L																	
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	710	< 1.9 U	< 0.19 U	0.93 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 4.6 U	< 1.9 U	< 0.19 U	< 0.19 U
95-95-4	2,4,5-TRICHLOROPHENOL	1,200	8.7 J	< 1 U	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.98 U	< 24 U	< 10 U	< 0.98 U	0.14 J
88-06-2	2,4,6-TRICHLOROPHENOL	4.1	24	< 1 U	**< 4.9 U**	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.98 U	**< 24 U**	**< 10 U**	< 0.98 U	< 0.98 U
120-83-2	2,4-DICHLOROPHENOL	46	3.7	< 0.19 U	0.49 J	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	0.36	< 4.6 U	< 1.9 U	< 0.19 U	< 0.19 U
105-67-9	2,4-DIMETHYLPHENOL	360	< 9.9 U	< 1 U	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.98 U	< 24 U	< 10 U	< 0.98 U	< 0.98 U
51-28-5	2,4-DINITROPHENOL	39	**99 U**	< 10 U	**49 U**	< 10 U	< 9.8 U	< 9.7 U	< 9.8 U	< 9.8 U	< 9.5 U	< 9.5 U	< 9.8 U	**< 240 U**	**< 100 U**	< 9.8 U	< 9.8 U
121-14-2	2,4-DINITROTOLUENE	0.24	**< 9.9 U**	**< 1 U**	**< 4.9 U**	**< 1 U**	**< 0.98 U**	**< 0.97 U**	**< 0.98 U**	**< 0.98 U**	**< 0.95 U**	**< 0.95 U**	**< 0.98 U**	**< 24 U**	**< 10 U**	**< 0.98 U**	**< 0.98 U**
606-20-2	2,6-DINITROTOLUENE	0.049	**< 9.9 U**	**< 1 U**	**< 4.9 U**	**< 1 U**	**< 0.98 U**	**< 0.97 U**	**< 0.98 U**	**< 0.98 U**	**< 0.95 U**	**< 0.95 U**	**< 0.98 U**	**< 24 U**	**< 10 U**	**< 0.98 U**	**< 0.98 U**
91-58-7	2-CHLORONAPHTHALENE	750	< 1.9 U	< 0.19 U	< 0.93 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 4.6 U	< 1.9 U	< 0.19 U	< 0.19 U
95-57-8	2-CHLOROPHENOL	91	< 9.9 U	0.15 J	2 J	0.11 J	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	0.15 J	0.32 J	< 24 U	< 10 U	0.42 J	< 0.98 U
95-48-7	2-METHLYPHENOL	930	< 9.9 U	< 1 U	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.98 U	< 24 U	< 10 U	< 0.98 U	< 0.98 U
91-57-6	2-METHYLNAPHTHALENE	36	< 1.9 U	< 0.19 U	< 0.93 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 4.6 U	< 1.9 U	< 0.19 U	< 0.19 U
88-74-4	2-NITROANILINE	190	< 50 U	< 5 U	< 25 U	< 5 U	< 4.9 U	< 4.9 U	< 4.9 U	< 4.9 U	< 4.8 U	< 4.8 U	< 4.9 U	**< 120 U**	< 51 U	< 4.9 U	< 4.9 U
88-75-5	2-NITROPHENOL	---	< 9.9 U	< 1 U	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.98 U	< 24 U	< 10 U	< 0.98 U	< 0.98 U
91-94-1	3,3`-DICHLOROBENZIDINE	0.13	**< 9.9 U**	**< 1 U**	**< 4.9 U**	**< 1 U**	**< 0.98 U**	**< 0.97 U**	**< 0.98 U**	**< 0.98 U**	**< 0.95 U**	**< 0.95 U**	**< 0.98 U**	**< 24 U**	**< 10 U**	**< 0.98 U**	**< 0.98 U**
99-09-2	3-NITROANILINE	---	< 50 U	5 U	< 25 U	< 5 U	< 4.9 U	< 4.9 U	< 4.9 U	< 4.9 U	< 4.8 U	< 4.8 U	< 4.9 U	< 120 U	< 51 U	< 4.9 U	< 4.9 U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	1.5	**< 50 U**	**< 5 U**	**< 25 U**	**< 5 U**	**< 4.9 U**	**< 4.9 U**	**< 4.9 U**	**< 4.9 U**	**< 4.8 U**	**< 4.8 U**	**< 4.9 U**	**< 120 U**	**< 51 U**	**< 4.9 U**	**< 4.9 U**
101-55-3	4-BROMOPHENYL PHENYL ETHER	---	< 9.9 U	< 1 U	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.98 U	< 24 U	< 10 U	< 0.98 U	< 0.98 U
59-50-7	4-CHLORO-3-METHYLPHENOL	1,400	< 9.9 U	< 1 U	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.98 U	< 24 U	< 10 U	< 0.98 U	< 0.98 U
106-47-8	4-CHLOROANILINE	0.37	**< 9.9 U**	**< 1 U**	2.2 J	**< 1 U**	**< 0.98 U**	**< 0.97 U**	**< 0.98 U**	**< 0.98 U**	**< 0.95 U**	**< 0.95 U**	**< 0.98 U**	**< 24 U**	**< 10 U**	**< 0.98 U**	**< 0.98 U**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	---	< 9.9 U	< 1 U	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.98 U	< 24 U	< 10 U	< 0.98 U	< 0.98 U
106-44-5	4-METHLYPHENOL	1,900	< 9.9 U	< 1 U	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.98 U	< 24 U	< 10 U	< 0.98 U	< 0.98 U
100-01-6	4-NITROANILINE	3.8	**< 50 U**	**< 5 U**	**< 25 U**	**< 5 U**	**< 4.9 U**	**< 4.9 U**	**< 4.9 U**	**< 4.9 U**	**< 4.8 U**	**< 4.8 U**	**< 4.9 U**	**< 120 U**	**< 51 U**	**< 4.9 U**	**< 4.9 U**
100-02-7	4-NITROPHENOL	---	< 50 U	< 5 U	< 25 U	< 5 U	< 4.9 U	< 4.9 U	< 4.9 U	< 4.9 U	< 4.8 U	< 4.8 U	< 4.9 U	< 120 U	< 51 U	< 4.9 U	< 4.9 U
83-32-9	ACENAPHTHENE	530	< 1.9 U	< 0.19 U	1.2	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U	0.36	0.12 J	< 4.6 U	< 1.9 U	< 0.19 U	< 0.19 U
208-96-8	ACENAPHTHYLENE	---	< 1.9 U	< 0.19 U	< 0.93 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 4.6 U	< 1.9 U	< 0.19 U	< 0.19 U
98-86-2	ACETOPHENONE	1,900	< 9.9 U	< 1 U	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	0.31 J	0.13 J	< 24 U	< 10 U	0.41 J	< 0.98 U
120-12-7	ANTHRACENE	1,800	< 1.9 U	< 0.19 U	0.93 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 4.6 U	< 1.9 U	< 0.19 U	< 0.19 U
1912-24-9	ATRAZINE	0.3	**< 9.9 U**	**< 1 U**	**< 4.9 U**	**< 1 U**	**< 0.98 U**	**< 0.97 U**	**< 0.98 U**	**< 0.98 U**	**< 0.95 U**	**< 0.95 U**	**< 0.98 U**	**< 24 U**	**< 10 U**	0.51 J	1.9
100-52-7	BENZALDEHYDE	19	< 9.9 U	< 1 U	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.98 U	< 24 U	< 10 U	< 0.98 U	< 0.98 U
56-55-3	BENZO[A]ANTHRACENE	0.03	< 1.9 U	< 0.19 U	< 0.93 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 4.6 U	< 1.9 U	< 0.19 U	< 0.19 U
50-32-8	BENZO[A]PYRENE	0.025	**< 1.9 U**	**< 0.19 U**	**< 0.93 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 4.6 U**	**< 1.9 U**	0.095 J	**< 0.19 U**
205-99-2	BENZO[B]FLUORANTHENE	0.25	**< 1.9 U**	< 0.19 U	**< 0.93 U**	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	**< 4.6 U**	**< 1.9 U**	0.1 J	< 0.19 U
191-24-2	BENZO[G,H,I]PERYLENE	---	< 1.9 U	< 0.19 U	< 0.93 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 4.6 U	< 1.9 U	0.14 J	< 0.19 U
207-08-9	BENZO[K]FLUORANTHENE	2.5	< 1.9 U	< 0.19 U	< 0.93 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	**< 4.6 U**	< 1.9 U	< 0.19 U	< 0.19 U
85-68-7	BENZYL BUTYL PHTHALATE	16	< 9.9 U	< 1 U	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.98 U	**< 24 U**	**10 U**	< 0.98 U	< 0.98 U
92-52-4	BIPHENYL	0.83	**< 9.9 U**	**< 1 U**	**< 4.9 U**	**< 1 U**	**< 0.98 U**	**< 0.97 U**	**< 0.98 U**	**< 0.98 U**	**< 0.95 U**	**< 0.95 U**	**< 0.98 U**	**< 24 U**	**< 0.98 U**	**< 0.98 U**	**< 0.98 U**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	59	< 9.9 U	< 1 U	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.98 U	< 24 U	10 U	< 0.98 U	< 0.98 U
111-44-4	BIS(2-CHLOROETHYL) ETHER	0.014	**< 1.9 U**	**< 0.19 U**	**< 0.93 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 4.6 U**	**< 1.9 U**	**< 0.19 U**	**< 0.19 U**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.6	34	2.3	**< 9.8 U**	2.8	1.9 J	2.4	13	< 2 U	7.4	< 1.9 U	< 2 U	**< 49 U**	**20 U**	6.4	2
105-60-2	CAPROLACTAM	9,900	< 50 U	< 5 U	< 25 U	5 U	< 4.9 U	< 4.9 U	< 4.9 U	< 4.9 U	< 4.8 U	< 4.8 U	< 4.9 U	< 120 U	< 51 U	< 4.9 U	< 4.9 U
86-74-8	CARBAZOLE	---	0.79 J	< 0.19 U	< 0.93 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 4.6 U	< 1.9 U	< 0.19 U	< 0.19 U
218-01-9	CHRYSENE	25	< 1.9 U	< 0.19 U	< 0.93 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 4.6 U	< 1.9 U	0.096 J	< 0.19 U
53-70-3	DIBENZ[A,H]ANTHRACENE	0.025	**< 1.9 U**	**< 0.19 U**	**< 0.93 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 4.6 U**	**< 1.9 U**	**< 0.19 U**	**< 0.19 U**
132-64-9	DIBENZOFURAN	7.9	< 9.9 U	< 1 U	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	0.17 J	< 0.98 U	**< 24 U**	**< 10 U**	< 0.98 U	< 0.98 U
84-66-2	DIETHYL PHTHALATE	15,000	< 9.9 U	0.14 J	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	0.21 J	< 0.99 U	< 0.95 U	< 0.95 U	< 0.98 U	< 24 U	1.8 J	< 0.98 U	0.2 J
131-11-3	DIMETHYL PHTHALATE	---	< 9.9 U	< 1 U	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.98 U	< 24 U	< 10 U	< 0.98 U	< 0.98 U
84-74-2	DI-N-BUTYL PHTHALATE	900	< 9.9 U	0.2 J	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	0.23 J	0.29 J	< 0.95 U	0.2 J	0.19 J	< 24 U	< 10 U	0.18 J	0.19 J
117-84-0	DI-N-OCTYL PHTHALATE	200	< 9.9 U	< 1 U	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.98 U	< 24 U	< 10 U	< 0.98 U	< 0.98 U
206-44-0	FLUORANTHENE	800	< 1.9 U	< 0.19 U	< 0.93 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 4.6 U	< 1.9 U	< 0.19 U	< 0.19 U
86-73-7	FLUORENE	290	< 1.9 U	< 0.19 U	1.5	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U	0.32	< 0.19 U	< 4.6 U	< 1.9 U	< 0.19 U	< 0.19 U
118-74-1	HEXACHLOROBENZENE	0.0098	**< 1.9 U**	**< 0.19 U**	**< 0.93 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 4.6 U**	**< 1.9 U**	**< 0.19 U**	**< 0.19 U**
87-68-3	HEXACHLOROBUTADIENE	0.14	**< 1.9 U**	**< 0.19 U**	**< 0.93 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 4.6 U**	**< 1.9 U**	**< 0.19 U**	**< 0.19 U**
77-47-4	HEXACHLOROCYCLOPENTADIENE	0.41	**< 9.9 U**	**< 1 U**	**< 4.9 U**	**< 1 U**	**< 0.98 U**	**< 0.97 U**	**< 0.98 U**	**< 0.98 U**	**< 0.95 U**	**< 0.95 U**	**< 0.98 U**	**< 24 U**	**< 10 U**	**< 0.98 U**	**< 0.98 U**
67-72-1	HEXACHLOROETHANE	0.33	**< 9.9 U**	**< 1 U**	**< 4.9 U**	**< 1 U**	**< 0.98 U**	**< 0.97 U**	**< 0.98 U**	**< 0.98 U**	**< 0.95 U**	**< 0.95 U**	**< 0.98 U**	**< 24 U**	**< 10 U**	**< 0.98 U**	**< 0.98 U**
193-39-5	INDENO[1,2,3-CD]PYRENE	0.25	**< 1.9 U**	< 0.19 U	**< 0.93 U**	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	**< 4.6 U**	**< 1.9 U**	0.15 J	< 0.19 U
78-59-1	ISOPHORONE	78	< 9.9 U	< 1 U	< 4.9 U	1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.98 U	< 24 U	< 10 U	< 0.98 U	< 0.98 U
91-20-3	NAPHTHALENE	0.17	**< 1.9 U**	**< 0.19 U**	**< 0.93 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 4.6 U**	**< 1.9 U**	**< 0.19 U**	**< 0.19 U**
98-95-3	NITROBENZENE	0.14	**< 20 U**	**< 2 U**	**< 9.8 U**	**< 2 U**	**< 2 U**	**< 1.9 U**	**< 2 U**	**< 2 U**	**< 1.9 U**	**< 1.9 U**	**< 2 U**	**< 49 U**	**< 20 U**	**< 2 U**	**< 2 U**
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.011	**< 1.9 U**	**< 0.19 U**	**< 0.93 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 4.6 U**	**< 1.9 U**	**< 0.19 U**	**< 0.19 U**
86-30-6	N-NITROSODIPHENYLAMINE	12	< 9.9 U	< 1 U	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.98 U	**< 24 U**	< 10 U	< 0.98 U	< 0.98 U
87-86-5	PENTACHLOROPHENOL	0.041	150	**< 5 U**	**< 25 U**	**< 5 U**	**< 4.9 U**	**< 4.9 U**	**< 4.9 U**	**< 4.9 U**	**< 4.8 U**	**< 4.8 U**	**< 4.9 U**	**< 120 U**	**< 51 U**	**< 4.9 U**	**< 4.9 U**
85-01-8	PHENANTHRENE	---	< 1.9 U	< 0.19 U	0.93 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 4.6 U	< 1.9 U	< 0.19 U	< 0.19 U
108-95-2	PHENOL	5,800	< 9.9 U	< 1 U	< 4.9 U	< 1 U	< 0.98 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.95 U	< 0.95 U	< 0.98 U	< 24 U	< 10 U	< 0.98 U	< 0.98 U
129-00-0	PYRENE	120	< 1.9 U	< 0.19 U	0.93 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U	< 4.6 U	< 1.9 U	< 0.19 U	< 0.19 U

Table 5-21
July-August 2017 (4th Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	MW-H-65 8/8/2017 MWH-65-080817	MW-I-55 8/8/2017 MWI-55-080817	MW-J-71 8/9/2017 MWJ-71-080917	MW-K-80 8/8/2017 MWK-80-080817	MW-K-440 8/4/2017 MWK-440-080417	MW-L-48 8/8/2017 MWL-48-080817	MW-L-250 8/7/2017 MWL-250-080717	MW-L-250 8/7/2017 DUP-080717	MW-M-50 8/9/2017 MWM-50-080917	MW-N-83 8/7/2017 MWN-83-080717	MW-N-113 8/7/2017 MWN-113-080717	MW-O-145 8/9/2017 MWO-145-080917	MW-P-235 8/8/2017 MWP-235-080817	MW-Q-150 8/9/2017 MWQ-150-080917	MW-R-330 8/8/2017 MWR-330-080817
VOLATILE ORGANIC COMPOUNDS in ug/L																	
71-55-6	1,1,1-TRICHLOROETHANE	8,000	< 1 U	< 1 U	< 10 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.076	**< 1 U**	**< 1 U**	**< 10 UF1***	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**1 U***	**< 1 U**	**< 1 U**	**< 5 U**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10,000	< 1 U	< 1 U	< 10 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U
79-00-5	1,1,2-TRICHLOROETHANE	0.28	**< 1 U**	**< 1 U**	**< 10 UF1**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**
75-34-3	1,1-DICHLOROETHANE	2.8	< 1 U	< 1 U	< 10 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U
75-35-4	1,1-DICHLOROETHYLENE	280	< 1 U	< 1 U	< 10 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U
120-82-1	1,2,4-TRICHLOROBENZENE	1.2	**1.4**	0.59 J	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**2.3**	**5.7**	**2.3**	**4.9**	1.1	**< 5 U**
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	0.00033	**< 1 U**	**< 1 U**	**< 10 UF1**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**
106-93-4	1,2-DIBROMOETHANE	0.0075	**< 1 U**	**< 1 U**	**< 10 UF1***	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**1 U***	**< 1 U**	**< 1 U**	**< 5 U**
95-50-1	1,2-DICHLOROBENZENE	300	19	4.7	49	5.8	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	3.4	11	48	30	2.6	4.4 J
107-06-2	1,2-DICHLOROETHANE	0.17	**< 1 U**	**< 1 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**0.64 J**	**< 1 U**	**0.36 J**	**< 1 U**	**1.5**	**0.34 J**	**5.2**
78-87-5	1,2-DICHLOROPROPANE	0.85	**< 1 U**	**< 1 U**	**< 10 UF1**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**
541-73-1	1,3-DICHLOROBENZENE	---	1.2	0.43 J	2.1 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.65 J	1.4	2.6	2.6	0.37 J	< 5 U
106-46-7	1,4-DICHLOROBENZENE	0.48	**25**	**12**	**60 F1**	**4.4**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	0.44 J	**10**	**23**	**49**	**59**	**8.2**	**11**
78-93-3	2-BUTANONE	5,600	< 5 U	< 5 U	< 50 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	25 U
591-78-6	2-HEXANONE	38	< 5 U	< 5 U	< 50 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	25 U
108-10-1	4-METHYL-2-PENTANONE	6,300	< 5 U	< 5 U	< 50 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	25 U
67-64-1	ACETONE	14,000	< 5 U	< 5 U	< 50 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	25 U
71-43-2	BENZENE	0.46	**7**	**0.91 J**	**44 F1**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**4.2**	**50**	**18**	**0.92 J**	**< 5 U**
75-27-4	BROMODICHLOROMETHANE	0.13	**< 1 U**	**< 1 U**	**< 10 UF1**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**
75-25-2	BROMOFORM	3.3	< 1 U	< 1 U	**< 10 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**< 5 U**
74-83-9	BROMOMETHANE	7.5	< 1 U	< 1 U	**< 10 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U
75-15-0	CARBON DISULFIDE	810	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U
56-23-5	CARBON TETRACHLORIDE	0.46	**< 1 U**	**< 1 U**	**< 10 UF1**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**
108-90-7	CHLOROBENZENE	78	**150**	40	**420**	14	< 1 U	0.32 J	< 1 U	< 1 U	0.69 J	44	58	**660**	**290**	41	63
75-00-3	CHLOROETHANE	21,000	< 1 U	< 1 U	< 10 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U
67-66-3	CHLOROFORM	0.22	**0.33 J**	**0.33 J**	**< 10 UF1**	**< 1 U**	**0.6 J**	**2**	**0.78 J**	**0.75 J**	**2.6**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**
74-87-3	CHLOROMETHANE	190	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U
156-59-2	CIS-1,2-DICHLOROETHENE	36	< 1 U	< 1 U	< 10 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	---	< 1 U	< 1 U	< 10 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U
110-82-7	CYCLOHEXANE	13,000	< 1 U	< 1 U	< 10 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U
124-48-1	DIBROMOCHLOROMETHANE	0.87	**< 1 U**	**< 1 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**
75-71-8	DICHLORODIFLUOROMETHANE	200	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U
100-41-4	ETHYLBENZENE	1.5	0.44 J	< 1 U	**< 10 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.95 J	0.82 J	0.27 J	< 1 U	< 5 U
98-82-8	ISOPROPYLBENZENE (CUMENE)	450	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.9	0.73 J	0.79 J	0.44 J	0.69 J	< 5 U
79-20-9	METHYL ACETATE	20,000	< 5 U	< 5 U	< 50 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	25 U
1634-04-4	METHYL TERT-BUTYL ETHER	14	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	0.2 J	< 1 U	< 1 U	< 1 U	1 U	< 1 U	< 1 U	0.82 J	0.2 J	1.1 J
108-87-2	METHYLCYLOHEXANE	---	< 1 U	< 1 U	< 10 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.37 J	< 1 U	< 1 U	< 1 U	0.21 J	< 5 U
75-09-2	METHYLENE CHLORIDE	11	< 1 U	< 1 U	**< 10 UF1**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U
100-42-5	STYRENE (MONOMER)	1,200	< 1 U	< 1 U	10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U
127-18-4	TETRACHLOROETHYLENE	11	< 1 U	< 1 U	**< 10 U**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U
108-88-3	TOLUENE	1,100	0.23 J	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.55 J	0.38 J	< 1 U	< 5 U
156-60-5	TRANS-1,2-DICHLOROETHENE	360	< 1 U	< 1 U	< 10 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	---	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U
79-01-6	TRICHLOROETHYLENE	0.49	**< 1 U**	**< 1 U**	**< 10 UF1**	**< 1 U**	**1.6**	**< 1 U**	0.28 J	0.24 J	**< 1 U**	0.23 J	0.27 J	0.27 J	**< 1 U**	**< 1 U**	**< 5 U**
75-69-4	TRICHLOROFLUOROMETHANE	5,200	< 1 U	< 1 U	< 10 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 5 U
75-01-4	VINYL CHLORIDE	0.019	**< 1 U**	**< 1 U**	**< 10 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 5 U**
XYLENES	Xylenes, Total	190	< 2 U	< 2 U	< 20 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	0.33 J	0.98 J	0.63 J	< 2 U	< 2 U	< 10 U

Notes:
USEPA RSL for TAP WATER (latest version, November 2017)
USEPA MCL (latest version, November 2017)
(1) No RSL exists, MCL utilized.
U - The analyte was not detected above the reporting limit (RL).
UJ - The reporting limit is estimated due to minor quality control anomaly.
J - Result is either less than the RL but greater than or equal to the method detecti
B - Parameter was detected in associated laboratory method blank.
NJ - Result is estimated due to a dual column imprecision greater than 100%.
Bold indicates the reporting limit was above the RSL and/or MCL.
Red bolded detected concentration exceeds RSL
Red bolded and highlighted detected concentration exceeds MCL

Table 5-21
July-August 2017 (4th Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	MW-R-600 8/8/2017 MWR-600-080817	EW-1-110 8/9/2017 EW1-110-080917	OW-1-62 7/31/2017 OW1-62-073117	OW-1-105 7/31/2017 OW1-105-073117	OW-2-65 8/1/2017 OW2-65-080117	OW-2-115 8/1/2017 OW2-115-080117	OW-3-55 8/2/2017 OW3-55-080217	OW-3-105 8/2/2017 OW3-105-080217	OW-4-70 8/2/2017 OW4-70-080217	OW-5-90 8/1/2017 OW5-90-080117	OW-7-242 8/3/2017 OW7-242-080317	OW-7-410 8/3/2017 OW7-410-080317	OW-8-230 7/31/2017 OW8-230-073117	OW-9-125 8/1/2017 OW9-125-080117
TOTAL METALS in ug/L																
7429-90-5	ALUMINUM	20,000	< 30 U	280	< 30 U	71	70	56	< 30 U	95	18 J	91	30	< 30 U	14 J	23 J
7440-36-0	ANTIMONY	7.8	0.62 J	< 2 U	< 2 U	< 2 U	< 2 U	0.49 J	< 2 U	0.58 J	1.7 J	< 2 U	0.59 JB	< 2 U	< 2 U	< 2 U
7440-38-2	ARSENIC	0.052	1.3	0.69 J	0.32 J	**< 1 U**	0.31 J	0.64 J	**< 1 U**	1.4	0.31 J	0.24 J	3.5	**< 1 U**	0.28 J	0.4 J
7440-39-3	BARIUM	3,800	65	28	140	130	40	41	80	130	34	40	59	32	25	92
7440-41-7	BERYLLIUM	25	< 1 U	0.13 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.65 J	< 1 U	< 1 U	< 1 U	< 1 U
7440-43-9	CADMIUM	9.2	< 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 U	< 1 U
7440-70-2	CALCIUM METAL	---	140000	480000	210000	140000	200000	300000	110000	83000	190000	220000	98000	290000	410000	160000
7440-47-3	CHROMIUM[10]	---	0.52 J	0.46 J	0.9 J	0.74 J	< 2 U	< 2 U	0.8 J	1.5 J	< 2 U	0.52 J	0.39 JB	< 2 U	< 2 U	0.39 J
7440-48-4	COBALT	6	1.1	0.13 J	< 0.5 U	< 0.5 U	< 0.5 U	9.1	< 0.5 U	0.52	0.37 J	0.15 J	< 0.5 U	< 0.5 U	0.32 J	< 0.5 U
7440-50-8	COPPER	800	1.4 J	1.1 J	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	2.2	2.1	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
7439-89-6	IRON	14,000	1900	29000	< 50 U	25 J	46 J	16000	< 50 U	1600	24 J	20 J	940	< 50 U	52	31 J
7439-92-1	LEAD	15	< 1 U	1.6	< 1 U	< 1 U	< 1 U	49	< 1 U	0.88 J	10	5.7	< 1 U	< 1 U	< 1 U	2.7
7439-95-4	MAGNESIUM	---	27000	24000	15000	14000	20000	21000	11000	13000	33000	21000	43000	55000	61000	17000
7439-96-5	MANGANESE	430	570	4200	< 5 U	8.3	5.4	3200	< 5 U	220	48	78	32	4 J	360	< 5 U
7440-02-0	NICKEL	390	2	< 1 U	0.35 J	< 1 U	0.29 J	5.8	0.41 J	1.4	2.2	1.3	1.6	0.58 J	1.4	< 1 U
7440-09-7	POTASSIUM	---	2100	8200	3200	1800	2500	4700	2700	1700	42000	14000	500 B	500 B	2200	1800
7782-49-2	SELENIUM	100	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
7440-22-4	SILVER	94	< 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 U	< 1 U
7440-23-5	SODIUM	---	19000	17000	170000	43000	41000	78000	26000	230000	56000	15000	500 B	500 B	39000	47000
7440-28-0	THALLIUM	0.2	0.06 J	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	0.16 J	**< 1 U**	**< 1 U**	0.41 J	0.14 J	**1 U**	0.14 JB	0.24 J	**< 1 U**
7440-62-2	VANADIUM	86	0.91 J	1.5	1.2	0.85 J	1.2	0.97 J	0.71 JB	1 B	0.82 JB	0.97 J	0.84 JB	0.78 JB	1.2	1.7
7440-66-6	ZINC	6,000	3 J	47	4.3 J	13	8	49	5 U	52	5.7	5 U	5 U	5 U	4 J	9.7
57-12-5	CYANIDE	1.5	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**
7439-97-6	MERCURY	0.63	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L																
16887-00-6	CHLORIDE	---	15	29	420	120	75	130	54	340	91	23	23	51	95	96
14797-55-8	NITRATE AS N	32	0.24	< 0.1 U	4.6	3.4	1.5	< 0.1 U	2.5	0.28	8.2	5.2	0.056 J	8.8	4.5	2.6
14808-79-8	SULFATE	---	140	1100	50	39	150	500	35	24	300	170	190	540	1000	86
ALKB	BICARBONATE ALKALINITY	---	400	380	470	450	600	440	340	280	380	500	460	400	390	450
ALKC	CARBONATE ALKALINITY	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	400	380	470	450	600	440	340	280	380	500	460	400	390	450
PESTICIDES in ug/L																
957-51-7	DIPHENAMID	530	1.8	16	< 1 U	< 1 U	< 0.95	17	< 0.94 U	< 0.96 U	1.5	0.67 J	2.6	25	26	< 0.96 U
53-19-0	2,4'-DDD	0.032	0.005	**< 0.13 U**	< 0.0013 U	0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.026 U	< 0.0013 U	< 0.0013 U	0.026 U	< 0.025 U	< 0.0013 U
3424-82-6	2,4'-DDE	0.046	0.015	0.056 JP	< 0.0013 U	0.0058	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.18	0.054	0.027	0.067 p	< 0.025 U	0.0056
789-02-6	2,4'-DDT	0.23	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.026 U	< 0.0013 U	< 0.0013 U	0.026 U	< 0.025 U	< 0.0013 U
72-54-8	4,4'-DDD	0.032	< 0.0013 U	**< 0.13 U**	< 0.0013 U	0.00071 J	< 0.0013 U	0.017 p	< 0.0013 U	0.0012 J	< 0.026 U	< 0.0013 U	< 0.0013 U	0.026 U	0.051	< 0.0013 U
72-55-9	4,4'-DDE	0.046	< 0.0013 U	**< 0.13 U**	< 0.0013 U	< 0.0013 U	0.0029	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.026 U	< 0.0013 U	< 0.0013 U	0.026 U	< 0.025 U	< 0.0013 U
50-29-3	4,4'-DDT	0.23	< 0.0013 U	< 0.13 U	< 0.0013 U	0.001 J	< 0.0013 U	< 0.0013 U	0.00043 J	0.0027	< 0.026 U	< 0.0013 U	< 0.0013 U	0.026 U	0.022 J	< 0.0013 U
309-00-2	ALDRIN	0.00092	**< 0.0013 U**	0.13 U	**< 0.0013 U**	**< 0.0013 U**	**< 0.0013 U**	**< 0.0013 U**	**< 0.0013 U**	**< 0.0013 U**	**< 0.026 U**	**< 0.0013 U**	**< 0.0013 U**	**0.026 U**	**< 0.025 U**	**< 0.0013 U**
319-84-6	ALPHA-BHC	0.0072	0.054 p	0.43	< 0.0013 U	0.0018 p	0.015 p	0.025 p	< 0.0013 U	< 0.0013 U	1.1	0.38 p	0.14	2.3	0.029 p	0.0086 p
5103-71-9	ALPHA-CHLORDANE	0.02	< 0.0013 U	**< 0.13 U**	< 0.0013 U	< 0.0013 U	0.027	0.0013 U	< 0.0013 U	< 0.0013 U	**< 0.026 U**	0.0013 U	0.0065 U	**0.026 U**	**< 0.025 U**	< 0.0013 U
319-85-7	BETA-BHC	0.025	0.11	3.9	< 0.0013 U	0.011	0.12	0.11	< 0.0013 U	< 0.0013 U	3	1.7	0.34	1.6	0.37	0.17
319-86-8	DELTA-BHC	0.025	0.17	5.4	< 0.0013 U	0.00083 JP	0.28	2.2	< 0.0013 U	< 0.0013 U	0.58	0.84	0.29	2.3	3.6	0.048
60-57-1	DIELDRIN	0.0018	< 0.0013 U	0.1 JP	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.18	0.041	0.0013 p	0.021 J	**< 0.025 U**	0.0016
959-98-8	ENDOSULFAN I	100	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.02 p	< 0.0013 U	< 0.0013 U	< 0.026 U	< 0.0013 U	< 0.0013 U	0.026 U	0.026 p	< 0.0013 U
33213-65-9	ENDOSULFAN II	100	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.0095 p	< 0.0013 U	< 0.0013 U	< 0.026 U	< 0.0013 U	< 0.0013 U	0.026 U	0.02 J	< 0.0013 U
1031-07-8	ENDOSULFAN SULFATE	---	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.026 U	< 0.0013 U	< 0.0013 U	0.026 U	< 0.025 U	< 0.0013 U
72-20-8	ENDRIN	2.3	< 0.0013 U	< 0.13 U	< 0.0013 U	0.00089 J	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.062	< 0.0013 U	< 0.0013 U	0.019 J	< 0.025 U	< 0.0013 U
7421-93-4	ENDRIN ALDEHYDE	---	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.026 U	0.011	< 0.0013 U	0.026 U	< 0.025 U	< 0.0013 U
53494-70-5	ENDRIN KETONE	---	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.11	0.035	< 0.0013 U	0.026 U	< 0.025 U	< 0.0013 U
58-89-9	GAMMA-BHC (LINDANE)	0.042	< 0.0013 U	**< 0.13 U**	< 0.0013 U	0.0018	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.00091 J	0.45	0.41	0.027	0.87	< 0.025 U	< 0.0013 U
12789-03-6	gamma-Chlordane	0.02	< 0.0013 U	**< 0.13 U**	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	**< 0.026 U**	< 0.0013 U	< 0.0013 U	**0.026 U**	**< 0.025 U**	< 0.0013 U
76-44-8	HEPTACHLOR	0.0014	< 0.0013 U	**< 0.13 U**	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	**< 0.026 U**	< 0.0013 U	< 0.0013 U	**0.026 U**	**< 0.025 U**	< 0.0013 U
1024-57-3	HEPTACHLOR EPOXIDE	0.0014	< 0.0013 U	**< 0.13 U**	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	**< 0.026 U**	0.021	< 0.0013 U	**0.026 U**	**< 0.025 U**	0.005
72-43-5	METHOXYCHLOR	37	< 0.0013 U	< 0.13 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.026 U	< 0.0013 U	< 0.0013 U	0.026 U	< 0.025 U	< 0.0013 U
8001-35-2	TOXAPHENE	0.071	**< 0.096 U**	**< 9.7 U**	**< 0.1 U**	**< 0.1 U**	**< 0.097 U**	**< 0.098 U**	**< 0.099 U**	**< 0.096 U**	**< 2 U**	**< 0.1 U**	**< 0.1 U**	**< 2 U**	**< 1.9 U**	**< 0.099 U**
HERBICIDES in ug/L																
94-75-7	2,4-D	170	< 3.9 U	< 3.8 U	< 3.9 U	< 4 U	< 3.9 U	< 3.9 U	< 3.9 U	< 3.9 U	< 3.8 U	< 3.9 U	< 4 U	< 4 U	< 3.8 U	< 3.8 U
93-76-5	2,4,5-T	160	< 0.98 U	< 0.95 U	< 0.97 U	< 1 U	< 0.97 U	< 0.97 U	< 0.98 U	< 0.97 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.94 U	< 0.95 U

Table 5-21
July-August 2017 (4th Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	MW-R-600 8/8/2017 MWR-600-080817	EW-1-110 8/9/2017 EW1-110-080917	OW-1-62 7/31/2017 OW1-62-073117	OW-1-105 7/31/2017 OW1-105-073117	OW-2-65 8/1/2017 OW2-65-080117	OW-2-115 8/1/2017 OW2-115-080117	OW-3-55 8/2/2017 OW3-55-080217	OW-3-105 8/2/2017 OW3-105-080217	OW-4-70 8/2/2017 OW4-70-080217	OW-5-90 8/1/2017 OW5-90-080117	OW-7-242 8/3/2017 OW7-242-080317	OW-7-410 8/3/2017 OW7-410-080317	OW-8-230 7/31/2017 OW8-230-073117	OW-9-125 8/1/2017 OW9-125-080117
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L																
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	710	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U
95-95-4	2,4,5-TRICHLOROPHENOL	1,200	< 0.96 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	0.07 J	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
88-06-2	2,4,6-TRICHLOROPHENOL	4.1	< 0.96 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
120-83-2	2,4-DICHLOROPHENOL	46	< 0.18 U	0.4	< 0.2 U	< 0.19 U	< 0.18 U	0.08 J	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U
105-67-9	2,4-DIMETHYLPHENOL	360	< 0.96 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
51-28-5	2,4-DINITROPHENOL	39	< 9.6 U	< 9.8 U	< 10 U	< 10 U	9.5 U	< 10 U	< 9.4 U	< 9.6 U	< 9.5 U	< 9.8 U	< 10 U	< 10 U	< 9.5 U	< 9.6 U
121-14-2	2,4-DINITROTOLUENE	0.24	**< 0.96 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 1 U**	**< 0.94 U**	**< 0.96 U**	**< 0.95 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**
606-20-2	2,6-DINITROTOLUENE	0.049	**< 0.96 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 1 U**	**< 0.94 U**	**< 0.96 U**	**< 0.95 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**
91-58-7	2-CHLORONAPHTHALENE	750	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U
95-57-8	2-CHLOROPHENOL	91	< 0.96 U	0.83 J	< 1 U	< 1 U	< 0.95 U	0.5 J	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
95-48-7	2-METHLYPHENOL	930	< 0.96 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
91-57-6	2-METHYLNAPHTHALENE	36	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U
88-74-4	2-NITROANILINE	190	< 4.8 U	< 4.9 U	< 5.2 U	< 5 U	< 4.8 U	< 5 U	< 4.7 U	< 4.8 U	< 4.8 U	< 4.9 U	5.1 U	5.1 U	< 4.8 U	< 4.8 U
88-75-5	2-NITROPHENOL	---	< 0.96 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
91-94-1	3,3'-DICHLOROBENZIDINE	0.13	**< 0.96 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 1 U**	**< 0.94 U**	**< 0.96 U**	**< 0.95 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**
99-09-2	3-NITROANILINE	---	< 4.8 U	< 4.9 U	< 5.2 U	5 U	< 4.8 U	5 U	< 4.7 U	< 4.8 U	< 4.8 U	< 4.9 U	5.1 U	5.1 U	< 4.8 U	< 4.8 U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	1.5	**< 4.8 U**	**< 4.9 U**	**< 5.2 U**	**< 5 U**	**< 4.8 U**	**< 5 U**	**< 4.7 U**	**< 4.8 U**	**< 4.8 U**	**< 4.9 U**	**< 5.1 U**	**< 5.1 U**	**< 4.8 U**	**< 4.8 U**
101-55-3	4-BROMOPHENYL PHENYL ETHER	---	< 0.96 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
59-50-7	4-CHLORO-3-METHYLPHENOL	1,400	< 0.96 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
106-47-8	4-CHLOROANILINE	0.37	**< 0.96 U**	**< 0.98 U**	**1 U**	**1 U**	**< 0.95 U**	0.085 J	**< 0.94 U**	**< 0.96 U**	**< 0.95 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	---	< 0.96 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
106-44-5	4-METHLYPHENOL	1,900	< 0.96 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
100-01-6	4-NITROANILINE	3.8	**< 4.8 U**	**< 4.9 U**	**< 5.2 U**	**< 5 U**	**< 4.8 U**	**< 5 U**	**< 4.7 U**	**< 4.8 U**	**< 4.8 U**	**< 4.9 U**	**< 5.1 U**	**< 5.1 U**	**< 4.8 U**	**< 4.8 U**
100-02-7	4-NITROPHENOL	---	< 4.8 U	< 4.9 U	< 5.2 U	5 U	< 4.8 U	< 5 U	< 4.7 U	< 4.8 U	< 4.8 U	< 4.9 U	5.1 U	5.1 U	< 4.8 U	< 4.8 U
83-32-9	ACENAPHTHENE	530	< 0.18 U	0.41	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U
208-96-8	ACENAPHTHYLENE	---	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U
98-86-2	ACETOPHENONE	1,900	0.12 J	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
120-12-7	ANTHRACENE	1,800	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U
1912-24-9	ATRAZINE	0.3	**0.61 J**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 1 U**	**< 0.94 U**	**< 0.96 U**	**1.3**	**0.4 J**	**1.2**	**2.2**	**< 0.95 U**	**< 0.96 U**
100-52-7	BENZALDEHYDE	19	< 0.96 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
56-55-3	BENZO[A]ANTHRACENE	0.03	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U
50-32-8	BENZO[A]PYRENE	0.025	**< 0.18 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**
205-99-2	BENZO[B]FLUORANTHENE	0.25	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	0.15 J	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U
191-24-2	BENZO[G,H,I]PERYLENE	---	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	0.11 J	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U
207-08-9	BENZO[K]FLUORANTHENE	2.5	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U
85-68-7	BENZYL BUTYL PHTHALATE	16	< 0.96 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
92-52-4	BIPHENYL	0.83	**< 0.96 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 1 U**	**< 0.94 U**	**< 0.96 U**	**< 0.95 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	59	< 0.96 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
111-44-4	BIS(2-CHLOROETHYL) ETHER	0.014	**< 0.18 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.6	4.5	3.1	< 2.1 U	< 2 U	5.9	< 2 U	3.9	3.8	6.1	2 U	13	2 U	4.2	9.1
105-60-2	CAPROLACTAM	9,900	3.4 J	< 4.9 U	< 5.2 U	< 5 U	< 4.8 U	< 5 U	< 4.7 U	< 4.8 U	< 4.8 U	< 4.9 U	5.1 U	5.1 U	< 4.8 U	< 4.8 U
86-74-8	CARBAZOLE	---	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U
218-01-9	CHRYSENE	25	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	0.15 J	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U
53-70-3	DIBENZ[A,H]ANTHRACENE	0.025	**< 0.18 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**
132-64-9	DIBENZOFURAN	7.9	< 0.96 U	0.35 J	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
84-66-2	DIETHYL PHTHALATE	15,000	0.22 J	< 0.98 U	< 1 U	0.13 J	< 0.95 U	0.32 J	< 0.94 U	0.12 J	< 0.95 U	0.23 J	0.14 J	< 1 U	0.22 J	< 0.96 U
131-11-3	DIMETHYL PHTHALATE	---	< 0.96 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
84-74-2	DI-N-BUTYL PHTHALATE	900	0.28 J	0.14 J	< 1 U	0.15 J	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	0.32 J	0.16 J	0.36 J	< 0.96 U
117-84-0	DI-N-OCTYL PHTHALATE	200	< 0.96 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
206-44-0	FLUORANTHENE	800	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	0.22	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U
86-73-7	FLUORENE	290	< 0.18 U	0.53	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U
118-74-1	HEXACHLOROBENZENE	0.0098	**< 0.18 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**
87-68-3	HEXACHLOROBUTADIENE	0.14	**< 0.18 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**
77-47-4	HEXACHLOROCYCLOPENTADIENE	0.41	**< 0.96 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 1 U**	**< 0.94 U**	**< 0.96 U**	**< 0.95 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**
67-72-1	HEXACHLOROETHANE	0.33	**< 0.96 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 1 U**	**< 0.94 U**	**< 0.96 U**	**< 0.95 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 0.95 U**	**< 0.96 U**
193-39-5	INDENO[1,2,3-CD]PYRENE	0.25	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	0.09 J	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U
78-59-1	ISOPHORONE	78	< 0.96 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
91-20-3	NAPHTHALENE	0.17	**< 0.18 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**
98-95-3	NITROBENZENE	0.14	**< 1.9 U**	**< 2 U**	**< 2.1 U**	**< 2 U**	**< 1.9 U**	**< 2 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 2 U**	**< 2 U**	**< 2 U**	**< 1.9 U**	**< 1.9 U**
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.011	**< 0.18 U**	**< 0.19 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**
86-30-6	N-NITROSODIPHENYLAMINE	12	< 0.96 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
87-86-5	PENTACHLOROPHENOL	0.041	**< 4.8 U**	**< 4.9 U**	**< 5.2 U**	**< 5 U**	**< 4.8 U**	**< 5 U**	**< 4.7 U**	**< 4.8 U**	**< 4.8 U**	**< 4.9 U**	**5.1 U**	**3.2 J**	**< 4.8 U**	**< 4.8 U**
85-01-8	PHENANTHRENE	---	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U
108-95-2	PHENOL	5,800	< 0.96 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 1 U	< 0.94 U	< 0.96 U	< 0.95 U	< 0.98 U	< 1 U	< 1 U	< 0.95 U	< 0.96 U
129-00-0	PYRENE	120	< 0.18 U	< 0.19 U	< 0.2 U	< 0.19 U	< 0.18 U	0.14 J	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U

Table 5-21
July-August 2017 (4th Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	MW-R-600 8/8/2017 MWR-600-080817	EW-1-110 8/9/2017 EW1-110-080917	OW-1-62 7/31/2017 OW1-62-073117	OW-1-105 7/31/2017 OW1-105-073117	OW-2-65 8/1/2017 OW2-65-080117	OW-2-115 8/1/2017 OW2-115-080117	OW-3-55 8/2/2017 OW3-55-080217	OW-3-105 8/2/2017 OW3-105-080217	OW-4-70 8/2/2017 OW4-70-080217	OW-5-90 8/1/2017 OW5-90-080117	OW-7-242 8/3/2017 OW7-242-080317	OW-7-410 8/3/2017 OW7-410-080317	OW-8-230 7/31/2017 OW8-230-073117	OW-9-125 8/1/2017 OW9-125-080117
VOLATILE ORGANIC COMPOUNDS in ug/L																
71-55-6	1,1,1-TRICHLOROETHANE	8,000	< 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 U	< 1 U
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.076	**< 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 U**	**< 1 U**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10,000	< 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 U	< 1 U
79-00-5	1,1,2-TRICHLOROETHANE	0.28	**< 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 U**	**< 1 U**
75-34-3	1,1-DICHLOROETHANE	2.8	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.4 J	< 1 U	< 1 U
75-35-4	1,1-DICHLOROETHYLENE	280	< 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 U	< 1 U
120-82-1	1,2,4-TRICHLOROBENZENE	1.2	< 1 U	1.2	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.51 J	1 U	1 U
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	0.00033	**< 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 U**	**< 1 U**
106-93-4	1,2-DIBROMOETHANE	0.0075	**< 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 U**	**< 1 U**
95-50-1	1,2-DICHLOROBENZENE	300	< 1 U	7	< 1 U	< 1 U	< 1 U	4.3	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	3.4	2.7	1 U
107-06-2	1,2-DICHLOROETHANE	0.17	**1.2**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**0.34 J**	**< 1 U**	**0.66 J**	**8.2**	**0.36 J**	**1 U**
78-87-5	1,2-DICHLOROPROPANE	0.85	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**0.49 J**	**< 1 U**	**< 1 U**
541-73-1	1,3-DICHLOROBENZENE	---	< 1 U	0.76 J	< 1 U	< 1 U	< 1 U	0.3 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.27 J	< 1 U	< 1 U
106-46-7	1,4-DICHLOROBENZENE	0.48	**0.27 J**	**20**	**< 1 U**	**< 1 U**	**< 1 U**	**5.6**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**8.3**	**2.9**	**< 1 U**
78-93-3	2-BUTANONE	5,600	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
591-78-6	2-HEXANONE	38	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
108-10-1	4-METHYL-2-PENTANONE	6,300	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
67-64-1	ACETONE	14,000	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
71-43-2	BENZENE	0.46	**< 1 U**	**1.7**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	0.23 J	**< 1 U**	**< 1 U**
75-27-4	BROMODICHLOROMETHANE	0.13	**< 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 U**	**< 1 U**
75-25-2	BROMOFORM	3.3	< 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 U	< 1 U
74-83-9	BROMOMETHANE	7.5	< 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 U	< 1 U
75-15-0	CARBON DISULFIDE	810	< 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 U	< 1 U
56-23-5	CARBON TETRACHLORIDE	0.46	**< 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 U**	**< 1 U**
108-90-7	CHLOROBENZENE	78	0.17 J	72	< 1 U	< 1 U	< 1 U	50	< 1 U	< 1 U	< 1 U	< 1 U	0.2 J	44	59	< 1 U
75-00-3	CHLOROETHANE	21,000	< 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 U	< 1 U
67-66-3	CHLOROFORM	0.22	**0.43 J**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**0.83 J**	**< 1 U**	**0.62 J**	**< 1 U**	**2.5**
74-87-3	CHLOROMETHANE	190	< 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 U	< 1 U
156-59-2	CIS-1,2-DICHLOROETHENE	36	< 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 U	< 1 U
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	---	< 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 U	< 1 U
110-82-7	CYCLOHEXANE	13,000	< 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 U	< 1 U
124-48-1	DIBROMOCHLOROMETHANE	0.87	**< 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 U**	**< 1 U**
75-71-8	DICHLORODIFLUOROMETHANE	200	< 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 U	< 1 U
100-41-4	ETHYLBENZENE	1.5	< 1 U	0.42 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
98-82-8	ISOPROPYLBENZENE (CUMENE)	450	< 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 U	< 1 U
79-20-9	METHYL ACETATE	20,000	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1634-04-4	METHYL TERT-BUTYL ETHER	14	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.25 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
108-87-2	METHYLCYLOHEXANE	---	< 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 U	< 1 U
75-09-2	METHYLENE CHLORIDE	11	< 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 U	< 1 U
100-42-5	STYRENE (MONOMER)	1,200	< 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 U	< 1 U
127-18-4	TETRACHLOROETHYLENE	11	< 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 U	< 1 U
108-88-3	TOLUENE	1,100	< 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 U	< 1 U
156-60-5	TRANS-1,2-DICHLOROETHENE	360	< 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 U	< 1 U
10061-02-6	TRANS-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	< 1 U	< 1 U
79-01-6	TRICHLOROETHYLENE	0.49	0.32 J	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**1**	**< 1 U**	**< 1 U**
75-69-4	TRICHLOROFLUOROMETHANE	5,200	< 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 U	< 1 U
75-01-4	VINYL CHLORIDE	0.019	**< 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 U**	**< 1 U**
XYLENES	Xylenes, Total	190	< 2 U	0.45 J	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U

Notes:
USEPA RSL for TAP WATER (latest version, November 2017)
USEPA MCL (latest version, November 2017)
(1) No RSL exists, MCL utilized.
U - The analyte was not detected above the reporting limit (RL).
UJ - The reporting limit is estimated due to minor quality control anomaly.
J - Result is either less than the RL but greater than or equal to the method detecti
B - Parameter was detected in associated laboratory method blank.
NJ - Result is estimated due to a dual column imprecision greater than 100%.
Bold indicates the reporting limit was above the RSL and/or MCL.
Red bolded detected concentration exceeds RSL
Red bolded and highlighted detected concentration exceeds MCL

Table 5-21
July-August 2017 (4th Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	OW-10-250 8/1/2017 OW10-250-080117	OW-11-240 8/8/2017 OW11-240-080817	OW-11-600 8/4/2017 OW11-240-080417	OW-12-232 8/1/2017 OW12-232-080117	OW-13-250 8/3/2017 OW13-250-080317	OW-14-96 8/2/2017 OW14-96-080217	OW-14-96 8/2/2017 DUP-080217	OW-14-235 8/2/2017 OW14-235-080217	OW-15-202 8/8/2017 OW15-202-080817	OW-16-448 8/3/2017 OW16-448-080317	OW-17-600 8/2/2017 OW17-600-080217	OW-18-597 8/3/2017 OW18-597-080317	OW-19-450 8/1/2017 OW19-450-080117	OW-19-450 8/1/2017 DUP-080117	FHCC-Well 8/2/2017 FHCC-WELL-080217
TOTAL METALS in ug/L																	
7429-90-5	ALUMINUM	20,000	30 U	< 30 U	< 30 U	180	160	< 30 U	580	< 30 U	21 J	< 30 U	< 30 U	< 30 U	< 30 U	< 30 U	< 30 U
7440-36-0	ANTIMONY	7.8	< 2 U	< 2 U	0.54 J	< 2 U	0.58 JB	1.1 J	0.85 J	< 2 U	0.44 J	< 2 U	0.78 J	0.45 JB	0.62 J	< 2 U	< 2 U
7440-38-2	ARSENIC	0.052	**0.34 J**	**0.63 J**	**0.3 J**	**1.5**	**0.27 JB**	**0.22 J**	**0.43 J**	**0.22 J**	**0.34 J**	**0.28 JB**	**0.25 J**	**0.23 JB**	**0.3 J**	**0.24 J**	**0.33 J**
7440-39-3	BARIUM	3,800	92	110	110	74	150	56	100	120	160	110	130	16	140	140	62
7440-41-7	BERYLLIUM	25	< 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 U	< 1 U	< 1 U
7440-43-9	CADMIUM	9.2	< 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 U	< 1 U	< 1 U
7440-70-2	CALCIUM METAL	---	120000	130000	110000	96000	91000	130000	100000	120000	100000	120000	98000	190000	120000	120000	140000 F1
7440-47-3	CHROMIUM[1]	---	1.1 J	< 2 U	0.61 J	< 2 U	0.67 JB	2.6	1.5 J	0.52 J	0.79 J	0.76 JB	0.41 J	2 U	0.53 J	0.45 J	0.54 J
7440-48-4	COBALT	6	< 0.5 U	1.4	0.16 J	0.13 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	< 0.5 U
7440-50-8	COPPER	800	< 2 U	1.5 J	< 2 U	< 2 U	1.2 JB	4.9	1.1 J	< 2 U	1.7 J	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	5.8
7439-89-6	IRON	14,000	< 50 U	510	< 50 U	1300	< 50 U	22 J	540	< 50 U	< 50 U	< 50 U	38 J	< 50 U	< 50 U	< 50 U	< 50 U
7439-92-1	LEAD	15	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	0.47 J	< 1 U	< 1 U	< 1 U	0.77 J	< 1 U	< 1 U	0.37 J	< 1 U
7439-95-4	MAGNESIUM	---	14000	14000	20000	24000	19000	8300	15000	17000	26000	12000	17000	53000	13000	14000	9200
7439-96-5	MANGANESE	430	< 5 U	350	< 5 U	26	< 5 U	< 5 U	3.5 J	< 5 U	< 5 U	2.8 J	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
7440-02-0	NICKEL	390	< 1 U	2.5	0.27 J	< 1 U	0.28 J	0.53 J	0.94 J	< 1 U	0.49 J	0.27 J	0.28 J	0.28 J	< 1 U	< 1 U	0.54 J
7440-09-7	POTASSIUM	---	1900	1700	1100	2200	500 B	2100	1200	1200	1400	500 B	1100	500 B	1200	1300	2400
7782-49-2	SELENIUM	100	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
7440-22-4	SILVER	94	< 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 U	< 1 U	< 1 U
7440-23-5	SODIUM	---	48000	27000	3600	58000	500 B	24000	5300	2100	1700	500 B	1100	500 B	6100	6200	27000
7440-28-0	THALLIUM	0.2	**< 1 U**	0.13 J	0.064 J	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
7440-62-2	VANADIUM	86	1.4	0.9 J	0.73 J	1.5	1 B	1.1	2.1	1 B	1.4	1 B	0.99 JB	1 B	1.5	1.3	1.1
7440-66-6	ZINC	6,000	4.3 J	7.8	9.4	4 J	3.3 J	3.9 J	3.3 J	5 U	6	21	3.3 J	5 U	3.1 J	5.5	4.8 J
57-12-5	CYANIDE	1.5	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**	**< 10 U**
7439-97-6	MERCURY	0.63	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U
INORGANIC PROPERTIES in mg/L																	
16887-00-6	CHLORIDE	---	100	28	12	28	13	17	17	10	5.3	49	1.7	21	27	27	52
14797-55-8	NITRATE AS N	32	2.3	0.23	4.5 F1	0.039 J	3.1	3.3	3.3	2.5	2.8 F1	4.2	1.9	4.3	3.9	3.9	3.6
14808-79-8	SULFATE	---	36	33	28	110	15	48	49	67	8.1	30	10	300	15	15	31
ALKB	BICARBONATE ALKALINITY	---	380	440	400	410	370	360	360	350	390	350	380	420	370	360	390
ALKC	CARBONATE ALKALINITY	---	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
	Total Alakalinity	---	380	440	400	410	370	360	360	350	390	350	380	420	370	360	390
PESTICIDES in ug/L																	
957-51-7	DIPHENAMID	530	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
53-19-0	2,4'-DDD	0.032	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.0021 p	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
3424-82-6	2,4'-DDE	0.046	0.0022	0.00038 JP	0.0063	< 0.0012 U	< 0.0013 U	0.02 p	0.015	**0.047**	< 0.0013 U	< 0.0012 U	0.00085 J	**0.044**	0.0012 J	0.0016	0.0022 p
789-02-6	2,4'-DDT	0.23	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
72-54-8	4,4'-DDD	0.032	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	0.0035	0.0022	< 0.0013 U	0.0041	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
72-55-9	4,4'-DDE	0.046	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
50-29-3	4,4'-DDT	0.23	< 0.0013 U	< 0.0013 U	< 0.0012 U	0.0025	0.00039 J	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.0004 JP	0.00058 JP	0.002	< 0.0013 U	< 0.0013 U	0.0051	< 0.0013 U
309-00-2	ALDRIN	0.00092	**< 0.0013 U**	**< 0.0013 U**	**0.0012 U**	**0.0012 U**	**< 0.0013 U**	**< 0.0013 U**	**< 0.0013 U**	**< 0.0013 U**	**< 0.0013 U**	**0.0012 U**	**< 0.0013 U**	**< 0.0013 U**	**< 0.0013 U**	**< 0.0013 U**	**< 0.0013 U**
319-84-6	ALPHA-BHC	0.0072	0.0014 p	< 0.0013 U	**0.03**	< 0.0012 U	< 0.0013 U	**0.026 p**	0.012 p	**0.025 p**	< 0.0013 U	< 0.0012 U	0.0062	**0.07**	< 0.0013 U	< 0.0013 U	< 0.0013 U
5103-71-9	ALPHA-CHLORDANE	0.02	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
319-85-7	BETA-BHC	0.025	**0.029**	< 0.0013 U	**0.11**	< 0.0012 U	< 0.0013 U	**0.81**	**0.39**	**0.79**	< 0.0013 U	< 0.0012 U	0.013 p	**0.72**	< 0.0013 U	< 0.0013 U	< 0.0013 U
319-86-8	DELTA-BHC	0.025	0.00095 JP	0.0049	0.0012 B	0.00085 JP	0.0036	**0.037**	0.015	**0.071**	0.0017 p	< 0.0012 U	0.0053	**0.11**	0.0031	0.001 JP	< 0.0013 U
60-57-1	DIELDRIN	0.0018	< 0.0013 U	< 0.0013 U	0.00088 J	< 0.0012 U	< 0.0013 U	**0.024**	**0.01**	**0.0062**	< 0.0013 U	0.00091 J	< 0.0013 U	**0.005**	**0.0019**	**0.0025**	**0.013**
959-98-8	ENDOSULFAN I	100	< 0.0013 U	< 0.0013 U	< 0.0012 U	0.00082 JP	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
33213-65-9	ENDOSULFAN II	100	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
1031-07-8	ENDOSULFAN SULFATE	---	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 UF1
72-20-8	ENDRIN	2.3	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	0.001 JpF1
7421-93-4	ENDRIN ALDEHYDE	---	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	0.0014 p	< 0.0013 U	< 0.0013 U	< 0.0013 U
53494-70-5	ENDRIN KETONE	---	< 0.0013 U	< 0.0013 U	0.0022	< 0.0012 U	< 0.0013 U	0.028	0.014	0.034	< 0.0013 U	< 0.0012 U	< 0.0013 U	0.0034 p	< 0.0013 U	< 0.0013 U	< 0.0013 U
58-89-9	GAMMA-BHC (LINDANE)	0.042	< 0.0013 U	< 0.0013 U	0.0077	< 0.0012 U	< 0.0013 U	0.018	0.0065	0.0098	< 0.0013 U	< 0.0012 U	0.002	0.01 p	< 0.0013 U	< 0.0013 U	< 0.0013 U
12789-03-6	gamma-Chlordane	0.02	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
76-44-8	HEPTACHLOR	0.0014	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
1024-57-3	HEPTACHLOR EPOXIDE	0.0014	< 0.0013 U	< 0.0013 U	0.0008 JP	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	**0.0085 p**	< 0.0013 U	< 0.0012 U	< 0.0013 U	**0.014 p**	0.00064 JP	0.00079 JP	< 0.0013 U
72-43-5	METHOXYCHLOR	37	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0012 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U
8001-35-2	TOXAPHENE	0.071	**< 0.097 U**	**< 0.098 U**	**< 0.095 U**	**< 0.095 U**	**< 0.097 U**	**< 0.097 U**	**< 0.097 U**	**< 0.099 U**	**< 0.097 U**	**< 0.095 U**	**< 0.097 U**	**< 0.096 U**	**< 0.098 U**	**< 0.098 U**	**< 0.1 U**
HERBICIDES in ug/L																	
94-75-7	2,4-D	170	< 4 U	< 3.9 U	< 4 U	< 3.9 U	< 4 U	< 3.9 U	< 3.9 U	< 4 U	< 4 U	< 3.8 U	< 4 U	< 3.8 U	< 4 U	< 4 U	< 3.9 U
93-76-5	2,4,5-T	160	< 0.99 U	< 0.98 U	< 1 U	< 0.97 U	< 1 U	< 0.97 U	< 0.97 U	< 1 U	< 1 U	< 0.95 U	< 0.99 U	< 0.96 U	< 0.99 U	< 0.99 U	< 0.97 U

Table 5-21
July-August 2017 (4th Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	OW-10-250 8/1/2017 OW10-250-080117	OW-11-240 8/8/2017 OW11-240-080817	OW-11-600 8/4/2017 OW11-240-080417	OW-12-232 8/1/2017 OW12-232-080117	OW-13-250 8/3/2017 OW13-250-080317	OW-14-96 8/2/2017 OW14-96-080217	OW-14-96 8/2/2017 DUP-080217	OW-14-235 8/2/2017 OW14-235-080217	OW-15-202 8/8/2017 OW15-202-080817	OW-16-448 8/3/2017 OW16-448-080317	OW-17-600 8/2/2017 OW17-600-080217	OW-18-597 8/3/2017 OW18-597-080317	OW-19-450 8/1/2017 OW19-450-080117	OW-19-450 8/1/2017 DUP-080117	FHCC-Well 8/2/2017 FHCC-WELL-080217
SEMIVOLATILE ORGANIC COMPOUNDS in ug/L																	
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	710	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 U
95-95-4	2,4,5-TRICHLOROPHENOL	1,200	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
88-06-2	2,4,6-TRICHLOROPHENOL	4.1	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
120-83-2	2,4-DICHLOROPHENOL	46	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 U
105-67-9	2,4-DIMETHYLPHENOL	360	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
51-28-5	2,4-DINITROPHENOL	39	< 10 U	< 9.5 U	< 9.7 U	< 10 U	< 10 U	< 9.7 U	< 9.7 U	< 9.4 U	< 9.7 U	< 9.8 U	< 9.8 U	< 9.8 U	< 10 U	< 10 U	< 10 U
121-14-2	2,4-DINITROTOLUENE	0.24	**< 1 U**	**< 0.95 U**	**< 0.97 U**	**< 1 U**	**< 1 U**	**< 0.97 U**	**< 0.97 U**	**< 0.94 U**	**< 0.97 U**	**< 0.98 U**	**< 0.98 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 1 U**
606-20-2	2,6-DINITROTOLUENE	0.049	**< 1 U**	**< 0.95 U**	**< 0.97 U**	**< 1 U**	**< 1 U**	**< 0.97 U**	**< 0.97 U**	**< 0.94 U**	**< 0.97 U**	**< 0.98 U**	**< 0.98 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 1 U**
91-58-7	2-CHLORONAPHTHALENE	750	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 UF1
95-57-8	2-CHLOROPHENOL	91	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
95-48-7	2-METHLYPHENOL	930	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
91-57-6	2-METHYLNAPHTHALENE	36	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 U
88-74-4	2-NITROANILINE	190	< 5.1 U	< < 4.8 U	< 4.9 U	< 5.2 U	< 5 U	< 4.9 U	< 4.9 U	< 4.7 U	< 4.9 U	< 4.9 U	< 4.9 U	< 4.9 U	< 5.2 U	< 5.2 U	< 5 U
88-75-5	2-NITROPHENOL	---	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
91-94-1	3,3'-DICHLOROBENZIDINE	0.13	**< 1 U**	**< 0.95 U**	**< 0.97 U**	**< 1 U**	**< 1 U**	**< 0.97 U**	**< 0.97 U**	**< 0.94 U**	**< 0.97 U**	**< 0.98 U**	**< 0.98 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 1 U**
99-09-2	3-NITROANILINE	---	< 5.1 U	< < 4.8 U	< 4.9 U	< 5.2 U	< 5 U	< 4.9 U	< 4.9 U	< 4.7 U	< 4.9 U	< 4.9 U	< 4.9 U	< 4.9 U	< 5.2 U	< 5.2 U	< 5 U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	1.5	**< 5.1 U**	**< < 4.8 U**	**< 4.9 U**	**< 5.2 U**	**< 5 U**	**< 4.9 U**	**< 4.9 U**	**< 4.7 U**	**< 4.9 U**	**< 4.9 U**	**< 4.9 U**	**< 4.9 U**	**< 5.2 U**	**< 5.2 U**	**< 5 U**
101-55-3	4-BROMOPHENYL PHENYL ETHER	---	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
59-50-7	4-CHLORO-3-METHYLPHENOL	1,400	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
106-47-8	4-CHLOROANILINE	0.37	**< 1 U**	**< 0.95 U**	**< 0.97 U**	**< 1 U**	**< 1 U**	**< 0.97 U**	**< 0.97 U**	**< 0.94 U**	**< 0.97 U**	**< 0.98 U**	**< 0.98 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 1 U**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	---	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
106-44-5	4-METHLYPHENOL	1,900	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
100-01-6	4-NITROANILINE	3.8	**< 5.1 U**	**< < 4.8 U**	**< 4.9 U**	**< 5.2 U**	**< 5 U**	**< 4.9 U**	**< 4.9 U**	**< 4.7 U**	**< 4.9 U**	**< 4.9 U**	**< 4.9 U**	**< 4.9 U**	**< 5.2 U**	**< 5.2 U**	**< 5 U**
100-02-7	4-NITROPHENOL	---	5.1 U	< < 4.8 U	< 4.9 U	< 5.2 U	< 5 U	< 4.9 U	< 4.9 U	< 4.7 U	< 4.9 U	< 4.9 U	< 4.9 U	< 4.9 U	< 5.2 U	< 5.2 U	< 5 U
83-32-9	ACENAPHTHENE	530	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 U
208-96-8	ACENAPHTHYLENE	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 U
98-86-2	ACETOPHENONE	1,900	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
120-12-7	ANTHRACENE	1,800	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 U
1912-24-9	ATRAZINE	0.3	**< 1 U**	**< 0.95 U**	**< 0.97 U**	**< 1 U**	**< 1 U**	**< 0.97 U**	**< 0.97 U**	**< 0.94 U**	**< 0.97 U**	**< 0.98 U**	**< 0.98 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 1 U**
100-52-7	BENZALDEHYDE	19	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
56-55-3	BENZO[A]ANTHRACENE	0.03	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 U
50-32-8	BENZO[A]PYRENE	0.025	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.2 U**	**< 0.2 U**	**< 0.19 U**
205-99-2	BENZO[B]FLUORANTHENE	0.25	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 U
191-24-2	BENZO[G,H,I]PERYLENE	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 U
207-08-9	BENZO[K]FLUORANTHENE	2.5	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 U
85-68-7	BENZYL BUTYL PHTHALATE	16	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
92-52-4	BIPHENYL	0.83	**< 1 U**	**< 0.95 U**	**< 0.97 U**	**< 1 U**	**< 1 U**	**< 0.97 U**	**< 0.97 U**	**< 0.94 U**	**< 0.97 U**	**< 0.98 U**	**< 0.98 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 1 U**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	59	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
111-44-4	BIS(2-CHLOROETHYL) ETHER	0.014	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.2 U**	**< 0.2 U**	**< 0.19 U**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	5.6	18	2.8	2.5	< 2.1 U	3.8	< 1.9 U	2.9	< 1.9 U	3.8 F1	< 2 U	4.2	10	< 2.1 U	< 2.1 U	3
105-60-2	CAPROLACTAM	9,900	5.1 U	< 4.8 U	< 4.9 U	< 5.2 U	< 5 U	< 4.9 U	< 4.9 U	< 4.7 U	< 4.9 U	< 4.9 U	< 4.9 U	< 4.9 U	< 5.2 U	< 5.2 U	< 5 U
86-74-8	CARBAZOLE	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 U
218-01-9	CHRYSENE	25	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 U
53-70-3	DIBENZ[A,H]ANTHRACENE	0.025	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.2 U**	**< 0.2 U**	**< 0.19 U**
132-64-9	DIBENZOFURAN	7.9	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
84-66-2	DIETHYL PHTHALATE	15,000	< 1 U	0.24 J	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	0.17 J	< 0.97 U	< 0.98 U	0.17 J	< 0.98 U	< 1 U	< 1 U	< 1 U
131-11-3	DIMETHYL PHTHALATE	---	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
84-74-2	DI-N-BUTYL PHTHALATE	900	0.19 J	0.17 J	< 0.97 U	0.24 J	0.16 J	< 0.97 U	< 0.97 U	0.18 J	0.17 J	0.14 J	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
117-84-0	DI-N-OCTYL PHTHALATE	200	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
206-44-0	FLUORANTHENE	800	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 U
86-73-7	FLUORENE	290	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 U
118-74-1	HEXACHLOROBENZENE	0.0098	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.2 U**	**< 0.2 U**	**< 0.19 U**
87-68-3	HEXACHLOROBUTADIENE	0.14	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.2 U**	**< 0.2 U**	**< 0.19 U**
77-47-4	HEXACHLOROCYCLOPENTADIENE	0.41	**< 1 U**	**< 0.95 U**	**< 0.97 U**	**< 1 U**	**< 1 U**	**< 0.97 U**	**< 0.97 U**	**< 0.94 U**	**< 0.97 U**	**< 0.98 U**	**< 0.98 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 1 U**
67-72-1	HEXACHLOROETHANE	0.33	**< 1 U**	**< 0.95 U**	**< 0.97 U**	**< 1 U**	**< 1 U**	**< 0.97 U**	**< 0.97 U**	**< 0.94 U**	**< 0.97 U**	**< 0.98 U**	**< 0.98 U**	**< 0.98 U**	**< 1 U**	**< 1 U**	**< 1 U**
193-39-5	INDENO[1,2,3-CD]PYRENE	0.25	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 U
78-59-1	ISOPHORONE	78	1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
91-20-3	NAPHTHALENE	0.17	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.2 U**	**< 0.2 U**	**< 0.19 U**
98-95-3	NITROBENZENE	0.14	**< 2 U**	**< 1.9 U**	**< 1.9 U**	**< 2.1 U**	**< 2 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 1.9 U**	**< 2 U**	**< 2 U**	**< 2 U**	**< 2.1 U**	**< 2.1 U**	**< 2 U**
621-64-7	N-NITROSODI-N-PROPYLAMINE	0.011	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.2 U**	**< 0.19 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.18 U**	**< 0.19 U**	**< 0.19 U**	**< 0.19 U**	**< 0.2 U**	**< 0.2 U**	**< 0.19 U**
86-30-6	N-NITROSODIPHENYLAMINE	12	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
87-86-5	PENTACHLOROPHENOL	0.041	**5.1 U**	**< 4.8 U**	**< 4.9 U**	**< 5.2 U**	**< 5 U**	**< 4.9 U**	**< 4.9 U**	**< 4.7 U**	**< 4.9 U**	**< 4.9 U**	**< 4.9 U**	**< 4.9 U**	**< 5.2 U**	**< 5.2 U**	**< 5 U**
85-01-8	PHENANTHRENE	---	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 U
108-95-2	PHENOL	5,800	< 1 U	< 0.95 U	< 0.97 U	< 1 U	< 1 U	< 0.97 U	< 0.97 U	< 0.94 U	< 0.97 U	< 0.98 U	< 0.98 U	< 0.98 U	< 1 U	< 1 U	< 1 U
129-00-0	PYRENE	120	< 0.19 U	< 0.18 U	< 0.18 U	< 0.2 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.2 U	< 0.2 U	< 0.19 U

Table 5-21
July-August 2017 (4th Quarter) Groundwater Sampling Analytical Results
Operable Unit 2 Remedial Investigation (OU-2 RI)
Central Chemical Site
Hagerstown, Maryland

CASRN	Location ID / Sample Date / Sample ID	EPA Region 3 Risk Screening Levels (RSLs) November 2017 Carcinogenic Target Risk (TR) = 1E-06 Hazard Index (HI) = 1.0	OW-10-250 8/1/2017 OW10-250-080117	OW-11-240 8/8/2017 OW11-240-080817	OW-11-600 8/4/2017 OW11-240-080417	OW-12-232 8/1/2017 OW12-232-080117	OW-13-250 8/3/2017 OW13-250-080317	OW-14-96 8/2/2017 OW14-96-080217	OW-14-96 8/2/2017 DUP-080217	OW-14-235 8/2/2017 OW14-235-080217	OW-15-202 8/8/2017 OW15-202-080817	OW-16-448 8/3/2017 OW16-448-080317	OW-17-600 8/2/2017 OW17-600-080217	OW-18-597 8/3/2017 OW18-597-080317	OW-19-450 8/1/2017 OW19-450-080117	OW-19-450 8/1/2017 DUP-080117	FHCC-Well 8/2/2017 FHCC-WELL-080217
VOLATILE ORGANIC COMPOUNDS in ug/L																	
71-55-6	1,1,1-TRICHLOROETHANE	8,000	< 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 U	< 1 U	< 1 U
79-34-5	1,1,2,2-TETRACHLOROETHANE	0.076	**< 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 U**	**< 1 U**	**< 1 U**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	10,000	< 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 U	< 1 U	< 1 UF1
79-00-5	1,1,2-TRICHLOROETHANE	0.28	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 UF1**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-34-3	1,1-DICHLOROETHANE	2.8	< 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 U	< 1 U	< 1 U
75-35-4	1,1-DICHLOROETHYLENE	280	< 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 U	< 1 U	< 1 U
120-82-1	1,2,4-TRICHLOROBENZENE	1.2	< 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 U	< 1 U	< 1 U
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	0.00033	**< 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 U**	**< 1 U**	**< 1 U**
106-93-4	1,2-DIBROMOETHANE	0.0075	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 UF1**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 UF1**
95-50-1	1,2-DICHLOROBENZENE	300	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 UF1
107-06-2	1,2-DICHLOROETHANE	0.17	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**0.55 J**	**< 1 U**	**< 1 U**	**< 1 U**
78-87-5	1,2-DICHLOROPROPANE	0.85	**< 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 U**	**< 1 U**	**< 1 U**
541-73-1	1,3-DICHLOROBENZENE	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 UF1
106-46-7	1,4-DICHLOROBENZENE	0.48	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 UF1**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 UF1**
78-93-3	2-BUTANONE	5,600	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
591-78-6	2-HEXANONE	38	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
108-10-1	4-METHYL-2-PENTANONE	6,300	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
67-64-1	ACETONE	14,000	< 5 U	8.2	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	4.8 J	< 5 U	4.2 J	< 5 U	< 5 U	< 5 U	6.5
71-43-2	BENZENE	0.46	**< 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 U**	**< 1 U**	**< 1 U**
75-27-4	BROMODICHLOROMETHANE	0.13	**< 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 U**	**< 1 U**	**< 1 U**
75-25-2	BROMOFORM	3.3	< 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 U	< 1 U	< 1 U
74-83-9	BROMOMETHANE	7.5	< 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 U	< 1 U	< 1 U
75-15-0	CARBON DISULFIDE	810	< 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 U	< 1 U	< 1 U
56-23-5	CARBON TETRACHLORIDE	0.46	**< 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 U**	**< 1 U**	**< 1 U**
108-90-7	CHLOROBENZENE	78	< 1 U	0.18 J	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
75-00-3	CHLOROETHANE	21,000	< 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 U	< 1 U	< 1 U
67-66-3	CHLOROFORM	0.22	**< 1 U**	**< 1 U**	**0.56 J**	**0.36 J**	**< 1 U**	**2.7**	**2.8**	**1.5**	**< 1 U**	**3.9 F1**	**< 1 U**	**0.56 J**	**2.3**	**2.4**	**0.54 JF1**
74-87-3	CHLOROMETHANE	190	< 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 U	< 1 U	< 1 U
156-59-2	CIS-1,2-DICHLOROETHENE	36	< 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 U	< 1 U	< 1 U
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	---	< 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 U	< 1 U	< 1 U
110-82-7	CYCLOHEXANE	13,000	< 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 U	< 1 U	< 1 U
124-48-1	DIBROMOCHLOROMETHANE	0.87	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 UF1**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-71-8	DICHLORODIFLUOROMETHANE	200	< 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 U	< 1 U	< 1 U
100-41-4	ETHYLBENZENE	1.5	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 UF1
98-82-8	ISOPROPYLBENZENE (CUMENE)	450	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 UF1
79-20-9	METHYL ACETATE	20,000	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	5 U
1634-04-4	METHYL TERT-BUTYL ETHER	14	< 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 U	< 1 U	< 1 U
108-87-2	METHYLCYLOHEXANE	---	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 UF1
75-09-2	METHYLENE CHLORIDE	11	< 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 U	< 1 U	< 1 U
100-42-5	STYRENE (MONOMER)	1,200	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 UF1
127-18-4	TETRACHLOROETHYLENE	11	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 UF1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 UF1
108-88-3	TOLUENE	1,100	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 UF1	< 1 U	0.23 J	< 1 U	< 1 U	< 1 UF1
156-60-5	TRANS-1,2-DICHLOROETHENE	360	< 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 U	< 1 U	< 1 U
10061-02-6	TRANS-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	< 1 U	< 1 U	< 1 U
79-01-6	TRICHLOROETHYLENE	0.49	**< 1 U**	0.31 J	**< 1 U**	**< 1 U**	**< 1 U**	0.46 J	0.42 J	**0.54 J**	**1 U**	**< 1 UF1**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**	**< 1 U**
75-69-4	TRICHLOROFLUOROMETHANE	5,200	< 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 U	< 1 U	< 1 U
75-01-4	VINYL CHLORIDE	0.019	**< 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 U**	**< 1 U**	**< 1 U**
XYLENES	Xylenes, Total	190	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 UF1	2 U	2 U	2 U	2 U	2 UF1

Notes:
USEPA RSL for TAP WATER (latest version, November 2017)
USEPA MCL (latest version, November 2017)
(1) No RSL exists, MCL utilized.
U - The analyte was not detected above the reporting limit (RL).
UJ - The reporting limit is estimated due to minor quality control anomaly.
J - Result is either less than the RL but greater than or equal to the method detecti
B - Parameter was detected in associated laboratory method blank.
NJ - Result is estimated due to a dual column imprecision greater than 100%.
Bold indicates the reporting limit was above the RSL and/or MCL.
Red bolded detected concentration exceeds RSL
Red bolded and highlighted detected concentration exceeds MCL