EXPLANATION OF SIGNIFICANT DIFFERENCES
UGI COLUMBIA GAS PLANT SUPERFUND SITE
BOROUGH OF COLUMBIA, LANCASTER COUNTY, PENNSYLVANIA

I. INTRODUCTION

A. Site Name and Location

Site Name:	UGI Columbia Gas Plant Superfund Site (Site)
Site Location:	Columbia Borough, Lancaster County, Pennsylvania

B. Lead and Support Agencies

Lead Agency:	United States Environmental Protection Agency (EPA), Region III
Support Agency:	Pennsylvania Department of Environmental Protection (PADEP)

II. STATEMENT OF PURPOSE

This Explanation of Significant Differences (ESD) is being issued under Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended (CERCLA), 42 U.S.C. § 9617 (c), and 40 C.F.R. § 300.435(c) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The NCP requires the publication of an ESD when modifications to the remedial action selected in the Record of Decision (ROD) are necessary, and such modifications significantly change, but do not fundamentally alter, the remedial action with respect to scope, performance, or cost.

This ESD has been prepared to provide the public with an explanation of a modification to the selected remedy for the Site. The ROD for the Site, signed on September 24, 2007, included a Technical Impracticability (TI) Waiver Zone because EPA determined that it was technically impracticable to clean up dense non-aqueous phase liquid (DNAPL) from an engineering perspective. The TI Waiver did not include a lobe of DNAPL near the Lancaster Water Authority (LWA) pumping station. This ESD modifies the remedial action by expanding the horizontal and vertical extent of the TI Waiver Zone to fully encompass the extent of the DNAPL. This ESD also eliminates cleanup levels for those contaminants of concern (COCs) for which there are no applicable federal maximum contaminant levels (MCLs) promulgated pursuant to the Safe Drinking Water Act, 42 U.S.L.§300(g-1)(b)(2)(C)(i) and codified at 40 C.F.R. §141.61. Finally, this ESD adds acenaphthylene as a groundwater COC and deletes aluminum, trichloroethene, tetrachloroethene, xylene, barium and lead as groundwater COCs at the Site.

The information that supports this ESD and confirms its compliance with the statutory requirements of Section 121 of CERCLA, 42 U.S.C. § 9621, is provided herein.

This ESD and supporting documentation shall become part of the Administrative Record for the Site. The ESD, supporting documentation for the ESD, and the Administrative Record are available to the public at the locations listed in Section VII, Public Information.

III. SUMMARY OF SITE HISTORY, CONTAMINATION AND SELECTED REMEDY

A. SITE HISTORY AND CHRONOLOGY

The Site is located in Columbia Borough, Lancaster County, Pennsylvania, approximately four hundred feet northeast of the Susquehanna River. The Site includes a former manufactured gas plant (hereinafter the plant property shall be referred to as the MGP Facility) which occupies approximately two acres; the Borough of Columbia's (Borough) municipal garage; the LWA pumping station; property owned by Pennsylvania Lines LLC; and a pedestrian tunnel which extends underneath the railroad tracks on the northern side of the Site. The Shawnee Creek, a tributary to the Susquehanna River, and the Municipal Authority of Columbia's wastewater treatment plant are also located in the vicinity of the Site (Figure 1).

The MGP Facility caused Site soils and groundwater to become contaminated with the following hazardous substances (MGP-related wastes): (1) volatile organic compounds (VOCs) including benzene, toluene, and xylene (BTEX); (2) semi-volatile organic compounds (SVOCs) including polycyclic aromatic hydrocarbons (PAHs); and (3) inorganics including metals and cyanide. The contamination in the groundwater exists as DNAPL which is located in the fractures of the bedrock, and acts as a source for a dissolved phase plume of contaminants in the groundwater. Soil contamination remains in surface and subsurface soils at the Site; however, those areas where soil contamination remains have been capped.

B. SITE CONDITIONS/CONTAMINATION

Gas was historically produced at the Site through a coal gasification process that included reacting steam with hot coal, coke and wood. The gas went from two gas-generating sets through a washbox, condenser, washer cooler, and then was stored in a gas holder. From the gas holder, the gas went through a coal tar separator and a purifier and finally to a relief holder for distribution in the Borough of Columbia. 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 VOCs, including BTEX, SVOCs, including PAHs, and inorganics, including metals and cyanide.

The primary sources of contamination at the Site were coal tar and sludge in the MGP Facility's gas holder and relief holder, coal tar-contaminated sediments in the Susquehanna River, and coal tar in the subsurface soil and bedrock. MGP Facility waste streams contaminated soil, sediment and groundwater. The groundwater contamination includes DNAPL in fractures of the bedrock. The DNAPL is the source for a dissolved phase plume of contaminants in the groundwater.

EPA proposed the Site for listing on the Superfund National Priorities List (NPL) on June 23, 1993, and listed the Site on the NPL on May 31, 1994.

In April 1996, PPL Electric Utilities Corporation and UGI Utilities, Inc., the Potentially Responsible Parties (PRPs) at the Site, entered into a Consent Order and Agreement (1996 CO&A) with the Pennsylvania Department of Environmental Protection (PADEP) to conduct a Remedial Investigation/Feasibility Study (RI/FS).

The PRPs completed the RI/FS on May 7, 2002. The EPA-approved RI/FS Report identified the primary sources of contamination at the Site were coal tar and sludge in the gas holder and the relief holder, coal tar-contaminated sediments in the Susquehanna River, and coal tar in the subsurface soil and bedrock. Hazardous substances associated with the coal tar and other wastes include VOCs, SVOCs, PAHs, heavy metals and cyanide. The coal tar is present in the subsurface soil and bedrock fractures as a DNAPL, which acts as a continuous source of contamination for groundwater. The subsurface soil and bedrock containing DNAPL is referred to as the DNAPL Zone. The DNAPL Zone is located entirely within the TI Waiver Zone boundary discussed in Section C, below.

On November 29, 2006, the PRPs and EPA entered into an Administrative Settlement and Order on Consent (2006 Settlement Agreement) for Removal Response Action. In accordance with the 2006 Settlement Agreement, the PRPs installed caps over the gas and relief holders where MGP-related wastes remained onsite; excavated and disposed of soil and MGP-related wastes; installed a stormwater management system; demolished onsite buildings; 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 constructed to help the Borough reuse the Site.

C. SELECTED REMEDY

EPA signed the ROD on September 24, 2007. The remedial action objectives (RAOs) and components of the Selected Remedy in the ROD are as follows:

1. Soil

The 2007 ROD identified the following RAOs for soil:

- Protect the integrity of the caps.
- Maintain the caps and the stormwater management system.

- Implement institutional controls to prevent residential use and any other uses of the Site property 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 remained in the soil had been capped.
- Long-term maintenance of the cap and stormwater management facilities.
- Implementation of institutional controls including 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 performed at the Site.

2. Groundwater

The 2007 ROD identified the following RAOs 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 TI waiver of Applicable or Relevant and Appropriate Requirements (ARARs), pursuant to CERCLA Section 121(d)(4)(C), consisting of both federal maximum contaminant levels (MCLs) and EPA Region 3 Risk-Based Concentrations (RBCs), for contaminants found within the TI Waiver Zone. EPA determined that restoration of groundwater within the TI Waiver Zone to drinking water quality was technically impracticable from an engineering perspective using available technologies within a reasonable or foreseeable timeframe.
- Long-term groundwater monitoring to confirm that COCs were not present outside the TI Waiver Zone at concentrations exceeding ARARs.
- Institutional controls restricting the installation and use of groundwater wells and prohibiting any residential use of the Site that would interfere with the protectiveness or integrity of the selected remedy.

In the ROD, EPA acknowledged that natural gradient flushing of the dissolved MGP constituents associated with the DNAPL into the Susquehanna River was occurring. The purpose of the long-term groundwater monitoring is to confirm that COCs are not present exceeding ARARs outside (side gradient) of the TI Waiver Zone where DNAPL is located. Historically, LWA operated two cooling water wells (CWW01 and CWW02) at the Site

that pumped water from the dissolved-phase groundwater contaminant plume. The ROD required performance of a Focused Feasibility Study (FFS) to evaluate how to address the dissolved-phase groundwater contaminant plume in the vicinity of the cooling water wells if those wells were shut down.

Groundwater COCs and ARARs from the 2007 ROD are listed here in Appendix 1. The ARARs listed in Appendix 1 from the 2007 ROD were waived within the TI Waiver Zone due to the technical impracticability of restoring groundwater within the TI Waiver Zone to meet those cleanup levels.

IV. DESCRIPTION OF SIGNIFICANT DIFFERENCES AND BASIS FOR SUCH DIFFERENCES

LWA completed upgrades to the pump station located on the Site between October 2007 and October 2010. As a component 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 pump 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 EPA-approved FFS Report found that after the cooling water wells were taken out of service, the concentrations of contaminants in CWW01 decreased to concentrations that are presently either not detectable or detected at estimated concentrations that are less than the laboratory reporting limits. The reporting limits are below the MCLs. Therefore, EPA has 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 (CSM) 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 has determined that CWW02 is located within the DNAPL Zone at the Site.

Based on the findings of the FFS, this ESD modifies the selected remedy in the 2007 ROD as follows:

1. Extension of the horizontal boundary of the TI Waiver Zone; and
2. Extension of the vertical boundary of the TI Waiver Zone.

Additionally, based on the evaluation of COCs in the 2007 ROD, this ESD also includes the following modification to the selected remedy:

1. Deletes COCs that do not have applicable MCLs from the list of waived ARARS and eliminate groundwater cleanup levels for those COCs;

2. Add acenaphthylene as a groundwater COC; and
3. Deletes aluminum, trichloroethene, tetrachloroethene, xylene, barium and lead as groundwater COCs.

These changes are discussed in detail below. This ESD applies to the groundwater component of the selected remedy of the 2007 ROD only. The soil component remains unchanged.

Extension of Horizontal Boundary of TI Zone

The horizontal extent of the current TI Waiver Zone in the 2007 ROD includes the Site, the area south of the Site to the Susquehanna River, and the area west of the Site including a portion of Shawnee Creek and the Lancaster Water Authority pumping station property (Figure 2), encompassing an area of approximately six acres. This ESD extends the TI Waiver Zone boundary approximately 100 feet to the northwest to include CWW02. This extended TI Waiver Zone places the northwestern TI Waiver Zone in better alignment with the strike of bedrock planar features identified during the 2014 geophysical investigation, which was reported in previous bedrock investigations and documented in the 2007 ROD. The extended TI Waiver Zone horizontal boundary is shown on Figure 2.

Extension of Vertical Boundary of TI Waiver Zone

The vertical extent of the TI Waiver Zone in the 2007 ROD includes the overburden, the shallow bedrock and deep bedrock water bearing zones at the Site and extends to an elevation of 160 above feet mean sea level (MSL). Former cooling water well CWW02 is the deepest well at the Site and dissolved-phase COCs from the DNAPL are present in groundwater samples collected from CWW02. Therefore, the western portion of the TI Waiver Zone vertical boundary is extended to an elevation of 60 feet above MSL, which is slightly below the bottom depth of the former cooling water well CWW02. Additionally, two wells within the current TI Waiver Zone horizontal boundary (LTMW-1 and LTMW-4) are screened or have open bedrock intervals at depths below the current TI Waiver Zone vertical boundary and have COCs in groundwater exceeding ARARs. The extended TI Waiver Zone vertical boundary includes deeper areas of groundwater contamination and is shown on Figure 3. The rationale for expanding the vertical TI Waiver Zone boundary and the horizontal TI Waiver Zone boundary is consistent with the original TI Waiver, which was technical impracticability from an engineering perspective.

Changes in Groundwater Cleanup Levels

Groundwater COCs with applicable MCLs from the 2007 ROD are listed in Table 1. MCLs will continue to be waived for the COCs, listed on Table 1, which are within the TI Waiver Zone due to the technical impracticability, from an engineering perspective, of restoring groundwater within the DNAPL Zone to meet these cleanup levels.

RBCs were established as ARARs for groundwater COCs without applicable MCLs in the 2007 ROD and those ARARs were waived within the TI Waiver Zone for those COCs. However, because RBCs are not promulgated standards, they should not have been

considered ARARs in the 2007 ROD. Consequently, ARARs are no longer waived for the groundwater COCs that do not have applicable MCLs. However, because these compounds are also components of the DNAPL, it is technically impracticable from an engineering perspective to restore groundwater to meet RBCs within the TI Waiver Zone. Therefore, this ESD eliminates groundwater cleanup levels for groundwater COCs with no applicable MCLs. The groundwater COCs without MCLs are shown on Table 2 along with the maximum detected concentration for each compound.

Groundwater COCs have not been detected outside of the TI Waiver 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 directly to the Susquehanna River thereby preventing further migration or expansion. Additionally, institutional controls are in place to prevent exposure to DNAPL and the dissolved phase groundwater plume.

This ESD also adds acenaphthylene as a groundwater COC. Acenaphthylene was included in the list of groundwater COCs in the Human Health Risk Assessment, but was not included in the list of groundwater COCs in the 2007 ROD, which is likely the result of a transcription error. Additionally, the following groundwater COCs from the 2007 ROD have been removed as COCs because concentrations are now below the respective MCL therefore, the MCL cannot be waived: aluminum, trichloroethene, tetrachloroethene, xylene, barium and lead.

Table 1: Groundwater COCs with waived MCLs Within TI Waiver Zone

Analyte	EPA MCL	Maximum Detection
Volatile Organic Compounds (µg/L)		
Benzene	5	44,000
Ethylbenzene	700	5,300
Toluene	1,000	16,400
Semi-Volatile Organic Compounds (µg/L)		
Benzo(a)pyrene	0.2	108,000
bis(2-Ethylhexyl)phthalate	6	37.9
Inorganic Compounds (µg/L)		
Cyanide	200	220

Notes:

1. Maximum detections are summarized for samples collected between 2007 and 2016 within the TI Zone.

Table 2: Groundwater COCs Without MCLs Within TI Waiver Zone

Analyte	Maximum Detection
Volatile Organic Compounds (µg/L)	
1,2,4-Trimethylbenzene	361
Semi-Volatile Organic Compounds (µg/L)	
1-Methylnaphthalene	655
2-Methylnaphthalene	124
Acenaphthene	192,000
Acenaphthylene	516,000
Benzo(a)anthracene	117,000
Benzo(b)fluoranthene	43,900
Chrysene	93,500
Dibenzofuran	14.4
Fluoranthene	212,000
Naphthalene	4,090,000
Phenanthrene	855,000
Pyrene	419,000
Inorganic Compounds (µg/L)	
Iron, Dissolved	10,200
Manganese	4,200

Notes:
1. Maximum detections are summarized for samples collected between 2007 and 2016 in the TI Zone.
2. Compounds without a MCL are combined with the MGP residual material and are not readily extractable from the fractured bedrock matrix.

V. SUPPORT AGENCY COMMENTS

PADEP has participated with EPA in reviewing the modifications to the remedy that are described herein, and concurred with the ESD on April 20, 2018.

VI. STATUTORY DETERMINATION

EPA has determined that the modified remedy described in this ESD complies with the statutory requirements of Section 121 of CERCLA, 42 U.S.C. § 9621. EPA has determined that the selected remedy, as modified by this ESD, will remain protective of human health and the environment, will comply with Federal and State requirements that are applicable or relevant and appropriate to this remedial action and that have not been waived, and will be cost-effective.

VII. PUBLIC INFORMATION

As required by the NCP, EPA will publish a notice of availability and a brief description of this ESD following its signing. In accordance with Section 117 (d) of CERCLA and the NCP 40 C.F.R. §300.825(a), this ESD and supporting information will become part of the Site's Administrative Record which is available for review at the location identified below.

This ESD and supporting documentation will become part of the Administrative Record for the Site. The Administrative Record is located at the following locations:

U.S. Environmental Protection
Agency Region III
1650 Arch Street
Philadelphia, PA 19103

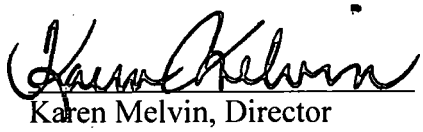
Columbia Public Library
24 S. 6th Street
Columbia, PA 17512

The Library is open Monday - Thursday 10:00 am - 8:00pm, Friday 10:00 am - 6:00pm, Saturday 9:00am - 4:00pm and closed Sundays.

VIII. SIGNATURE

This ESD modifies the selected remedy for the UGI Columbia Gas Plant Site to expand the TI Waiver Zone, eliminates groundwater cleanup levels for groundwater COCs without applicable MCLs, and modifies the list of groundwater COCs.

Approved By: Date:



JUN 4 2018

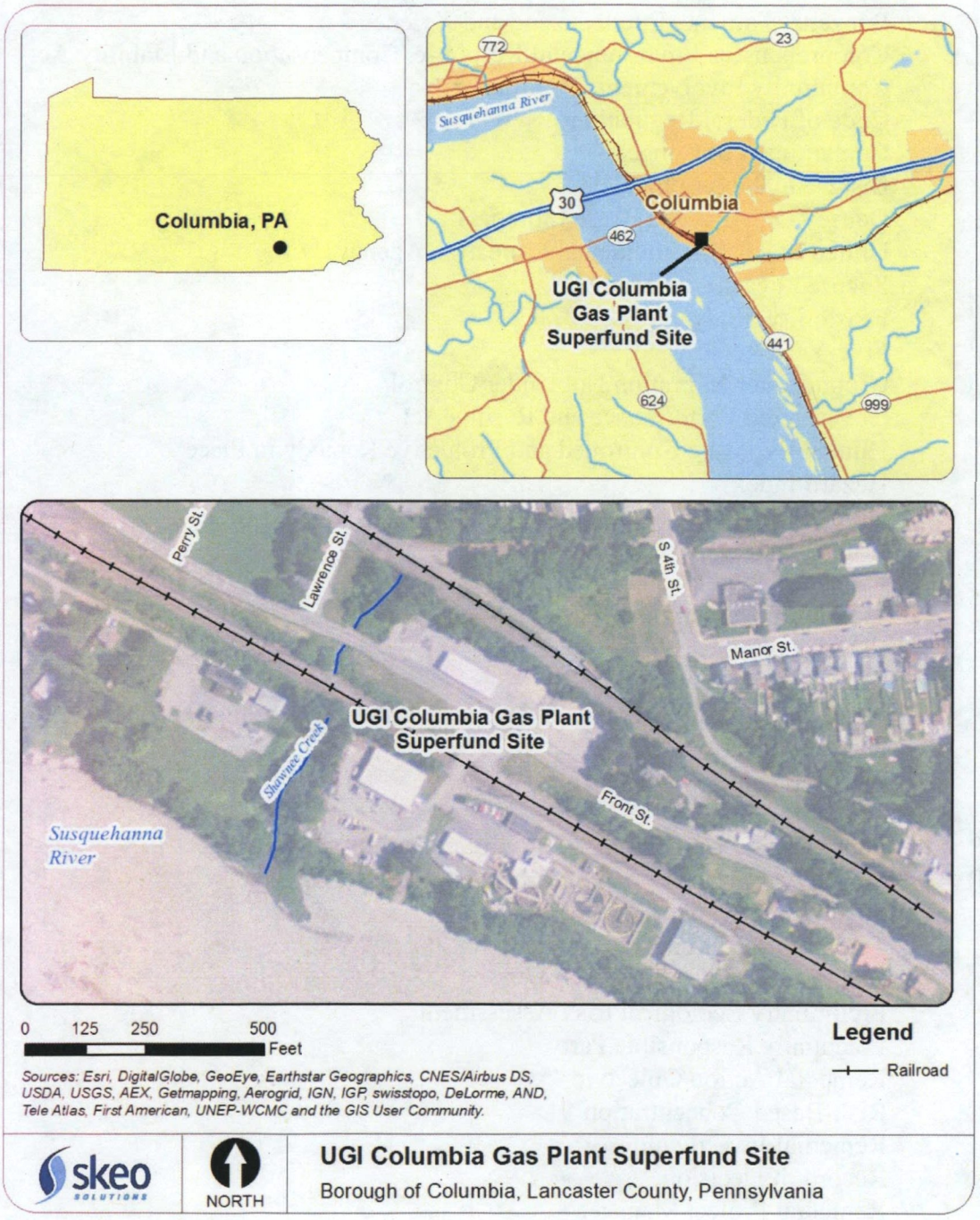
Karen Melvin, Director
Hazardous Site Cleanup Division
U.S. EPA, Region III

APPENDICES

LIST OF ABBREVIATIONS

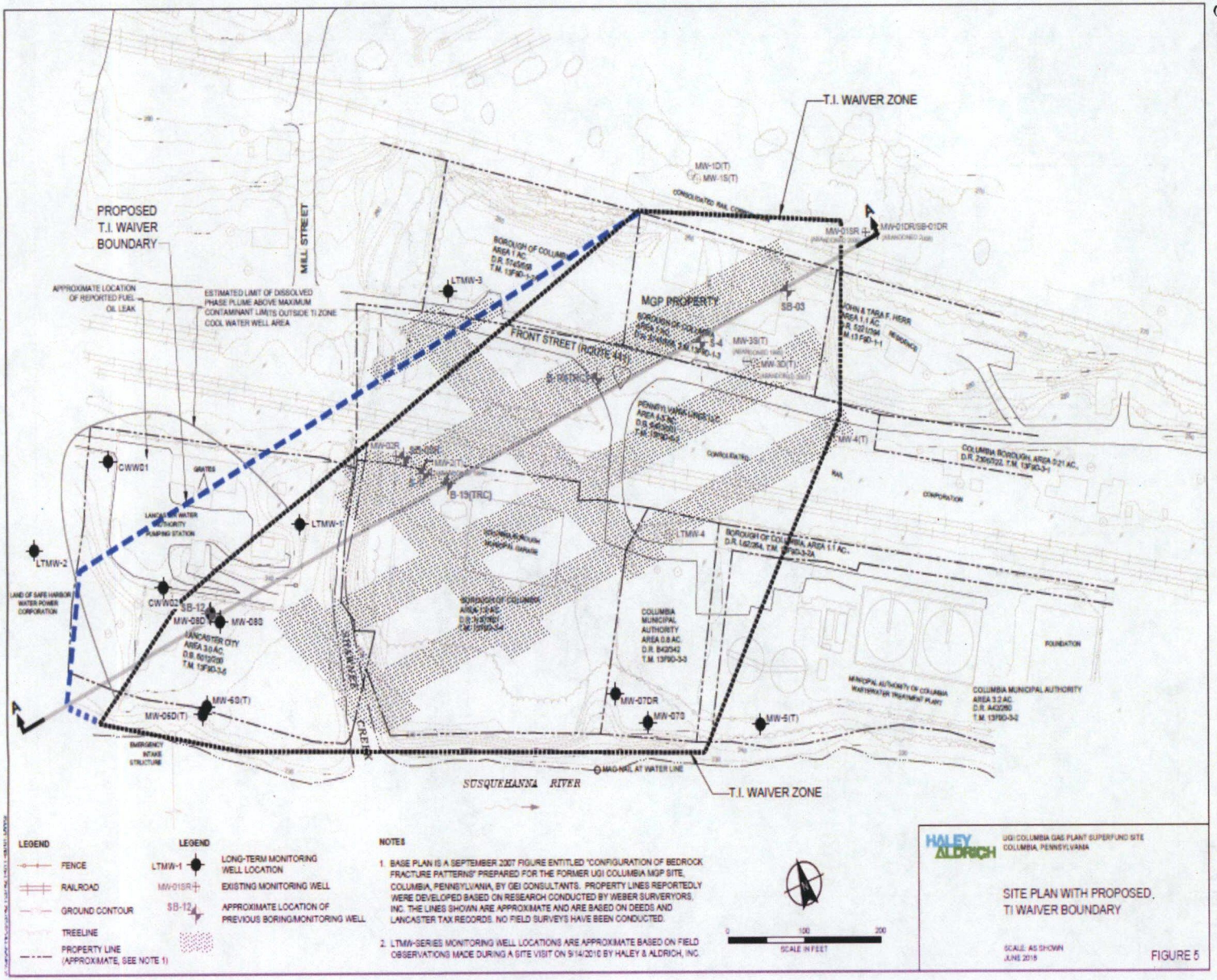
ARAR	Applicable or Relevant and Appropriate Requirement
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CIC	Community Involvement Coordinator
CFR	Code of Federal Regulations
COC	Contaminant of Concern
DEHP	Bis(2-ethylhexyl)phthalate
DNAPL	Dense Non-Aqueous Phase Liquid
EPA	United States Environmental Protection Agency
FFS	Focused Feasibility Study
FS	Feasibility Study
FYR	Five-Year Review
GMNUC	Groundwater Migration Not Under Control
GPRA	Government Performance and Results Act
HEPR	Human Exposure Controlled and Protective Remedy in Place
HI	Hazard Index
HHRA	Human Health Risk Assessment
IC	Institutional Control
LWA	Lancaster Water Authority
MCL	Maximum Contaminant Level
MGP	Manufactured Gas Plant
µg/L	Micrograms per Liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PADEP	Pennsylvania Department of Environmental Protection
PADER	Pennsylvania Department of Environmental Resources
PAH	Polycyclic Aromatic Hydrocarbon
PCE	Tetrachloroethylene
PCOR	Preliminary Close-out Report
PERA	Preliminary Ecological Risk Assessment
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RBC	Risk-Based Concentration
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
SVOC	Semi-volatile Organic Compound
SWRAU	Sitewide Ready for Anticipated Use
TCE	Trichloroethylene
TI	Technical Impracticability
VOC	Volatile Organic Compound
WWTP	Wastewater Treatment Plant

Figure 1



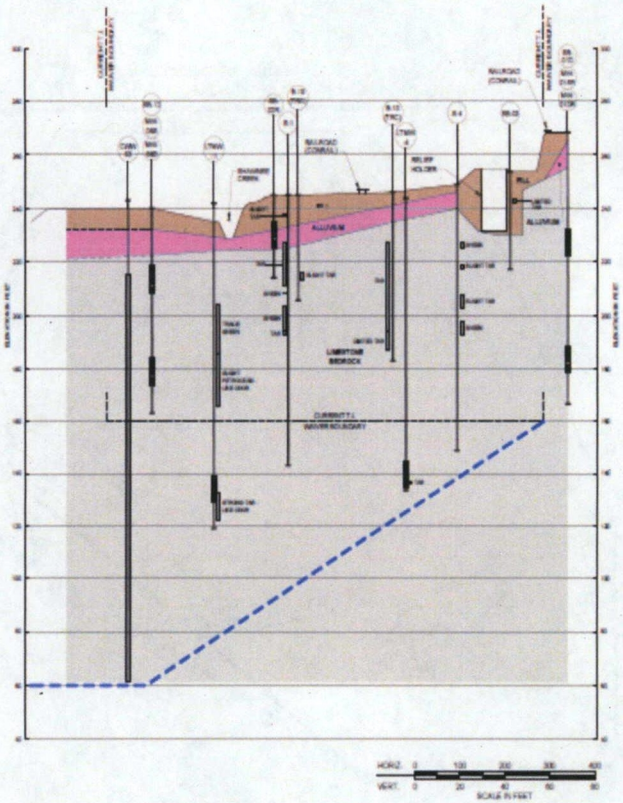
Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Figure 2



AR300186

Figure 3



LEGEND

- MONITORING WELL SCREEN
- BEDROCK WELL OPEN INTERVAL
- PROPOSED VERTICAL T.I. WAIVER BOUNDARY

NOTES

1. CROSS-SECTION ADAPTED FROM REMEDIAL INVESTIGATION REPORT FIGURE 3.9, APRIL 1996, BY GEI CONSULTANTS ATLANTIC ENVIRONMENTAL DIVISION.
2. OBSERVATIONS OF TAR AND SHEEN BASED ON INFORMATION REPORTED ON BORING LOGS COMPLETED BY OTHERS.

HALEY ALDRICH

USX COLUMBIA GAS PLANT SUPERFUND SITE
COLUMBIA, PENNSYLVANIA

PROPOSED VERTICAL
TI WAIVER BOUNDARY

SCALE: AS SHOWN
FEBRUARY 2017

FIGURE 5

Appendix 1 – Site Contaminants of Concern Detected in GW from 2007 ROD (Table 1)

Compound	Maximum Concentration Detected (mg/l)	RBC For Tap Water (mg/l) *	MCL (mg/l) *
Volatile Organic Compounds (VOCs)			
Benzene	39	0.00034 (C)	0.005
Ethylbenzene	4.7	1.3 (N)	0.7
Tetrachloroethene	0.005	0.0001 (C)	0.005
Toluene	9.5	2.3 (N)	1.0
Trichloroethene	0.003	0.000026 (C)	0.005
1,2,4-Trimethylbenzene	0.47	0.061 (N)	0.07
Xylenes (total)	3.7	0.21 (N)	10
Semi-Volatile Organic Compounds (SVOCs)			
Acenaphthene	0.75	0.37 (N)	NA
Benzo(a)anthracene	0.19	0.00003 (C)	NA
Benzo(a)pyrene	0.15	0.000003 (C)	0.0002
Benzo(b)fluoranthene	0.13	0.00003 (C)	NA
Chrysene	0.014	0.003 (C)	NA
Fluoranthene	0.28	1.5 (N)	NA
1-Methyl Naphthalene (1)	0.75	0.0065 (N)	NA
2-Methyl Naphthalene	2.6	0.024 (N)	NA
Naphthalene	8.2	0.0065 (N)	NA
Phenanthrene (2)	1.2	0.18 (N)	NA
Pyrene	0.72	0.18 (N)	NA
Other SVOCs			
Bis(2-ethylhexyl)phthalate - also called - di(2-ethylhexyl)phthalate or DEHP	0.069	0.0048 (C)	0.006
Dibenzofuran	0.081	0.037 (N)	NA
Inorganic Compounds			
Aluminum	9.6	37 (N)	0.05-0.2 (4)
Barium	0.541	7.3 (N)	2
Cyanide	0.22	0.73 (N)	0.2
Iron	42	26 (N)	0.3 (4)
Lead	0.019		0.015 (TT)
Manganese	3.0	0.73 (N)	0.05 (4)

* = Since the RI, EPA has updated the MCLs and/or RBCs for some of the Site-related COPCs. This Table reflects the current MCLs, as of June 2003, and RBCs, as of April 2007.

NA - Not Available

1 - The RBC doe Naphthalene is used as the RBC for these compounds

2 - The RBC for Pyrene is used as the RBC for this compound

3 - EPA "Action level" for lead in groundwater

4 - Secondary MCL

N - Indicated that the RBC is based on noncarcinogenic effects (using a target hazard quotient of 0.1)

C - Indicated that the RBC is based on Carcinogenic effects (using a target cancer risk of 10E-06)

TT - Treatment technique