SECOND FIVE-YEAR REVIEW REPORT FOR
UGI COLUMBIA GAS PLANT SUPERFUND SITE
LANCASTER COUNTY, PENNSYLVANIA

MAY 2021

Prepared by

U.S. Environmental Protection Agency
Region 3
Philadelphia, Pennsylvania

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May 5, 2021

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LIST OF ABBREVIATIONS AND ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
DNAPL	Dense Non-Aqueous Phase Liquid
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FFS	Focused Feasibility Study
FYR	Five-Year Review
IC	Institutional Control
LWA	Lancaster Water Authority
MCL	Maximum Contaminant Level
µg/L	Micrograms per Liter
mg/kg	Milligrams per Kilogram
MGP	Manufactured Gas Plant
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
PPL	PPL Electric Utilities Corp.
PRP	Potentially Responsible Party
ROD	Record of Decision
RPM	Remedial Project Manager
SVOC	Semi-Volatile Organic Compound
TI	Technical Impracticability
UGI	UGI Utilities, Inc.
UU/UE	Unlimited Use and Unrestricted Exposure
VISL	Vapor Intrusion Screening Level
VOC	Volatile Organic Compound
WWTP	Wastewater Treatment Plant

I. INTRODUCTION

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

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

This is the second FYR for the UGI Columbia Gas Plant Superfund site (the Site). The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared because hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE). The Site consists of one operable unit.

Site Background

The Site is located in a light industrial and residential area of Columbia Borough in Lancaster County, Pennsylvania (Figure 1). The Site includes a 2-acre former manufactured gas plant (referred to as the former MGP facility). The borough built a maintenance garage at the Site on the former MGP facility foundation in 2011 and began using the building in 2014. The borough also operates a municipal garage at the Site, south of the former MGP facility. The Susquehanna River is about 500 feet from the former MGP facility. The Lancaster Water Authority (LWA) operates a drinking water pumping station at the Site that withdraws water from the Susquehanna River for the city of Lancaster water supply. Shawnee Creek, a tributary to the Susquehanna River, runs to the west of the former MGP facility. An active rail line runs parallel to Front Street, across from the former MGP facility. The former Columbia wastewater treatment plant (WWTP) near the Site is no longer in operation. There are residential properties along the Susquehanna River immediately west of the LWA pumping station. No land use changes are currently anticipated at or near the Site.

Starting in 1851, the Columbia Gas Company used the MGP facility to manufacture gas for the borough of Columbia using a coal gasification process. The potentially responsible parties (PRPs) have gone through several name changes and corporate restructures. They are currently identified as PPL Electric Utilities Corp. (PPL) and UGI Utilities, Inc. (UGI). The MGP Facility operated until about 1950. The primary waste streams generated during coal gasification were liquid coal tar, boiler ash and spent gas purifying materials. Coal tar is a mixture of volatile organic compounds (VOCs), including benzene, toluene, ethylbenzene and xylene; semi-volatile organic compounds (SVOCs), including polycyclic aromatic hydrocarbons; and inorganics, including metals and cyanide.

During gas manufacturing operations at the Site, overflows from a tar separator were directed to an open ditch that led to the Susquehanna River. The Pennsylvania Department of Environmental Resources conducted preliminary investigations at the Site in August 1984. In 1985, EPA and the Pennsylvania Department of Environmental Resources conducted further investigations to determine the nature and extent of contamination. Waste from the former MGP facility contaminated soil, sediment and groundwater. The groundwater contamination includes dense non-aqueous phase liquid (DNAPL) in fractures of the bedrock. The DNAPL is a continuous source of contamination for groundwater.

Surficial groundwater flows southwest toward the Susquehanna River. In the site area, a thin layer of overburden overlies weathered bedrock. Depth to bedrock at the Site varies from 4 to 23 feet. The bedrock has significant fracturing.

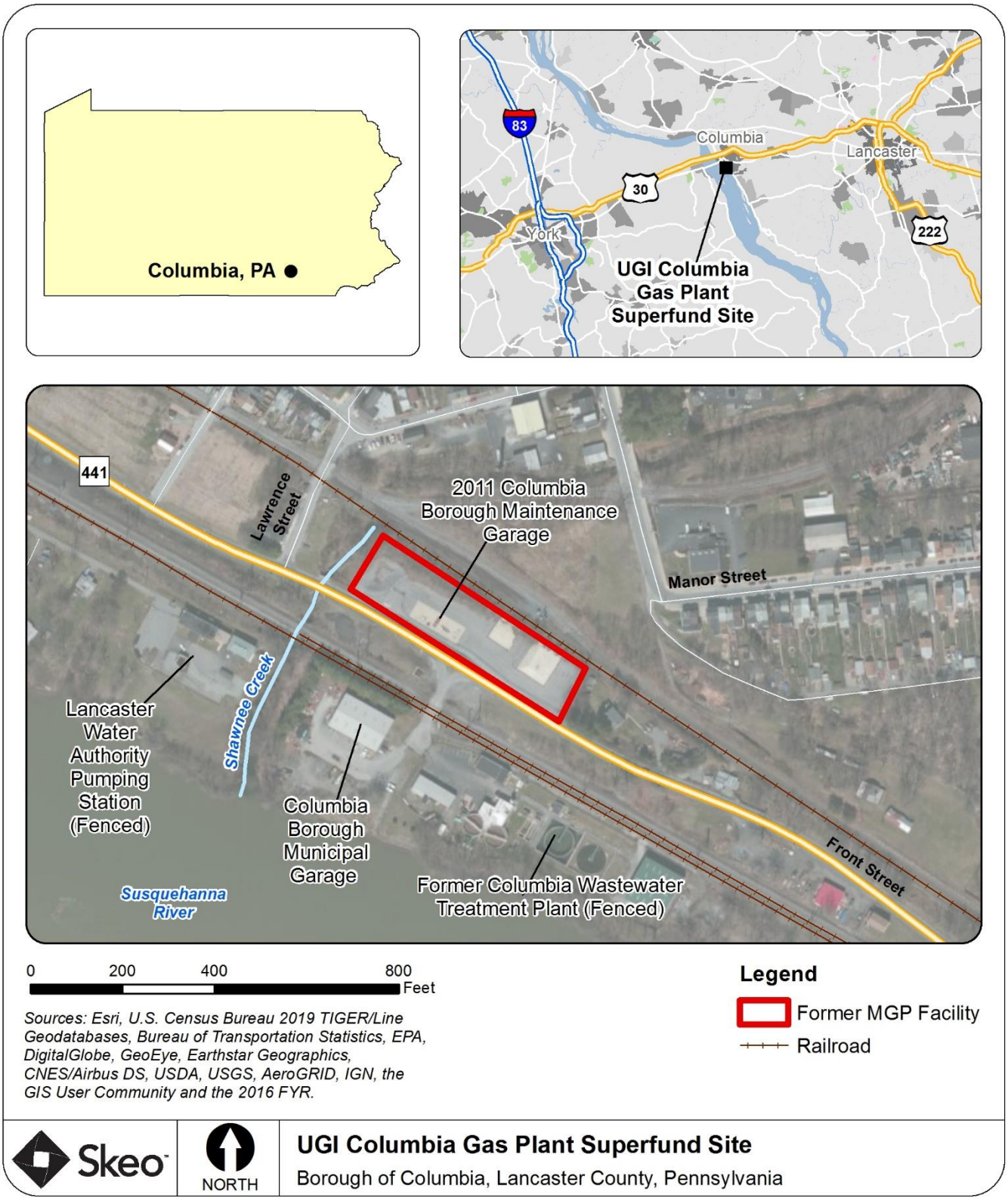
According to December 2020 conversations with Columbia Borough's zoning and planning office and the Columbia Water Company, the water company serves the area surrounding the Site. One nearby property is not connected to the water system. During the Remedial Investigation private wells west of the Site, including the property not connected to the water system, were abandoned. The property is about 500 feet side-gradient of the area of groundwater contamination, so it is not expected to be affected.

Appendix A lists the documents used to prepare this FYR Report. Appendix B provides a brief site chronology.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: UGI Columbia Gas Plant		
EPA ID: PAD980539126		
Region: 3	**State:** Pennsylvania	**City/County:** Columbia / Lancaster
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	**Has the Site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name: Mark Conaron, with additional support provided by Skeo		
Author affiliation: EPA Region 3		
Review period: 8/31/2020 – 5/5/2021		
Date of site inspection: 9/22/2020		
Type of review: Statutory		
Review number: 2		
Triggering action date: 5/5/2016		
Due date *(five years after triggering action date)*: 5/5/2021		

Figure 1: Site Vicinity Map



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

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

EPA proposed listing the Site on the Superfund program's National Priorities List (NPL) in June 1993. EPA finalized the Site's listing on the NPL in May 1994.

The PRPs concluded in the 1998 Human Health Risk Assessment that direct contact with soil and ingestion of groundwater at the Site posed unacceptable human health risks for construction workers and future residents due to the presence of MGP-related wastes. Surface water, sediments and air did not present an unacceptable human health risk.

The PRPs did a preliminary ecological risk assessment in 1994. The assessment indicated that there was no habitat on the Site, but that polycyclic aromatic hydrocarbons in the Susquehanna River sediment posed a potential ecological risk. The PRPs later removed contaminated river sediment during a 1998 removal action. The PRPs sampled sediments in the Susquehanna River in 2003 and in Shawnee Creek in 2005. Site-related contaminant concentrations in surface water and sediments in both 2003 and 2005 were below ecological screening levels. The 2003 and 2005 sampling indicated that polycyclic aromatic hydrocarbon contamination was due to non-site-related sources. Therefore, EPA concluded that a baseline ecological risk assessment was not necessary for the Site.

Response Actions

In 1987, the PRPs removed about 100 cubic yards of coal tar and visibly contaminated soil from the pedestrian tunnel that runs beneath the railroad tracks on the northern portion of the Site. The tunnel walls were steam-cleaned and an 8-inch-thick concrete floor was constructed in the tunnel to prevent potential contact with the underlying contaminated soils. The tunnel is no longer accessible to the public; its northern end has been closed, and its southern end opens into the fenced-off former MGP facility.

In April 1996, PPL entered into a Consent Order and Agreement (1996 Settlement Agreement) with the Pennsylvania Department of Environmental Resources to conduct a remedial investigation and feasibility study. One goal of the 1996 Settlement Agreement was to initiate removal actions for the Susquehanna River and the gas and relief holders (structures that were used to store gas and/or coal tar from the coal gasification process). In accordance with the 1996 Settlement Agreement, PPL used the CROW™ (Contained Recovery of Oily Wastes) process between 1996 and 1998 to remove coal tar from the relief holder as a removal action. Steam and hot water were injected into the relief holder to facilitate the removal of coal tar, which was then taken off site for thermal treatment and disposal. After the tar extraction, coal tar remained in subsurface soils below the holders. PPL injected the holders with a grout and cement mixture to stabilize and solidify them.

Also in accordance with the 1996 Settlement Agreement, the PRPs removed about 700 tons of contaminated sediments from the Susquehanna River in 1998 as a second removal action. The contaminated sediments were shipped off site for thermal treatment and disposal. The PRPs installed a sheet pile wall, about 106 feet in length, along the river bank in the area next to the sediments to prevent the sediments from being recontaminated by the coal tar remaining in site soils. The PRPs regraded and covered the area with a geosynthetic fabric and clean stone.

In November 2006, the PRPs and EPA entered into an Administrative Settlement and Order on Consent (2006 Settlement Agreement) for a third removal action. In accordance with the 2006 Settlement Agreement, the PRPs demolished on-site buildings, excavated and disposed of soil and MGP-related wastes, installed concrete caps over the gas and relief holders where MGP-related wastes remained on site, installed an asphalt cap over the rest of the former MGP facility, installed a stormwater management system, and installed downgradient groundwater

monitoring wells. As part of cap installation, a slab-on-grade building foundation with a passive sub-slab ventilation system was built to help the borough reuse the Site.

EPA selected the Site's final remedy in a September 2007 Record of Decision (ROD) and modified the remedy in a June 2018 Explanation of Significant Differences (ESD).

Soil

EPA identified the following remedial action objectives for soil:

- Protect the integrity of the caps.
- Maintain the caps and the stormwater management system.
- Implement institutional controls for all parts of the Site to prevent residential use and any other uses that would interfere with or adversely affect the integrity or protectiveness of the caps.

EPA selected the following remedy for soil:

- No further remediation of the former MGP facility soils because those areas where MGP-related waste remains in the soil have been capped.
- Long-term maintenance of the caps and stormwater management facilities.
- Implementation of institutional controls. The institutional control components of the soil remedy include deed notices, easements and/or restrictive covenants to prohibit current and future site property owners from using site property for residential use or in any manner that would interfere with or adversely affect the integrity or protectiveness of the remedial actions at the Site.

Groundwater

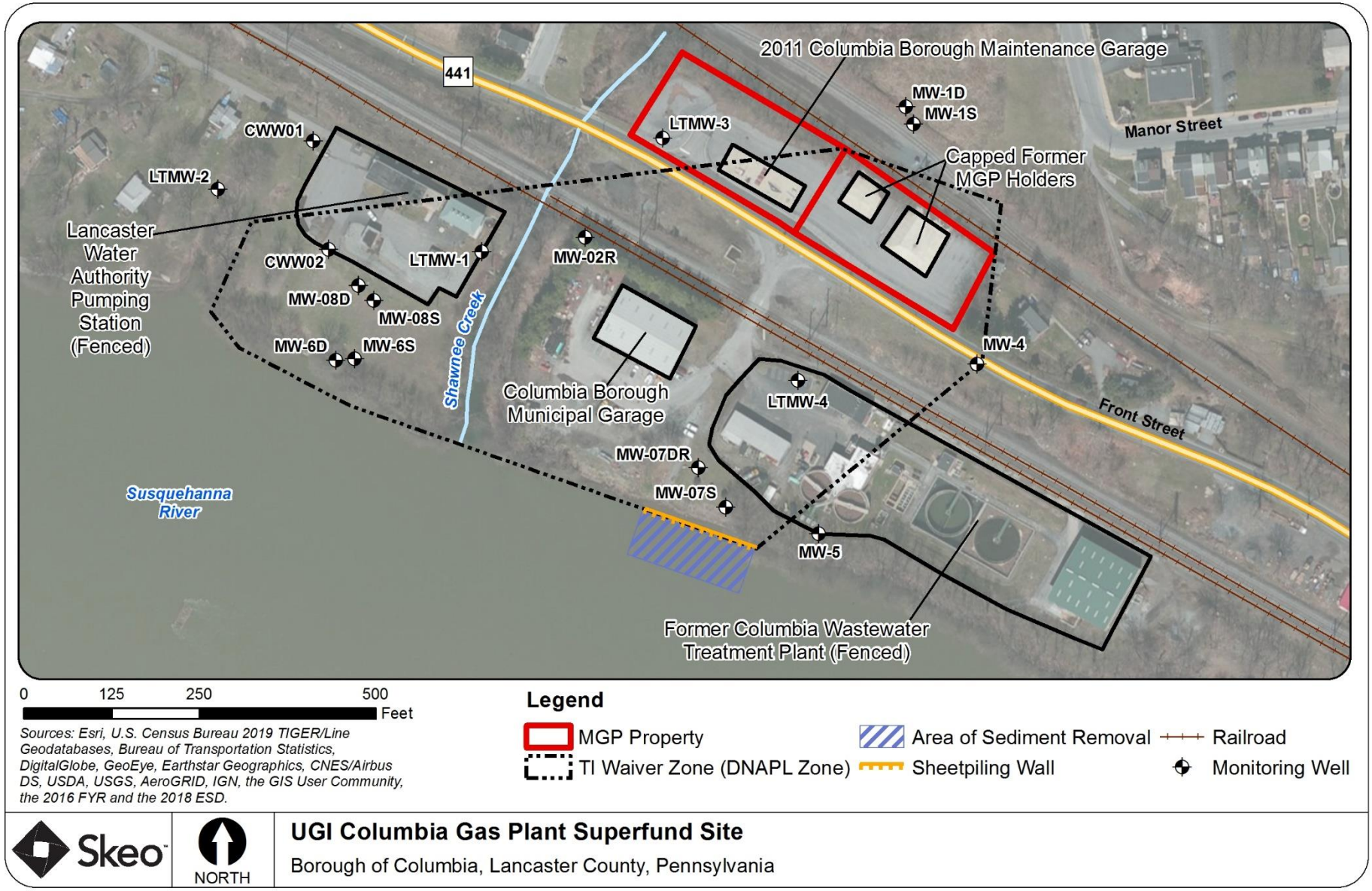
EPA identified the following remedial action objectives for groundwater:

- Prevent human exposures to MGP-related wastes in the groundwater via ingestion, inhalation and dermal contact.
- Prevent further migration of the dissolved phase plume.
- Implement institutional controls to prevent groundwater uses that would interfere with or adversely affect the integrity or protectiveness of the final remedy for the Site.

EPA selected the following remedy for groundwater:

- Monitored natural gradient flushing of dissolved MGP constituents to the Susquehanna River to dilute, disperse and biodegrade to non-detectable levels.
- Invocation of a technical impracticability (TI) waiver of applicable or relevant and appropriate requirements (ARARs) for contaminants found within the DNAPL Zone, pursuant to CERCLA Section 121(d)(4)(C). EPA determined that restoration of groundwater in the DNAPL Zone to drinking water quality is technically impracticable from an engineering perspective using available technologies within a reasonable or foreseeable timeframe.
- Long-term groundwater monitoring to confirm that contaminants of concern (COCs) are not present outside the DNAPL Zone at concentrations exceeding ARARs.
- Institutional controls restricting the installation and use of groundwater wells and prohibiting any use of the Site that would interfere with the protectiveness or integrity of the selected remedy.

Figure 2: Detailed Site Map



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

As previously indicated, LWA operates a surface water pumping station at the Site to the southwest of the former MGP facility. LWA historically operated two cooling water wells (CWW01 and CWW02) to provide cooling water to the surface water intake pumps. Figure 2 shows the wells. The 2007 ROD noted the presence of a lobe of dissolved-phase groundwater contamination (referred to as the LWA Lobe) near the LWA pumping station that extended outside the spatial extent of the DNAPL Zone. The LWA Lobe resulted from the long-term operation of LWA cooling water wells CWW01 and CWW02. Contaminated groundwater extracted by the LWA cooling water wells was treated and combined with surface water for use in the LWA public water supply. The ROD required performance of a Focused Feasibility Study (FFS) if the cooling water wells were shut down to evaluate how to address the dissolved-phase groundwater contaminant plume in the vicinity of those wells.

LWA upgraded its pumping station from 2007 to 2010. As part of the upgrade, LWA was required to use finished water from the Columbia Water System as cooling water for the surface water intake pumps instead of water from the cooling water wells. The cooling water wells were subsequently taken out of service and permanently disconnected from the LWA pumping station in late 2010. In 2011, as required by the 2007 ROD, the PRPs began an FFS to evaluate whether there was dissolved-phase groundwater contamination in the vicinity of the cooling water wells once the cooling water wells were taken out of service. EPA approved the FFS Report in May 2016. The FFS Report found that after the cooling water wells were taken out of service, the concentrations of contaminants in CWW01 decreased to concentrations below the Maximum Contaminant Levels (MCLs) in EPA's National Primary Drinking Water Regulations. Therefore, EPA concluded that groundwater currently sampled in CWW01 does not originate from DNAPL-contaminated areas of the Site. This conclusion is consistent with the conceptual site model described in the Feasibility Study and ROD and is expected for a separate dissolved phase plume that dissipates over time as a result of natural gradient flushing. However, concentrations of site-related contaminants in CWW02 increased after the cooling water wells were taken out of service and DNAPL was observed in well CWW02. Therefore, EPA determined that CWW02 is located within the DNAPL Zone at the Site. Based on the findings of the FFS, EPA issued an ESD in 2018 to modify the remedy selected in the 2007 ROD. The ESD extended the boundaries of the TI Waiver Zone (also known as the DNAPL Zone) both horizontally and vertically. The ESD also updated the Site's list of COCs and cleanup levels (see Table 1). The ESD stated that the Site's groundwater cleanup levels are the federal MCLs and eliminated groundwater cleanup levels for COCs that do not have MCLs. The cleanup levels apply only to the area outside the TI Waiver Zone (see Figure 2).

Table 1: Groundwater COCs and Cleanup Levels

Groundwater COC	Cleanup Level (µg/L)[a]
Benzene	5
Ethylbenzene	700
Toluene	1,000
Benzo(a)pyrene	0.2
Bis(2-ethylhexyl)phthalate	6
Cyanide	200
1,2,4-Trimethylbenzene	NA
1-Methylnaphthalene	NA
2-Methylnaphthalene	NA
Acenaphthene	NA
Acenaphthylene	NA
Benzo(a)anthracene	NA
Benzo(b)fluoranthene	NA
Chrysene	NA
Dibenzofuran	NA

Groundwater COC	Cleanup Level (µg/L)[a]
Fluoranthene	NA
Naphthalene	NA
Phenanthrene	NA
Pyrene	NA
Iron	NA
Manganese	NA

Notes:

a) The 2018 ESD stated that the Site's groundwater cleanup levels are the federal MCLs and eliminated groundwater cleanup levels for COCs that do not have MCLs. EPA waived the MCLs within the DNAPL Zone due to the technical impracticability of restoring groundwater within the DNAPL Zone to meet the MCLs.

b) µg/L = micrograms per liter

NA = chemical does not have an MCL

Status of Implementation

Soil

The removal actions in 1997 and 1998 addressed soil and sediment contamination at the Site. EPA determined that no additional soil remediation was needed. Institutional controls were put in place in 2007, 2009 and 2018 to prohibit residential use or any use that could impact the remedy (see the Institutional Control Review section below).

Groundwater

Due to the presence of DNAPL in fractured bedrock, EPA determined that it is technically impracticable to achieve groundwater ARARs within the DNAPL Zone. Natural gradient flushing will continue to dilute, disperse and degrade the dissolved phase groundwater plume resulting from the DNAPL. The dissolved phase groundwater plume discharges to the Susquehanna River thereby preventing further migration or expansion.

The PRPs conduct annual groundwater monitoring to confirm that the remedy is performing consistently within expectations and that conditions in the site area have not changed significantly. Institutional controls were put in place to limit the installation of new wells and limit use of groundwater (see the Institutional Control Review section below).

Institutional Control (IC) Review

The 2007 ROD required institutional controls to prohibit residential use, installation or use of groundwater wells, and any use of the Site that would interfere with the protectiveness or integrity of the selected remedy. All institutional controls needed for the Site have been put in place. The borough's zoning restrictions and a borough ordinance augment the institutional controls. Figure 3 shows the Site's institutional controls on a map. Table 2 summarizes the Site's institutional controls. Table 3 lists the letters used in this FYR Report to refer to the Site's parcels and cross-references each parcel with its institutional control document.

2007 Restrictive Covenants

In June and September 2007, the PRPs recorded four Environmental Protection Easements and Declarations of Restrictive Covenants (2007 Restrictive Covenants). The 2007 Restrictive Covenants prevent the installation of new groundwater wells and the use of groundwater for any purpose besides required monitoring, among other

restrictions, on the Safe Harbor Power Corporation property (Parcel F, 7.6 acres, since subdivided), on the LWA pumping station property (Parcel G, 3.0 acres), and on part of the Borough WWTP property (Parcel K, 3.2 acres).

The 2007 Restrictive Covenants also included restrictions on the LWA pumping station property (Parcel G) and for Parcel K of the Borough WWTP property, including prohibiting the use of these properties for residential purposes or commercial purposes other than as its current use as a sewage treatment facility without prior written approval by EPA and PADEP.

Finally, the 2007 Restrictive Covenant for the Shawnee Run Greenway (Parcel A) established a stormwater easement. This easement allows construction and maintenance of a stormwater conveyance system across the property to Shawnee Run, specifically including installation of a subsurface stormwater pipe and riprap. In addition, the property cannot be used in any manner that interferes with the proper flow of stormwater from adjacent properties to Shawnee Run.

In 2012 and 2013, tax map number 13E12B-3-2 (Safe Harbor Power Corporation property, Parcel F), subject to a 2007 Restrictive Covenant, was divided into parcels that were sold individually to residents (Figure 3). The subdivided parcels are still subject to the restrictions because the 2007 Restrictive Covenant runs with the land and binds successive owners.

2009 Environmental Covenant

On February 20, 2009, the PRPs recorded an Environmental Covenant for the properties that comprise the MGP Facility (Parcels B and C). The 2009 Environmental Covenant implemented groundwater restrictions on Parcels B and C, including a prohibition on installing new groundwater wells and using groundwater for any purpose aside from furthering the response action. The 2009 Environmental Covenant also implemented land use restrictions, including, but not limited to, prohibiting residential use of the properties and commercial uses inconsistent with the 2006 Settlement Agreement and prohibiting excavation on the properties without a site-specific health and safety plan and a soil management plan.

2018 Environmental Covenants

On October 10, 2018, the PRPs recorded two Environmental Covenants (together, 2018 Environmental Covenants): one for the Borough garage parcel (Parcel H) two of the Borough WWP parcels (Parcels I and J) and one for Parcel K of the Borough WWTP. The 2018 Environmental Covenants implement both groundwater restrictions and land use restrictions for the properties, including, but no limited to, limiting use of the properties to non-residential use, prohibiting the installation of new groundwater wells except as required by EPA and PADEP, and prohibiting the use of groundwater at the properties except for required response actions.

2018 Informational Letter

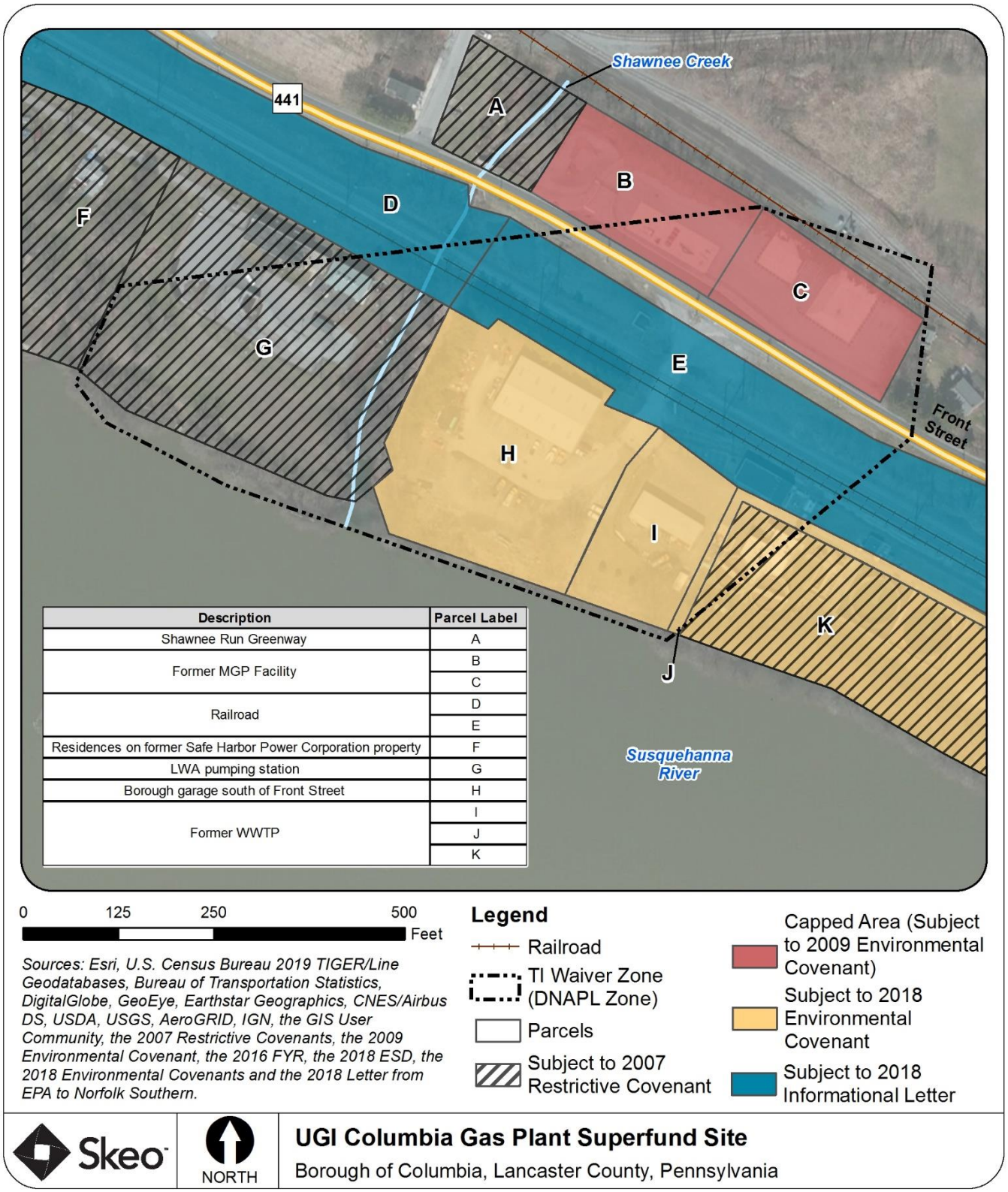
On March 19, 2018, EPA sent a letter (2018 Informational Letter) to Norfolk Southern Railway Company (Norfolk Southern) informing it of known groundwater and likely sub-surface contamination beneath railroad right-of-way property at the Site (Parcels D and E). In the 2018 Informational Letter, EPA explained that residential use of the properties is prohibited and recommended that Norfolk Southern should contact EPA and PADEP prior to any construction at the properties to provide for appropriate worker protection.

2021 Informational Letter

On March 9, 2021, EPA sent a letter (2021 Informational Letter) to Penn DOT informing it of known groundwater and likely sub-surface contamination beneath S. Front Street, Route 441, that bisects the Site. In the 2021 Informational Letter, EPA explained, although unlikely, that residential use of road right-of-way is prohibited and that prior to any activities on the property (road maintenance, utility maintenance, construction, or excavation) notification of EPA and PA DEP in order to provide for appropriate worker protection from any

subsurface contamination present. The letter was also sent to Columbia Borough, the Lancaster Planning Commission, and Columbia Water.

Figure 3: Institutional Control Map



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

Table 2: Summary of Institutional Controls (ICs)

Media, Engineered Controls, and Areas That Do Not Support UU/UE Based on Current Conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcels	IC Objective	Title of IC Instrument Implemented and Date
Groundwater	Yes	Yes	Former MGP facility (B and C) LWA pumping station (G) Former WWTP (I, J and K) Former Safe Harbor Power Corporation property (F) Borough garage (H)	• Prohibit interference with monitoring wells or soil around wells. • Prohibit installation of new groundwater wells other than in support of the response action. • Prohibit use of groundwater other than in support of the response action.	2007 Restrictive Covenants 2009 Environmental Covenant 2018 Environmental Covenants
			Railroad (D and E)	• Prohibit groundwater use.	2018 Informational letter sent from EPA to Norfolk Southern

Media, Engineered Controls, and Areas That Do Not Support UU/UE Based on Current Conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcels	IC Objective	Title of IC Instrument Implemented and Date
Soil	Yes	Yes	LWA pumping station (G) Former WWTP (I, J and K) Borough garage (H)	• Prohibit residential use. • Parcels G and K: Prohibit construction of habitable buildings other than expansion of existing facilities. Prohibit commercial use of WWTP property beyond current use, unless approved.	2007 Restrictive Covenants 2018 Environmental Covenants
			Former MGP facility (B and C)	• Prohibit excavation or removal of soils. • Prohibit residential use. • Prohibit commercial use inconsistent with the 2006 Settlement Agreement. • Prohibit vehicles or buildings in area of holders. • Prohibit construction of habitable buildings or basements unless vapor extraction system installed. • Require maintenance of concrete, asphalt and drainage collection basins.	2009 Environmental Covenant
			Railroad (D and E)	• Prohibit residential use. • Recommend notifying EPA and Pennsylvania Department of Environmental Protection prior to conducting activities in order to prevent worker exposure to subsurface contamination.	2018 Informational letter sent from EPA to Norfolk Southern
			Shawnee Run Greenway (A)	• Establish stormwater easement to protect underground stormwater pipe.	2007 Restrictive Covenant
			Front Street right-of-way	• Prevent worker exposure to subsurface contamination during road and utility work	2021 Informational letter sent from EPA to Penn DOT

Table 3: Parcel Summary Table

Description	FYR Parcel Label	County Parcel Number	Institutional Control Document
Shawnee Run Greenway	A	1106334000000	2007 Restrictive Covenant (Instrument #5630772)
Former MGP facility	B	1108042300000	2009 Environmental Covenant (Instrument #5762141)
	C	1100228400000	
Railroad	D	1101934200000	2018 Informational letter sent from EPA to Norfolk Southern
	E	1106577600000	
Residences on former Safe Harbor Power Corporation property	F	Parcels formed by subdividing tax map number 13E12B-3-2	2007 Restrictive Covenant (Instrument #5654036)
LWA pumping station	G	1102723600000	2007 Restrictive Covenant (Instrument #5654033)
Borough garage south of Front Street	H	1106089400000	2018 Environmental Covenant (Instrument #6421235)
Former WWTP	I	1108127900000	
	J	1103430000000	
	K	1101908900000	2007 Restrictive Covenant (Instrument #5654034) 2018 Environmental Covenant (Instrument #6421236)

Zoning Restrictions

Although zoning restrictions were not selected as institutional controls for the Site, the location of part of the Site within the Columbia Borough Conservation zoning district further restricts use of those parcels for residential use. Parcels in the Conservation zoning district require a special exception from the Columbia Borough Zoning Hearing Board for residential use. Residential use is permitted in Riverfront Commercial and Rural Residential zoning districts. Site parcels are in the following zoning districts:

- Conservation zoning district:
  - Shawnee Run Greenway (Parcel A)
  - Former MGP facility (Parcels B and C)
  - Railroad (Parcels D and E)
  - LWA pumping station (Parcel G)
- Rural Residential zoning district:
  - Residences on former Safe Harbor Power Corporation property (Parcel F)
- Riverfront Commercial zoning district:
  - Borough garage south of Front Street (Parcel H)
  - Borough WWTP (Parcels I, J and K)

According to December 2020 conversations with Columbia Borough's zoning and planning office and the Columbia Water Company, the water company's system serves the area surrounding the Site. One nearby property is not connected to the water system. During the Remedial Investigation private wells west of the Site, including the property not connected to the water system, were abandoned. The property is about 500 feet side-gradient of the area of groundwater contamination, so it is not expected to be affected.

For new developments, the Subdivision and Land Development Ordinance of the borough of Columbia (Chapter 190, Ordinance 850, adopted November 2014) states that publicly-owned community water supply systems are preferable, but individual wells can be used when a community water supply system is not accessible (§190-45).

Although a portion of the parcel immediately east of Parcel C lies within the DNAPL TI Waiver Zone, EPA has determined that institutional controls are not necessary for the parcel immediately east of Parcel C due to it being

upgradient from the flow of groundwater. In addition, EPA has determined that institutional controls are not necessary for the contaminated soils remaining under the 8-inch-thick concrete floor constructed in the tunnel that runs beneath the railroad tracks on the northern side of the Site. The tunnel is no longer accessible to the public; its northern end has been closed and its southern end opens into the fenced-off former MGP facility.

Operation and Maintenance (O&M)

Operation and maintenance (O&M) activities are performed in accordance with the June 24, 2011, Sampling and Monitoring Work Plan. The O&M Plan for the asphalt and concrete caps is Appendix B of the Work Plan. In accordance with the O&M Plan, the PRP contractor performs annual inspections to verify the integrity of the asphalt and concrete caps and associated stormwater management system. The PRP contractor also documents any changes to the use of the Site and abutting properties Annual inspections of the caps have identified minor asphalt cracking, minor shrinkage of sealant along the foundation of the borough building, minor vegetative growth along the northern fence line, and debris in the retention pond and catch basins. Ongoing maintenance of the cap includes monitoring vegetative growth along the northern fence line and concrete cover systems and removal of debris and leaf litter in the retention pond and catch basins.

In accordance with the Work Plan, the PRP contractor performs annual groundwater monitoring. The Data Review section of this FYR Report discusses the groundwater monitoring results.

III. PROGRESS SINCE THE PREVIOUS REVIEW

This section includes the protectiveness determinations and statements from the previous FYR Report as well as the recommendations from the previous FYR Report and the status of those recommendations.

Table 4: Protectiveness Determinations/Statements from the 2016 FYR Report

OU #	Protectiveness Determination	Protectiveness Statement
Sitewide	Short-term Protective	The remedy is protective of human health and the environment in the short-term because concrete and asphalt caps prevent unacceptable exposure to remaining contaminated soil and no exposure to contaminated groundwater is currently occurring. However, in order for the remedy to be protective in the long-term, the following actions need to be taken: • Evaluate institutional controls for the Site and modify or add controls, as necessary, for the affected properties: Railroad, WWTP, and Borough garage parcels. • Evaluate groundwater data and DNAPL extent to determine whether an alternate remedial method for groundwater is necessary. • Continue monitoring manganese and cyanide concentrations near the Susquehanna River to determine whether unacceptable ecological risk is present and evaluate if additional investigation and/or mitigation are necessary.

Table 5: Status of Recommendations from the 2016 FYR Report

OU #	Issue	Recommendation	Current Status	Current Implementation Status Description	Completion Date
1	Institutional controls for some affected properties are not implemented as required in the 2007 ROD and as necessary for long-term remedy protectiveness.	Evaluate institutional controls for the Site and modify or add controls, as necessary, for the affected properties: Railroad, WWTP, and Borough garage parcels.	Completed	The borough of Columbia recorded Environmental Covenants for the former WWTP and the borough garage south of Front Street in October 2018. EPA sent an informational letter to the Norfolk Southern railroad in March 2018 describing groundwater and land use restrictions. EPA sent an informational letter for the portion of Front Street that crosses the DNAPL Zone to prevent workers from being exposed to subsurface contamination during road and utility work.	3/6/21
1	The LWA cooling water wells are no longer pumping, but alternate remedial methods to address the remaining LWA Lobe are not in place.	Evaluate groundwater data and DNAPL extent to determine whether an alternate remedial method for groundwater is necessary and if the existing boundary of the DNAPL Zone is appropriate for the current Site conditions.	Completed	The PRPs conducted an FFS from 2011 to 2016. Based on its findings, EPA issued an ESD in 2018 to expand the boundaries of the DNAPL Zone.	6/4/2018
1	Two monitoring wells within the DNAPL Zone adjacent to the Susquehanna River indicate that manganese and cyanide may be discharging to the river at concentrations that may present an ecological risk.	Continue monitoring manganese and cyanide concentrations near the Susquehanna River to determine whether there is an unacceptable ecological risk due to the groundwater discharge and evaluate if additional investigation and/or mitigation are necessary.	Ongoing	Over the past five years, the three wells closest to the Susquehanna River have had contaminants at levels above ecological screening levels for surface water. EPA will assess the monitoring data to determine whether there is an unacceptable ecological risk and evaluate if additional investigation or mitigation are necessary.	NA

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Community Involvement and Site Interviews

A public notice was made available on Lancaster Online on February 1, 2021 (Appendix C). It stated that the FYR was underway and invited the public to submit any comments to EPA. The results of the review and the report will be made available at the Site's information repository, Mountville Public Library, located at 120 College Avenue in Mountville, Pennsylvania 17554, and online at www.epa.gov/superfund/ugicolumbia.

During the FYR process, no public comments were received. EPA updated the new Columbia Borough Manager, Mark E. Stivers on February 25, 2021 on the Site status.

Data Review

This FYR reviewed groundwater sampling data collected during the past five years to determine whether groundwater outside of the DNAPL Zone exceeds the Site's cleanup goals. Groundwater monitoring is conducted in accordance with the EPA-approved 2011 Sampling and Monitoring Work Plan. Monitoring has been done annually since 2011 at the following wells:

- Bedrock wells: LTMW-1, LTMW-2, LTMW-3, MW-6D, MW-07DR, MW-08S, MW-08D
- Overburden well: MW-07S
- Overburden/bedrock interface wells: MW-5, MW-6S
- Former LWA cooling water wells (bedrock): CWW01, CWW02

Figure 2 shows the locations of these wells. Groundwater samples are analyzed for VOCs, SVOCs, cyanide, iron and manganese.[1] The subsections below summarize groundwater monitoring results, separated into two geographic areas: wells in the DNAPL Zone and wells outside the DNAPL Zone. Table F-1 in Appendix F presents the groundwater sampling results from the past five years.

Monitoring Wells in the DNAPL Zone

As expected, monitoring wells in the DNAPL Zone continue to have COC concentrations exceeding MCLs. EPA waived the requirement to meet MCLs within the DNAPL Zone. The highest concentrations were detected in bedrock wells LTMW-1, CWW02, MW-08D and MW-6D. Figure F-1 in Appendix F shows the benzene concentrations in these wells over the past five years. LTMW-1 has the highest benzene concentrations at the Site, with concentrations around 8,000 micrograms per liter (µg/L) over the past five years. Benzene concentrations at CWW02 and MW-08D increased significantly over the past five years, rising from below 1,000 µg/L to over 4,000 µg/L. The Site's 2019 annual report states that "the increased concentration of VOCs detected in groundwater collected from MW-08D may be related to pressure pulse testing completed in November 2014, as potable water injected at cooling water well CWW02 has flushed downgradient towards the Susquehanna River and away from the study area. The COCs detected at MW-08D appear to be returning to pre-pressure pulse test concentrations." Annual groundwater monitoring will continue to be done to evaluate contaminant concentration trends in the DNAPL Zone.

Over the past five years, the three wells closest to the Susquehanna River (MW-5, MW-6S and MW-07S) have had inorganic contaminants at levels above Region 3's ecological screening levels for surface water. For example, barium was detected at up to 130 µg/L (screening level = 4 µg/L), iron up to 9,800 µg/L (screening level = 300 µg/L), manganese up to 2,600 µg/L (screening level = 120 µg/L) and cyanide up to 17 µg/L (screening level = 5 µg/L). As stated in the 2016 FYR Report, this suggests the possibility that contaminants may be discharging to the river at levels that present an ecological risk. The PRPs will continue monitoring groundwater concentrations to establish trends for these contaminants.

Monitoring Wells Outside the DNAPL Zone

Over the past five years, there has been only one occurrence of a COC exceeding its MCL outside the DNAPL Zone. In 2015, benzene was detected at 15.2 µg/L in LTMW-2. Since then, benzene has been well below its MCL (5 µg/L) in that well.

For the COCs without cleanup levels, nearly all of these COCs, except for napthalene in 2015, have been consistently below regional screening levels for drinking water over the past five years in wells outside of the

[1] During 2016-2019, LTMW-2 was analyzed for VOCs only because of the sampling method used for that well.

DNAPL Zone. Groundwater is not used at or near the Site. EPA will consider cumulative risk levels before deleting the Site from the NPL.

Site Inspection

The site inspection took place on September 22, 2020. Participants included the EPA RPM, the EPA hydrogeologist, the PRP contractor and Skeo (EPA's FYR support contractor). The purpose of the inspection was to assess the protectiveness of the remedy. Appendix D provides the site inspection checklist. Appendix E provides photographs from the site inspection.

Site inspection participants observed the former MGP facility, the area of sediment remediation in the Susquehanna River, the former Columbia WWTP, the borough municipal garage southwest of Front Street and the LWA drinking water pumping station. At the former MGP facility, the concrete and asphalt covers are in good condition with no significant cracks; they appear to have been sealed recently. The two concrete-capped former MGP holders are surrounded by bollards for protection. A locked fence surrounds the former MGP facility. Monitoring well CWW01 was locked but the lid was not secured to the well casing. The PRPs have since fixed the locking cap and the well is secured. Other monitoring wells appeared to be in good condition but were not labeled.

V. TECHNICAL ASSESSMENT

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

Yes. The remedy is functioning as intended by the decision documents. All remaining soil contamination is covered by concrete or asphalt caps, which are regularly inspected and maintained to ensure protectiveness. Sediment contamination in the Susquehanna River was removed. All necessary institutional controls have been implemented to provide groundwater and land use controls at the Site.

As expected, groundwater in the DNAPL Zone continues to exceed MCLs. Outside the DNAPL Zone, there was only one occurrence of a COC (benzene in 2015) exceeding its MCL over the past five years. For the COCs without cleanup levels, nearly all, except napthalene in 2015, of these COCs, have been consistently below EPA screening levels for drinking water over the past five years in wells outside the DNAPL Zone. Groundwater is not used at or near the Site. EPA will consider cumulative risk levels before deleting the Site from the NPL.

Elevated concentrations of inorganic contaminants in three wells next to the Susquehanna River may indicate that contaminants are discharging to the river at levels that may present an ecological risk. Monitoring will continue in these wells to determine whether there is an unacceptable ecological risk and EPA will evaluate if additional investigation and/or mitigation are necessary.

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

Yes. The former MGP facility has been capped, eliminating the risk associated with exposure to soils at that portion of the Site. The 2007 ROD determined that the levels of soil contamination present between the former MGP facility and the Susquehanna River were protective for industrial use but not for residential use. Institutional controls prohibiting residential use are in place. To determine whether these areas are still safe for industrial use based on current toxicity values, this FYR conducted a screening-level evaluation comparing the soil concentrations against EPA's current screening levels (Table G-4). The screening-level evaluation shows that soil contamination in the area between the former MGP facility and the Susquehanna River is within EPA's acceptable risk range for industrial use.

The remedial action objectives in the 2007 ROD are still valid. EPA has achieved the remedial action objectives of preventing exposure to contaminated soil and groundwater and preventing migration of dissolved groundwater contamination.

EPA's 2018 ESD updated the Site's groundwater cleanup levels and ARARs. None of the ARARs' numerical values have changed since the 2018 ESD (see Appendix G). Groundwater is not used at or near the Site.

Vapor intrusion sampling has not been done at the Site. Residences are located near the DNAPL Zone. The borough building built on the former MGP facility in 2011 is located above the DNAPL Zone. The borough building was constructed with a passive venting system to prevent vapor intrusion into the building. This FYR conducted a screening-level vapor intrusion evaluation using groundwater data to identify if further vapor intrusion evaluation is needed for the residences or the borough building (Appendix F). The results of the screening-level evaluation show that vapor intrusion is not currently a concern. There are other occupied buildings above the area of groundwater contamination, but these buildings are used primarily for storage and are not routinely occupied. Therefore, EPA does not believe they are at risk from vapor intrusion and that vapor intrusion air sampling is necessary at this time at the Site.

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

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

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the FYR:
All

Issues and Recommendations Identified in the FYR:
None

Other Findings:

One additional finding was identified during the FYR. This finding does not affect current and/or future protectiveness.

- Elevated concentrations of inorganic contaminants in three wells next to the Susquehanna River may indicate contaminants are discharging to the River. Monitoring should continue of the wells next to the river and an evaluation of the results conducted to determine whether additional ecological risk assessment is required.

VII. PROTECTIVENESS STATEMENT

Sitewide Protectiveness Statement
Protectiveness Determination: Protective
Protectiveness Statement: The remedy is protective of human health and the environment because concrete and asphalt caps prevent unacceptable exposure to remaining contaminated soil, there is no exposure to contaminated groundwater, and institutional controls are in place to restrict groundwater and land use.

VIII. NEXT REVIEW

The next FYR Report for the UGI Columbia Gas Plant Superfund site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

2015 through 2019 Annual Sampling and Monitoring Reports. Prepared by Haley & Aldrich, Inc. for PPL Electric Utilities Corporation and UGI Utilities, Inc. December 2015 – January 2020.

Baseline Human Health Risk Assessment: Former UGI Columbia Manufactured Gas Plant. Prepared by Menzie-Cura & Associates, Inc. for Clean Sites, Inc. Dated April 1998, updated June 1998.

Environmental Covenant. Instrument #6421235. Grantor: Borough of Columbia. Grantees: PPL and UGI. Recorded October 1, 2018.

Environmental Covenant. Instrument #6421236. Grantor: Borough of Columbia. Grantees: PPL and UGI. Recorded October 1, 2018.

Environmental Covenant for UGI Columbia Gas Plant Superfund Site. Instrument #5762141. Grantor: Borough of Columbia. Grantees: PPL, UGI and Pennsylvania Department of Environmental Protection. Recorded February 20, 2009.

Environmental Protection Easement and Declaration of Restrictive Covenants. Instrument #5630772. Grantor: Shawnee Run Greenway, Inc. Grantees: PPL and UGI. Recorded June 27, 2007.

Environmental Protection Easement and Declaration of Restrictive Covenants. Instrument #5654033. Grantor: City of Lancaster. Grantees: PPL and UGI. Recorded September 25, 2007.

Environmental Protection Easement and Declaration of Restrictive Covenants. Instrument #5654034. Grantor: Columbia Municipal Authority. Grantees: PPL and UGI. Recorded September 25, 2007.

Environmental Protection Easement and Declaration of Restrictive Covenants. Instrument #5654036. Grantor: Safe Harbor Power Corporation. Grantees: PPL and UGI. Recorded September 25, 2007.

Explanation of Significant Differences: UGI Columbia Gas Plant Superfund Site. U.S. EPA Region III. June 2018.

First Five-Year Review Report for UGI Columbia Gas Plant Superfund Site. U.S. EPA Region 3. May 2016. https://semspub.epa.gov/src/document/03/2228409.

Letter from EPA to Norfolk Southern Corporation Re: UGI Columbia Gas Plant Superfund Site, Columbia Borough, Lancaster County, Pennsylvania – Important Information Regarding Environmental Conditions and Use of the Railroad Right-of-Way Owned by Norfolk Southern Railway Company. March 2018.

Record of Decision: UGI Columbia Gas Plant. U.S. EPA. September 2007. https://semspub.epa.gov/src/document/03/2084262.

Superfund Preliminary Close Out Report: UGI Columbia Gas Plant Superfund Site. U.S. EPA Region III. September 2007. https://semspub.epa.gov/src/document/03/2085017.

APPENDIX B – SITE CHRONOLOGY

Table B-1: Site Chronology

Event	Date
Columbia Gas Company used the on-site manufactured gas plant to make gas for the borough of Columbia	1851-1950
EPA discovered contamination	June 1, 1981
EPA and the state completed the Preliminary Assessment	February 1, 1985
PRPs cleaned pedestrian tunnel walls and installed concrete flooring	1987
EPA completed the Site Inspection	October 17, 1989
EPA proposed listing the Site on the NPL	June 23, 1993
EPA listed the Site on the NPL	May 31, 1994
PRPs conducted the remedial investigation/feasibility study	April 4, 1996 to May 7, 2002
PRPs conducted first removal action	July 26, 1996 to December 23, 1998
PRPs conducted second removal action	December 17, 1997 to September 29, 1998
PRPs conducted second feasibility study	May 17, 2006 to September 24, 2007
EPA and PRP agreed to Administrative Settlement and Order on Consent	November 29, 2006
PRPs conducted third removal action	March 19, 2007 to May 7, 2008
EPA signed ROD EPA prepared Preliminary Close-Out Report	September 24, 2007
PRPs and landowners recorded four Environmental Protection Easements and Declarations of Restrictive Covenants for the LWA pumping station, part of the former WWTP, residences on the former Safe Harbor Power Corporation property and the Shawnee Run Greenway	June and September 2007
PRPs recorded an Environmental Covenant for the former MGP facility	February 20, 2009
PRPs conducted the remedial design	May 28, 2010 to May 31, 2011
EPA and PRPs agreed to Consent Decree	September 15, 2010
Lancaster Water Authority stopped using the two cooling water wells	2010
PRPs conducted FFS to evaluate the effect of shutting down the cooling water wells	2011-2016
PRPs started the remedial action	May 31, 2011
The borough constructed a maintenance garage on the former MGP facility foundation	2011
The borough began using the on-site maintenance garage	2014
EPA issued an ESD	June 4, 2018
EPA sent informational letter to Norfolk Southern railroad describing groundwater and land use restrictions	March 2018
Borough of Columbia recorded Environmental Covenants for the former WWTP and the borough garage south of Front Street	October 2018
EPA sent informational letter to Penn DOT describing groundwater and land use restrictions	March 2021

APPENDIX C – PRESS NOTICE

EPA PUBLIC NOTICE

EPA REVIEWS CLEANUP

UGI COLUMBIA GAS PLANT SUPERFUND SITE

The U.S. Environmental Protection Agency (EPA) is reviewing the cleanup that was conducted at the UGI Columbia Gas Plant Superfund Site located in Columbia, Pennsylvania. EPA conducts five-year reviews to ensure that cleanups continue to protect public health and the environment. EPA conducted the previous five-year review in 2016 and concluded that the remedy was working as designed and is protective in the short-term. Findings from the current review will be available in May 2021.

To access site information, including the five-year review report once finalized, visit:
www.epa.gov/superfund/ugicolumbia

For questions or to provide site-related information for the review, contact:
Gina Soscia,
EPA Community Involvement Coordinator
215-814-5538 or soscia.gina@epa.gov

APPENDIX D – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site Name: UGI Columbia	**Date of Inspection:** 09/22/2020
Location and Region: Columbia, PA; Region 3	**EPA ID:** PAD980539126
Agency, Office or Company Leading the Five-Year Review: EPA	**Weather/Temperature:** clear, about 50°F

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☒ Other: DNAPL and sediment removal; TI waiver
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☒ Vertical barrier walls

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

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

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

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

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

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

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

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

   Agency _____
   Contact _____ _____ _____ _____

	Name	Title	Date	Phone No.	
	Problems/suggestions ☐ Report attached:_____				
4.	**Other Interviews** (optional) ☐ Report attached: _____				
	III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)				
1.	**O&M Documents**				
	☒ O&M manual	☒ Readily available	☒ Up to date	☐ N/A	
	☐ As-built drawings	☐ Readily available	☐ Up to date	☒ N/A	
	☐ Maintenance logs	☐ Readily available	☐ Up to date	☒ N/A	
	Remarks: _____				
2.	**Site-Specific Health and Safety Plan**	☐ Readily available	☐ Up to date	☒ N/A	
	☐ Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☒ N/A	
	Remarks: _____				
3.	**O&M and OSHA Training Records**	☐ Readily available	☐ Up to date	☒ N/A	
	Remarks: _____				
4.	**Permits and Service Agreements**				
	☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A	
	☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A	
	☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A	
	☐ Other permits: _____	☐ Readily available	☐ Up to date	☒ N/A	
	Remarks: _____				
5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	☒ N/A	
	Remarks: _____				
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	☒ N/A	
	Remarks: _____				
7.	**Groundwater Monitoring Records**	☒ Readily available	☒ Up to date	☐ N/A	
	Remarks: _____				
8.	**Leachate Extraction Records**	☐ Readily available	☐ Up to date	☒ N/A	
	Remarks: _____				
9.	**Discharge Compliance Records**				
	☐ Air	☐ Readily available	☐ Up to date	☒ N/A	
	☐ Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A	
	Remarks: _____				

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

Remarks: _____

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for state

☐ PRP in-house ☒ Contractor for PRP

☐ Federal facility in-house ☐ Contractor for Federal facility

☐ _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date

☐ Funding mechanism/agreement in place ☐ Unavailable

Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached
From: _____ Date	To: _____ Date	_____ Total cost	☐ Breakdown attached

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

Describe costs and reasons: _____

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

A. Fencing

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

Remarks: _____

B. Other Access Restrictions

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

Remarks: _____

C. Institutional Controls (ICs)

1. **Implementation and Enforcement**

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

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

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

Frequency: _____

Responsible party/agency: _____

Contact _____ _____ _____ _____

Name Title Date Phone no.

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

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

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

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

Other problems or suggestions: ☐ Report attached

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

Remarks: EPA will evaluate whether an institutional control needs to be implemented for the portion of Front Street that crosses the DNAPL Zone to prevent workers from being exposed to subsurface contamination during road and utility work.

D. General

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

Remarks: _____

2. **Land Use Changes On Site** ☐ N/A

Remarks: wastewater treatment plant is no longer operating

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

Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

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

Remarks: _____

B. Other Site Conditions

Remarks: _____

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface

1. **Settlement** (low spots) ☐ Location shown on site map ☒ Settlement not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident

Lengths: _____ Widths: _____ Depths: _____

Remarks: _____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident

Area extent: _____ Depth: _____

Remarks: _____

4. **Holes** ☐ Location shown on site map ☒ Holes not evident

Area extent: _____ Depth: _____

Remarks: _____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established

☐ No signs of stress ☐ Trees/shrubs (indicate size and locations on a diagram)

Remarks: cover is asphalt and concrete, not vegetated

6. **Alternative Cover** (e.g., armored rock, concrete) ☐ N/A

Remarks: Concrete and asphalt are in good condition (recently sealed) at manufactured gas plant area.

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident

Area extent: _____ Height: _____

Remarks: _____

8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident

☐ Wet areas ☐ Location shown on site map Area extent: _____

☐ Ponding ☐ Location shown on site map Area extent: _____

☐ Seeps ☐ Location shown on site map Area extent: _____

☐ Soft subgrade ☐ Location shown on site map Area extent: _____

Remarks: _____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map

☒ No evidence of slope instability

Area extent: _____

Remarks: _____

B. Benches ☐ Applicable ☒ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay

Remarks: _____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay

Remarks: _____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay

Remarks: _____

C. Letdown Channels ☐ Applicable ☒ N/A

(Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ No evidence of settlement
   Area extent: _____ Depth: _____
   Remarks: _____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type:_____ Area extent: _____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Area extent: _____ Depth: _____
   Remarks: _____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Area extent: _____ Depth: _____
   Remarks: _____

5. **Obstructions** Type: _____ ☐ No obstructions
   ☐ Location shown on site map Area extent: _____
   Size: _____
   Remarks: _____

6. **Excessive Vegetative Growth** Type: _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Area extent: _____
   Remarks: _____

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A
   Remarks: _____

2. **Gas Monitoring Probes**
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A
   Remarks: _____

3. **Monitoring Wells** (within surface area of landfill)

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

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

4. **Extraction Wells Leachate**

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

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A

Remarks: _____

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

1. **Gas Treatment Facilities**

☐ Flaring ☐ Thermal destruction ☐ Collection for reuse

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Gas Collection Wells, Manifolds and Piping**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)

☐ Good condition ☐ Needs maintenance ☐ N/A

Remarks: _____

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A

Remarks: _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A

Remarks: _____

G. Detention/Sedimentation Ponds ☒ Applicable ☐ N/A

1. **Siltation** Area extent: _____ Depth: _____ ☐ N/A

☒ Siltation not evident

Remarks: _____

2. **Erosion** Area extent: _____ Depth: _____

☒ Erosion not evident

Remarks: _____

3. **Outlet Works** ☒ Functioning ☐ N/A

Remarks: _____

4. **Dam** ☒ Functioning ☐ N/A

Remarks: _____

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident

Horizontal displacement: _____ Vertical displacement: _____

Rotational displacement: _____

Remarks: _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident

Remarks: _____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A

☐ Vegetation does not impede flow

Area extent: _____ Type: _____

Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident

Area extent: _____ Depth: _____

Remarks: _____

4. **Discharge Structure** ☐ Functioning ☐ N/A

Remarks: _____

VIII. VERTICAL BARRIER WALLS ☒ Applicable ☐ N/A

1. **Settlement** ☐ Location shown on site map ☒ Settlement not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Performance Monitoring** Type of monitoring: _____

☒ Performance not monitored

Frequency: _____ ☐ Evidence of breaching

Head differential: _____

Remarks: Sheetpile wall installed along Susquehanna River to prevent sediments from being recontaminated by coal tar remaining in site soils.

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

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

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

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

Remarks: _____

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

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

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

Remarks: _____

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

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

☐ Good condition ☐ Needs maintenance

Remarks: _____

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

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

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

Remarks: _____

C. Treatment System ☐ Applicable ☒ N/A

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

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation

☐ Air stripping ☐ Carbon adsorbers

☐ Filters: _____

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

☐ Others: _____

☐ Good condition ☐ Needs maintenance

☐ Sampling ports properly marked and functional

☐ Sampling/maintenance log displayed and up to date

☐ Equipment properly identified

☐ Quantity of groundwater treated annually: _____

☐ Quantity of surface water treated annually: _____

Remarks: _____

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

☐ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

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

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

Remarks: _____

4. **Discharge Structure and Appurtenances**

☐ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

5. **Treatment Building(s)**

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

☐ Chemicals and equipment properly stored

Remarks: _____

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

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

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

Remarks: _____

D. Monitoring Data

1. **Monitoring Data**

☒ Is routinely submitted on time ☒ Is of acceptable quality

2. **Monitoring Data Suggests:**

☒ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

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

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

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

Remarks: Monitoring well CWW01 was locked but the lid was not attached to the casing.

X. OTHER REMEDIES

If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS	
A.	**Implementation of the Remedy**
	Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions). The remedy is designed to prevent exposure to remaining soil contamination through capping and institutional controls. The groundwater remedy includes institutional controls, natural gradient flushing, and a TI waiver. The remedy is functioning as intended by the decision documents. All remaining soil contamination is covered by concrete or asphalt caps, which are regularly inspected and maintained to ensure protectiveness. Sediment contamination in the Susquehanna River was removed. All necessary institutional controls have been put in place to provide groundwater and land use controls at the Site, with the possible exception of the Front Street right-of-way. As expected, groundwater in the DNAPL Zone continues to exceed MCLs. Outside the DNAPL Zone, there was only one occurrence of a COC exceeding its MCL over the past five years.
B.	**Adequacy of O&M**
	Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. O&M is adequate. In accordance with the O&M Plan, the PRP contractor performs annual inspections to verify the integrity of the asphalt and concrete caps and associated stormwater management system.
C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. None identified.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. None identified.

Site inspection participants:

EPA RPM
EPA hydrogeologist
Clean Sites (PRP contractor)
Skeo (EPA FYR support contractor)

APPENDIX E – SITE INSPECTION PHOTOS

MGP area

Western concrete cap at MGP area

Eastern concrete cap at MGP area

Borough municipal garage southwest of Front Street

Former WWTP


LWA drinking water pumping station

Monitoring well MW-4

Railroad tracks next to borough municipal garage (southwest of Front Street)

Residential area west of LWA pumping station

Monitoring well CWW01 (lid locked but not attached to casing)

New collar and lockable lid installed on CWW01 after FYR site inspection

APPENDIX F – DATA REVIEW SUPPORTING MATERIAL

Table F-1: Groundwater Sampling Results, 2015 to 2019[2]

TI Waiver Zone		Outside TI Waiver Zone										
Location	EPA	CWW01	CWW01	CWW01	CWW01	CWW01	LTMW-2	LTMW-2	LTMW-2	LTMW-2	LTMW-2	LTMW-2
Sample Date	MCL	09/16/2015	09/14/2016	09/13/2017	09/18/2018	10/02/2019	09/16/2015	12/15/2015	09/14/2016	09/13/2017	09/19/2018	10/02/2019
Sample Type		N	N	N	N	N	N	N	N	N	N	N
Sample Depth (bgs)		75 (ft)	75 (ft)	75 (ft)	75 (ft)	75 (ft)	121.5 - 131.5 (ft)	121.5 - 131.5 (ft)	121.5 - 131.5 (ft)	121.5 - 131.5 (ft)	121.5 - 131.5 (ft)	121.5 - 131.5 (ft)
Volatile Organic Compounds (ug/L)												
1,2,4-Trimethylbenzene	-	< 1	< 1	< 1	< 1	< 1	**1.2**	< 1	< 1	< 1	< 1	< 1
Benzene	5	< 1	< 1	< 1	< 1	< 1	**15.2** [IN]	< 1	< 1	< 1	< 1	**0.47 J**
Ethylbenzene	700	< 1	< 1	< 1	< 1	< 1	**15.3**	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	1000	< 1	< 1	< 1	< 1	< 1	**0.32 J**	< 1	< 1	< 1	< 1	< 1
Trichloroethene	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	10000	< 3	< 3	< 3	< 3	< 3	**6**	< 3	< 3	< 3	< 3	< 3
Semi-Volatile Organic Compounds (ug/L)												
1-Methylnaphthalene	-	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	-	-	-	-
2-Methylnaphthalene	-	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	-	-	-	-
Acenaphthene	-	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	-	-	-	-
Acenaphthylene	-	-	< 1.4	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene	-	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	-	-	-	-
Benzo(a)pyrene	0.2	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	-	-	-	-
Benzo(b)fluoranthene	-	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	-	-	-	-
bis(2-Ethylhexyl)phthalate	6	< 2.8 J	< 2.8	< 2.7	< 2.8	< 2.9	< 2.8	< 2.8	-	-	-	-
Chrysene	-	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	-	-	-	-
Dibenzofuran	-	< 2.8 J	< 2.8	< 2.7	< 2.8	< 2.9	< 2.8	< 2.8	-	-	-	-
Fluoranthene	-	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	-	-	-	-
Naphthalene	-	< 1.4 J	**0.25 J**	< 1.4	< 1.4	< 1.4	**0.49 J**	< 1.4	-	-	-	-
Phenanthrene	-	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	-	-	-	-
Pyrene	-	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	-	-	-	-
Semi-Volatile Organic Compounds (SIM) (ug/L)												
1-Methylnaphthalene	-	**0.015 J**	**0.029 J**	**0.022 J**	< 0.093	< 0.096	**0.026 J**	< 0.093	-	-	-	-
2-Methylnaphthalene	-	< 0.093	< 0.094	< 0.091	< 0.093	< 0.096	< 0.093	< 0.093	-	-	-	-
Acenaphthene	-	**0.013 J**	< 0.094	< 0.091	< 0.093	**0.015 J**	< 0.093	< 0.093	-	-	-	-
Acenaphthylene	-	-	< 0.094	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene	-	< 0.093	< 0.094	< 0.091	< 0.093	< 0.096	< 0.093	< 0.093	-	-	-	-
Benzo(a)pyrene	0.2	< 0.093	< 0.094	< 0.091	< 0.093	< 0.096	< 0.093	< 0.093	-	-	-	-
Benzo(b)fluoranthene	-	-	< 0.094	< 0.091	< 0.093	< 0.096	-	< 0.093	-	-	-	-
Chrysene	-	< 0.093	< 0.094	< 0.091	< 0.093	< 0.096	< 0.093	< 0.093	-	-	-	-
Fluoranthene	-	< 0.093	< 0.094	< 0.091	< 0.093	< 0.096	< 0.093	< 0.093	-	-	-	-
Naphthalene	-	**0.019 J**	**0.23**	< 0.091	< 0.093	< 0.096	**0.21**	< 0.093	-	-	-	-
Phenanthrene	-	**0.012 J**	< 0.094	**0.022 J**	< 0.093	< 0.096	< 0.093	**0.021 J**	-	-	-	-
Pyrene	-	**0.027 J**	**0.027 J**	**0.031 J**	**0.024 J**	**0.034 J**	< 0.093	< 0.093	-	-	-	-
Inorganic Compounds (ug/L)												
Aluminum, Dissolved	-	< 80	< 80	< 89	< 89	< 89	< 80	< 80	-	-	-	-
Barium, Dissolved	2000	**34**	**33**	**35**	**37**	**35**	**220**	**240 J**	-	-	-	-
Iron, Dissolved	-	**17 J**	**26 J**	< 56	< 56	< 56	**720**	**760**	-	-	-	-
Lead, Dissolved	15	< 2	< 2	< 2.2	< 2.2	< 2.2	< 2	< 2	-	-	-	-
Manganese, Dissolved	-	< 5	**1.7 J**	**6**	< 5.6	< 5.6	**4.7 J**	**4.6 J**	-	-	-	-
Cyanide	200	< 5	**1 J**	< 5	< 5	**1.9 J**	< 5	< 5 J	-	-	-	-
Other (ug/L)												
Alkalinity, Total (as CaCO3)	-	**278000**	-	-	-	-	**430000**	-	-	-	-	-
Ferrous Iron	-	**40 J**	-	-	-	-	-	-	-	-	-	-
Methane	-	**1.2 J**	-	-	-	-	**490**	-	-	-	-	-
Nitrite/Nitrate Nitrogen	10000	**2900 J**	-	-	-	-	< 200	-	-	-	-	-
Sulfate	-	**37600**	-	-	-	-	**132000**	-	-	-	-	-
Sulfide	-	< 1000	-	-	-	-	< 1000	-	-	-	-	-

[2] *Source*: 2019 Annual Sampling and Monitoring Report

TI Waiver Zone		Outside TI Waiver Zone									
Location	EPA	LTMW-3	LTMW-3	LTMW-3	LTMW-3	LTMW-3	MW-5	MW-5	MW-5	MW-5	MW-5
Sample Date	MCL	09/17/2015	09/14/2016	09/13/2017	09/18/2018	10/03/2019	09/14/2015	09/12/2016	09/11/2017	09/18/2018	09/30/2019
Sample Type		N	N	N	N	N	N	N	N	N	N
Sample Depth (bgs)		100 - 110 (ft)	100 - 110 (ft)	100 - 110 (ft)	100 - 110 (ft)	100 - 110 (ft)	20 - 35 (ft)	20 - 35 (ft)	20 - 35 (ft)	20 - 35 (ft)	20 - 35 (ft)
Volatile Organic Compounds (ug/L)											
1,2,4-Trimethylbenzene	-	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Benzene	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	**1.4**
Ethylbenzene	700	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	1000	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	10000	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Semi-Volatile Organic Compounds (ug/L)											
1-Methylnaphthalene	-	< 1.4	< 1.4	< 1.5	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
2-Methylnaphthalene	-	< 1.4	< 1.4	< 1.5	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Acenaphthene	-	< 1.4	< 1.4	< 1.5	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Acenaphthylene	-	-	< 1.4	-	-	-	-	< 1.4	-	-	-
Benzo(a)anthracene	-	< 1.4	< 1.4	< 1.5	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Benzo(a)pyrene	0.2	< 1.4	< 1.4	< 1.5	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Benzo(b)fluoranthene	-	< 1.4	< 1.4	< 1.5	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
bis(2-Ethylhexyl)phthalate	6	< 2.8	< 2.8	< 2.9	< 2.8	**0.25 J**	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8
Chrysene	-	< 1.4	< 1.4	< 1.5	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Dibenzofuran	-	< 2.8	< 2.8	< 2.9	< 2.8	< 2.9	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8
Fluoranthene	-	< 1.4	< 1.4	< 1.5	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Naphthalene	-	< 1.4	< 1.4	**0.45 J**	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	**0.3 J**
Phenanthrene	-	< 1.4	< 1.4	< 1.5	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Pyrene	-	< 1.4	< 1.4	< 1.5	< 1.4	< 1.4	**0.81 J**	**0.72 J**	**1.1 J**	**1.1 J**	< 1.4
Semi-Volatile Organic Compounds (SIM) (ug/L)											
1-Methylnaphthalene	-	< 0.093	< 0.093	**0.079 J**	< 0.093	< 0.097	< 0.093	< 0.093	< 0.093	< 0.094	< 0.094 J
2-Methylnaphthalene	-	< 0.093	< 0.093	**0.026 J**	< 0.093	< 0.097	< 0.093	< 0.093	< 0.093	< 0.094	< 0.094 J
Acenaphthene	-	< 0.093	< 0.093	**0.03 J**	< 0.093	< 0.097	< 0.093	< 0.093	< 0.093	< 0.094	**0.012 J**
Acenaphthylene	-	-	< 0.093	-	-	-	-	**0.014 J**	-	-	-
Benzo(a)anthracene	-	< 0.093	< 0.093	< 0.098	< 0.093	< 0.097	< 0.093	< 0.093	**0.02 J**	< 0.094	< 0.094 J
Benzo(a)pyrene	0.2	< 0.093	< 0.093	< 0.098	< 0.093	< 0.097	< 0.093	< 0.093	< 0.093	< 0.094	< 0.094 J
Benzo(b)fluoranthene	-	-	< 0.093	**0.024 J**	**0.023 J**	**0.033 J**	-	< 0.093	< 0.093	< 0.094	< 0.094 J
Chrysene	-	< 0.093	< 0.093	< 0.098	< 0.093	< 0.097	< 0.093	< 0.093	< 0.093	< 0.094	< 0.094 J
Fluoranthene	-	**0.017 J**	< 0.093	**0.049 J**	**0.063 J**	**0.068 J**	**0.013 J**	< 0.093	< 0.093	< 0.094	< 0.094 J
Naphthalene	-	**0.029 J**	< 0.093	**0.72**	< 0.093	< 0.097	**0.036 J**	< 0.093	< 0.093	< 0.094	**0.22 J**
Phenanthrene	-	< 0.093	< 0.093	< 0.098	< 0.093	< 0.097	< 0.093	< 0.093	< 0.093	< 0.094	< 0.094 J
Pyrene	-	**0.027 J**	< 0.093	**0.074 J**	**0.098**	**0.11**	**0.61**	**0.7**	**1.3**	**0.92**	**0.077 J**
Inorganic Compounds (ug/L)											
Aluminum, Dissolved	-	< 80	< 80	< 89	< 89	< 89	< 80	< 80	< 89	< 89	< 89
Barium, Dissolved	2000	**46**	**48**	**47**	**47**	**45**	**96**	**130**	**99**	**80**	**83**
Iron, Dissolved	-	**38 J**	**190**	< 56	**260**	**200**	**1400**	**2500 J**	**4400**	**390**	**33 J**
Lead, Dissolved	15	< 2	< 2	< 2.2	< 2.2	< 2.2	< 2	< 2	< 2.2	< 2.2	< 2.2
Manganese, Dissolved	-	**17**	**17**	**17**	**17**	**16**	**980**	**790**	**540**	**440**	**110**
Cyanide	200	< 5	< 5	< 5	< 5	< 2	< 5	**1 J**	**3 J**	**8**	**17**
Other (ug/L)											
Alkalinity, Total (as CaCO3)	-	**507000**	-	-	-	-	-	-	-	-	-
Ferrous Iron	-	**290**	-	-	-	-	-	-	-	-	-
Methane	-	**4.2**	-	-	-	-	-	-	-	-	-
Nitrite/Nitrate Nitrogen	10000	< 200	-	-	-	-	-	-	-	-	-
Sulfate	-	**169000**	-	-	-	-	-	-	-	-	-
Sulfide	-	< 1000	-	-	-	-	-	-	-	-	-

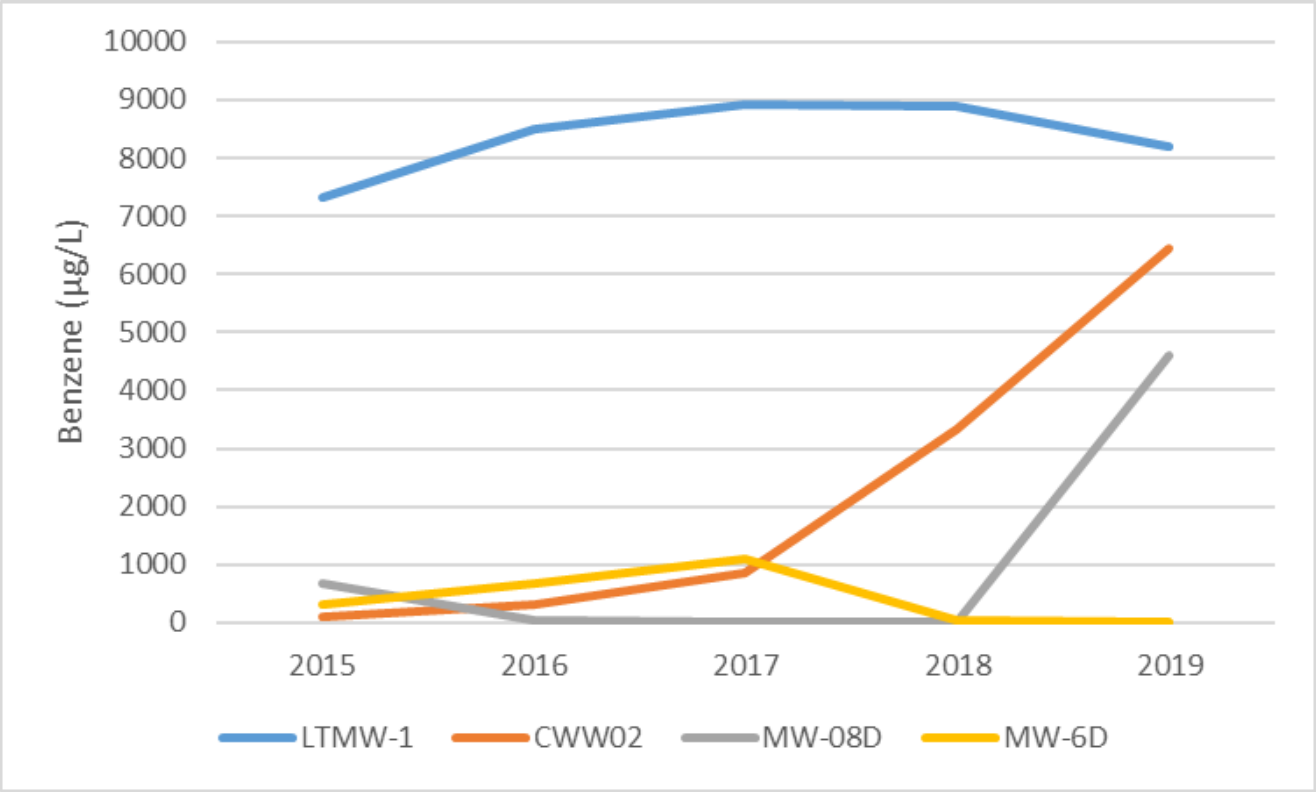
TI Waiver Zone		Within TI Waiver Zone												
Location	EPA	CWW02	CWW02	CWW02	CWW02	CWW02	CWW02	CWW02	LTMW-1	LTMW-1	LTMW-1	LTMW-1	LTMW-1	LTMW-1
Sample Date	MCL	09/17/2015	09/18/2015	09/18/2015	09/14/2016	09/13/2017	09/20/2018	10/01/2019	09/16/2015	09/14/2016	09/14/2016	09/13/2017	09/20/2018	10/01/2019
Sample Type		N	N	N	N	N	N	N	N	N	FD	N	N	N
Sample Depth (bgs)		145 (ft)	45 (ft)	185 (ft)	145 (ft)	145 (ft)	145 (ft)	145 (ft)	103 - 113 (ft)	103 - 113 (ft)	103 - 113 (ft)	103 - 113 (ft)	103 - 113 (ft)	103 - 113 (ft)
Volatile Organic Compounds (ug/L)														
1,2,4-Trimethylbenzene	-	**0.25 J**	< 1	< 1	**1**	< 10	**4.3**	**13.7**	**361**	**329**	**341**	**274**	**222**	**296**
Benzene	5	**94.2**	**6.9**	**63**	**307**	**862**	**3340**	**6430**	**7330**	**8500**	**8420**	**8910**	**8890**	**8210**
Ethylbenzene	700	**16.4**	**0.81 J**	**1.8**	**8.3**	**15.5**	**57.3**	**144**	**2650**	**2900**	**2990**	**3280**	**2980**	**3150**
Tetrachloroethene	5	< 1	< 1	< 1	< 1	< 10	< 1	< 10	< 5	< 50	< 50	< 50	< 50	< 50
Toluene	1000	< 1	< 1	**0.25 J**	**0.25 J**	< 10	**1.3**	**3.5 J**	**82.6**	**168**	**175**	**133**	**102**	**29.4 J**
Trichloroethene	5	< 1	< 1	< 1	< 1	< 10	< 1	< 10	< 5	< 50	< 50	< 50	< 50	< 50
Xylene (total)	10000	< 3	< 3	< 3	**8.5**	**9.4 J**	**61.2**	**153**	**1360**	**1450**	**1520**	**1510**	**1300**	**1070**
Semi-Volatile Organic Compounds (ug/L)														
1-Methylnaphthalene	-	**7.4 J**	**0.56 J**	**0.46 J**	**5.9**	**25.6**	**14.9**	**65.1**	**655**	**383**	**436**	**555**	**516**	**420**
2-Methylnaphthalene	-	< 1.4 J	< 1.4	< 1.4	< 1.5	**0.23 J**	**0.49 J**	**4.5**	**54.1**	**46.8**	**49.1**	**146**	**62.9**	**55.9**
Acenaphthene	-	**16.8 J**	**7.5**	**2.6**	**11.1**	**21.4**	**21**	**37.6**	**261**	**161**	**194**	**245**	**228**	**179**
Acenaphthylene	-	-	-	-	< 1.5	-	-	-	-	< 1.4	< 1.4	-	-	-
Benzo(a)anthracene	-	< 1.4 J	< 1.4	< 1.4	< 1.5	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Benzo(a)pyrene	0.2	< 1.4 J	< 1.4	< 1.4	< 1.5	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Benzo(b)fluoranthene	-	< 1.4 J	< 1.4	< 1.4	< 1.5	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
bis(2-Ethylhexyl)phthalate	6	< 2.8 J	< 2.8	**0.36 J**	< 2.9	< 2.8	< 2.9	< 2.9	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8
Chrysene	-	< 1.4 J	< 1.4	< 1.4	< 1.5	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Dibenzofuran	-	**0.36 J**	< 2.8	< 2.8	**0.27 J**	**0.48 J**	**0.48 J**	**0.87 J**	**14.4**	**11.7**	**11.6**	**13.1**	**10.9**	**14.2**
Fluoranthene	-	< 1.4 J	< 1.4	< 1.4	< 1.5	< 1.4	< 1.4	< 1.4	**0.44 J**	**0.63 J**	**0.65 J**	**0.69 J**	**0.57 J**	**0.81 J**
Naphthalene	-	**3.5 J**	< 1.4	< 1.4	**7.9**	**38.7**	**159**	**621**	**5810**	**3450**	**3950**	**5230**	**4930**	**3770**
Phenanthrene	-	< 1.4 J	< 1.4	< 1.4	< 1.5	**0.26 J**	**0.4 J**	**1 J**	**32.6**	**31.7**	**30.9**	**34.1**	**28.2**	**34.8**
Pyrene	-	< 1.4 J	< 1.4	< 1.4	< 1.5	< 1.4	< 1.4	< 1.4	< 1.4	**0.44 J**	**0.43 J**	**0.54 J**	**0.49 J**	**0.71 J**
Semi-Volatile Organic Compounds (SIM) (ug/L)														
1-Methylnaphthalene	-	**6.9 J**	**0.54**	**0.86**	**6.3 J**	**23.6 J**	**13.2 J**	**68 J**	**24.6 J**	**74.2 J**	-	-	**169 J**	**149 J**
2-Methylnaphthalene	-	**0.022 J**	**0.0092 J**	**0.015 J**	**0.051 J**	**0.24**	**0.59**	**5.8 J**	**5.6 J**	**19.3 J**	-	-	**47.4 J**	**25.6 J**
Acenaphthene	-	**15.8 J**	**7.6 J**	**5**	**11.3 J**	**18.7 J**	**14 J**	**29.9 J**	**72.2 J**	**97.1 J**	**82.7 J**	**110 J**	**55.6 J**	**87.5 J**
Acenaphthylene	-	-	-	-	**0.1**	-	-	-	-	**5 J**	**4.8 J**	-	-	-
Benzo(a)anthracene	-	< 0.093	< 0.093	< 0.093	< 0.097	< 0.093	< 0.095	< 0.095 J	< 0.093 J	< 0.093	0.093 R	< 0.093 J	< 0.093	< 0.093 J
Benzo(a)pyrene	0.2	< 0.093	< 0.093	< 0.093	< 0.097	< 0.093	< 0.095	< 0.095 J	< 0.093 J	< 0.093	0.093 R	< 0.093 J	< 0.093	< 0.093 J
Benzo(b)fluoranthene	-	-	-	-	< 0.097	< 0.093	< 0.095	< 0.095 J	-	< 0.093	0.093 R	< 0.093 J	< 0.093	< 0.093 J
Chrysene	-	< 0.093	< 0.093	< 0.093	< 0.097	< 0.093	< 0.095	< 0.095 J	< 0.093 J	< 0.093	0.093 R	< 0.093 J	< 0.093	< 0.093 J
Fluoranthene	-	< 0.093	< 0.093	**0.0099 J**	< 0.097	< 0.093	**0.018 J**	**0.027 J**	**0.32 J**	**0.47**	**0.51 J**	**0.59 J**	**0.46 J**	**0.66 J**
Naphthalene	-	**3.2 J**	< 0.19	**0.57**	**8 J**	**33.8 J**	**66.7 J**	**272 J**	**37.1 J**	**103 J**	-	-	**411 J**	**316 J**
Phenanthrene	-	**0.11**	**0.024 J**	**0.027 J**	**0.13**	**0.28**	**0.3**	**0.93 J**	**23.8 J**	**26.1 J**	**25.9 J**	**25.2 J**	**15.4 J**	**26.7 J**
Pyrene	-	< 0.093	< 0.093	**0.013 J**	< 0.097	**0.016 J**	**0.022 J**	**0.028 J**	**0.21 J**	**0.34**	**0.38 J**	**0.48 J**	**0.4**	**0.55 J**
Inorganic Compounds (ug/L)														
Aluminum, Dissolved	-	< 80	< 80	< 80	< 80	**34 J**	< 89	< 89	< 80	< 80	< 80	< 89	< 89	< 89
Barium, Dissolved	2000	**220**	**200**	**220**	**150**	**170**	**130**	**140**	**120**	**98**	**99**	**100**	**100**	**100**
Iron, Dissolved	-	**9000**	**590**	**10200**	**620**	**3700**	**280**	**1500**	**1900**	**1800**	**1800**	**2600**	**2500**	**2200**
Lead, Dissolved	15	< 2	< 2	< 2	< 2	< 2.2	< 2.2	< 2.2	< 2	< 2	< 2	< 2.2	< 2.2	< 2.2
Manganese, Dissolved	-	**870**	**1500**	**840**	**470**	**300**	**190**	**190**	**42**	**49**	**49**	**51**	**42**	**45**
Cyanide	200	< 5 J	**1 J**	< 5 J	**2 J**	< 5	< 5	< 2	**33**	**39**	**44**	**48 J**	**36**	**35**
Other (ug/L)														
Alkalinity, Total (as CaCO3)	-	**385000**	**348000**	-	-	-	-	-	**352000**	-	-	-	-	-
Ferrous Iron	-	**10700**	**870**	-	-	-	-	-	-	-	-	-	-	-
Methane	-	**1810**	**1190**	-	-	-	-	-	**2390**	-	-	-	-	-
Nitrite/Nitrate Nitrogen	10000	< 200	< 200	-	-	-	-	-	< 200	-	-	-	-	-
Sulfate	-	**17300**	**36800**	-	-	-	-	-	< 2000	-	-	-	-	-
Sulfide	-	< 1000	< 1000	-	-	-	-	-	< 1000	-	-	-	-	-

TI Waiver Zone		Within TI Waiver Zone											
Location	EPA	MW-07DR	MW-07DR	MW-07DR	MW-07DR	MW-07DR	MW-07DR	MW-07DR	MW-07S	MW-07S	MW-07S	MW-07S	MW-07S
Sample Date	MCL	09/14/2015	09/12/2016	09/11/2017	09/17/2018	09/17/2018	09/30/2019	09/30/2019	09/14/2015	09/12/2016	09/11/2017	09/17/2018	09/30/2019
Sample Type		N	N	N	N	FD	N	FD	N	N	N	N	N
Sample Depth (bgs)		50 - 60 (ft)	50 - 60 (ft)	50 - 60 (ft)	50 - 60 (ft)	50 - 60 (ft)	50 - 60 (ft)	50 - 60 (ft)	10 - 20 (ft)	10 - 20 (ft)	10 - 20 (ft)	10 - 20 (ft)	10 - 20 (ft)
Volatile Organic Compounds (ug/L)													
1,2,4-Trimethylbenzene	-	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Benzene	5	< 1	< 1	< 1	< 1	< 1	**0.58 J**	**0.6 J**	< 1	< 1	< 1	< 1	< 1
Ethylbenzene	700	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	1000	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	10000	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Semi-Volatile Organic Compounds (ug/L)													
1-Methylnaphthalene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6
2-Methylnaphthalene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6
Acenaphthene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	**0.37 J**	**0.24 J**	**0.51 J**	< 1.4	< 1.4	< 1.4	< 1.6
Acenaphthylene	-	-	< 1.4	-	-	-	-	-	-	< 1.4	-	-	-
Benzo(a)anthracene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6
Benzo(a)pyrene	0.2	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6
Benzo(b)fluoranthene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6
bis(2-Ethylhexyl)phthalate	6	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8	< 3.2	< 2.8	< 2.8	< 2.9	< 2.8	< 2.8	< 3.3
Chrysene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6
Dibenzofuran	-	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8	< 3.2	< 2.8	< 2.8	< 2.9	< 2.8	< 2.8	< 3.3
Fluoranthene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6
Naphthalene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6
Phenanthrene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6
Pyrene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.6	< 1.4	**0.43 J**	**0.16 J**	< 1.4	< 1.4	**0.35 J**
Semi-Volatile Organic Compounds (SIM) (ug/L)													
1-Methylnaphthalene	-	< 0.093	< 0.093	**0.02 J**	< 0.093	< 0.093	**0.03 J**	**0.032 J**	**0.015 J**	< 0.096	< 0.093	< 0.093	< 0.11 J
2-Methylnaphthalene	-	**0.01 J**	< 0.093	< 0.093	< 0.093	< 0.093	< 0.11	**0.016 J**	< 0.093	< 0.096	< 0.093	< 0.093	< 0.11 J
Acenaphthene	-	< 0.093	< 0.093	< 0.093	< 0.093	< 0.093	**0.22**	**0.22**	**0.47**	**0.021 J**	< 0.093	< 0.093	**0.021 J**
Acenaphthylene	-	-	< 0.093	-	-	-	-	-	-	**0.056 J**	-	-	-
Benzo(a)anthracene	-	< 0.093	< 0.093	< 0.093	< 0.093	< 0.093	< 0.11	< 0.093	< 0.093	< 0.096	< 0.093	< 0.093	< 0.11 J
Benzo(a)pyrene	0.2	< 0.093	< 0.093	< 0.093	< 0.093	< 0.093	< 0.11	< 0.093	< 0.093	< 0.096	< 0.093	< 0.093	< 0.11 J
Benzo(b)fluoranthene	-	-	< 0.093	< 0.093	< 0.093	< 0.093	< 0.11	< 0.093	-	< 0.096	< 0.093	< 0.093	< 0.11 J
Chrysene	-	< 0.093	< 0.093	< 0.093	< 0.093	< 0.093	< 0.11	< 0.093	< 0.093	< 0.096	< 0.093	< 0.093	< 0.11 J
Fluoranthene	-	< 0.093	< 0.093	< 0.093	< 0.093	< 0.093	< 0.11	< 0.093	< 0.093	< 0.096	< 0.093	< 0.093	< 0.11 J
Naphthalene	-	**0.019 J**	< 0.093	**0.039 J**	< 0.093	< 0.093	**0.042 J**	**0.046 J**	**0.017 J**	< 0.096	< 0.093	< 0.093	< 0.11 J
Phenanthrene	-	< 0.093	< 0.093	< 0.093	< 0.093	< 0.093	< 0.11	< 0.093	< 0.093	< 0.096	< 0.093	< 0.093	< 0.11 J
Pyrene	-	< 0.093	< 0.093	< 0.093	< 0.093	< 0.093	< 0.11	< 0.093	**0.33**	**0.11**	**0.11**	**0.11**	**0.25 J**
Inorganic Compounds (ug/L)													
Aluminum, Dissolved	-	< 80	< 80	< 89	< 89	< 89	< 89	< 89	< 80	< 80	< 89	< 89	< 89
Barium, Dissolved	2000	**48**	**51**	**47**	**49**	**49**	**48**	**47**	**85**	**85**	**85**	**77**	**73**
Iron, Dissolved	-	< 50	< 50 J	< 56	**22 J**	**35 J**	**43 J**	< 56	**53**	< 50 J	< 56	**22 J**	**51 J**
Lead, Dissolved	15	< 2	< 2	< 2.2	< 2.2	< 2.2	**0.76 J**	< 2.2	< 2	< 2	< 2.2	< 2.2	< 2.2
Manganese, Dissolved	-	< 5	< 5	< 5.6	**7.8**	< 5.6	**11**	**10**	**1600**	**1100**	**880**	**1400**	**2600**
Cyanide	200	**1 J**	**5 J**	**8 J**	**11**	**9**	**20**	**19**	**4.9 J**	**8 J**	**11 J**	**17**	**24**
Other (ug/L)													
Alkalinity, Total (as CaCO3)	-	-	-	-	-	-	-	-	-	-	-	-	-
Ferrous Iron	-	-	-	-	-	-	-	-	-	-	-	-	-
Methane	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite/Nitrate Nitrogen	10000	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfide	-	-	-	-	-	-	-	-	-	-	-	-	-

TI Waiver Zone		Within TI Waiver Zone									
Location	EPA	MW-08D	MW-08D	MW-08D	MW-08D	MW-08D	MW-08S	MW-08S	MW-08S	MW-08S	MW-08S
Sample Date	MCL	09/16/2015	09/13/2016	09/12/2017	09/19/2018	10/02/2019	09/15/2015	09/13/2016	09/12/2017	09/19/2018	10/01/2019
Sample Type		N	N	N	N	N	N	N	N	N	N
Sample Depth (bgs)		56 - 66 (ft)	56 - 66 (ft)	56 - 66 (ft)	56 - 66 (ft)	56 - 66 (ft)	21.5 - 31.5 (ft)	21.5 - 31.5 (ft)	21.5 - 31.5 (ft)	21.5 - 31.5 (ft)	21.5 - 31.5 (ft)
Volatile Organic Compounds (ug/L)											
1,2,4-Trimethylbenzene	-	< 5	< 1	< 1	< 1	**104**	< 1	< 1	< 1	< 1	< 1
Benzene	5	**672**	**48.4**	< 1	< 1	**4610**	< 1	< 1	< 1	< 1	< 1
Ethylbenzene	700	**58.2**	**0.45 J**	< 1	< 1	**775**	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene	5	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	1000	**1.5 J**	**0.53 J**	< 1	< 1	**7.4**	< 1	< 1	< 1	< 1	< 1
Trichloroethene	5	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	10000	**11.9 J**	< 3	< 3	< 3	**271**	< 3	< 3	< 3	< 3	< 3
Semi-Volatile Organic Compounds (ug/L)											
1-Methylnaphthalene	-	**68.3**	**3**	**0.28 J**	< 1.4	**197**	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
2-Methylnaphthalene	-	< 1.4	< 1.4	< 1.4	< 1.4	**6.7**	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Acenaphthene	-	**53.9**	**32.8**	**23.6**	**7.6**	**80.8**	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Acenaphthylene	-	-	< 1.4	-	-	-	-	< 1.4	-	-	-
Benzo(a)anthracene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Benzo(a)pyrene	0.2	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Benzo(b)fluoranthene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
bis(2-Ethylhexyl)phthalate	6	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8	**7.1**	< 2.8	< 2.8	< 2.8
Chrysene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Dibenzofuran	-	**1.5 J**	**0.83 J**	**0.44 J**	< 2.8	**3**	< 2.8	< 2.8	< 2.8	< 2.8	< 2.8
Fluoranthene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Naphthalene	-	**15.1**	< 1.4	< 1.4	< 1.4	**788**	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Phenanthrene	-	< 1.4	< 1.4	< 1.4	< 1.4	**2.6**	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Pyrene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Semi-Volatile Organic Compounds (SIM) (ug/L)											
1-Methylnaphthalene	-	**48.9 J**	**3.4 J**	**0.3**	**0.089 J**	**184 J**	< 0.093	< 0.093	< 0.093	< 0.093	< 0.094 J
2-Methylnaphthalene	-	**0.043 J**	**0.025 J**	**0.019 J**	< 0.093	**10.5 J**	< 0.093	< 0.093	< 0.093	< 0.093	< 0.094 J
Acenaphthene	-	**47.2 J**	**33.6 J**	**21.1 J**	**5.7 J**	**61.6 J**	< 0.093	< 0.093	< 0.093	< 0.093	< 0.094 J
Acenaphthylene	-	-	**0.38**	-	-	-	-	< 0.093	-	-	-
Benzo(a)anthracene	-	< 0.093	< 0.093	< 0.092	< 0.093	< 0.093	< 0.093	< 0.093	< 0.093	< 0.093	< 0.094 J
Benzo(a)pyrene	0.2	< 0.093	< 0.093	< 0.092	< 0.093	< 0.093	< 0.093	< 0.093	< 0.093	< 0.093	< 0.094 J
Benzo(b)fluoranthene	-	-	< 0.093	< 0.092	< 0.093	< 0.093	-	< 0.093	< 0.093	< 0.093	< 0.094 J
Chrysene	-	< 0.093	< 0.093	< 0.092	< 0.093	< 0.093	< 0.093	< 0.093	< 0.093	< 0.093	< 0.094 J
Fluoranthene	-	**0.013 J**	**0.018 J**	**0.019 J**	< 0.093	**0.032 J**	< 0.093	< 0.093	< 0.093	< 0.093	< 0.094 J
Naphthalene	-	**12.2 J**	**0.18**	**0.12**	**0.038 J**	**353 J**	**0.023 J**	**0.14**	**0.036 J**	< 0.093	**0.06 J**
Phenanthrene	-	**0.056 J**	**0.039 J**	**0.056 J**	< 0.093	**2.4 J**	< 0.093	< 0.093	< 0.093	< 0.093	< 0.094 J
Pyrene	-	**0.011 J**	< 0.093	**0.016 J**	< 0.093	**0.018 J**	< 0.093	< 0.093	< 0.093	< 0.093	< 0.094 J
Inorganic Compounds (ug/L)											
Aluminum, Dissolved	-	< 80	< 80	< 89	**770**	< 89	< 80	< 80	< 89	< 89	< 89
Barium, Dissolved	2000	**110**	**110**	**110**	**1000**	**110**	**64**	**74**	**83**	**74**	**87**
Iron, Dissolved	-	**280**	**170 J**	**450**	**1500**	**390**	**90**	< 50 J	< 56	**23 J**	**130**
Lead, Dissolved	15	< 2	< 10	< 2.2	**1.6 J**	< 2.2	< 2	< 2	< 2.2	< 2.2	< 2.2
Manganese, Dissolved	-	**240**	**250**	**230**	**370**	**260**	**440**	**440**	**440**	**56**	**600**
Cyanide	200	**70**	**94 J**	**110 J**	**27**	**67**	**220**	**170 J**	**210 J**	**36**	**270**
Other (ug/L)											
Alkalinity, Total (as CaCO3)	-	**401000**	-	-	-	-	-	-	-	-	-
Ferrous Iron	-	-	-	-	-	-	-	-	-	-	-
Methane	-	**1510**	-	-	-	-	-	-	-	-	-
Nitrite/Nitrate Nitrogen	10000	< 200	-	-	-	-	-	-	-	-	-
Sulfate	-	**8400**	-	-	-	-	-	-	-	-	-
Sulfide	-	< 1000	-	-	-	-	-	-	-	-	-

TI Waiver Zone		Within TI Waiver Zone											
Location	EPA	MW-6D	MW-6D	MW-6D	MW-6D	MW-6D	MW-6D	MW-6S	MW-6S	MW-6S	MW-6S	MW-6S	MW-6S
Sample Date	MCL	09/16/2015	09/16/2015	09/13/2016	09/12/2017	09/19/2018	10/01/2019	09/17/2015	09/13/2016	09/12/2017	09/12/2017	09/19/2018	10/02/2019
Sample Type		N	FD	N	N	N	N	N	N	N	FD	N	N
Sample Depth (bgs)		47 - 65 (ft)	47 - 65 (ft)	47 - 65 (ft)	47 - 65 (ft)	47 - 65 (ft)	47 - 65 (ft)	7 - 22 (ft)	7 - 22 (ft)	7 - 22 (ft)	7 - 22 (ft)	7 - 22 (ft)	7 - 22 (ft)
Volatile Organic Compounds (ug/L)													
1,2,4-Trimethylbenzene	-	**5.6**	**5.5**	**10.4**	**10.3 J**	**1.2**	**0.59 J**	< 1	< 1	< 1	< 1	< 1	< 1
Benzene	5	**316**	**308**	**685**	**1110 J**	**31.8**	**17.8**	**1.6**	**7.6**	< 1	< 1	< 1	**25.1**
Ethylbenzene	700	**16.1**	**16.6**	**80.2**	**122 J**	**6.2**	**2.8**	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene	5	< 1	< 1	< 1	< 20	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	1000	**0.66 J**	**0.65 J**	**0.79 J**	< 20	**0.26 J**	**0.44 J**	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene	5	< 1	< 1	< 1	< 20	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	10000	**14.4**	**14.5**	**26.2**	**38.6 J**	**2.5 J**	**1.7 J**	< 3	< 3	< 3	< 3	< 3	< 3
Semi-Volatile Organic Compounds (ug/L)													
1-Methylnaphthalene	-	**11.2**	**10.6**	**11.1**	**23.7**	**2.1**	**1.5**	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
2-Methylnaphthalene	-	**9.7**	**9.4**	**11.9**	**28.1**	< 1.4	< 1.4	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Acenaphthene	-	**4.8**	**4.7**	**4.4**	**8.2**	**1.3 J**	**0.88 J**	**3.7 J**	**3.3 J**	**0.41 J**	**0.31 J**	< 1.4	**1.3 J**
Acenaphthylene	-	-	-	< 1.4	-	-	-	-	< 1.4	-	-	-	-
Benzo(a)anthracene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Benzo(a)pyrene	0.2	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Benzo(b)fluoranthene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
bis(2-Ethylhexyl)phthalate	6	< 2.8	< 2.8	< 2.9	< 2.8	< 2.8	< 2.9	< 2.8 J	< 2.8	**0.22 J**	< 2.8	< 2.8	< 2.9
Chrysene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Dibenzofuran	-	< 2.8	< 2.8	< 2.9	< 2.8	< 2.8	< 2.9	< 2.8 J	< 2.8	< 2.8	< 2.8	< 2.8	< 2.9
Fluoranthene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Naphthalene	-	**34**	**32**	**97.1**	**312**	< 1.4	**5.6**	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Phenanthrene	-	**0.72 J**	**0.67 J**	**0.59 J**	**1 J**	**0.23 J**	< 1.4	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Pyrene	-	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4 J	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Semi-Volatile Organic Compounds (SIM) (ug/L)													
1-Methylnaphthalene	-	**10 J**	**10 J**	**12 J**	**24.2 J**	**2**	**0.76 J**	< 0.093	**0.11**	**0.021 J**	**0.09 J**	< 0.093	**0.033 J**
2-Methylnaphthalene	-	**8.9 J**	**8.9 J**	**12.7 J**	**31.3 J**	< 0.094	**0.092 J**	< 0.093	< 0.095	< 0.092	**0.015 J**	< 0.093	< 0.095
Acenaphthene	-	**4.4 J**	**4.4 J**	**4.4 J**	**7.2 J**	**1.1**	**0.56 J**	**3.5 J**	**3.3 J**	**0.38**	**0.29**	< 0.093	**1.1**
Acenaphthylene	-	-	-	**0.22**	-	-	-	-	**0.05 J**	-	-	-	-
Benzo(a)anthracene	-	< 0.093	< 0.093	< 0.096	< 0.094	< 0.094	< 0.096 J	< 0.093	< 0.095	< 0.092	< 0.093	< 0.093	< 0.095
Benzo(a)pyrene	0.2	< 0.093	< 0.093	< 0.096	< 0.094	< 0.094	< 0.096 J	< 0.093	< 0.095	< 0.092	< 0.093	< 0.093	< 0.095
Benzo(b)fluoranthene	-	-	-	< 0.096	< 0.094	< 0.094	< 0.096 J	-	< 0.095	< 0.092	< 0.093	< 0.093	< 0.095
Chrysene	-	< 0.093	< 0.093	< 0.096	< 0.094	< 0.094	< 0.096 J	< 0.093	< 0.095	< 0.092	< 0.093	< 0.093	< 0.095
Fluoranthene	-	**0.01 J**	**0.01 J**	< 0.096	**0.024 J**	< 0.094	< 0.096 J	< 0.093	< 0.095	< 0.092	< 0.093	< 0.093	< 0.095
Naphthalene	-	**25.5 J**	**26.7 J**	**47.8 J**	**177 J**	< 0.094	**0.27 J**	**0.084 J**	**0.11**	**0.037 J**	**0.15**	< 0.093	**0.098**
Phenanthrene	-	**0.52**	**0.53**	**0.6**	**0.99**	**0.19**	**0.11 J**	**0.013 J**	< 0.095	< 0.092	**0.021 J**	< 0.093	< 0.095
Pyrene	-	**0.014 J**	**0.014 J**	< 0.096	**0.03 J**	< 0.094	< 0.096 J	**0.08 J**	**0.064 J**	**0.074 J**	**0.076 J**	**0.02 J**	**0.042 J**
Inorganic Compounds (ug/L)													
Aluminum, Dissolved	-	< 80	< 80	< 80	< 89	< 89	< 89	< 80	< 80	< 89	< 89	< 89	< 89
Barium, Dissolved	2000	**44**	**46**	**55**	**55**	**45**	**13**	**120**	**110**	**110**	**110**	**120**	**130**
Iron, Dissolved	-	**6000**	**5900**	**4700 J**	**3000**	**1300**	**670**	**5600**	**3200 J**	**7600**	**7700**	**6000**	**9800**
Lead, Dissolved	15	< 2	< 2	< 2	< 2.2	< 2.2	< 2.2	< 2	< 2	< 2.2	< 2.2	< 2.2	< 2.2
Manganese, Dissolved	-	**65**	**69**	**45**	**28**	**57**	**36**	**2500**	**1900**	**2300**	**2300**	**2200**	**2100**
Cyanide	200	< 5	< 5	**2 J**	**4 J**	< 5	< 2	**130**	**160 J**	**150 J**	**140 J**	**48**	**100**
Other (ug/L)													
Alkalinity, Total (as CaCO3)	-	**131000**	**125000**	-	-	-	-	-	-	-	-	-	-
Ferrous Iron	-	**6620**	**6570**	-	-	-	-	-	-	-	-	-	-
Methane	-	**3300**	**3330**	-	-	-	-	-	-	-	-	-	-
Nitrite/Nitrate Nitrogen	10000	< 200	< 200	-	-	-	-	-	-	-	-	-	-
Sulfate	-	< 2000	< 2000	-	-	-	-	-	-	-	-	-	-
Sulfide	-	< 1000	< 1000	-	-	-	-	-	-	-	-	-	-

Figure F-1: Benzene Concentrations in Selected Wells, 2015 to 2019



Vapor Intrusion

Due to the presence of subsurface vapor sources at the Site, including VOCs dissolved in groundwater and DNAPL, the potential exists for VOCs to migrate from the subsurface into the indoor air of nearby structures.

Due to the proximity of several residences near the DNAPL Zone, this FYR conducted a screening-level vapor intrusion evaluation using EPA's Vapor Intrusion Screening Level (VISL) calculator to identify if further vapor intrusion evaluation is needed for the residences west of the DNAPL Zone. EPA's VISL calculator allows the user to enter contaminant concentrations in groundwater and then calculates screening-level vapor intrusion cancer risks and non-cancer hazard indices using conservative default residential exposure assumptions and current toxicity information. The VISL calculator was run using a residential use exposure scenario. Ideally, when groundwater concentrations are used as the input for the VISL calculator, data from the uppermost zone of groundwater should be used. However, there are no shallow wells sampled near the residences, so this FYR's screening-level analysis used the maximum groundwater concentrations detected in the past five years in the two bedrock wells closest to the residences (CWW01 and LTMW-2). Both of these wells were sampled annually from 2015 through 2019. As shown in Table G-2, the total screening-level cancer risk is within EPA's risk management range of 1×10^{-6} to 1×10^{-4} and the total non-cancer hazard is below EPA's threshold value of 1, indicating that groundwater concentrations do not pose a vapor intrusion exposure concern near the residential structures. In addition, the vapor intrusion risks calculated in Table G-2 are mostly due to anomalously high concentrations detected in LTMW-2 in 2015; concentrations of VOCs and SVOCs in that well were consistently much lower from 2016 through 2019.

Table F-2: Screening-Level Vapor Intrusion Risk Evaluation for Residences

COC	Maximum Groundwater Concentration Detected Near Residences, 2015 to 2019		Screening-Level Risk Calculated by 2020 VISL Calculator[a]	
	Concentration (µg/L)	Well	Cancer Risk	Non-Cancer Hazard Quotient
1,2,4-Trimethylbenzene	1.2	LTMW-2	NA	0.0048
Benzene	15.2	LTMW-2	9.6×10^{-6}	0.11
Ethylbenzene	15.3	LTMW-2	4.4×10^{-6}	0.0047
Toluene	0.32 J	LTMW-2	NA	0.000017
Xylene (total)	6	LTMW-2	NA	0.016
1-Methylnaphthalene	0.029 J	CWW01	NA	NA
Acenaphthene	0.015 J	CWW01	NA	NA
Naphthalene	0.49 J[b]	LTMW-2	1.1×10^{-7}	0.0028
Phenanthrene	0.022 J	CWW01	NA	NA
Pyrene	0.034 J	CWW01	NA	NA
		Totals:	1.4×10^{-5}	0.14

Notes:
a. Risk calculated for residential exposure scenario with average groundwater temperature 25°C using EPA's VISL calculator (accessed 11/30/2020 at https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-level-calculator).
b. The more sensitive analytical method determined that the concentration of this sample was 0.21 µg/L.
J = estimated value
NA = VISL cannot calculate a value for this type of risk or hazard for this COC

Buildings located above the DNAPL Zone are used primarily for storage and are not routinely occupied. A building was constructed on the former MGP facility within the DNAPL Zone in 2011 and is now being used; a passive vapor intrusion mitigation system was constructed to mitigate vapor intrusion. This FYR conducted a screening-level vapor intrusion evaluation using EPA's VISL calculator to identify if further vapor intrusion evaluation is needed for the borough building on the former MGP facility. The VISL calculator was run using a commercial use exposure scenario. Because there are no shallow wells sampled near the former MGP facility, this FYR's screening-level analysis used the maximum groundwater concentrations detected in the past five years in the bedrock well closest to the former MGP facility (LTMW-3). This well was sampled annually from 2015 through 2019. As shown in Table F-3, the total screening-level cancer risk is below EPA's risk management range of 1×10^{-6} to 1×10^{-4} and the total non-cancer hazard is below EPA's threshold value of 1, indicating that groundwater concentrations do not pose a vapor intrusion exposure concern for the borough building on the former MGP facility. If any other buildings are planned for future routine occupancy by commercial/industrial workers, a vapor intrusion evaluation using multiple lines of evidence should be conducted. Alternatively, vapor mitigation systems could be installed in the future to address the vapor intrusion exposure pathway.

Table F-3: Screening-Level Vapor Intrusion Risk Evaluation for Borough Building at Former MGP Facility

COC	Maximum Groundwater Concentration Detected Near Former MGP Facility, 2015 to 2019		Screening-Level Risk Calculated by 2020 VISL Calculator[a]	
	Concentration (µg/L)	Well	Cancer Risk	Non-Cancer Hazard Quotient
bis(2-Ethylhexyl)phthalate	0.25 J	LTMW-3	NA	NA
1-Methylnaphthalene	0.079 J	LTMW-3	NA	NA
2-Methylnaphthalene	0.026 J	LTMW-3	NA	NA
Acenaphthene	0.03 J	LTMW-3	NA	NA
Benzo(b)fluoranthene	0.033 J	LTMW-3	NA	NA
Fluoranthene	0.068 J	LTMW-3	NA	NA
Naphthalene	0.72	LTMW-3	3.6×10^{-8}	0.00099
Pyrene	0.11	LTMW-3	NA	NA
		Totals:	3.6×10^{-8}	0.00099

Notes:
a. Risk calculated for commercial exposure scenario with average groundwater temperature 25°C using EPA's VISL calculator (accessed 11/30/2020 at https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-level-calculator).
J = estimated value
NA = VISL cannot calculate a value for this type of risk or hazard for this COC

Screening-Level Evaluation of Risk Associated with Soil at Areas Off the Former MGP Facility

The 2007 ROD determined that the levels of soil contamination present between the former MGP facility and the Susquehanna River were protective for industrial use but not for residential use. Institutional controls prohibiting residential use are in place. To determine whether these areas are still safe for industrial use based on current toxicity values, this FYR conducted a screening-level evaluation comparing the reasonable maximum concentrations of contaminants in the soil against EPA's current screening levels for those contaminants. As shown in Table F-4, the screening-level evaluation shows that soil contamination in the area between the former MGP facility and the Susquehanna River is within EPA's acceptable risk range for industrial use.

Table F-4: Screening-Level Evaluation of Risk Associated with Soil at Areas Off the Former MGP Facility

Contaminant	Reasonable Maximum Soil Concentration at Areas Off the Former MGP Facility (mg/kg)[a]	Current EPA Soil Screening Levels for Workers (mg/kg)[b]		Screening-Level Risk/Hazard Levels Corresponding to Soil Concentration[c]	
		Cancer-Based	Noncancer-Based	Cancer Risk	Noncancer Hazard
Benzo(a)anthracene	47	21	NA	2.2×10^{-6}	NA
Benzo(a)pyrene	24	2.1	220	1.1×10^{-5}	0.1
Benzo(b)fluoranthene	21	21	NA	1.0×10^{-6}	NA
Benzo(k)fluoranthene	6.6	210	NA	3.1×10^{-8}	NA
Dibenzo(a,h)anthracene	8.4	2.1	NA	4.0×10^{-6}	NA
Indeno(1,2,3-c,d)pyrene	6.00	21	NA	2.9×10^{-7}	NA
Aluminum	16,000	NA	1,100,000	NA	0.01

Contaminant	Reasonable Maximum Soil Concentration at Areas Off the Former MGP Facility (mg/kg)[a]	Current EPA Soil Screening Levels for Workers (mg/kg)[b]		Screening-Level Risk/Hazard Levels Corresponding to Soil Concentration[c]	
		Cancer-Based	Noncancer-Based	Cancer Risk	Noncancer Hazard
Arsenic	7.0	3.0	480	2.3×10^{-6}	0.01
Beryllium	1.6	6,900	2,300	2.3×10^{-10}	0.001
Iron	26,000	NA	820,000	NA	0.03
Manganese	850	NA	26,000	NA	0.03
Thallium	1.1	NA	12	NA	0.09
			Totals:	2.1×10^{-5}	0.3

Notes:

a. Reasonable maximum subsurface soil concentrations from 1998 Baseline Human Health Risk Assessment, Tables 16D through 16F. Tables do not include surface soil.

b. Current soil screening levels for non-residential use obtained from https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables (accessed December 17, 2020).

c. Screening level risk and hazard were calculated using these equations:

Cancer risk = (Soil concentration ÷ Cancer-based screening level) × 10^{-6}

Non-cancer hazard = Soil concentration ÷ Noncancer-based screening level

mg/kg = milligrams per kilogram

APPENDIX G – ARAR REVIEW

EPA's 2018 ESD stated that federal MCLs are "applicable or relevant and appropriate requirements" (ARARs) for the Site's groundwater cleanup. The 2007 ROD also selected EPA's risk-based concentrations as ARARs, but the 2018 ESD stated that the risk-based concentrations cannot be considered ARARs because they are not promulgated standards.

The 2007 ROD waived the groundwater ARARs within the DNAPL Zone due to the presence of DNAPL and the technical impracticability of achieving the ARARs from an engineering perspective. The 2007 ROD required monitoring to confirm that groundwater ARARs are achieved outside of the DNAPL Zone.

This FYR compares the numerical values of the MCLs as presented in the 2018 ESD against the current values of the MCLs to determine whether any of the MCL values have changed. As shown in Table G-1, none of the ARAR values have changed since the 2018 ESD.

Table G-1: ARAR Review for Groundwater COCs

Groundwater COC	2018 ESD MCL Value (µg/L)	Current MCL Value (µg/L)[a]	ARAR Change
Benzene	5	5	No change
Ethylbenzene	700	700	No change
Toluene	1,000	1,000	No change
Benzo(a)pyrene	0.2	0.2	No change
Bis(2-ethylhexyl)phthalate	6	6	No change
Cyanide	200	200	No change

Note:

a. Current MCL values were obtained from https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations (accessed 11/30/2020).