BLADES GROUNDWATER SUPERFUND SITE
BLADES, SUSSEX COUNTY, DELAWARE
OPERABLE UNIT 2

RECORD OF DECISION
FOR INTERIM ACTION

United States Environmental Protection Agency
Region 3
1600 John F. Kennedy Boulevard
Philadelphia, PA 19103-2852

February 2024

BLADES GROUNDWATER
SUPERFUND SITE OPERABLE UNIT 2
BLADES, SUSSEX COUNTY, DELEWARE

RECORD OF DECISION
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RECORD OF DECISION FOR INTERIM ACTION

BLADES GROUNDWATER SUPERFUND SITE
OPERABLE UNIT 2

1. DECLARATION

Site Name and Location

The Blades Groundwater Superfund Site (Site) is located in Blades, Sussex County, Delaware. The Site was placed on the National Priorities List (NPL) on September 3, 2020. The National Superfund Database Identification Number is DEN000304203. For administrative purposes the Site has been separated into two Operable Units. Operable Unit 1 (OU1) addresses contaminated media Site-wide. Operable Unit 2 (OU2) addresses public exposure to contaminants in private drinking water wells from contaminated groundwater. This Record of Decision (ROD) for interim action only addresses the remedy for OU2. A remedy for OU1 will be addressed in a separate and subsequent ROD.

Statement of Basis and Purpose

This ROD presents the selected interim remedial action (Selected Remedy) for OU2. The Selected Remedy was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) 42 U.S.C. §§ 9601 et seq., as amended, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300. This decision document explains the factual and legal basis for the Selected Remedy for OU2 at the Site. The information supporting this decision is contained in the Administrative Record (AR) for the Site, which was developed in accordance with Section 113(k) of CERCLA, 42 U.S.C. § 9613(k). This AR file is available for review online at https://semspub.epa.gov/src/collection/03/AR67374. The AR file index (Appendix A) identifies each document contained in the AR file upon which the selection of the remedy is based. The signed ROD will become part of the AR for the Site.

The Delaware Department of Natural Resources and Environmental Control (DNREC) concurs with the Selected Remedy for OU2 (Appendix E).

Assessment of the Site

The Selected Remedy in this ROD for interim action is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances, pollutants, or contaminants into the environment.

Description of the Selected Remedy

The Selected Remedy for OU2 addresses exposure to current and future residents to groundwater containing unacceptable levels of Site-related contamination.

The contamination at the Site consists of heavy metals (including cobalt, hexavalent chromium, and lead) and perfluoroalkyl/polyfluoroalkyl substances (PFAS) in groundwater. Groundwater is the sole drinking water source for both public and domestic potable water in Blades and the surrounding area. Residences within the town limits of Blades are connected to the public water supply, which treats groundwater prior to distribution; however, residences located beyond town limits to the southwest rely on domestic groundwater wells for potable water. The area subject to this Selected Remedy are the residences located south and southwest, outside of the town limits of Blades, bounded by Morgan Branch and the Nanticoke River as depicted in Figure 2.

The Selected Remedy (Alternative 5) consists of the following components:

1. Extending an existing public water line and connecting residential properties whose private wells are currently impacted or potentially impacted by Site-related contaminants.

2. Implementing institutional controls such as local ordinances and/or groundwater management zones to prevent the installation of new potable wells.

3. Maintaining existing point-of-entry treatment systems (POETS) / point-of-use treatment systems (POUTS) until connection to the public water line is complete.

The Selected Remedy will ensure long-term public protection from contaminated groundwater until groundwater is restored to beneficial use under OU1.

Statutory Determinations

The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions to the maximum extent practicable.

Because this Selected Remedy will result in hazardous substances remaining on-Site above levels that allow for unlimited use and unrestricted exposure, a review will be conducted within five years after commencement of the interim remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. Such reviews will be conducted a minimum of every five years thereafter, until EPA determines that hazardous substances remaining at the Site do not prevent unlimited use and unrestricted exposure at the Site.

ROD Data Certification Checklist

The following information is included in the Decision Summary (Part 2) of this ROD. Additional information can be found in the Administrative Record for the Site:

ROD CERTIFICATION CHECKLIST	
Information	**Location/Page Number**
Contaminants of Concern (COCs) and respective concentrations	Section VII, page 13
Baseline risk represented by COCs	Section VII, page 15
Cleanup levels established for COCs and the basis for these levels	Section XI, page 27
Current and reasonably anticipated future land use assumptions potential future beneficial uses of groundwater used in the baseline risk assessment and ROD	Section VI, page 11
Potential land and groundwater uses that will be available at the Site as a result of the Selected Remedy	Section VI, page 11
Estimated capital, annual Operations & Maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected	Section X, page 26
Key factors that led to selecting the remedy	Section XI, page 26

Authorizing Signature

This ROD for interim action documents the Selected Remedy for OU2 of the Site. EPA selected this interim remedial action with the concurrence of DNREC.

PAUL LEONARD

Digitally signed by PAUL LEONARD
Date: 2024.02.09 12:53:56 -05'00'

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Paul Leonard, Director
Superfund and Emergency Management Division
EPA Region 3

INTERIM RECORD OF DECISION
BLADES GROUNDWATER SUPERFUND SITE
OPERABLE UNIT 2

2. DECISION SUMMARY

I. SITE NAME, LOCATION, AND DESCRIPTION

The Site is located within the Town of Blades, Sussex County, Delaware. The Site is approximately 0.5 square miles, lying primarily between the Nanticoke River, Morgan Branch, and Route 13 (See Figure 1). The Site was finalized on the National Priorities List (NPL) on September 3, 2020. The National Superfund Database Identification Number for this Site is DEN000304203. Contaminants commonly related to plating operations including metals and per- and polyfluoroalkyl substances (PFAS) have been detected in residential drinking water downgradient of the Site. EPA Region 3 is the lead agency for the Site, and DNREC is the support agency.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

There are two likely source areas of contamination related to this Site located in the Town of Blades: Procino Plating (now known as Procino Enterprises), an active metal plating facility, and the former Peninsula Plating facility, which is currently vacant land. The locations of Procino Plating and former Peninsula Plating are shown in Figure 2. Below is a brief overview of the operational history and environmental investigations conducted at both facilities, prior to the Site being listed on the NPL. Additional information regarding these investigations can be found in Sections 2.2 and 2.3 of the June 2019 Final Site Inspection (SI) Report. Investigations prior to 2018 did not include the collection or analysis of PFAS.

<u>Procino Plating</u>

Procino Plating is an active plating facility that began operations in Blades in 1985, performing ornamental/decorative plating with copper, nickel, and chromium (See Figure 2). From 1994-2002, Procino Plating received a series of Notices of Violation (NOVs) from DNREC and EPA citing labeling, training and operational deficiencies related to handling of hazardous waste. Procino Plating responded with notification letters stating that the deficiencies had been corrected. None of the NOVs cited spillage, discharges, or releases of hazardous wastes. In December 2007 and February 2008, DNREC and EPA conducted inspections, collected samples, and interviewed employees at the Procino Plating. These inspections coincided with the 2007 discontinuation of plating operations in the second building when equipment was being dismantled to create rental space. Procino Plating was issued an NOV pursuant to the Resource Conservation and Recovery Act (RCRA). The operational and regulatory histories of the Procino Plating facility led to DNREC, in cooperation with EPA, conducting a preliminary assessment (PA)

at Procino Plating in 2010 due to chemical use, primarily metals, and the potential impact to soil and groundwater.

During the 2010 PA, photographs were taken that showed the presence of Atotech Fumetrol® 140. Fumetrol is used as a mist suppressant to control the emission of chromium mists created during the plating process. Perfluorooctane sulfonic acid (PFOS) is an active ingredient within Fumetrol 140. PFOS was not identified or investigated as a contaminant of concern in 2010 since there was not as much toxicity data or analytical methods available as there are now. As a result of the PA, a site investigation was recommended due to chemical use and the potential to impact soil and groundwater. DNREC performed the SI activities in 2010 and 2011.

The SI included sampling any registered/permitted private water supply wells within the Town of Blades limits. Water samples were collected from outdoor spigots of residential homes with registered and accessible private wells where access was granted. Twelve private water supply wells surrounding the Procino Plating facility were sampled. Soil and groundwater samples were collected and analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, and for total and dissolved target analyte list (TAL) inorganics on the Procino Plating property. Based on the results, DNREC recommended further investigation. Procino Plating entered into a Voluntary Cleanup Program agreement with DNREC in 2011 to complete the investigation.

From 2012 to 2015, Procino Plating's contractor performed various remedial investigation (RI) activities to characterize subsurface stratigraphy, determine groundwater elevations and flow direction, determine the extent and magnitude of contamination, and assess potential human health risks. Soil and groundwater at Procino Plating were not analyzed for PFAS during this investigation.

In 2015, an interim removal action was completed by Procino Plating's contractor that consisted of removing a portion of the facility's concrete slab floor, collecting soil samples for the purpose of delineating chromium concentrations, and removing chromium impacted soil with a mini excavator. Approximately 20 cubic yards of soil were removed from a 10-foot by 10-foot area to depths of 6 to 8 feet below ground surface (bgs). A polyvinyl chloride (PVC) piping system was also installed to facilitate potential future remedial injections.

In 2018, a chromic acid tank was overfilled with water and overflowed into a secondary containment and crawlspace beneath the building. The total volume of solution spilled was unknown, but 600 gallons were captured in the secondary containment. Procino Plating's contractor removed the impacted soil for off-site disposal.

Peninsula Plating

The former Peninsula Plating facility was located within the former Blades Commercial Complex at the intersection of Market Street and River Road (See Figure 2). Peninsula Plating operated from 1992 to 1995 conducting brass, copper, and chrome plating operations. In 1995 the

DNREC Hazardous Waste Management Branch conducted a site visit at the Peninsula Plating facility. DNREC noted the presence of plating process chemicals, including nickel sulfate, sulfuric acid, chromic acid, hexavalent chromium, hydrofluoric acid, nickel chloride, copper cyanide, copper sulfate, zinc cyanide, and cadmium fluoroborate. Peninsula Plating closed shortly thereafter, following a history of noncompliance with industrial waste discharge permits and Emergency Planning and Community-Right-to-Know Act (EPCRA) requirements.
DNREC's Emergency Response and Enforcement Branches informed EPA Region 3 that the former plating building contained numerous vats, tanks, drums, and containers of hazardous materials. EPA conducted a CERCLA Removal Action at the abandoned Peninsula Plating facility in mid to late 1995. The removal action included the removal of 78 55-gallon drums of hazardous waste and 30 cubic yards of hazardous solids, including flammable and corrosive liquids, oxidizers, and liquids contaminated with cadmium and chromium. DNREC performed an SI at Peninsula Plating in 1999. Samples collected during the SI included soil and groundwater samples from three on-site monitoring wells and one public supply well. With the exception of the concentrations of arsenic, inorganics were not detected in the soil samples at concentrations exceeding EPA or DNREC standards. Chromium was detected in three soil samples at concentrations ranging from 2.4 mg/kg to 9.4 mg/kg. Organic analysis of soil samples indicated several polycyclic aromatic hydrocarbons (PAHs) at concentrations exceeding EPA and DNREC standards. Analysis of groundwater samples indicated concentrations of aluminum, iron, and manganese in the on-site monitoring wells at concentrations above DNREC regulatory standards and/or EPA maximum contaminant levels (MCLs). Chromium was not detected in the collected groundwater samples. Organic constituents were not detected in groundwater at concentrations exceeding the EPA or DNREC standards.

Based on the Procino and Peninsula facilities' operational and regulatory histories, previous investigations, and the advancement of PFAS testing, EPA and DNREC furthered their investigations. In 2018, EPA, in coordination with DNREC, conducted a site-wide investigation (2018 SI) to further define the extent of contamination, assess the relative threat posed to human health and the environment, and determine the need for additional action under CERCLA.

Public Supply Well Sampling

All residences within the corporate limits of the Town of Blades are connected to the municipal water supply. The Town of Blades maintains three municipal water supply wells. In February 2018, based on information pertaining to the use of PFAS at metal plating facilities and potential hazards associated with consumption of PFAS, DNREC, in consultation with EPA, collected samples from the Town of Blades' municipal supply wells to analyze for PFAS. Results indicated each of the three public supply wells had a summed total concentration of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS) ranging from 96.2 ppt to 187.1 ppt,[1] which was greater than the combined health advisory level (HAL) of 70 parts per

[1] In 2016 EPA released a HAL for combined PFOA and PFOS at 70 ppt. At the time of this sampling, the HAL of 70 ppt was the level DNREC was acting upon. On June 15, 2022, EPA issued interim updated drinking water health advisories for PFOA at 0.004 ppt and PFOS at 0.02 ppt that superseded those EPA issued in 2016.

trillion (ppt). As a result of the HAL exceedance, DNREC and Delaware Department of Health (DPH) began distributing alternative water to Blades' residents as a precautionary measure. On February 19, 2018, DNREC funded and installed a carbon filtration system on the Blades water supply system. On February 28, 2018, DNREC and DPH announced that a follow-up sampling of the treated Blades water supply, in conjunction with the carbon filtration system, showed non-detect levels for PFAS. The public water system continues to be sampled on a reoccurring basis to ensure protectiveness and the sample results continue to be below standards.

Residential Well Sampling

Residences outside of the Blades town limits are served by private domestic wells. In February, March, and April of 2018, EPA collected domestic well water samples from 54 locations for PFAS analysis. PFAS concentrations exceeded the combined HAL of 70 ppt in effect at the time for PFOS and PFOA concentrations in seven of the domestic wells located southwest of Blades. PFOS was the main contaminant detected with concentrations up to 350 ppt.

Subsequently during 2018, DNREC provided drinking water filters to all residents with domestic wells impacted with PFOA/PFOS concentrations above 52.5 ppt (75% of the HAL in effect in 2018). DNREC provided the filters to eight residences and has continued to provide replacement filters as needed.

On September 3, 2020, EPA added the Site to the NPL based on the conclusions of the 2018 SI that identified chromium, copper, nickel, zinc, and cyanide above EPA health-based screening levels and/or MCLs in groundwater and soil. Additionally, PFAS, specifically PFOA and PFOS, were detected above EPA's 2016 HAL in groundwater.

Remedial Investigation/Removal Action

After listing on the NPL, EPA began RI activities to define the nature and extent of contamination. EPA conducted routine sampling of the public water supply to ensure the treated water continued to meet federal and state drinking water standards.[2] Additionally, EPA contacted 97 households through mailings and door-to-door visits, requesting permission to sample residents' domestic well water for a full suite of analysis, including PFAS compounds.

A total of 55 residents agreed to sampling which included residences that were previously sampled and residences that had not been previously sampled during the 2018 residential sampling event. Samples were collected from outdoor spigots or indoor taps in the event outdoor spigots were not available. Figure 3 depicts the approximate boundaries of the residential sampling effort. Based upon results, several constituents exceeded tapwater Regional Screening Levels (RSLs). Notably, hexavalent chromium, cobalt, lead, and PFOS exceeded either the MCL pursuant to the Safe Drinking Water Act, or the Removal Management Level (RML). RMLs are used to support the decision for EPA to undertake a

[2] As of December 2023, the Town of Blades will be responsible for conducting routine public water supply sampling.

removal action under CERCLA. Based on the RML and MCL exceedances, EPA conducted a removal action at 12 residences whose owners granted access. EPA issued a removal action memorandum in March 2022 to address the hexavalent chromium, cobalt, and lead that was found to exceed action levels in well water of nine households. An addendum to EPA's removal action memorandum was issued in August 2022 to add additional residences where lead exceeded the MCL and cobalt exceeded the RML (two additional households) after resampling had occurred, and additionally to address PFOS after EPA's RMLs were updated to be more stringent[3] (two additional households). At these locations, there were residential wells where more than one contaminant was found to be above its respective RML or MCL at a given location. The removal action was conducted to address exceedances for multiple contaminants when present.

At these 12 residences, either Point-of-Entry Treatment Systems (POETS) / Point-of-Use Treatment Systems (POUTS) were installed based on space availability and access to plumbing. POETS were installed in residences where there was enough space to accommodate the system (e.g., garage, basement, or closet) and the system could be connected to the well plumbing that would route to the entire household. POUTS were installed at locations where POETS were not feasible. EPA installed POUTS in bathroom and kitchen sinks, where a resident is most likely to ingest water. A total of 2 POETS were installed at 2 residences, and a total of 21 POUTS were installed at 10 residences.

In 2021, Delaware passed House Bill 8, which required DNREC and DPH to work cooperatively to issue MCLs for PFOA and PFOS. In anticipation, DPH issued an Implementation Plan proposing MCLs for PFOA at 21 ppt, 14 ppt for PFOS and 17 ppt for the sum of both PFOS and PFOA. [4] DNREC currently provides filters as a preventive measure to residences (where the resident allows such assistance) where domestic well concentrations are equal to or greater than 4 ppt PFOA or PFOS.

Due to the contamination found in domestic well water, EPA created OU2 for an interim action to provide a consistent source of treated or alternative water to residences whose well water is impacted or likely to become impacted. EPA is continuing the Site-wide RI under OU1 to define the nature and extent of contamination (and to identify any other potential source areas) and will subsequently propose and select a final remedial action to address Site-wide contamination. The area subject to this interim action is outside of the Town of Blades, to the south and southwest, bounded by Morgan Branch and the Nanticoke River.

In August of 2022, EPA finalized the RI Report, including the Human Health Risk Assessment (HHRA), for OU2 to summarize the residential sampling effort and to calculate unacceptable risk posed by contaminant levels from the results. Additional information on the HHRA can be

[3] The RML for hexavalent chromium is 3.5 parts per billion (ppb); the RML for cobalt is 18 ppb; the MCL for lead is 15 ppb; the RML for PFOS is 120 ppt.

[4] This link provides the Delaware Division of Public Health's PFOA and PFOS MCL Implementation Plan that DNREC uses as a proactive measure to provide water filters to residences. https://www.dhss.delaware.gov/dhss/dph/hsp/files/MCLimplementationPlanPFAS.pdf.

found under the Summary of Site Risks section of this ROD and Appendix C of the August 2022 RI Report for Operable Unit 2. Because the HHRA indicated that contaminants in well water posed an unacceptable risk to some residents, EPA identified and evaluated various remedial alternatives to address this risk in a February 2023 Feasibility Study (FS). The remedial alternatives presented in the FS were evaluated by EPA and a Preferred Alternative was proposed for public comment in the Proposed Remedial Action Plan (Proposed Plan) in June 2023.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

Pursuant to Section 113(k)(2)(B) of CERCLA, 42 U.S.C. § 113(k)(2)(B), the RI and FS reports, the Proposed Plan, and other documents relating to OU2 were released to the public for comment on June 29, 2023. These documents were made available to the public online at https://semspub.epa.gov/src/collection/03/AR67374, in the EPA Administrative Records Room at EPA's Region 3 office in Philadelphia, and in the Seaford District Library in Seaford, Delaware. The notice of availability of these documents was published in the *Seaford Star* and a fact sheet detailing the Proposed Plan was mailed to local citizens on June 29, 2023.

A public comment period was held from June 29, 2023, until July 28, 2023. EPA held a public meeting on July 20, 2023, at the Blades Fire Company, located at 200 E. 5th Street, Blades, Delaware 19973. During the public meeting, EPA gave a formal presentation on EPA's Proposed Plan, followed by a "Question and Answer" session where representatives from EPA answered questions regarding the Site and the Proposed Plan. All significant comments related to OU2 are provided in the Responsiveness Summary. No written comments were received on the Proposed Plan. All comments provided in the Responsiveness Summary are from the July 20, 2023, public meeting. A transcript of the public meeting is available in the Administrative Record.

IV. SCOPE OF THE SELECTED REMEDY

During the RI, contaminants commonly related to plating operations including metals (cobalt, lead, and hexavalent chromium) and PFAS have been detected in residential drinking water downgradient of the Site. A removal action was conducted in an expedited manner by EPA to address the immediate risk posed by the contamination. The OU2 interim remedial action set forth in this ROD provides a permanent remedy to prevent the exposure to current and future residents to groundwater containing unacceptable levels of Site-related COCs.

This OU2 interim remedial action will be consistent with the final remedial action for the restoration of groundwater to beneficial use at the Site (OU1). The final remedial action will be the subject of a future proposed plan and ROD following completion of the OU1 RI/FS, which addresses all contaminated media at the Site.

V. SITE CHARACTERISTICS

A. Physical Setting

The Town of Blades is located along the southern bank of the Nanticoke River, a tributary of the Chesapeake Bay, and north of Morgan Branch, which flows west to converge with the Nanticoke River, as seen on Figure 1. The Site is located in the Coastal Plain Physiographic Province, which consists of a seaward-dipping wedge of unconsolidated and semi-consolidated sediments.

B. Geology

Overburden Composition

In general, the Site is underlain by the Nanticoke River Group deposits, which consist of the Turtle Branch and Kent Isle formations and are related to rise and high stand of sea level; the formation can consist of beach, tidal flat, open estuary, marsh, swamp, and fluvial deposits. These deposits underlie terraces that flank the margins of the present Nanticoke River and its tributaries.

Hydrogeology

The surficial aquifer (Columbia aquifer) extends over a large part of the Delmarva Peninsula. The aquifer consists of unconsolidated sand and gravel and includes the Nanticoke River Group deposits where present. The aquifer contains water predominantly in the unconfined conditions of the sand and gravel beds, but clay beds can create locally semi-confined conditions. Within the vicinity of Blades, the fine-grained beds of the Manokin Formation are at the base of the Columbia aquifer. Therefore, the aquifer acts as both an unconfined and semi-confined aquifer with a saturated thickness ranging from 30 to 100 feet.

The deep aquifer (Choptank aquifer) consists of multiple fining-upward sequences of fine to coarse sand and shelly and gravelly sand, that grade into sandy clayey shelly silt and is isolated from the contaminant plume by sub-surface confining units, notably the St. Mary's formation.

Groundwater is encountered at shallow depths, between 9 and 12 feet below ground surface (bgs). Groundwater flow across the Site has both horizontal and vertical flow components. Groundwater in the Columbia aquifer exists under the water table (unconfined) conditions. Based on groundwater elevations collected during the 2018 SI, it was inferred that groundwater flow at the Procino facility was generally north to south, towards Morgan Branch. However, a complete description of the horizontal and vertical groundwater flow characteristics and the

influence of pumping on groundwater and surface water will continue to be defined as part of the OU1 RI.

C. Nature and Extent of Contamination

Past investigations and assessments have identified the presence of organic, inorganic, and PFAS-containing materials that were stored and used at the former Peninsula and Procino Plating facilities. Therefore, these properties are probable source areas for metals and PFAS found in environmental media. These contaminants have been identified in drinking water samples from residential wells close to the Site and downgradient from these facilities. During the continued OU1 RI, other potential source areas will be investigated, and the nature and extent of contamination will be more fully defined.

The most significant pathway for contaminant migration is from uncontrolled releases at historical and current source areas that infiltrate the soil column and migrate downward into groundwater. Once in the groundwater, contaminants migrate via horizontal and vertical pathways through the saturated zone of the Columbia aquifer. The operation of municipal and domestic wells may draw contaminants to well intakes. Surface water bodies (Nanticoke River and Morgan Branch) also likely influence the local flow of groundwater in and around the Site.

To date, public, domestic, and monitoring well samples confirm the presence of PFAS in groundwater. Furthermore, elevated concentrations of metals, including cobalt, hexavalent chromium, and lead were detected in domestic wells.

D. National Historical Preservation Act

EPA has initiated National Historic Preservation Act (NHPA) consultation with stakeholders including Delaware State Historic Preservation Office (DESHPO), DNREC, Delaware Nation, and Delaware Tribe of Indians. These consultation efforts led to the consummation of *"Programmatic Agreement Among the Environmental Protection Agency, and the Delaware State Historic Preservation Office Regarding Implementation of Interim Remedial Action for Blades Groundwater Superfund Site, Operable Unit 2 Blades, Sussex County, Delaware"*. This document was made effective on November 6, 2023. This document sets forth procedures to determine if historical properties are present and, if historical properties are present, procedures for avoidance or minimization of adverse impacts on historic properties that will be implemented as part of the interim remedial action for the Site and can be found in the Administrative Record.

VI. CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

The current and reasonably anticipated future land use in the Town of Blades and surrounding areas is residential land use, however light commercial and industrial facilities exist in and

around the Town of Blades. Groundwater is the sole drinking water source for both public and domestic potable water in the Town and the surrounding area. It is expected future land and groundwater uses will remain the same. The land use controls associated with the Selected Remedy (see selected ICs) will be consistent with current and any future land and groundwater use.

VII. SUMMARY OF SITE RISKS

During the OU2 RI, an HHRA was conducted to determine the current and potential future effects of contaminated drinking water on human health in the absence of any cleanup actions at the Site. A baseline risk assessment (before any cleanup) provides the basis for taking a remedial action and indicates the exposure pathway(s) that need to be addressed by the remedial action. This section summarizes the results of the HHRA at the Site.

For more detailed human health information, please refer to the August 2022 Blades Groundwater HHRA available in the Administrative Record for the Site. Human health risk summary tables from the HHRA are included as Appendix C to this ROD.

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund human health risk assessment estimates the baseline risk. The baseline risk is an estimate of the likelihood of health problems occurring if no cleanup action were taken at a site. To estimate the baseline risk at a Superfund site, EPA undertakes a four-step process:

Step 1: Analyze Contamination
Step 2: Estimate Exposure
Step 3: Assess Potential Health Dangers
Step 4: Characterize Site Risk

In Step 1, EPA looks at the concentrations of contaminants found at a site as well as past scientific studies on the effects these contaminants have had on people (or animals, when human studies are unavailable). Comparisons between site-specific concentrations and concentrations reported in past studies help EPA to determine which contaminants are most likely to pose the greatest threat to human health.

In Step 2, EPA considers the different ways that people might be exposed to the contaminants identified in Step 1, the concentrations that people might be exposed to, and the potential frequency and duration of exposure. Using this information, EPA calculates a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur.

In Step 3, EPA uses the information from Step 2 combined with information on the toxicity of each chemical to assess potential risks. EPA considers two types of risk: cancer and non-cancer risk. The likelihood of any kind of cancer resulting from a Superfund site is generally expressed as an upper bound probability; for example, a "1 in 10,000 chance." In other words, for every 10,000 people that

could be exposed, one extra instance of cancer may occur as a result of exposure to site contaminants. An extra cancer case means that one more person could get cancer than would normally be expected to from all other causes. For non-cancer health effects, EPA calculates a "hazard index." The key concept here is that a "threshold level" (measured as a HI of equal to or less than 1) exists below which non-cancer health effects are no longer predicted.

In Step 4, EPA determines whether site risks are great enough to cause health problems for people at or near the Superfund site. The results of the three previous steps are combined, evaluated, and summarized. EPA adds up the potential risks from the individual contaminants and exposure pathways and calculates a total site risk. Generally, cancer risks between 10^{-4} and 10^{-6}, and a non-cancer HI of 1 or less are considered acceptable for EPA Superfund sites.

A. Human Health Risk Assessment Summary

The HHRA was conducted for 13 residential locations where groundwater concentrations exceeded EPA and/or DNREC action levels to characterize and quantify the current and potential future human health risks that would occur if no remedial action were taken to address contaminated drinking water at the Site. The HHRA identifies the potential exposure pathways in which people may be exposed to Site contaminants, the toxicity of the contaminants present, and the potential for carcinogenic and non-carcinogenic effects to occur from exposure to the contaminants.

Identification of Contaminants of Concern

The selection of contaminants of potential concern (COPCs) is a risk-based screening step to identify chemicals that should be included in the quantitative risk assessment. The selection of COPCs was based on information regarding chemical substances found at the Site including chemical-specific concentrations, occurrence, distribution, and toxicity. COPCs include only those chemicals with positive detections and are limited to those chemicals that exceed the selection criterion. Screening levels based on residential exposure assumptions were used for this HHRA as a health-protective screening tool to be protective of all potential current and future Site uses. The COCs identified in the HHRA include cobalt, hexavalent chromium, lead, PFOA, and PFOS.

Risk assessments are conducted using an exposure point concentration (EPC) for each COPC. The EPC represents an estimated concentration to which a receptor is assumed to be continuously exposed while in contact with an environmental medium. Consistent with EPA's *Supplemental Guidance to RAGS: Calculating the Concentration Term*, a conservative estimate of the mean concentration is used as the EPC. The EPC is generally defined as the 95 percent upper confidence limit (UCL) on the mean and is calculated using EPA's ProUCL 5.1 software.

EPCs used in the risk assessment are presented in Appendix C.

Exposure Assessment

The exposure assessment portion of the risk assessment defines and evaluates the type and magnitude of human exposure to the chemicals present at or migrating from a site. Based on current and potential future land use at the site, residents (child/adult) were identified as potential receptors. Groundwater within the study area is used as a drinking water source and several surveys have been conducted to identify residential wells within the study area that may be impacted by the groundwater contaminant plume.

Exposure to lead was assessed using the following models:

- The latest version of EPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model for lead (version 2). This model is typically used to evaluate lead exposure assuming a residential land use scenario.
- EPA's Adult Lead Methodology (2003b and 2017). This methodology is typically used to evaluate lead exposure assuming a non-residential land use scenario.

The IEUBK Model for lead is designed to estimate blood levels of lead in children (under 7 years of age) based on either default or site-specific input values for air, drinking water, diet, dust, and soil exposure. Studies indicate that infants and young children are extremely susceptible to adverse effects from exposure to lead. Considerable behavioral and developmental impairments have been noted in children with elevated blood-lead levels. Historically blood-lead levels greater than 10 micrograms per deciliter (µg/dL) were considered to be a "concern." Current scientific literature on lead toxicity indicates that adverse health effects are associated with blood-lead (PbB) levels below the long-held target of 10 µg/dL. Specifically, evidence exists of clear cognitive declines in young children with PbB levels between 2 and 8 µg/dL (as referenced in the December 2016 EPA Office of Land and Emergency Management [OLEM] Memo). Therefore, a value of 5 µg/dL was used as the acceptable blood lead level in this HHRA.

The exposure factors used to estimate intake for residents (child/adult) are presented and defined in Appendix C.

Toxicity Assessment

The toxicity assessment for the COPCs examines information concerning the potential human health effects of exposure to COPCs. The goal of the toxicity assessment is to provide, for each COPC, a quantitative estimate of the relationship between the magnitude and type of exposure and the severity or probability of human health effects.

The toxicity values applied in the HHRA can be found in Appendix C.

Risk Characterization

EPA has set a target risk range of 10^{-4} to 10^{-6} for a lifetime excess carcinogenic risk. An excess lifetime cancer risk means the acceptable risk to an individual of developing cancer from exposure over a lifetime to carcinogens at a site is between 10,000 to 1 (10^{-4}) and 1,000,000 to 1 (10^{-6}). For non-carcinogenic contaminants, EPA sets a target Hazard Index (HI) of no greater than 1. The hazard quotient (HQ) measures the risk posed by each exposure pathway (i.e., inhalation, ingestion, and dermal contact) for a single non-carcinogenic contaminant at a site, while the HI is the sum of all of the HQ values for the respective receptor (e.g., child or adult resident).

The COCs identified in the HHRA include cobalt, hexavalent chromium, lead, PFOA, and PFOS.

Of the 13 select locations, the HHRA determined that there is unacceptable risk, exceedance of regulatory thresholds (carcinogenic risk 1E-4, non-carcinogenic HI of 1), from drinking water to child and adult receptors, as summarized in Table 1 below.

Table 1: Risk Findings

Risk Findings	Number of Locations	Highest Threshold Exceedances
No unacceptable risk	None	--
Cobalt in drinking water – unacceptable risk to child and adult receptors	9 locations	Non-carcinogenic HI of 5
Lead in drinking water – unacceptable risk to child receptor	3 locations	Greater than 5% of children exposed exceed a blood lead level of 5 µg/dL
PFOA and PFOS in drinking water – unacceptable risk to child and adult receptors	4 locations child and adult 3 locations child only	Non-carcinogenic HI of 6
Hexavalent Chromium in drinking water – risk to the lifetime receptor	1 location	Carcinogenic risk of 2E-04

A summary of the carcinogenic and non-carcinogenic risks are presented in Appendix C.

Risk from Lead

Residential exposures to lead in soil and groundwater were evaluated using EPA's Integrated Exposure Uptake Biokinetic (IEUBK) lead model. The results of the IEUBK model indicate that risks for current child residents exposed to lead in surface soil do not exceed the EPA goal of no more than 5% of children exceeding a 5 microgram per deciliter (µg/dL) blood-lead level. However, the IEUBK model also indicates that risks to future child residents exposed to lead in both groundwater and surface/subsurface soil exceed the EPA goal; lead in groundwater was responsible for the exceedance of the benchmark for residential exposures to lead.

B. Summary of Ecological Risk Assessment

A Screening Level Ecological Risk Assessment (SLERA) was not conducted as part of the OU2 RI activities because OU2 specifically addresses the contamination found in residential drinking water. Ecological risk will be assessed for the Site in a future RI and ROD for OU1.

C. Summary of Site Risks

In summary, the HHRA for the Site demonstrates the presence of unacceptable risk to human health, and that remedial actions are necessary to reduce the risks to within or below EPA's acceptable risk range. EPA has identified the COCs that pose the greatest potential unacceptable risk to human health and the environment at the Site. Therefore, EPA has determined that the Selected Remedy for this Interim ROD is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

VIII. REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) are specific goals developed to address the Site COCs and exposure pathways to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered (TBC) guidance, and Site-specific risk-based levels.

The RAO established for this interim remedial action is to:

- Prevent current and future residential exposure to groundwater containing unacceptable levels of Site-related COCs.

EPA guidance states that "an interim action is limited in scope and only addresses areas/media that also will be addressed by a final site/operable unit ROD. Reasons for taking an interim action could include to:

- Take quick action to protect human health and the environment from an imminent threat in the short term, while a final remedial solution is being developed; or

- Institute temporary measures to stabilize the Site or operable unit and/or prevent further migration of contaminants or further environmental degradation."[5]

This RAO is designed to support a final remedial action which will comply with CERCLA requirements to clean up contaminants in groundwater and restore the groundwater to beneficial use. Therefore, the RAO reflects the limited scope of an interim action. By preventing human exposure to contaminated groundwater, the interim action will reduce Site risks by ensuring the public is not exposed or potentially exposed to contaminants in groundwater prior to the restoration of groundwater.

IX. SUMMARY OF REMEDIAL ACTION ALTERNATIVES

The Superfund law (CERCLA) requires that any remedy selected to address contamination at a site must be protective of human health and the environment, cost-effective, in compliance with promulgated standards or requirements that are determined to be ARARs, and consistent with the NCP. The five Remedial Alternatives, as shown in Table 2, were evaluated to meet the RAO for this interim remedial action.

Table 2: Remedial Alternatives Evaluated

Alternative	Description
1	No Action
2	Bottled Water
3	Point-of-entry Treatment Systems (POETS) / Point-of-use Treatment Systems (POUTS)
4	Install Deeper Drinking Water Wells
5	Connection to Public Water Line and Institutional Controls (ICs)

Alternative 1: No Action

Consideration of this alternative is required by the NCP at 40 C.F.R. § 300.430(e)(6). Under Alternative 1, no additional remedial action would be taken at the Site. The "no action" alternative serves as a basis against which each of the other proposed remedial alternatives can be compared. Under this alternative, the Site would remain in its present condition. Current and future residents would remain exposed to Site-related contaminants in residential drinking water wells. Under this alternative, the existing POETS and POUTS that have been provided by EPA's removal program would no longer be maintained by EPA or DNREC and would be properly removed.

Alternative 2: Bottled Water

Under this alternative, bottled water would be delivered to all impacted or potentially impacted residences on a reoccurring basis and EPA would fund the delivery costs. This alternative would

[5] A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents" (Office of Solid Waste and Emergency Response) (July 1999), at p. 8-2.

be in effect until a future groundwater remediation project achieves cleanup goals and supplied water is no longer necessary. Typically, a duration of up to 30 years is assumed for groundwater remedies for the purposes of cost calculation.

Under this alternative, an initial bottle supply system/dispenser would be put in place in each residence with large volume (e.g., 5-gallon) bottles. Reoccurring deliveries would provide water as needed for each impacted or potentially impacted residence. Existing private wells would remain in place for non-ingestion uses (e.g., bathing and irrigation) and monitored to evaluate any changes in groundwater conditions.

Under this alternative, the existing POETS and POUTS that are provided by the EPA removal program would be maintained by EPA until implementation of the alternative, at which point, EPA would no longer maintain the systems.

Alternative 3: Point-of-entry Treatment Systems (POETS) / Point-of-use Treatment Systems (POUTS)

Under this alternative, POETS/ POUTS would be installed at all impacted or potentially impacted residences, and EPA would fund the cost of installation of the system. POETS are installed to filter and treat all water entering the household. POUTS treat only the water intended for direct consumption (drinking and cooking) and are typically installed at a single tap or limited number of taps. This alternative would be in effect until a future groundwater remediation project achieves cleanup goals and the treatment systems are no longer necessary. Typically, a duration of up to 30 years is assumed for groundwater remedies for the purposes of cost calculation.

Each residence would be evaluated for which type of treatment system would be most appropriate, with the preferred option being POET which treats all water entering the home. POETS/POUTS have already been installed at some residences, but they may not include all processes necessary to remove all COCs. Residences where systems do not meet the requirements to remove all COCs, to achieve the RAO, would require system upgrades. Currently installed systems depended on the amount of space available (wall space/closet space/garage/basement for POET, or POUT installed on bathroom and kitchen faucets when space does not allow for POET). Filter/media replacement (various timing depending on the filter/media) are required for both types of systems.

Monitoring of treated water would be performed to evaluate remedy protectiveness/success and is assumed to be performed annually for 30 years; however, the frequency and duration of monitoring could differ if this alternative were selected as the interim remedy.

Alternative 4: Install Deeper Water Wells

Under this alternative, new wells targeting groundwater below the contaminant plume would be installed by EPA at each impacted or potentially impacted residence. The wells would be

approximately 250 to 300 feet deep and screened in the Choptank aquifer, which is isolated from the contaminant plume by the sub-surface confining geologic unit in the St. Mary's formation.

Prior to installing individual private wells in the deeper aquifer, a pump test and sampling would be performed to confirm that the aquifer could produce the necessary amount of water and it is unimpacted by contaminants from the Site.

Each residence would have a new well installed and the existing wells would be abandoned. If needed for residences near wetland resource areas, erosion control measures (i.e., silt fences) would be installed prior to well installation. Evaluation of the best placement (both location and depth) would be determined during pre-design and design efforts.

Monitoring of well water would be performed to evaluate remedy protectiveness and is assumed to be performed annually for 30 years; however, the frequency and duration of monitoring could differ if this alternative were selected as the interim remedy.

Under this alternative, the existing POETS and POUTS that are provided by the EPA removal program would be maintained by EPA until implementation of the alternative, at which point, EPA would no longer maintain the systems.

Alternative 5: Connection to Public Water Line and ICs

This alternative involves extending a public water line into the impacted area and connecting impacted or potentially impacted residences to the public water line distribution system. Under Alternative 5, upgrades or expansions to the public water system maintained by the Town of Blades would be determined during the design phase in consultation with the state and the town.

Capital costs would be funded by EPA, with monthly water use being paid by residents. This alternative requires the agreement of affected residents to connect to the Blades' public water system. Residents who elect to be connected would have their existing drinking wells completely disconnected from the house water system and either abandoned by EPA or converted to non-potable use if the intended use does not pose unacceptable risk. Residents who elect not to be connected would continue to use their private drinking wells and all associated costs to make a future connection the public water supply would be at the homeowner's expense.

Under this alternative, the existing POETS and POUTS that have been provided by the EPA removal program would be maintained by EPA until implementation of the alternative, at which time EPA would no longer maintain the systems.

This alternative would eliminate exposure to contaminated groundwater by providing an alternate water supply and implementing institutional controls (ICs) such as local ordinances

and/or groundwater management zones to prevent the installation of new potable wells and proper abandonment/capping of existing wells.

X. COMPARATIVE ANALYSIS OF ALTERNATIVES

A. Criteria Used to Compare Cleanup Alternatives

The remedial alternatives have been evaluated against the nine decision criteria set forth in the NCP, 40 C.F.R. § 300.430(e)(9)(iii) and listed in Table 3 below. These nine criteria are organized into three categories: threshold criteria, primary balancing criteria, and modifying criteria. Threshold criteria must be satisfied in order for an alternative to be eligible for selection. Primary balancing criteria are used to weigh major trade-offs among alternatives. Modifying criteria are formally taken into account after public comment has been received on the Proposed Plan.

In the remedial decision-making process, EPA describes the relative performance of each alternative against the evaluation criteria and notes how each alternative compares to the other alternatives under consideration. A detailed analysis of alternatives can be found in the FS, which is in the Administrative Record file for the Site.

Table 3: Evaluation Criteria for Superfund Remedial Alternatives

Threshold Criteria	**1. Overall Protection of Human Health and the Environment** determines whether an alternative can adequately protect human health and the environment by eliminating, reducing, or controlling exposures to hazardous substances, pollutants or contaminants to levels that do not pose an unacceptable risk.
	2. Compliance with ARARs evaluates whether an alternative meets Federal and more stringent State environmental laws or facility siting laws, or whether a waiver is justified.
Primary Balancing Criteria	**3. Long-term Effectiveness and Permanence** considers the ability of an alternative to maintain protection of human health and the environment over time.
	4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
	5. Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
	6. Implementability considers the technical and administrative feasibility of implementing an alternative, including factors such as the relative availability of goods and services.
	7. Cost includes the estimated capital and annual operation and maintenance costs, as well as present worth cost of an alternative. Present worth cost is the total cost of an alternative over time in today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

Modifying Criteria	**8. State/ Support Agency Acceptance** considers whether the State agrees with EPA's analyses and recommendations, as described in the Feasibility Study and Proposed Plan.
	9. Community Acceptance considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

B. Detailed Analysis of Proposed Remedial Alternatives

1. Overall Protection of Human Health and the Environment

Alternative 1 (No Action) does not provide adequate protection of human health and the environment because it does not eliminate or control the current and future risks from exposure to contaminated groundwater. The No Action alternative will not be discussed further in the nine criteria analysis because it does not satisfy the threshold criterion of providing overall protection to human health.

Alternative 2 (Bottled Drinking Water) is effective in reducing risks related to ingestion of contaminated groundwater. As contaminated groundwater would still enter residences, the reliability of the alternative depends on residents being diligent in drinking only the bottled water. Assuming the resident complies with use of bottled water, this alternative would be protective to human health because exposure via ingestion of contaminated groundwater would be eliminated.

Alternative 3 (POETS/POUTS) is effective in reducing risks related to ingestion of contaminated groundwater. While exposure pathways related to contaminated groundwater may still exist in a residence, depending on the type of system (POET vs. POUT), proper usage and maintenance would reduce ingestion risks. Similar to Alternative 2, assuming that the resident complies with use of POETS/POUTS, this alternative is considered protective of human health.

Alternative 4 (Installing Deeper Drinking Water Wells**)** involves replacing existing residential wells with wells screened in a deeper aquifer not hydraulically connected to the impacted Columbia aquifer. Assuming the deeper aquifer is free from contaminants, this alternative is considered protective of human health.

Alternative 5 (Connection to Public Water Line and ICs) would protect human health by eliminating the need to use contaminated groundwater from private drinking water wells in the impacted areas. Alternative 5 would provide a permanent, treated and monitored water supply to the residences through connection to a public water system. Additionally, ICs would prevent the installation of new potable wells until groundwater is restored to its designated beneficial use.

2. Compliance with ARARs

Section 121(d) of CERCLA, 42 U.S.C. § 9621(d), and the NCP at 40 C.F.R. § 300.430(f)(1)(ii)(B), require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law, which are collectively referred to as "ARARs," unless such ARARs are waived under Section 121(d)(4) of CERCLA, 42 U.S.C. § 9621(d)(4), and the NCP at 40 C.F.R. § 300.430(f)(1)(ii)(C).

"Applicable" requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility-siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. Only those State standards that are identified by a State in a timely manner and that are more stringent than Federal requirements may be applicable.

"Relevant and appropriate" requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility-siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. Only those State standards that are identified by a State in a timely manner and that are more stringent than Federal requirements may be relevant and appropriate.

EPA also considers to-be-considered materials (TBCs), along with ARARs. TBCs are non-promulgated criteria, advisories, or guidance, issued by Federal or State government that are not legally binding and do not have the status of potential ARARs. However, TBCs may be considered during development of remedial alternatives. EPA may use TBCs in determining the necessary level of cleanup for protection of human health or the environment when ARARs do not exist for particular contaminants.

ARARs for remedial action alternatives can be classified into one of the following three functional groups:

- **Chemical-Specific:** Health-risk-based numerical values or methodologies that establish concentration or discharge limits for particular contaminants. Often, these ARARs are used to determine the extent of site remediation. In general, chemical-specific requirements are set for a single chemical or a closely related group of chemicals. Examples include MCLs, promulgated under the Safe Drinking Water Act (SDWA). Potential Federal and more stringent State chemical-specific ARARs and TBCs for the Preferred Alternative are identified in Appendix B.

- **Location-Specific:** Requirements that restrict remedial actions based on the characteristics of the Site or its immediate environment. Examples of these areas regulated under various Federal laws include floodplains, and wetlands. Federal and more stringent State location-specific ARARs and TBCs identified for the Preferred Alternative are presented in Appendix B.

- **Action-Specific:** Requirements that set controls or restrictions on the design, implementation, and performance levels (including discharge limits) of activities related to the management of hazardous substances, pollutants, or contaminants. These action-specific requirements do not in themselves determine the remedial alternative; rather, they indicate how a selected alternative must be achieved. Federal and more stringent State action-specific ARARs and TBCs for the Preferred Alternative are identified in Appendix B.

The major ARARs for this interim action include:

- National Primary Drinking Water Standards: 40 C.F.R. §§ 141.50, 141.61 and 141.62 establish health-based standards (i.e., Maximum Contaminant Level Goals (MCLGs) and MCLs) for public drinking water.
- Delaware Regulations Governing the Construction and Use of Wells: 7 Del. Admin. C. § 7301 contains requirements governing the location, design, installation, use, modification, repair, and sealing of all wells and associated equipment as well as requirements for public and private potable wells.

All alternatives analyzed in this remedial decision-making process would meet their respective ARARs for Federal and State laws. Achievement of chemical-specific ARARs in groundwater within the aquifer will be addressed in a future decision document that addresses the restoration of groundwater.

3. Long-Term Effectiveness and Permanence

Alternative 2 (Bottled Water) does not permanently eliminate the exposure pathway to contaminated groundwater. There will be some residual risk since contaminated groundwater would still enter residences. The reliability of this alternative depends on residents being diligent in using bottled water for ingestion purposes. Alternative 2 would require extensive coordination and scheduling for routine water deliveries/drop-offs for each residence.

Similar to Alternative 2, the long-term effectiveness of Alternative 3 (POETS/POUTS) depends on the residents being diligent in using treated water for ingestion purposes and the installed POETS/POUTS functioning properly. During previous removal actions at the Site, the POETS had difficulty functioning as intended. This was the result of by-pass valves unintentionally being turned on, or treatment solutions not properly reducing contaminants to acceptable levels. Therefore, Alternative 3 requires continuous maintenance and oversight to ensure the technical components of POETS/POUTS are functioning properly at each residence.

Alternative 4 (Installing Deeper Drinking Water Wells) would be more reliable than Alternatives 2 and 3 at eliminating the risk to residents exposed to contaminated groundwater by eliminating the reliance on the resident's diligence and filter monitoring and maintenance. However, long-term effectiveness could be impacted by the potential of contaminating the deeper aquifer by drilling a large number of well points through the confining layers of the shallow aquifer. Long-term monitoring would also be needed to ensure that Site-related contaminants don't migrate to the deeper aquifer over time. Additionally, Alternative 4 is reliant on the deeper aquifer's ability to produce the necessary amount of water for all residences.

Alternative 5 (Connection to Public Water Line and ICs) would be the most effective long-term remedy because it would permanently eliminate the exposure pathway and provide residents with a treated and monitored water supply through the connection to a public water system. The Town of Blade's current water system is being effectively treated and sampled on a reoccurring basis which demonstrates long-term effectiveness. Additionally, ICs would prevent the installation of new potable wells until groundwater is restored to its designated beneficial use. Alternatives 2, 3, and 4 are individual systems at a large number of residences that would require more rigorous monitoring, maintenance, oversight, and coordination than a single public water system. A single public water system poses the least amount of residual risk.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

None of the alternatives evaluated reduce toxicity, mobility, or volume through treatment processes.

Groundwater restoration will be addressed in a future OU1 proposed plan and decision document.

5. Short-Term Effectiveness

Alternative 2 (Bottled Drinking Water) has no short-term risks to the workers providing bottled water but does have minor short-term risks for the community related to delivery trucks on local roads and with handling of the bottled water. The RAO would be achieved once bottled water is supplied to each residence (approximately 1 month following design approval). Alternative 3 (POETS/POUTS) has minor short-term risks to workers, specifically, if workers were to come into contact with contaminated groundwater during system installation. This risk would be mitigated through use of personal protective equipment (PPE). The RAO would be achieved upon installation of the treatment systems (approximately 6 months following design approval).

Alternative 4 (Installing Deeper Drinking Water Wells) would have short-term risks for the community related to well drillers and contractors driving in the neighborhoods. Similar to Alternative 3, drillers and contractors would mitigate minor short-term risks related to

contaminated groundwater contact through use of PPE and would conduct work in accordance with Occupational Safety and Health Administration (OSHA) requirements and implementation of safe work practices. The RAO would be achieved upon installation of the new private wells (approximately 6 months following design approval). Alternative 5 (Connection to Public Water Line and ICs) would have a moderate but temporary disturbance on the local community during water line (and any needed facilities) installation/construction. Construction workers would conduct work in accordance with OSHA requirements and implementations of safe work practices. The RAO would be achieved upon connection to the alternate water supply (approximately 1 year following design approval).

Alternatives 2, 3, and 4 have similar short-term impacts on workers and community members. Alternative 5 poses more risk to workers than the other alternatives; however, construction necessary to connect residences to public water would be conducted in accordance with well-established worker protection procedures.

6. Implementability

Alternatives 2 (Bottled Drinking Water) and 3 (POETS/POUTS) are easily implementable. The resources required for implementation are readily available. However, the reliability of Alternative 2 is based on the residences not using untreated groundwater as a drinking water source. Alternative 3 also requires continuous maintenance and oversight to ensure the POETS/POUTS are functioning correctly. There may be times when individual POETS/POUTS are not functioning properly, which could lead to limited short-term exposure, and would require diligent maintenance and oversight. Therefore, in terms of technology operation and reliability, Alternative 3 may not be considered reliable.

Alternative 4 (Installing Deeper Drinking Water Wells) is more difficult to implement than Alternatives 2 and 3, as it involves installing deep wells at a large number of residences, under the assumption that the aquifer can adequately provide water to each residence. Test wells would be needed to confirm the water supply is adequate, and free from contaminants. The resources required for implementation of this alternative are readily available. Coordination with local property owners, as well as local and state agencies would be required to locate and develop a new water supply beneath all impacted residences.

Alternative 5 (Connection to Public Water Line and ICs) includes the most significant amount of construction for installing water lines and potential new facilities but includes commonly used technologies and engineering services. The resources required for implementation of this alternative are readily available. Coordination with local property owners, railroad owners, and local and state agencies would be required to install new water supply lines/connections to all affected residences. Coordination with local property owners, as well as local and state agencies would be required to determine implementation steps that may include temporary roadway closures and detours.

Alternative 5 would require more initial construction activities than the other alternatives, however, the other alternatives would require more frequent maintenance and monitoring at a large number of residences for as long as is required to remediate the groundwater (presumed to be 30 years for cost estimation) or indefinitely.

7. Cost

Cost information for alternatives 2,3,4, and 5 over a presumed 30-year period is presented below. These preliminary cost estimates are anticipated to be within -30 percent to +50 percent of the actual costs of implementing each alternative. Alternative 2 (Bottled Water) is the least expensive. Alternatives 3 (POET/POUT) and 5 (Water Line) are similar in cost. Alternative 4 (Deep Wells) has the largest capital cost. See Appendix D for the detailed cost estimate for Alternative 5 and the Administrative Record for Alternatives 2, 3, and 4.

Table 4: Cost Estimate of Alternatives

Alternative	Description	Capital	O&M	Total
2	Bottled Water	$49,000	$4,094,000	$4,143,000
3	POETS/POUTS	$448,000	$5,753,000	$6,201,000
4	Install Deeper Wells	$7,108,000	$2,465,000	$9,573,000
5	Connection to Public Water Line and ICs	$5,611,000	$127,000	$5,738,000

8. State Acceptance

EPA and DNREC have consulted closely during preparation of the Proposed Plan and this ROD for interim action. DNREC concurred with the Selected Remedy in a letter dated January 12, 2024 (Appendix E).

9. Community Acceptance

EPA received a limited number of comments and questions concerning the Preferred Alternative in the Proposed Plan (Alternative 5). A majority of the comments received from the local community expressed support for EPA's Preferred Alternative. No written comments were received on the Proposed Plan. All comments provided in the Responsiveness Summary section are from the July 20, 2023, public meeting. A transcript of the public meeting is available in the Administrative Record.

XI. SELECTED REMEDY

The Selected Remedy for OU2 is Alternative 5, Connection to Public Water Line and Institutional Controls. The Selected Remedy will extend a public water line to properties whose private wells are currently impacted with Site-related contaminants and to those properties that have the potential to become impacted. The Selected Remedy requires the agreement of residents to

connect to the public water system. Residents who elect to be connected will have their existing drinking wells completely disconnected from the house water system and either abandoned by EPA or converted to non-potable use if the intended use does not pose unacceptable risk at EPA's expense. Once connected, residents would be responsible for the recurring water bill. Residents who elect not to be connected would continue to use their private drinking wells and all associated costs to make a future connection to the public water supply would be at the homeowner's expense.

The area subject to this Selected Remedy are the residences located south and southwest, outside of the town limits of Blades, bounded by Morgan Branch and the Nanticoke River as depicted in Figure 2. This area encompasses the wells that have been impacted and based on EPA's best professional judgement may be impacted in the future.

Existing POETS/POUTS will be maintained until connection to the public water line is completed, at which time EPA would no longer maintain the systems. Additionally, institutional controls such as local ordinances and/or groundwater management zones will be put in place to prevent the installation of new potable wells until the aquifer is restored to beneficial use under OU1.

EPA expects that a water line connection will likely be made in the River Road area (Figure 4). Construction of the new water line will likely need to pass underneath the railroad tracks to extend to the impacted residences. Erosion and dust control measures will be implemented during the work. Water mains will be installed, and service connections/supply lines will be installed at each residence. Repair of roadway pavement and driveways/lawns (as needed) will be performed.

If additional production is needed for the system to maintain the necessary capacity, EPA expects a new water supply well will be installed with a pump similar to the existing production wells (providing a yield of 150 gallons per minute [gpm]) and screened in the lower Choptank aquifer (approximately 300 feet bgs), which is not anticipated to be hydraulically connected to the impacted Columbia aquifer. The groundwater from the Choptank aquifer will be sampled to confirm sufficient yield and absence of contamination. If additional treatment is necessary, EPA expects that a new treatment facility will be constructed with similar treatment processes as the Town of Blades' current facility or the current facility will be upgraded. The size will be appropriate for treating the flow from the new production well (150 gpm). If additional storage is necessary, a storage tank will be constructed to manage the volume of expanded capacity.

A. Summary of the Rationale for the Selected Remedy

The Selected Remedy (Alternative 5) is most protective of human health because extension of the public water supply will permanently eliminate the potential use of contaminated groundwater as a drinking water source. Additionally, the Selected Remedy will provide drinking water that is required to comply with all drinking water standards. The POETS/POUTS provided under Alternative 3 can fail and result in short-term exposure until maintenance is

performed, making the Selected Remedy more effective in the long-term. The Selected Remedy is also readily implementable with relatively limited short-term impacts and is more cost-effective compared to Alternative's 3 and 4.

Based on the information available at this time, EPA has concluded that the Selected Remedy (Alternative 5: Public Water Line and ICs) meets the threshold criteria and provides the best balance of trade-offs when compared to the other alternatives for OU2 with respect to the balancing criteria. EPA expects the Selected Remedy to satisfy the following statutory requirements of CERCLA Section 121(b), 42 U.S.C. § 9621(b): 1) to be protective of human health and the environment; 2) to comply with ARARs (or justify a waiver); 3) to be cost-effective; and 4) to utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. With respect to the fifth statutory requirement, *i.e.*, to satisfy the preference for treatment as a principal element (or justify not meeting the preference), the Selected Remedy does not satisfy the preference for treatment as a principal element. However, it does permanently eliminate or reduce the exposure pathway to contaminated groundwater via residential wells. The final remedial action for the Site, which will be proposed in a future proposed plan and decision document for OU1 and subject to public participation requirements, will address the remaining contaminated media at the Site.

B. Summary of the Estimated Costs

The cost of the Selected Remedy (Alternative 5) is estimated to be $5,738,000, which is less than the estimated cost of $6,201,000 for Alternative 3 and $9,573,000 for Alternative 4. Detailed cost information for the Selected Remedy can be found in Appendix D.

C. Performance Standards

Performance standards do not apply to the off-Site treatment, under applicable law, of public water to be supplied by the Town of Blades to residents via the newly installed water line. Treatment of the public water will be conducted off-Site by the provider in compliance with all drinking water standards.

D. Expected Outcome of the Selected Remedy

The Selected Remedy is expected to meet the RAO for this ROD for interim action:

- Prevent current and future residential exposure to groundwater containing unacceptable levels of Site-related COCs.

XII. STATUTORY DETERMINATIONS

The OU2 Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the interim remedial action, is cost-effective, and utilizes permanent solutions to the maximum

extent practicable.

Because the Selected Remedy will result in hazardous substances remaining onsite above levels that allow for unlimited use and unrestricted exposure, a review will be conducted within five years after commencement of the interim remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. Such reviews will be conducted a minimum of every five years thereafter, until EPA determines that hazardous substances remaining at the Site do not prevent unlimited use and unrestricted exposure at the Site.

A. Compliance with Applicable or Relevant and Appropriate Requirements

An interim remedial action must comply with (or waive) those Federal and State requirements that are applicable or relevant and appropriate to the limited-scope action. Therefore, the focus is only on those ARARs specific to this interim remedial action. While the final remedial action for OU1 will address the remaining Site-related contamination in all media, this interim remedial action for OU2 will implement limited action to prevent human exposure to contaminated groundwater in residential wells. The final remedial action for OU1, after any necessary public participation requirements are met, will address the remaining unacceptable risks presented by the Site.

A complete list of ARARs and TBCs for the Selected Remedy for OU2 is provided in Appendix B. The major ARARs identified therein include, but are not limited to:

- National Primary Drinking Water Standards: 40 C.F.R. §§ 141.50, 141.61 and 141.62 establish health-based standards (i.e., Maximum Contaminant Level Goals (MCLGs) and MCLs) for public drinking water.

- Delaware Regulations Governing the Construction and Use of Wells: 7 Del. Admin. C. §7301 contains requirements governing the location, design, installation, use, modification, repair, and sealing of all wells and associated equipment as well as requirements for public and private potable wells.

B. Cost-Effectiveness

The NCP, at 40 C.F.R. § 300.430(f)(l)(ii)(D), requires EPA to evaluate cost-effectiveness by evaluating all the alternatives meeting the threshold criteria (protection of human health and the environment and compliance with ARARs) against long-term effectiveness and permanence, reduction of toxicity, mobility or volume through treatment, and short-term effectiveness to determine overall effectiveness. Then overall effectiveness is compared to cost to determine cost-effectiveness. As presented in Section X (Comparative Analysis of Alternatives), above, the Selected Remedy provides the most long-term effectiveness and permanence, followed by Alternative 4, and significantly trailed by Alternative 3 and then 2. All four alternatives are evaluated equally for purposes of reduction of toxicity, mobility and volume through treatment

since none of the alternatives would treat COCs. Each of the alternatives would pose a manageable amount of impact on effectiveness in the short term. Thus, the Selected Remedy is strongest in overall effectiveness. Further, Alternative 5, the Selected Remedy, is less costly than Alternatives 4 and 3, the next most cost effective alternatives.

The Selected Remedy is cost-effective in providing overall protection of human health and the environment by limiting the risk posed by Site COCs and meets all other requirements of CERCLA and the NCP at a cost that is proportional to or less than the other alternatives that were evaluated. Further, the Selected Remedy is readily implementable and provides a high degree of both short- and long-term effectiveness. The estimated present value of the Selected Remedy is approximately $5,738,000.

C. Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable and Preference for Treatment as a Principal Element

The Selected Remedy is an interim remedial action to protect people from exposure to contamination in drinking water from groundwater. The Selected Remedy is not intended to treat contamination or provide a permanent solution to contamination in groundwater. A future proposed plan and decision document will address remaining contamination present in all media at the Site for OU1.

D. Five Year Review Requirements

CERCLA Section 121(c), 42 U.S.C. § 9621(c), and Section 300.430(f)(4)(ii) of the NCP, 40 C.F.R. § 300.430(f)(4)(ii), require review of a remedy if the remedy results in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure. Any such review must be conducted no less often than every five years after initiation of the interim remedial action.

Because hazardous substances will remain at the Site, the review required by Section 121(c) of CERCLA and Section 300.430(f)(4)(ii) of the NCP will be conducted no less often than every five years after initiation of the interim remedial action.

E. Documentation of Significant Changes

The Proposed Plan was released for public comment on June 29, 2023. EPA has reviewed all comments submitted during the public comment period and determined that no significant changes were necessary or appropriate to be made to the Selected Remedy, as originally identified as the Preferred Alternative in the Proposed Plan.

3. RESPONSIVENESS SUMMARY

This Responsiveness Summary summarizes the significant comments and concerns received during the public comment period for the Proposed Plan for the Site and provides EPA's responses to those comments. After reviewing and considering all public comments received during the public comment period, EPA's Selected Remedy for OU2 is ***Alternative 5—Connection to Public Water Line and ICs***.

The Proposed Plan and supporting documents were made available to the public in the Administrative Record File, which was compiled to support selection of this Interim Remedial Action. EPA provided notice to the public that the Administrative Record File could be viewed online at https://semspub.epa.gov/src/collection/03/AR67374, or at the following locations:

Seaford District Library
600 N. Market Street
Seaford, DE 19973
Mon-Fri 10:00 am to 6:00 pm
(302) 629-2524

EPA Administrative Records Room
Administrative Records Coordinator
Four Penn Center
1600 John F. Kennedy Boulevard
Philadelphia, PA 19103
Phone: (215) 814-2469
Hours: Monday - Friday 8:30 am to 4:00 pm
By appointment only

The notice of availability of these documents was published in the *Seaford Star* and a fact sheet detailing the Proposed Plan was mailed to local citizens on June 29, 2023.

A public comment period was held from June 29, 2023, until July 28, 2023. EPA held a public meeting on July 20, 2023, at the Blades Fire Company, located at 200 E. 5th Street, Blades, Delaware 19973. During the public meeting, EPA gave a formal presentation on EPA's Proposed Plan, followed by a "Question and Answer" session where representatives from EPA answered questions regarding the Site and the Proposed Plan. No written comments were received on the Proposed Plan.

July 20, 2023 Public Meeting

All comments provided in this Responsiveness Summary are from the July 20, 2023 public meeting. At this meeting, numerous question and comments were posed. Several of these questions and comments did not pertain to OU2 and the specific cleanup alternatives from the Proposed Plan and, thus, are not provided in this Responsiveness Summary. Below is a summary of the public comments and EPA's responses during the public meeting. Repeated questions and comments received during the public meeting are only listed once and similar questions and comments are grouped together.

For full questions and corresponding answers provided at the public meeting, please see the transcript of the public meeting, which is included in the Administrative Record.

Comments Related to OU2 and the Specific Cleanup Alternatives from the Proposed Plan

Comment #1: A commentor asked if the distribution of public water would be metered.

EPA Response: EPA responded, yes, the water would be metered. Once connected, residents would be responsible for the recurring water bill.

Comment #2: A commentor asked if the existing POET/POUT systems can stay in the house if they want to keep it (post water line installation).

EPA Response: EPA responded that residents could keep the existing POET/POUT system(s). However, EPA would no longer maintain the systems and the cost/maintenance would be the responsibility of the resident.

Comment #3: A commentor mentioned they live in an area that would be at the end of the proposed water line. They asked what happens to all the material and chemicals that flush down the water line and expressed concerns about being at the end of the line and receiving the residual material.

EPA Response: The design of the water line would be fully determined during the design phase, but it is common for water lines to be configured as loop systems rather than capping at the end of a road. The loop system would be considered on this project.

Comment #4: A commentor asked what the charge would be for the wastewater. The commentor elaborated they would get charged for how much water they use, plus the sewage going back. The commentor asked if that is included or if it would be separate.

EPA Response: EPA responded that the Preferred Alternative only involves providing public water connections and does not include sewage/wastewater.

Comment #5: A commentor expressed their concern with the amount of water volume the water line is going to take and whether the aquifer will be sustained. They asked will the aquifer be able to handle this.

EPA Response: This information would be considered and determined during the design phase. This includes activities such as aquifer testing to understand if and how additional home connections would influence the aquifer.

Comment #6: A commentor asked, “what’s the water pressure to the line?”

EPA Response: EPA did not know the exact water pressure at the time of this question but ensured those present that the water line would meet all minimum water pressure requirements and considerations for pounds per square inch (PSI) would be evaluated

during the design phase for all piping structures.

Comment #7: A commentor asked if they could keep their well for irrigation because it would be too costly to irrigate their land using public water.

> **EPA Response**: EPA encouraged residents to allow EPA to abandon their well because of unknown potential future risks from contamination, but EPA responded that as of now, yes, residents can keep their private well for non-potable use if risks related to the intended use allow for it.

Comment #8: A commentor asked if Blades has any plans to incorporate/annex the residents outside of the town limits into the town. The commentor expressed opposition to this.

> **EPA Response**: EPA responded that the current plan is to annex the residents into the water authority but not into the Town of Blades.

Comment #9: A commentor asked if someone wants to build a new house or new building on vacant parcels, will they be able to connect to the water line.

> **EPA Response**: EPA responded certainly they can connect to the water line. If the new construction occurs after the implementation of the water line, the property owner would be responsible to cover the cost to connect.

Comment #10: A commentor asked if EPA has a time frame for all of this to happen.

> **EPA Response**: EPA responded that following this public meeting the next step is to develop the Record of Decision which may take approximately six months from now to complete. The second phase is to design the remedy. Typically, designs take anywhere from two to three years, but this period could vary with unforeseen circumstances. Following the design approval, it is estimated the remedial action would be implemented in one year.

Comment #11: A commentor asked, “what’s the cost for the monthly water bill?”

> **EPA Response**: EPA responded that according to the Blades municipality website, there is a minimum $35.00/month charge that will cover the first 3,000 gallons. Any additional usage is charged at $6.15/1,000 gallons.

Comment #12: A commentor in support of EPA’s previous response to Comment #9 stated that when they moved to town, they took advantage of connecting to the Blade’s public water line (formerly on private well water). They stated that the house includes two and a half baths and, with comfortable water usage, their water bill is in fact $35. They stated that the contractors the Town of Blades hired to connect the house to the water line were very cordial and mindful of the residents and their property. The experience was fantastic, and it exceeded their

expectations. The commentor said that, before connecting to public water, they had concerns similar to those expressed by others in the meeting about water bills but the commenter was pleasantly surprised with the process.

> **EPA Response**: EPA thanked the commentor for their support and for offering their real-life experience from a similar project.

Comment #13: A commentor asked if something was going to be done for the 73 families that are affected over the two- or three-year period waiting for the water line to be installed.

> **EPA Response**: EPA stated that the 73 homes includes homes that are currently impacted, and homes that have the potential to be impacted over time, should contamination migrate. Based upon the residential sampling efforts, the homes that had elevated concentrations of contamination in their well water were addressed by EPA through a Removal Action where treatment systems were installed at the residences.

Comment #14: A commentor asked if EPA felt comfortable to install a well to some depth that was not contaminated. They asked if 300 feet was deep enough.

> **EPA Response**: EPA stated that the nature and extent of contamination is still being assessed under Operable Unit 1. It is the agency's current understanding that the contamination is primarily in the shallow aquifer, however, there may be areas where groundwater migrates deeper.
>
> To that point, one of the alternatives that was evaluated (Alternative 4) was targeting new deep wells 250-300 feet below ground surface into the Choptank Aquifer. This aquifer/depth is desirable because the St. Mary's confining unit overlays the Choptank Aquifer which would act as a barrier in the event contamination migrates vertically to that depth. EPA also explained that the downside of drilling a large number of wells through the confining layer is that it may create pathways for contamination to migrate vertically into the Choptank Aquifer.

Comment #15: A commentor asked what the life expectancy of the carbon filters is that are currently being used by the Town of Blades. The commentor elaborated there was a quote in the News Journal at the time the carbon filters were installed on the public water that said the filters would eventually be spent. The commentor asked who would absorb the cost of replacing these filters.

> **EPA Response**: EPA indicated the Town of Blades, as the water authority, would be responsible for replacement of the treatment system carbon filters. EPA indicated there has been ongoing monitoring to evaluate over time to determine how the carbon is functioning and if there is any evidence of contaminant breakthrough (exceeding or close to exceeding drinking water standards). While EPA cannot predict the exact life expectancy of the carbon filters, EPA did mention that the public water has been

sampled 12 times on a quarterly basis and has not shown signs of breakthrough.

After further consideration of the question and post-meeting discussions with DNREC, EPA would like to clarify and expand the response. The length of time that carbon will remain effective is not based on a fixed length of time but is based on the variable conditions such as the amount of water flowing through the treatment system, contaminant concentrations and other water chemistry conditions. The best way to determine when to replace the carbon is based on the effluent concentration (determined from testing a water sample collected after the water has passed through the carbon treatment system). The groundwater analytical result concentrations collected from the effluent are analyzed over time. The water provider uses the data to determine when the concentrations will become close to exceeding the drinking water standard or when the contaminant levels could be expected to exceed the drinking water standard; at that time, the carbon will be replaced. Since the effluent concentrations are still very low, EPA is not able to estimate when to expect breakthrough and thus is not able to determine when the carbon will need to be replaced.

Comment #16: A commentor asked if EPA will continue to monitor the treated water after the water line is in.

EPA Response: EPA stated that the water provider is responsible for the ongoing treatment and sampling of provided water. After the commentor expressed concerns regarding whether the water provider will faithfully ensure the quality of the public water, EPA indicated there are annual water quality reports and publicly available information to provide the community with results and provide confirmation to the community that the treatment is functioning properly.

Comment #17: A commentor asked, "If EPA came in and found the PFAS contamination, how come Blades didn't find this years ago?"

EPA Response: EPA cannot comment on behalf of the Town of Blades, however, PFAS is a relatively recently discovered contaminant in groundwater. Until 2018, EPA and DNREC were not aware that PFAS could be in drinking water or that sampling for PFAS was necessary. As PFAS became better understood, including the industrial uses of the compound, it prompted EPA and DNREC to begin investigating.

Comment #18: A commentor asked if any wells have been tested on the other side of Morgan Branch.

EPA Response: EPA stated the current understanding is OU2 is hydraulically bounded by the Nanticoke River and Morgan Branch. As the OU1 remedial investigation continues, if evidence is discovered suggesting the contamination is migrating beyond the water body boundaries, EPA will respond accordingly.

Comment #19: A commentor asked, “If the water should all of a sudden clear up in the next four or five years, can I go back using my private well?”

EPA Response: EPA stated that the Selected Remedy will be implemented until groundwater is restored to its beneficial use. When the groundwater no longer poses an unacceptable risk to human health and the environment, the commenter can go back to using their private well for drinking water. However, EPA noted restoration of groundwater to beneficial use can take decades.

FIGURES

Figure 1: Site Location Map

Figure 2: Site Layout

Figure 3: 2021-2022 Residential Well Sampling

Figure 4: Selected Remedy – Water Main Extension

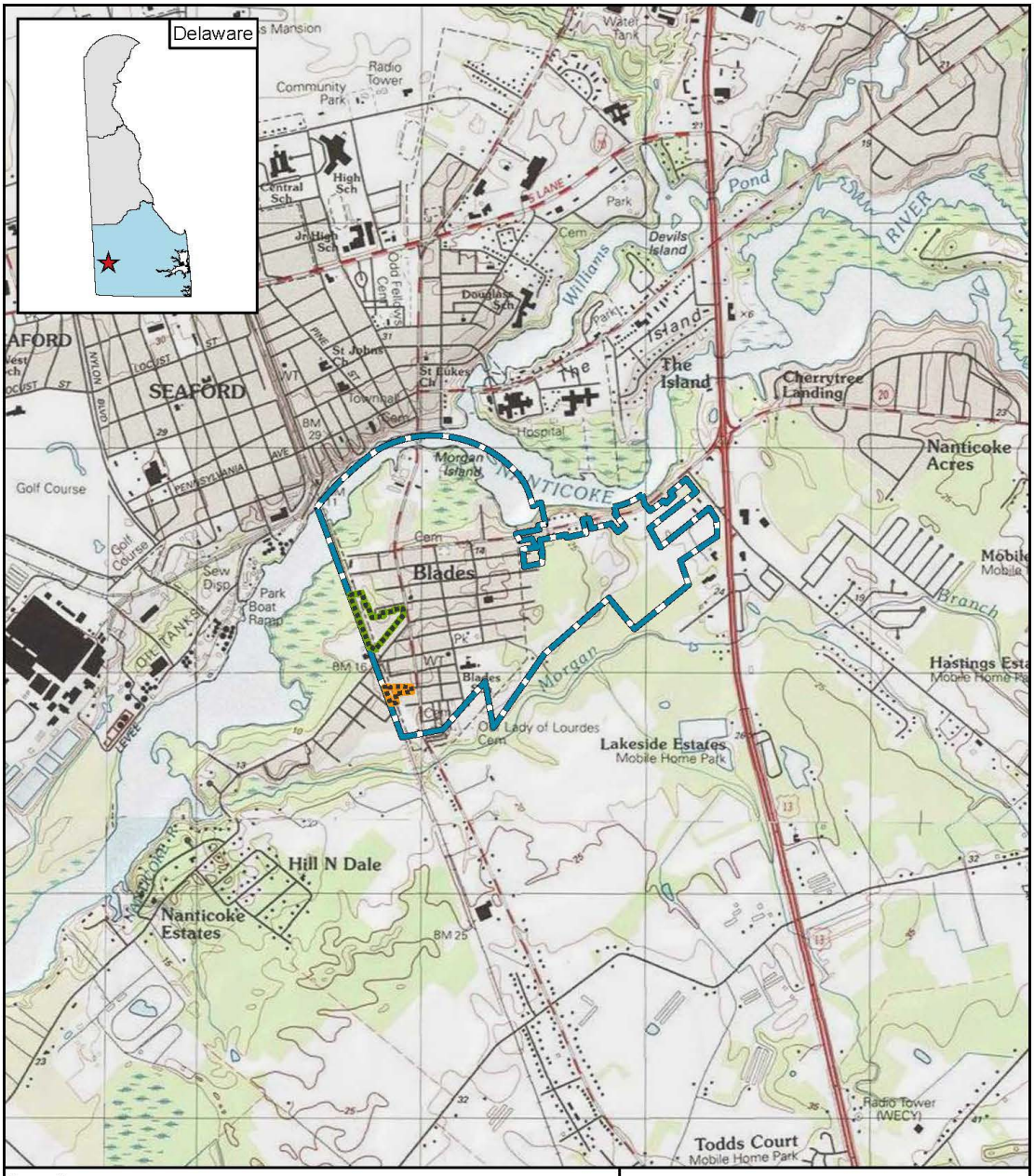

Figure 1
Site Location Map

Client: EPA	Project: FS at Blades Groundwater, DE	
GIS: SK	Base Map: Copyright© 2013 National Geographic Society, i-cubed	
CHK: SM	Revised: 7/27/2022	AECOM
PM: LS	Scale: 1:24,000	12420 Milestone Center Drive Germantown, MD 20876

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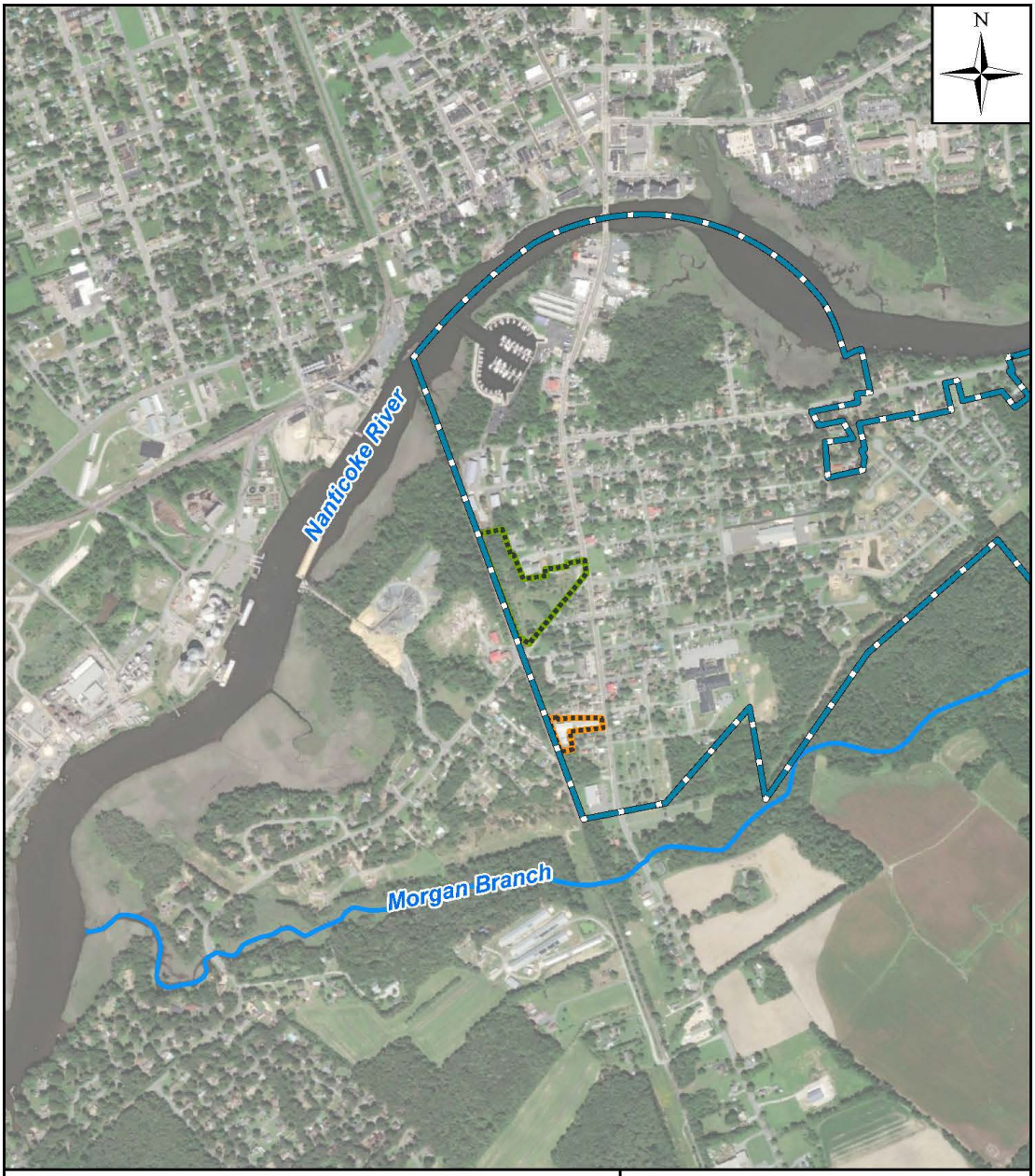
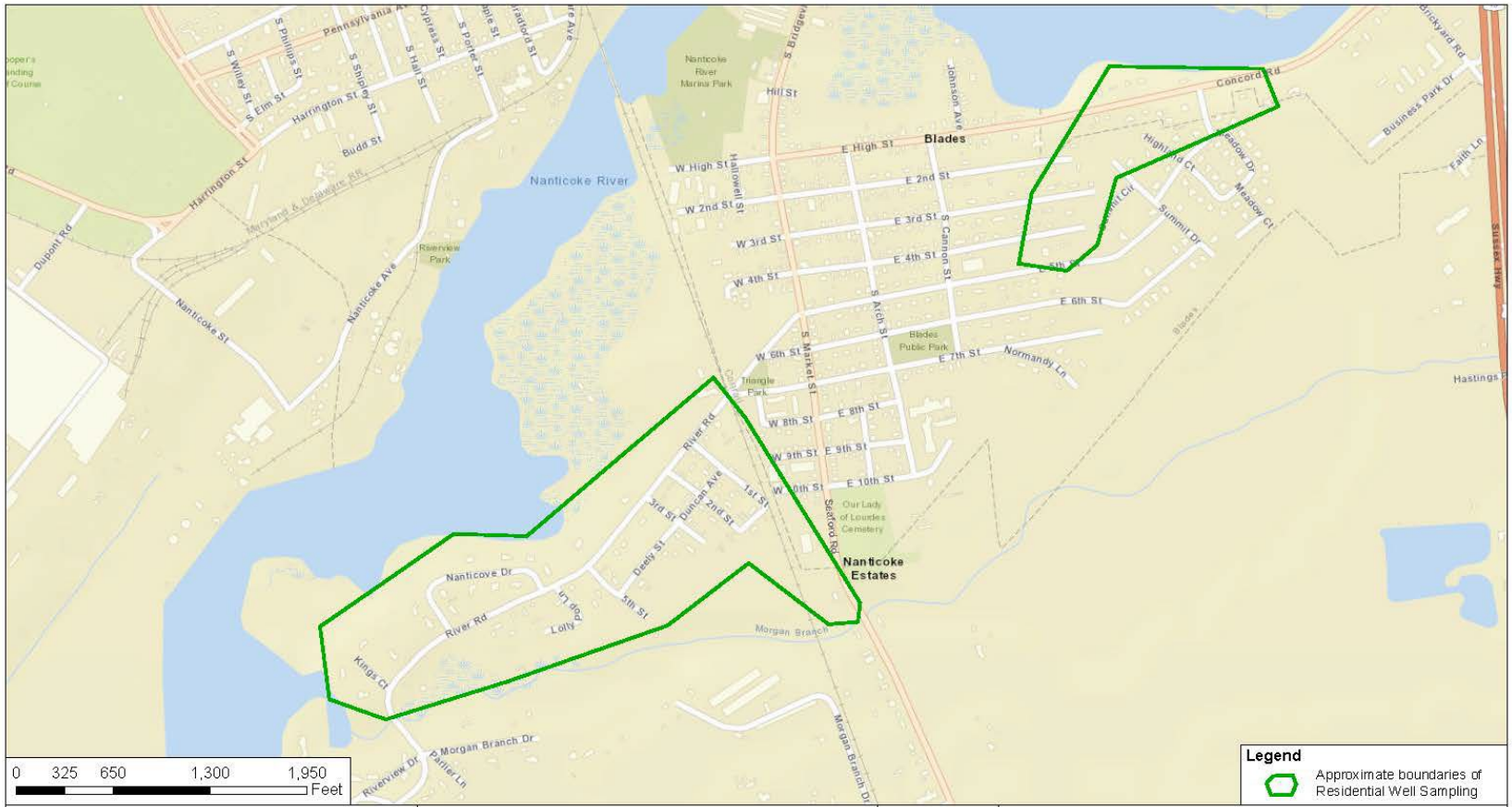

N
Nanticoke River
Morgan Branch
Legend
Town of Blades Boundary
Procino Plating
Former Blades Commercial Complex
Former Peninsula Plating Facility
Stream/River
0 500 1,000 2,000 Feet
1 inch = 1,000 feet
Figure 2
Site Layout
Client: EPA
Project: FS at Blades Groundwater, DE
GIS: MS
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
CHK: GC
Revised: 4/28/2023
PM: LS
Scale: 1:12,000
AECOM
12420 Milestone Center Drive
Germantown, MD 20876
\\na.aecomnet.com\lfs\AMER\Germantown-USGRM2\DCS\Projects\ENV\GEARS\GEO\Blades_RI\MXDs\OU2_FS\Fig_2_Site_layout_PWS.mxd



CLIENT	US Environmental Protection Agency Region 3			
PROJECT	Blades Groundwater Superfund Site			
REVISED	3/14/2023	ORIGBY	GC	3/14/2023
SCALE	1:7,800	CHKBY	RP	3/14/2023
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	LS	3/14/2023

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 3
2021 to 2022 Residential Well Sampling

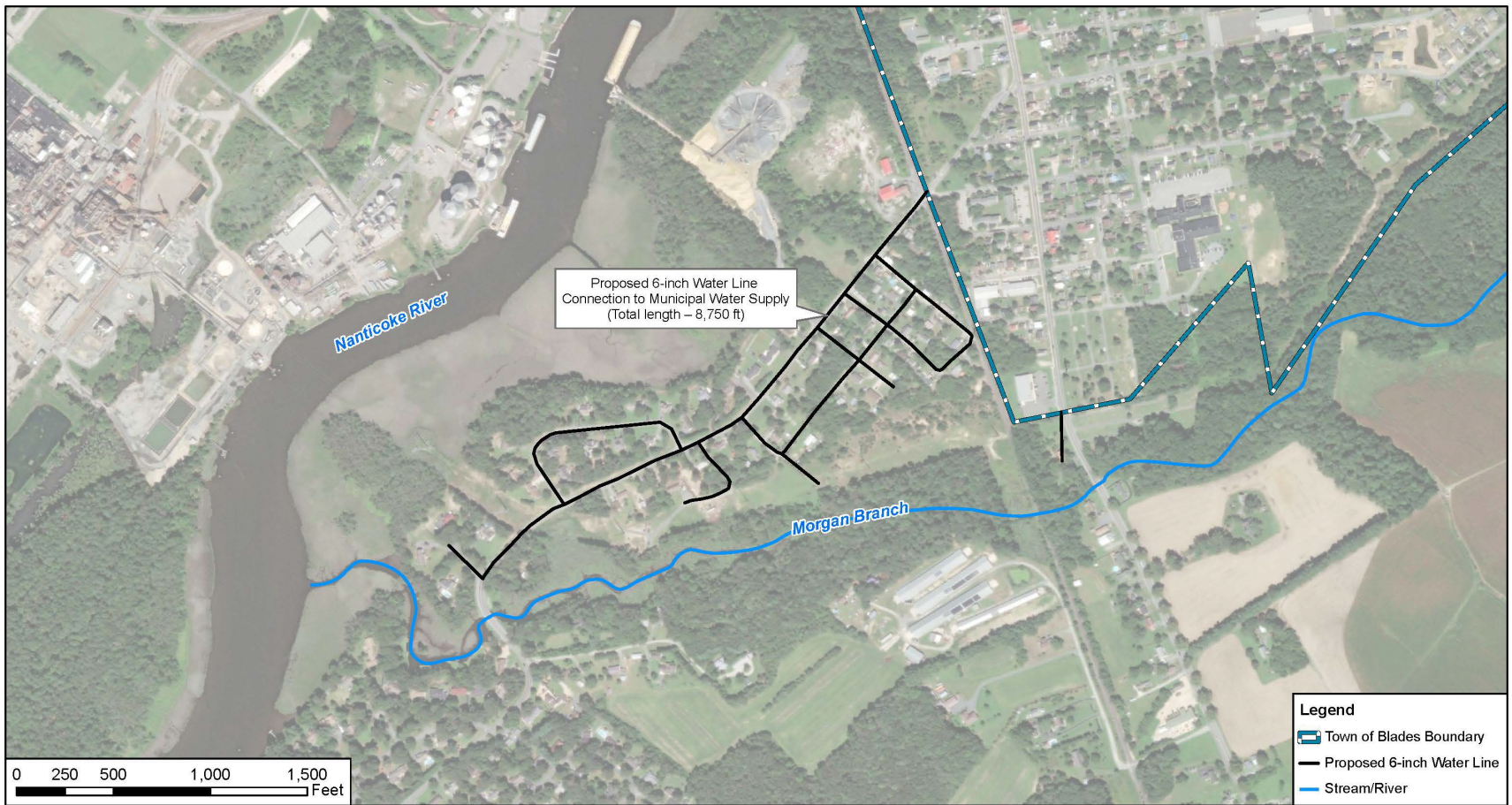


Figure 4
Selected Remedy - Water Main Extension

APPENDIX A

ADMINISTRATIVE RECORD INDEX

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION III

1600 John F. Kennedy Blvd.

Philadelphia, Pennsylvania 19103

BLADES GROUNDWATER

OU 2 REMEDIAL ACTION ADMINISTRATIVE RECORD FILE

INDEX OF DOCUMENTS

AVAILABLE 6/29/2023, UPDATED //2024

https://semspub.epa.gov/src/collection/03/AR67374

Introduction

The "Administrative Record" is the collection of documents which form the basis for the U. S. Environmental Protection Agency's (EPA) selection of a response action at a Superfund site. Superfund is the name given to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) which can be found in Title 42 of the U.S. Code (U.S.C.) at Sections 9601 through 9675. Response actions under Superfund can be either "removal actions" or "remedial actions." As the EPA decides what to do at the site of a release of hazardous substances, the EPA compiles documents concerning the site and EPA's decision into an "Administrative Record File." Documents may be added to the Administrative Record File from time to time. Once the EPA Regional Administrator or the Regional Administrator's delegate signs the decision document memorializing the selection of an action, the documents which form the basis for the selection of an action are known as the "Administrative Record." An Administrative Record file is required by CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA).

The Administrative Record will be available for public review during normal business hours in an electronic computer imaged format at the selected repository and by appointment only at the Environmental Protection Agency (EPA), Region 3 office which is located at the address given on the cover page. The Administrative Record is treated as a non-circulating reference document. Individuals may review documents contained in the Administrative Record, according to the procedures at the local repository and at the EPA Region 3 office. The Administrative Record will be maintained at the repository until further notice. EPA may send additional documents to the repository as work progresses at the Site. The EPA may hold formal public comment periods at certain stages of the response process. The public is urged to use the formal public comment periods to submit written comments to the EPA regarding the actions at the Site.

Except as explained below, this index and the record were compiled in accordance with the EPA's Revised Guidance on Compiling Administrative Records for CERCLA Response Actions, EPA/OSRE/OEM/OSRTI (September 20, 2010), and/or in accordance with Superfund Removal Procedures Public Participation Guidance for On-Scene Coordinators: Community Relations and the Administrative Record, OSWER 9360.3-05 (July 1992), and/or the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. Consistent with 40 CFR Sections 300.805 (a) (2), and 300.810 (a) (2), Region 3 has listed, in the Administrative Record Index (or in bibliographies of documents listed in the Index), guidance documents which may form a basis for the selection of this response action (EPA Guidance Documents, Non-Site Specific). Unless the guidance documents indexed were generated specifically for the Site, the guidance documents may not be present in the Administrative Record. However, it should be noted that the EPA does maintain an extensive collection of Superfund response action guidance documents available in electronic format on the EPA website at: https://www.epa.gov/superfund/superfund-policy-guidance-and-laws.

Additionally, the EPA guidance related to Superfund cleanup enforcement may be found on the website at the following address:
http://cfpub.epa.gov/compliance/resources/policies/cleanup/superfund.
This page is titled, “Superfund Cleanup Policies and Guidance.”

The Administrative Record is listed in chronological order with the earliest dated document at the top and followed by documents which may be “Undated.”

Documents in the Administrative Record File have been redacted due to the presence of confidential business information, personal identifiable information, and/or other privileged materials. The redactions are evident from the face of the document and the word “Redacted” appears in the title on the index.

DOC ID	DOC DATE	TITLE	PAGE COUNT	ADDRESSEE NAME	AUTHOR NAME
2342514	02/16/2021	REDACTED FINAL FIELD SAMPLING PLAN	110	ROVIRA,EDUARDO (EPA)	SOLLENBERGER,CHRIS (TETRA TECH INC.)
2342512	04/01/2021	REDACTED FINAL COMPREHENSIVE QUALITY ASSURANCE PROJECT PLAN (QAPP) - REVISION 1	134	(EPA)	(AECOM)
2342510	04/08/2021	REDACTED DRAFT TRIP REPORT - BACKGROUND MONITORING WELL INSTALLATION (COVER LETTER ATTACHED)	30	TAYLOR,DANIEL (EPA)	SOLLENBERGER,CHRIS (TETRA TECH INC.)
2342509	11/01/2021	REDACTED AMENDMENT TO COMPREHENSIVE QUALITY ASSURANCE PROJECT PLAN (QAPP) - REVISION 2	15	(EPA)	(AECOM)
2339302	12/06/2021	REDACTED TRIP REPORT - 6/2021 PUBLIC WATER SUPPLY SAMPLING EVENT	30	TAYLOR,DANIEL (EPA)	(AECOM)
2336396	12/21/2021	REDACTED FINAL TRIP REPORT - 4/2021 SECOND QUARTERLY GROUNDWATER SAMPLING EVENT (COVER LETTER ATTACHED)	155	(EPA)	(TETRA TECH)
2336398	12/21/2021	REDACTED FINAL TRIP REPORT - 7/2021 SECOND QUARTERLY GROUNDWATER SAMPLING EVENT (COVER LETTER ATTACHED)	163	(EPA)	(TETRA TECH)
2336399	03/01/2022	REDACTED TRIP REPORT - 11/2021 THIRD QUARTERLY BACKGROUND WELL SAMPLING EVENT	17	TAYLOR,DANIEL (EPA)	(AECOM)
2334965	03/22/2022	ACTION MEMORANDUM: REQUEST FOR FUNDS FOR REMOVAL ACTION & CONSISTENCY EXEMPTION FROM 12-MONTH LIMIT	10	LEONARD,PAUL (EPA)	LEONARD,PAUL (EPA)|ROVIRA,EDUARDO (EPA)|TOWLE,MICHAEL,T (EPA)
2345902	04/04/2022	REDACTED TRIP REPORT - 9/2021 & 10/2021 RESIDENTIAL WELL SAMPLING EVENT	102	TAYLOR,DANIEL (EPA)	(AECOM)
2339303	04/27/2022	REDACTED TRIP REPORT - 1/2022 PUBLIC WATER SUPPLY SAMPLING EVENT	12	TAYLOR,DANIEL (EPA)	(AECOM)
2339304	04/27/2022	REDACTED TRIP REPORT - 10/2021 PUBLIC WATER SUPPLY SAMPLING EVENT	14	TAYLOR,DANIEL (EPA)	(AECOM)
2336397	04/27/2022	REDACTED TRIP REPORT - 1/2022 FOURTH QUARTERLY BACKGROUND WELL SAMPLING EVENT	45	TAYLOR,DANIEL (EPA)	(AECOM)
2342513	06/01/2022	REDACTED FINAL REMEDIAL INVESTIGATION WORK PLAN	406	(EPA)	(AECOM)
2342508	06/01/2022	REDACTED FINAL COMPREHENSIVE QUALITY ASSURANCE PROJECT PLAN (QAPP)	241	(EPA)	(AECOM)
2338485	06/27/2022	OU 2 SCREENING OF ALTERNATIVES	8	TAYLOR,DANIEL (EPA)	(AECOM)
2342511	08/01/2022	REDACTED OU 2 FINAL REMEDIAL INVESTIGATION REPORT	456	TAYLOR,DANIEL (EPA)	(AECOM)
2338587	08/08/2022	TRIP REPORT - 5/2022 EXISTING MONITORING WELL INVENTORY & STREAM GAUGE INSTALLATION EVENT	8	TAYLOR,DANIEL (EPA)	(AECOM)

DOC ID	DOC DATE	TITLE	PAGE COUNT	ADDRESSEE NAME	AUTHOR NAME
2334964	08/11/2022	ACTION MEMORANDUM: REQUEST FOR ADDITIONAL FUNDS FOR REMOVAL ACTION & CHANGE OF SCOPE	9	LEONARD,PAUL (EPA)	LEONARD,PAUL (EPA)|ROVIRA,EDUARDO (EPA)|TOWLE,MICHAEL,T (EPA)
2339300	08/26/2022	REDACTED TRIP REPORT - 4/2022 PUBLIC WATER SUPPLY SAMPLING EVENT	31	TAYLOR,DANIEL (EPA)	(AECOM)
2339306	09/13/2022	REDACTED FINAL TRIP REPORT - 4/2022 & 5/2022 RESIDENTIAL WELL RESAMPLING EVENT	12	TAYLOR,DANIEL (EPA)	(AECOM)
2342522	11/22/2022	REDACTED TRIP REPORT - 7/2022 PUBLIC WATER SUPPLY SAMPLING EVENT	14	TAYLOR,DANIEL (EPA)	(AECOM)
2342525	12/02/2022	REDACTED TRIP REPORT - 7/2022 RESIDENTIAL WELL CONFIRMATION SAMPLING EVENT	14	TAYLOR,DANIEL (EPA)	(AECOM)
2342516	12/06/2022	TRIP REPORT - 7/2022 EXISTING WELL SAMPLING & SYNOPTIC GAUGING EVENT	103	TAYLOR,DANIEL (EPA)	(AECOM)
2345901	01/01/2023	REDACTED OU 2 FINAL DETAILED ALTERNATIVES EVALUATION	114	(EPA)	(AECOM)
2345900	02/01/2023	REDACTED OU 2 FINAL FEASIBILITY STUDY (FFS)	138	(EPA)	(AECOM)
2342524	02/21/2023	REDACTED TRIP REPORT - 8/2022 & 10/2022 RESIDENTIAL WELL CONFIRMATION SAMPLING EVENTS	14	TAYLOR,DANIEL (EPA)	(AECOM)
2342523	03/10/2023	REDACTED TRIP REPORT - 10/2022 PUBLIC WATER SUPPLY SAMPLING EVENT	14	TAYLOR,DANIEL (EPA)	(AECOM)
2345102	05/08/2023	MEMO TO FILE REGARDING UPDATES FROM FEASIBILITY/REMEDIAL ALTERNATIVE EVALUATION & PROPOSED PLAN	21	(FILE)	TAYLOR,DANIEL (EPA)
2347864	06/01/2023	FACT SHEET: EPA PROPOSES PLAN TO PROVIDE CLEAN WATER TO AFFECTED RESIDENTS	4		(EPA)
2347865	06/29/2023	OU 2 PROPOSED REMEDIAL ACTION PLAN (PRAP)	28		(EPA)
2368370	07/20/2023	OU 2 PROPOSED REMEDIAL ACTION PLAN (PRAP) PUBLIC MEETING TRANSCRIPT	93		(LEXITAS LEGAL)
2368369	11/06/2023	OU 2 PROGRAMMATIC AGREEMENT AMONG EPA & DELAWARE STATE HISTORIC PRESERVATION OFFICE (COVER LETTER ATTACHED)	19		KILLSCROW,BRAD (DELAWARE TRIBE OF INDIANS)|LEONARD,PAUL (EPA)|RATSEP,TIMOTHY (DE DEPT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL (DNREC))|SAVERY,SUZANNE (DELAWARE STATE HISTORIC PRESERVATION OFFICE)

APPENDIX B

ARARs and TBCs

ARAR	Citation	Class	Synopsis	Relevance to Remedy
Chemical-Specific				
Maximum Contaminant Levels (MCLs) promulgated under the Safe Drinking Water Act of 1974, as amended, 42 U.S.C. §§ 300f et seq. (SDWA)	40 C.F.R. §§ 141.61 and 62.	Relevant and appropriate	Establishes maximum contaminant levels (MCLs) for common organic and inorganic contaminants, which are applicable to public drinking water supplies.	Groundwater in the area of concern is currently being used as a source of drinking water for residents. MCLs establish health-based standards (i.e., MCLs) for public drinking water. MCLs are relevant and appropriate since the selected remedy of a public drinking water line is required to meet MCLs in order to provide potable water to residents.
Safe Drinking Water Act, National Primary Drinking Water Regulations- MCL Goals (MCLGs)	40 C.F.R. § 141.51(b).	Relevant and appropriate	Establishes non-zero maximum contaminant level goals (MCLGs) for public water supplies. MCLGs are health goals for drinking water sources.	Ground water in the area of concern is currently being used for public consumption by residents. A public drinking water supply line will be designed and implemented to supply drinking water to all residences in OU2.
Drinking Water Health Advisory for PFOA and PFOS (EPA Office of Drinking Water), 2016	None	To Be Considered	Health Advisories are estimates of risk from consumption of contaminated drinking water. They provide information on contaminants that can cause human health effects and are known or anticipated to occur in drinking water.	PFAS compounds have been detected in the area of this interim remedial action.
Interim Drinking Water Health Advisory for perfluorooctanoic acid (PFOA) [EPA 822-R-22-003] and perfluorooctanesulfonic acid (PFOS) [EPA 822-R-22-004] (EPA Office of Water), 2022	None	To Be Considered	Health Advisories are estimates of risk from consumption of contaminated drinking water. They provide information on contaminants that can cause human health effects and are known or anticipated to occur in drinking water.	PFAS compounds have been detected in the area of this interim remedial action.
EPA Proposed National Primary Drinking Water Regulation (NPDWR) for PFOA, PFOS, PFNA, HFPO-DA, PFHxS, and PFBS.	None	To Be Considered	Establishes a proposed maximum contaminant level for PFOA and PFOS applicable to all public water supplies Nationwide.	PFAS compounds have been detected in the area subject to this interim remedial action.
Delaware Regulations Governing Drinking Water	16 Del. Admin. C. §	Relevant and Appropriate	These regulations define the maximum contaminant levels (MCLs) for potable use	Groundwater in the area of concern is currently being used as a source of drinking water for

Systems	4462-9.0.		of groundwater.	residents. MCLs establish health-based standards (i.e., MCLs) for public drinking water. MCLs are relevant and appropriate since the selected remedy of a public drinking water line is required to meet MCLs in order to provide potable water to residents.
Delaware Proposed Statute Governing Drinking Water Systems	Del. H.B. 8, 151st Gen. Assem. (2021).	To Be Considered	Delaware has proposed a statute directing DNREC and DPH to work together to issue primary MCLs for PFOA and PFOS. In anticipation, Delaware DPH has issued an implementation plan proposing MCLs for PFOS- 14 parts per trillion/liter (ng/l), PFOA-21 ng/l and combined 17 ng/l.	PFAS compounds have been detected in the area of this interim remedial action.
ARAR	Citation	Class	Synopsis	Relevance to Remedy
Location-Specific				
Regulations promulgated under Section 106 of the National Historical Preservation Act of 1966, as amended (NHPA) 54 U.S.C. § 306108	36 C.F.R Part 800	Applicable	Section 106 of the NHPA requires any Federal undertaking to consider the effect the activity may have on any historic property. It is the responsibility of a Federal agency to identify historic properties potentially affected by an undertaking, assess its effects and seek ways to avoid, minimize or mitigate any adverse effects on historic properties.	The water line construction meets the definition of an "undertaking" under 36 C.F.R. § 800.16(y). Accordingly, EPA will take the appropriate steps to identify historic property and then after assessing its potential effects, seek ways to avoid, or minimize those effects.
Regulations under the Migratory Bird Treaty Act of 1918, as amended ("MBTA"), 16 U.S.C. § 703	16 U.S.C. § 703 and 50 C.F.R. § 10.13	Applicable	Section 703 of the MBTA prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species that are native to the United States without prior authorization by the U.S. Fish and Wildlife Services("FWS"). The species protected as migratory birds under the MBTA are listed in 50 C.F.R. § 10.13.	Appropriate actions will be taken during the water line construction to ensure that no on-Site migratory birds listed at 50 C.F.R. § 10.13, or their nests are adversely affected.
Consultation requirements under Section 7 of the Endangered Species Act of	50 C.F.R. §§ 402.01-402.17	Applicable	The ESA requires consultation between the FWS and other Federal agencies to ensure that any *agency action* authorized,	Consultation will occur with FWS to ensure the water line construction does not jeopardize the continued existence of any endangered or

1973, as amended ("ESA"), 16 U.S.C § 1536			funded, or carried out by these agencies is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat of such species.	threatened species or result in the destruction or adverse modification of habitat of these species.
Protection of Floodplains	44 C.F.R §§ 9.2- 9.18	Relevant and Appropriate	Requires minimization of harm to or within the floodplain.	There is a potential for work to be performed within the floodplains of the Nanticoke River and Morgan Branch. [6]
Protection of Wetlands	44 C.F.R §§ 9.2- 9.18	Relevant and Appropriate	Requires the minimization of the destruction, loss, or degradation of wetlands. Requires the preservation and enhancement of the natural and beneficial wetlands values.	There is potential for work to be performed that may impact wetlands. [7]
ARAR	Citation	Class	Synopsis	Relevance to Remedy
Action-Specific				
Stormwater regulations promulgated under the CWA, 33 U.S.C. §§ 1251 et seq.	40 C.F.R. § 122.26(c)(1)(ii)	Relevant and Appropriate	This regulation requires the operator of a new stormwater discharge associated with small construction activity, as defined by 40 C.F.R. § 122.26(b)(15), to maintain certain information about the nature of the site, the nature of on-site activities, proposed best management practices to control pollutants in stormwater during	Provides best management practices to control contaminants of concern in stormwater during the construction of the water line. Information required to be maintained under this regulation will be reported to appropriate Delaware and Federal officials. No permit will be obtained. [8]

[6] See also (1) Executive Order 11988, Section 1 (which requires action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains) and 2(a)(2) (which requires consideration of alternatives to avoid adverse effects and incompatible development in floodplains); (2) Executive Order 13690, Section 2(c) (which requires use of natural systems, ecosystem processes, and nature-based approaches when developing alternatives for consideration). Federal Agencies are required to comply with executive order requirements.

[7] See also Executive Order 11990, Section 1(a) (which requires action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance beneficial values of wetlands) and 2(a) (which requires taking action to avoid construction in wetlands unless there is no practicable alternative to such construction and the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use). Federal Agencies are required to comply with executive order requirements.

[8] See 42 U.S.C. § 9621(e) and 40 C.F.R. § 300.400(e) (No Federal, state, or local permit is required for the on-site portion of a response action conducted under Section 104 of CERCLA. The term on-site means the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action.)

			and after construction activities, an estimate of the runoff coefficient of the site, and the name(s) of the receiving water(s).	
Delaware Hazardous Substance Cleanup Act (HSCA)	7 Del. C. Ch. 91.	Relevant and Appropriate	HSCA gives DNREC the authority to ensure cleanup of facilities with a release or imminent threat of release of hazardous substances.	The interim remedy being implemented at the site will be conducted under oversight from Delaware HSCA.
Delaware Regulations Governing Hazardous Substance Cleanup	7 Del. Admin. C. § 1375-12.7.5	Relevant and Appropriate	Establishes the long-term stewardship of a remedial action including maintenance, monitoring environmental covenants, and required compliance with institutional controls.	The regulations will establish institutional controls, such as a groundwater management zone that may be required following completion of the remedy.
Delaware Regulations Governing Drinking Water Systems	16 Del. Admin. C. § 4462-1.11.	Applicable	Establishes plans and specifications for the construction of a new public water supply or alteration of an existing public water supply.	The interim remedy chosen for implementation is the construction and installation of a public water supply line to serve the area of concern.
Delaware Regulations Governing Public Service Commission	26 Del. C. § 203C	Relevant and Appropriate	Establishes regulations of all public utilities including their rates, property rights, equipment, facilities, service territories and franchises. These regulations address the expansion of a water supply lines.	The chosen interim remedy is the installation of a public water line.
Delaware Sediment and Stormwater Regulations	7 Del. Admin. C. §§ 5101-3.4.1.5 and 3.7.15	Relevant and Appropriate	Establish the Delaware statewide sediment and stormwater management plans requirements including those for dewatering of trenches and minor liner utility disturbances.	The interim remedy being implemented is construction of a public water utility line. Sections 3.4.1.5 and 3.7.15 are relevant and appropriate to any soil disturbance for the water line installation if the soil disturbance is greater than 1.0 acres, all the requirements for the Construction General Permit will be required including minimizing sediment tracking and removing of the sediment from the roadway.
Regulations Governing the Construction and Use of Wells	7 Del. Admin. C. § 7301 – 3.6; 3.12.4; 3.12.9; 5.5.9;	Relevant and Appropriate	Establishes minimum requirements governing the location, design, installation, use, disinfection, modification, repair, and sealing of all wells and associated equipment as well as requirements for public and private potable water wells.	The interim remedy chosen is the installation of new public water line serving the residences in the Site. The remedy will comply with all relevant and appropriate requirements to use, cap, and abandon any private drinking water wells which will no longer be used following implementation.

	5.5.10; 5.11.5; 10.3			As well as any relevant and appropriate requirements in the event a new public water well is required in order to supply water to the Towns of Blades public water supply.
Delaware Regulations Governing the Allocation of Water	7 Del. Admin. C. § 7303-3.4; 5.5	Relevant and Appropriate	Establishes authority for Delaware to regulate the withdraw of groundwater for public use.	The interim remedy chosen for implementation is the installation of a public water supply line. Groundwater modeling may be necessary to make sure current Town of Blades public water supply wells are adequate for additional residents. Additionally, if modeling shows that existing supply will not meet the capacity needs these regulations provide for new water allocation permit perimeters.
Delaware Air Quality Management Regulations	7 Del. Admin. C. §§ 1103-1.6; 3.0; 11	Relevant and Appropriate	The regulations establish the ambient air quality and particulate emissions for the state of Delaware.	The interim remedy will include excavation of the water line areas. These regulations will apply to any dust or emissions from construction vehicles.
Delaware Air Quality Management Regulations	7 Del. Admin. C. § 1106	Relevant and Appropriate	The regulations establish particulate emissions during construction and material handling.	The interim remedy will include excavation of the water line areas. These regulations will apply to any dust or emissions from construction vehicles.
Delaware Division of Transportation Solutions	2 Del. Admin. C. §§ 2400- 3.0 - 4.0.	Relevant and Appropriate	Establishes Regulations within the State of Delaware including policies and procedures for adjusting, relocating, and accommodating utility facilities and private lines within the public right-of-way of DelDOT-maintained highways and streets, including any utility work related to highway project construction in the right-of-way of DelDOT-maintained streets and highways.	The chosen interim remedy is the installation of a public water line that will use the right of way in public right of way.
Delaware Regulations Governing Control of Water Pollution	7 Del. Admin. C. § 7201, Subsections	Applicable	Contains water quality regulations for discharging into surface and groundwater.	Applicable for potential discharge of treated groundwater into surface water (dewater). Also applicable for potential storm water runoff into Morgan Branch or the Nanticoke River.

	7, 8, 9, 10, 11, 12, 13			
Delaware Water Quality Standards	7 Del. Admin. C. § 7401, Subsections 3-6, 8-10, 11.1, 11.2, 11.3, 11.4, 11.6, 12	Applicable	Standards are established in order to regulate the discharge into state waters in order to maintain the integrity of the water.	Applicable because the groundwater management system will most likely discharge to surface water (the final discharge point will be determined in design).

APPENDIX C

RISK ASSESSMENT CALCULATIONS

ATTACHMENT 1: HUMAN HEALTH RISK ASSESSMENT DATA SETS

Table A1-1	Selection of Exposure Pathways
Table A1-2	Samples Used Within HHRA - Summary

ATTACHMENT 2: HUMAN HEALTH IDENTIFICATION OF CONSTITUENTS OF INTEREST

Table A2-1	Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0124)
Table A2-2	Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0155)
Table A2-3	Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0170)
Table A2-4	Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0173)
Table A2-5	Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0176)
Table A2-6	Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0182)
Table A2-7	Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0197)
Table A2-8	Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0212)
Table A2-9	Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0275)
Table A2-10	Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0500)
Table A2-11	Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0501)
Table A2-12	Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0510)
Table A2-13	Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0527)
Table A2-14	Surrogate Toxicity Used within Human Health Risk Assessment

ATTACHMENT 3: HUMAN HEALTH EXPOSURE ASSESSMENT CALCULATIONS

Human Health Exposure Point Concentration Summary

Table A3-1	Exposure Point Concentration Summary (Direct Contact – Groundwater)
Table A3-2	Exposure Point Concentration Summary (Vapor Intrusion – Groundwater)
Table A3-3	Residential VISL Model Input Values for Vapor Intrusion from Groundwater

ATTACHMENT 4:

Values Used for Daily Intake and Dermally Absorbed Dose Calculations: Reasonable Maximum Exposure

Table A4-1	Reasonable Maximum Exposure: Incidental Ingestion and Dermal Absorption of Groundwater
Table A4-2	Reasonable Maximum Exposure: Inhalation of Vapors from Groundwater to Indoor Air (Shower/Vapor Intrusion)

Environmental Transport and Fate Models

Table A4-3	Dermal Worksheet for Groundwater (Potable Use)
Table A4-4	Modeled Groundwater-to-Vapor Concentrations while Showering

Lead Exposure Modeling Results

Table A4-5	Integrated Exposure Uptake Biokinetic (IEUBK) Model Results, Lead in Groundwater, Child Resident, Residential Well 0155 Tapwater Results
Table A4-6	Integrated Exposure Uptake Biokinetic (IEUBK) Model Results, Lead in Groundwater, Child Resident, Residential Well 0176 Tapwater Results
Table A4-7	Integrated Exposure Uptake Biokinetic (IEUBK) Model Results, Lead in Groundwater, Child Resident, Residential Well 0212 Tapwater Results

ATTACHMENT 5: HUMAN HEALTH TOXICITY ASSESSMENT AND RISK CHARACTERIZATION CALCULATIONS

Cancer and Non-Cancer Toxicity Data

Table A5-1	Non-Cancer Toxicity Data - Oral/Dermal
Table A5-2	Non-Cancer Toxicity Data - Inhalation
Table A6-1	Cancer Toxicity Data - Oral/Dermal
Table A6-2	Cancer Toxicity Data - Inhalation

Calculation of Chemical Cancer Risks and Non-Cancer Hazards: Reasonable Maximum Exposure

Table A7-1	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0124)
Table A7-2	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0124)
Table A7-3	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0124)
Table A7-4	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0155)
Table A7-5	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0155)
Table A7-6	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0155)
Table A7-7	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0170)
Table A7-8	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0170)
Table A7-9	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0170)
Table A7-10	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0173)
Table A7-11	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0173)
Table A7-12	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0173)
Table A7-13	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0176)
Table A7-14	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0176)
Table A7-15	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0176)

Table A7-16	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0182)
Table A7-17	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0182)
Table A7-18	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0182)
Table A7-19	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0197)
Table A7-20	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0197)
Table A7-21	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0197)
Table A7-22	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0212)
Table A7-23	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0212)
Table A7-24	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0212)
Table A7-25	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0275)
Table A7-26	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0275)
Table A7-27	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0275)
Table A7-28	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0500)
Table A7-29	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0500)
Table A7-30	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0500)
Table A7-31	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0501)
Table A7-32	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0501)
Table A7-33	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0501)
Table A7-34	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0510)
Table A7-35	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0510)
Table A7-36	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0510)
Table A7-37	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0527)
Table A7-38	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0527)
Table A7-39	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0527)

Summary of Chemical Cancer Risks and Non-Cancer Hazards for Constituents of Interest: Reasonable Maximum Exposure

Table A9-1	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0124)
Table A9-2	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0124)

Table A9-3	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0124)
Table A9-4	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0155)
Table A9-5	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0155)
Table A9-6	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0155)
Table A9-7	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0170)
Table A9-8	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0170)
Table A9-9	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0170)
Table A9-10	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0173)
Table A9-11	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0173)
Table A9-12	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0173)
Table A9-13	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0176)
Table A9-14	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0176)
Table A9-15	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0176)
Table A9-16	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0182)
Table A9-17	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0182)
Table A9-18	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0182)
Table A9-19	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0197)
Table A9-20	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0197)
Table A9-21	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0197)
Table A9-22	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0212)
Table A9-23	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0212)
Table A9-24	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0212)
Table A9-25	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0275)
Table A9-26	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0275)
Table A9-27	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0275)
Table A9-28	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0500)
Table A9-29	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0500)

Table A9-30	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0500)
Table A9-31	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0501)
Table A9-32	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0501)
Table A9-33	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0501)
Table A9-34	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0510)
Table A9-35	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0510)
Table A9-36	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0510)
Table A9-37	Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0527)
Table A9-38	Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0527)
Table A9-39	Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion); Reasonable Maximum Exposure (Well 0527)

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Attachment 1

Human Health Risk Assessment Data Sets

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Table A1-1
Selection of Exposure Pathways
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Groundwater	Groundwater	Groundwater at OU2	OU2 Resident	Ingestion	Adult	Quant	Receptor may ingest groundwater as a source of tap water.
						Child	Quant	Receptor may ingest groundwater as a source of tap water.
						Child/Adult	Quant	The cancer risk estimates for the adult resident (20 years) and child resident (6 years) are added together (26 years) to address lifetime exposure to groundwater. The non-cancer hazard evaluations are treated separately for child and adult resident.
				OU2 Resident	Dermal	Adult	Quant	Receptor may come into contact with groundwater (tap water).
						Child	Quant	Receptor may come into contact with groundwater (tap water).
						Child/Adult	Quant	The cancer risk estimates for the adult resident (20 years) and child resident (6 years) are added together (26 years) to address lifetime exposure to groundwater. The non-cancer hazard evaluations are treated separately for child and adult resident.
		Indoor Air	Groundwater at OU2	OU2 Resident	Inhalation	Adult	Quant	Receptor may inhale VOCs from groundwater via vapor intrusion into residence.
						Child	Quant	Receptor may inhale VOCs from groundwater via vapor intrusion into residence.
						Child/Adult	Quant	The cancer risk estimates for the adult resident (20 years) and child resident (6 years) are added together (26 years) to address lifetime exposure to groundwater. The non-cancer hazard evaluations are treated separately for child and adult resident.
		Shower Air	Groundwater at OU2	OU2 Resident	Inhalation	Adult	Quant	Receptor may inhale vapors while showering since groundwater is used as a tap water source.
						Child	Quant	Receptor may inhale vapors while bathing since groundwater is used as a tap water source.
						Child/Adult	Quant	The cancer risk estimates for the adult resident (20 years) and child resident (6 years) are added together (26 years) to address lifetime exposure to groundwater. The non-cancer hazard evaluations are treated separately for child and adult resident.

Quant = Quantitative; VOC = volatile organic compound

Table A1-2
Samples Used Within HHRA - Summary
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Medium	Exposure Area	Sample Location	Sample Name	Type	Date	Vertical Unit	Result Count							
							VOC	SVOC	PFAS	PCB	DIOX	TMET	CYANIDE	TOTAL
WP	OU2	0155	C0BF8	N	9/20/2021	--	55	67	4	2	1	21	1	151
WP	OU2	0510	C0BF6	N	9/20/2021	--	55	67	4	2	1	21	1	151
WP	OU2	0173	C0BG1	N	9/21/2021	--	55	67	4	2	1	21	1	151
WP	OU2	0176	C0BG2	N	9/21/2021	--	55	67	3	2	1	21	1	150
WP	OU2	0501	C0BH8	N	9/22/2021	--	54	19	4	2	1	21	1	102
WP	OU2	0124	C0BK1	N	9/27/2021	--	55	68	4	2	1	21	1	152
WP	OU2	0182	C0BL8	N	9/29/2021	--	55	68	4	2	1	21	1	152
WP	OU2	0197	C0BM1	N	9/30/2021	--	55	68	4	2	1	21	1	152
WP	OU2	0275	C0BN3	N	10/5/2021	--	55	68	4	2	1	21	1	152
WP	OU2	0500	C0BM9	N	10/5/2021	--	55	68	3	2	1	21	1	151
WP	OU2	0527	C0BN2	N	10/5/2021	--	55	68	4	2	1	21	1	152
WP	OU2	0170	C0BN7	N	10/6/2021	--	55	68	4	2	1	21	1	152
WP	OU2	0212	C0BP1	N	10/7/2021	--	55	68	4	2	1	21	1	152

Notes:

FD = Field Duplicate Sample
N = Primary Sample
WP = Potable Water
VOC = Volatile Organic Compounds
SVOC = Semi-Volatile Organic Compounds
PFAS = Perfluorinated Compounds
PCB = Polychlorinated Biphenyls
DIOX = Dioxins/Furans
TMET = Total Metals

Attachment 2

Human Health Risk-Based Screening Results

Table A2-1
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0124)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0124

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Volatile Organic Compounds (VOCs)																			
1,1,1-Trichloroethane	V	71-55-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	800		RSL	893	No	No	MDL ≤ SL
1,1,2,2-Tetrachloroethane	V	79-34-5	N/A		N/A		µg/L	0/1	0%	0.05 – 0.05	0.05	MDL	0.076		RSL	4.18	No	No	MDL ≤ SL
1,1,2-Trichloroethane	V	79-00-5	N/A		N/A		µg/L	0/1	0%	0.042 – 0.042	0.042	MDL	0.041		RSL	0.779	No	See DSA	MDL > SL
1,1,2-Trichlorotrifluoroethane (Freon 113)	V	76-13-1	N/A		N/A		µg/L	0/1	0%	0.099 – 0.099	0.099	MDL	1000		RSL	28.5	No	No	MDL ≤ SL
1,1-Dichloroethane	V	75-34-3	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	2.8		RSL	9.09	No	No	MDL ≤ SL
1,1-Dichloroethene	V	75-35-4	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	28		RSL	22.7	No	No	MDL ≤ SL
1,2,3-Trichlorobenzene	V	87-61-6	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	0.7		RSL	No SL	No	No	MDL ≤ SL
1,2,3-Trichloropropane	V	96-18-4	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	0.00075		RSL	2.89	No	See DSA	MDL > SL
1,2,4-Trichlorobenzene	V	120-82-1	N/A		N/A		µg/L	0/1	0%	0.068 – 0.068	0.068	MDL	0.4		RSL	4.97	No	No	MDL ≤ SL
1,2,4-Trimethylbenzene	V	95-63-6	N/A		N/A		µg/L	0/1	0%	0.051 – 0.051	0.051	MDL	5.6		RSL	33	No	No	MDL ≤ SL
1,2-Dibromo-3-chloropropane	V	96-12-8	N/A		N/A		µg/L	0/1	0%	0.14 – 0.14	0.14	MDL	0.00033		RSL	0.0381	See DSA	See DSA	MDL > SL
1,2-Dibromoethane	V	106-93-4	N/A		N/A		µg/L	0/1	0%	0.052 – 0.052	0.052	MDL	0.0075		RSL	0.221	No	See DSA	MDL > SL
1,2-Dichlorobenzene	V	95-50-1	N/A		N/A		µg/L	0/1	0%	0.045 – 0.045	0.045	MDL	30		RSL	351	No	No	MDL ≤ SL
1,2-Dichloroethane	V	107-06-2	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.17		RSL	2.74	No	No	MDL ≤ SL
1,2-Dichloropropane	V	78-87-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.82		RSL	4.44	No	No	MDL ≤ SL
1,3,5-Trimethylbenzene	V	108-67-8	N/A		N/A		µg/L	0/1	0%	0.067 – 0.067	0.067	MDL	6		RSL	23.2	No	No	MDL ≤ SL
1,3-Dichlorobenzene	V	541-73-1	N/A		N/A		µg/L	0/1	0%	0.071 – 0.071	0.071	MDL	30	*	RSL	351	No	No	MDL ≤ SL
1,4-Dichlorobenzene	V	106-46-7	N/A		N/A		µg/L	0/1	0%	0.047 – 0.047	0.047	MDL	0.48		RSL	3.42	No	No	MDL ≤ SL
1,4-Dioxane	V	123-91-1	N/A		N/A		µg/L	0/1	0%	0.9 – 0.9	0.9	MDL	0.46		RSL	3570	No	See DSA	MDL > SL
2-Butanone (MEK)	V	78-93-3	N/A		N/A		µg/L	0/1	0%	1.5 – 1.5	1.5	MDL	560		RSL	274000	No	No	MDL ≤ SL
2-Hexanone	V	591-78-6	N/A		N/A		µg/L	0/1	0%	0.68 – 0.68	0.68	MDL	3.8		RSL	1060	No	No	MDL ≤ SL
4-Methyl-2-pentanone (MIBK)	V	108-10-1	N/A		N/A		µg/L	0/1	0%	0.71 – 0.71	0.71	MDL	630		RSL	70200	No	No	MDL ≤ SL
Acetone	V	67-64-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	1800		RSL	No SL	No	No	MDL ≤ SL
Benzene	V	71-43-2	N/A		N/A		µg/L	0/1	0%	0.085 – 0.085	0.085	MDL	0.46		RSL	1.92	No	No	MDL ≤ SL
Bromochloromethane	V	74-97-5	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	8.3		RSL	83.9	No	No	MDL ≤ SL
Bromodichloromethane	V	75-27-4	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.13		RSL	1.08	No	No	MDL ≤ SL
Bromoform	V	75-25-2	N/A		N/A		µg/L	0/1	0%	0.095 – 0.095	0.095	MDL	3.3		RSL	152	No	No	MDL ≤ SL
Bromomethane	V	74-83-9	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	0.75		RSL	1.98	No	No	MDL ≤ SL
Carbon disulfide	V	75-15-0	N/A		N/A		µg/L	0/1	0%	0.092 – 0.092	0.092	MDL	81		RSL	145	No	No	MDL ≤ SL
Carbon tetrachloride	V	56-23-5	N/A		N/A		µg/L	0/1	0%	0.086 – 0.086	0.086	MDL	0.46		RSL	0.499	No	No	MDL ≤ SL
Chlorobenzene	V	108-90-7	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	7.8		RSL	51.9	No	No	MDL ≤ SL
Chloroethane	V	75-00-3	N/A		N/A		µg/L	0/1	0%	0.074 – 0.074	0.074	MDL	830		RSL	1050	No	No	MDL ≤ SL
Chloroform	V	67-66-3	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.22		RSL	0.972	No	No	MDL ≤ SL
Chloromethane	V	74-87-3	0.17	J	0.17	J	µg/L	1/1	100%	0.082 – 0.082	0.17	MDC	19		RSL	28.9	No	No	MDC < SL
cis-1,2-Dichloroethene	V	156-59-2	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
cis-1,3-Dichloropropene	V	10061-01-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Cyclohexane	V	110-82-7	N/A		N/A		µg/L	0/1	0%	0.065 – 0.065	0.065	MDL	1300		RSL	123	No	No	MDL ≤ SL
Dibromochloromethane	V	124-48-1	N/A		N/A		µg/L	0/1	0%	0.073 – 0.073	0.073	MDL	0.87		RSL	No SL	No	No	MDL ≤ SL
Dichlorodifluoromethane	V	75-71-8	N/A		N/A		µg/L	0/1	0%	0.12 – 0.12	0.12	MDL	20		RSL	0.815	No	No	MDL ≤ SL
Ethylbenzene	V	100-41-4	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	1.5		RSL	4.45	No	No	MDL ≤ SL

Table A2-1
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0124)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0124

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Isopropylbenzene	V	98-82-8	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	45		RSL	121	No	No	MDL ≤ SL
m,p-Xylene	V	179601-23-1	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	19	*	RSL	45.5	No	No	MDL ≤ SL
Methyl Acetate	V	79-20-9	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	2000		RSL	No SL	No	No	MDL ≤ SL
Methyl Tert Butyl Ether	V	1634-04-4	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	14		RSL	533	No	No	MDL ≤ SL
Methylcyclohexane	V	108-87-2	N/A		N/A		µg/L	0/1	0%	0.08 – 0.08	0.08	MDL	1300	*	RSL	123	No	No	MDL ≤ SL
Methylene chloride	V	75-09-2	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	11		RSL	555	No	No	MDL ≤ SL
o-Xylene	V	95-47-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	19		RSL	63.3	No	No	MDL ≤ SL
Styrene	V	100-42-5	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	120		RSL	1210	No	No	MDL ≤ SL
Tetrachloroethene	V	127-18-4	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	4.1		RSL	7.25	No	No	MDL ≤ SL
Toluene	V	108-88-3	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	110		RSL	2390	No	No	MDL ≤ SL
trans-1,2-Dichloroethene	V	156-60-5	N/A		N/A		µg/L	0/1	0%	0.081 – 0.081	0.081	MDL	6.8		RSL	12.9	No	No	MDL ≤ SL
trans-1,3-Dichloropropene	V	10061-02-6	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Trichloroethene	V	79-01-6	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.28		RSL	0.632	No	No	MDL ≤ SL
Trichlorofluoromethane	V	75-69-4	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	520		RSL	No SL	No	No	MDL ≤ SL
Vinyl chloride	V	75-01-4	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.019		RSL	0.164	No	See DSA	MDL > SL
Semi-Volatile Organic Compounds (SVOCs)																			
1,1'-Biphenyl	V	92-52-4	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.083		RSL	4.71	No	See DSA	MDL > SL
1,2,4,5-Tetrachlorobenzene	V	95-94-3	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.017		RSL	No SL	No	See DSA	MDL > SL
1-Methylnaphthalene	V	90-12-0	N/A		N/A		µg/L	0/1	0%	0.0055 – 0.0055	0.0055	MDL	1.1		RSL	No SL	No	No	MDL ≤ SL
2,3,4,6-Tetrachlorophenol		58-90-2	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	24		RSL	No SL	No	No	MDL ≤ SL
2,4,5-Trichlorophenol		95-95-4	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	120		RSL	No SL	No	No	MDL ≤ SL
2,4,6-Trichlorophenol		88-06-2	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	1.2		RSL	No SL	No	See DSA	MDL > SL
2,4-Dichlorophenol		120-83-2	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4.6		RSL	No SL	No	No	MDL ≤ SL
2,4-Dimethylphenol		105-67-9	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	36		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrophenol		51-28-5	N/A		N/A		µg/L	0/1	0%	0.98 – 0.98	0.98	MDL	3.9		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrotoluene		121-14-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	0.24		RSL	No SL	No	See DSA	MDL > SL
2,6-Dinitrotoluene		606-20-2	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.049		RSL	No SL	No	See DSA	MDL > SL
2-Chloronaphthalene	V	91-58-7	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	75		RSL	No SL	No	No	MDL ≤ SL
2-Chlorophenol	V	95-57-8	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	9.1		RSL	No SL	No	No	MDL ≤ SL
2-Methylnaphthalene	V	91-57-6	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
2-Methylphenol		95-48-7	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	93		RSL	No SL	No	No	MDL ≤ SL
2-Nitroaniline		88-74-4	N/A		N/A		µg/L	0/1	0%	3.4 – 3.4	3.4	MDL	19		RSL	No SL	No	No	MDL ≤ SL
2-Nitrophenol		88-75-5	N/A		N/A		µg/L	0/1	0%	2.7 – 2.7	2.7	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
3,3'-Dichlorobenzidine		91-94-1	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	0.13		RSL	No SL	No	See DSA	MDL > SL
3-Nitroaniline		99-09-2	N/A		N/A		µg/L	0/1	0%	0.67 – 0.67	0.67	MDL	19	*	RSL	No SL	No	No	MDL ≤ SL
4,6-Dinitro-o-cresol		534-52-1	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.15		RSL	No SL	No	See DSA	MDL > SL
4-Bromophenyl phenyl ether	V	101-55-3	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Chloro-3-methyl phenol		59-50-7	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	140		RSL	No SL	No	No	MDL ≤ SL
4-Chloroaniline		106-47-8	N/A		N/A		µg/L	0/1	0%	4.6 – 4.6	4.6	MDL	0.37		RSL	No SL	No	See DSA	MDL > SL
4-Chlorophenyl phenyl ether	V	7005-72-3	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Methylphenol		106-44-5	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	37		RSL	No SL	No	No	MDL ≤ SL

Table A2-1
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0124)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0124

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
4-Nitroaniline		100-01-6	N/A		N/A		µg/L	0/1	0%	0.85 – 0.85	0.85	MDL	3.8		RSL	No SL	No	No	MDL ≤ SL
4-Nitrophenol		100-02-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
Acenaphthene	V	83-32-9	N/A		N/A		µg/L	0/1	0%	0.0061 – 0.0061	0.0061	MDL	53		RSL	No SL	No	No	MDL ≤ SL
Acenaphthylene	V	208-96-8	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	53	*	RSL	No SL	No	No	MDL ≤ SL
Acetophenone	V	98-86-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	190		RSL	No SL	No	No	MDL ≤ SL
Anthracene	V	120-12-7	N/A		N/A		µg/L	0/1	0%	0.011 – 0.011	0.011	MDL	180		RSL	No SL	No	No	MDL ≤ SL
Atrazine		1912-24-9	N/A		N/A		µg/L	0/1	0%	0.48 – 0.48	0.48	MDL	0.3		RSL	No SL	No	See DSA	MDL > SL
Benzaldehyde	V	100-52-7	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	19		RSL	No SL	No	No	MDL ≤ SL
Benzo(a)anthracene	V	56-55-3	N/A		N/A		µg/L	0/1	0%	0.0094 – 0.0094	0.0094	MDL	0.03		RSL	62.3	No	No	MDL ≤ SL
Benzo(a)pyrene		50-32-8	N/A		N/A		µg/L	0/1	0%	0.017 – 0.017	0.017	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Benzo(b)fluoranthene		205-99-2	N/A		N/A		µg/L	0/1	0%	0.0082 – 0.0082	0.0082	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Benzo(g,h,i)perylene	V	191-24-2	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	12	*	RSL	No SL	No	No	MDL ≤ SL
Benzo(k)fluoranthene		207-08-9	N/A		N/A		µg/L	0/1	0%	0.0041 – 0.0041	0.0041	MDL	2.5		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethoxy)methane		111-91-1	N/A		N/A		µg/L	0/1	0%	2.9 – 2.9	2.9	MDL	5.9		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethyl)ether	V	111-44-4	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.014		RSL	17	No	See DSA	MDL > SL
bis(2-Chloroisopropyl)ether	V	108-60-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	71		RSL	No SL	No	No	MDL ≤ SL
bis(2-Ethylhexyl)phthalate		117-81-7	N/A		N/A		µg/L	0/1	0%	0.82 – 0.82	0.82	MDL	5.6		RSL	No SL	No	No	MDL ≤ SL
Butyl benzyl phthalate		85-68-7	N/A		N/A		µg/L	0/1	0%	1.4 – 1.4	1.4	MDL	16		RSL	No SL	No	No	MDL ≤ SL
Caprolactam		105-60-2	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	990		RSL	No SL	No	No	MDL ≤ SL
Carbazole	V	86-74-8	N/A		N/A		µg/L	0/1	0%	3.2 – 3.2	3.2	MDL	29	*	RSL	No SL	No	No	MDL ≤ SL
Chrysene		218-01-9	N/A		N/A		µg/L	0/1	0%	0.0054 – 0.0054	0.0054	MDL	25		RSL	No SL	No	No	MDL ≤ SL
Dibenzo(a,h)anthracene		53-70-3	N/A		N/A		µg/L	0/1	0%	0.0059 – 0.0059	0.0059	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Dibenzofuran	V	132-64-9	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	0.79		RSL	No SL	No	See DSA	MDL > SL
Diethyl phthalate		84-66-2	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	1500		RSL	No SL	No	No	MDL ≤ SL
Dimethyl phthalate		131-11-3	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	1500	*	RSL	No SL	No	No	MDL ≤ SL
Di-n-butyl phthalate		84-74-2	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	90		RSL	No SL	No	No	MDL ≤ SL
Di-n-octyl phthalate		117-84-0	N/A		N/A		µg/L	0/1	0%	0.64 – 0.64	0.64	MDL	20		RSL	No SL	No	No	MDL ≤ SL
Fluoranthene		206-44-0	N/A		N/A		µg/L	0/1	0%	0.012 – 0.012	0.012	MDL	80		RSL	No SL	No	No	MDL ≤ SL
Fluorene	V	86-73-7	N/A		N/A		µg/L	0/1	0%	0.0072 – 0.0072	0.0072	MDL	29		RSL	No SL	No	No	MDL ≤ SL
Hexachlorobenzene	V	118-74-1	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.0098		RSL	0.133	See DSA	See DSA	MDL > SL
Hexachlorobutadiene	V	87-68-3	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	0.14		RSL	0.414	See DSA	See DSA	MDL > SL
Hexachlorocyclopentadiene	V	77-47-4	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	0.041		RSL	0.0786	See DSA	See DSA	MDL > SL
Hexachloroethane	V	67-72-1	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	0.33		RSL	2.29	See DSA	See DSA	MDL > SL
Indeno(1,2,3-cd)pyrene		193-39-5	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Isophorone		78-59-1	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	78		RSL	No SL	No	No	MDL ≤ SL
Naphthalene	V	91-20-3	N/A		N/A		µg/L	0/1	0%	0.0077 – 0.0077	0.0077	MDL	0.12		RSL	6.29	No	No	MDL ≤ SL
Nitrobenzene	V	98-95-3	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	0.14		RSL	99.3	No	See DSA	MDL > SL
N-Nitroso-di-n-propylamine		621-64-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.011		RSL	No SL	No	See DSA	MDL > SL
N-Nitrosodiphenylamine		86-30-6	N/A		N/A		µg/L	0/1	0%	3.6 – 3.6	3.6	MDL	12		RSL	No SL	No	No	MDL ≤ SL
Pentachlorophenol		87-86-5	N/A		N/A		µg/L	0/1	0%	0.024 – 0.024	0.024	MDL	0.041		RSL	No SL	No	No	MDL ≤ SL
Phenanthrene	V	85-01-8	N/A		N/A		µg/L	0/1	0%	0.0087 – 0.0087	0.0087	MDL	180	*	RSL	No SL	No	No	MDL ≤ SL

Table A2-1
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0124)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0124

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Phenol		108-95-2	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	580		RSL	No SL	No	No	MDL ≤ SL
Pyrene	V	129-00-0	N/A		N/A		µg/L	0/1	0%	0.014 – 0.014	0.014	MDL	12		RSL	No SL	No	No	MDL ≤ SL
DIOX																			
Total PCDD/F TEQ (Mammal)	V	TEQ-M-DF	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
PCB																			
Total PCB TEQ (Mammal)	V	TEQ-M-PCB	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
Total PCB Congener	V	TPCB_CON	0.000051	J	0.000051	J	µg/L	1/1	100%	N/A	0.000051	MDC	0.044	*	RSL	1.65	No	No	MDC < SL
Perfluorinated Compounds																			
Perfluorononanoic acid (PFNA)		375-95-1	N/A		N/A		µg/L	0/1	0%	0.002 – 0.002	0.002	MDL	0.0059		RSL	No SL	No	No	MDL ≤ SL
Perfluorohexanesulfonic acid (PFHxS)		355-46-4	0.00056	J	0.00056	J	µg/L	1/1	100%	0.002 – 0.002	0.00056	MDC	0.039		RSL	No SL	No	No	MDC < SL
Perfluorobutanesulfonic acid (PFBS)		375-73-5	0.0058		0.0058		µg/L	1/1	100%	0.00039 – 0.00039	0.0058	MDC	0.6		RSL	No SL	No	No	MDC < SL
Perfluorooctanesulfonic acid (PFOS)		1763-23-1	0.011		0.011		µg/L	1/1	100%	0.00039 – 0.00039	0.011	MDC	0.004		RSL	No SL	No	Yes	MDC ≥ SL
Perfluorooctanoic acid (PFOA)		335-67-1	0.0012	J	0.0012	J	µg/L	1/1	100%	0.00039 – 0.00039	0.0012	MDC	0.006		RSL	No SL	No	No	MDC < SL
Total Metals																			
Aluminum		7429-90-5	130		130		µg/L	1/1	100%	4 – 4	130	MDC	2000		RSL	No SL	No	No	MDC < SL
Antimony		7440-36-0	N/A		N/A		µg/L	0/1	0%	0.32 – 0.32	0.32	MDL	0.78		RSL	No SL	No	No	MDL ≤ SL
Arsenic		7440-38-2	N/A		N/A		µg/L	0/1	0%	0.33 – 0.33	0.33	MDL	0.052		RSL	No SL	No	See DSA	MDL > SL
Barium		7440-39-3	480		480		µg/L	1/1	100%	1.9 – 1.9	480	MDC	380		RSL	No SL	No	Yes	MDC ≥ SL
Beryllium		7440-41-7	2		2		µg/L	1/1	100%	0.17 – 0.17	2	MDC	2.5		RSL	No SL	No	No	MDC < SL
Cadmium		7440-43-9	0.16	J	0.16	J	µg/L	1/1	100%	0.14 – 0.14	0.16	MDC	0.18		RSL	No SL	No	No	MDC < SL
Calcium		7440-70-2	8400		8400		µg/L	1/1	100%	120 – 120	8400	MDC	Nutrient		N/A	Nutrient	No	No	Classified as an essential nutrient
Chromium, Total		7440-47-3	0.51	J	0.51	J	µg/L	1/1	100%	0.32 – 0.32	0.51	MDC	2200	*	RSL	No SL	No	No	MDC < SL
Chromium, Hexavalent		18540-29-9	N/A		N/A		µg/L	0/1	0%	1 – 1	1	MDL	0.035		RSL	No SL	No	See DSA	MDL > SL
Cobalt		7440-48-4	30		30		µg/L	1/1	100%	0.19 – 0.19	30	MDC	0.6		RSL	No SL	No	Yes	MDC ≥ SL
Copper		7440-50-8	250		250		µg/L	1/1	100%	0.4 – 0.4	250	MDC	80		RSL	No SL	No	Yes	MDC ≥ SL
Iron		7439-89-6	N/A		N/A		µg/L	0/1	0%	54 – 54	54	MDL	1400		RSL	No SL	No	No	MDL ≤ SL
Lead		7439-92-1	9.8	J-	9.8	J-	µg/L	1/1	100%	0.21 – 0.21	9.8	MDC	15		RSL	No SL	No	No	MDC < SL
Manganese		7439-96-5	190		190		µg/L	1/1	100%	0.17 – 0.17	190	MDC	43		RSL	No SL	No	Yes	MDC ≥ SL
Mercury		7439-97-6	N/A		N/A		µg/L	0/1	0%	0.06 – 0.06	0.06	MDL	0.2	*	RSL	No SL	No	No	MDL ≤ SL
Nickel		7440-02-0	8		8		µg/L	1/1	100%	0.2 – 0.2	8	MDC	39		RSL	No SL	No	No	MDC < SL
Selenium		7782-49-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	10		RSL	No SL	No	No	MDL ≤ SL
Silver		7440-22-4	N/A		N/A		µg/L	0/1	0%	0.18 – 0.18	0.18	MDL	9.4		RSL	No SL	No	No	MDL ≤ SL
Thallium		7440-28-0	N/A		N/A		µg/L	0/1	0%	0.23 – 0.23	0.23	MDL	0.02		RSL	No SL	No	See DSA	MDL > SL
Vanadium		7440-62-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	8.6		RSL	No SL	No	No	MDL ≤ SL
Zinc		7440-66-6	140		140		µg/L	1/1	100%	1.6 – 1.6	140	MDC	600		RSL	No SL	No	No	MDC < SL
Total Cyanide																			
Cyanide	V	57-12-5	4.6	J	4.6	J	µg/L	1/1	100%	2.6 – 2.6	4.6	MDC	0.15		RSL	20.1	No	Yes	MDC ≥ SL

Notes:
% = Percent
AL = Action Level

Table A2-1
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0124)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current and Future
Medium:	Groundwater (Drinking Water)
Well:	0124

Chemical [1]	CASRN	Minimum Detected Concentration	Maximum Detected Concentration	Units	Detection Frequency	Range of Method Detection Limits	Screening Concentration	Screening Level [2, 3, 5, 6]	Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion

CASRN = Chemical Abstracts Service Registry Number
COPC = Chemical of Potential Concern
DSA = Data Sensitivity Analysis
HAL = Health Advisory Level
J = Indicates an estimated value
J- = The result is an estimated quantity, but the result may be biased low.
MCL = Maximum Contaminant Level
MDC = Maximum Detected Concentration
N/A = Not Applicable
ND = Non-Detect or Not Detected
"PFOA and PFOS Combined" = Combined total of the detected concentrations of PFOA and PFOS (non-detect results were not included in the summation).
RL = Reporting Limit
RSL = Regional Screening Level
µg/L = micrograms per liter
USEPA = United States Environmental Protection Agency
(1) "V" indicates that the chemical is volatile.
(2) Groundwater data screened against USEPA Tap Water RSLs, last updated May 2022 (TR = 1E-6, THQ = 0.1).
(3) An asterisk,"*", indicates surrogate toxicity information was used to derive a Screening Level (see Table A2-14).
(4) Groundwater data screened against USEPA Residential Groundwater VISLs, last updated May 2022 (TR = 1E-6, THQ = 0.1). Site-specific, system temperature was set to 20.5 Celsius (average of recorded temperatures taken in field).
(6) Lead is compared to the EPA tap water RSL of 15 µg/L, which represents the 90th percentile concentration of lead found in tap water samples collected nationwide (Lead and Copper Rule, 56 Federal Register 26460-26564, dated June 7, 1991) and is not a risk-based number, but rather an action level.

Table A2-2
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0155)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0155

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Volatile Organic Compounds (VOCs)																			
1,1,1-Trichloroethane	V	71-55-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	800		RSL	893	No	No	MDL ≤ SL
1,1,2,2-Tetrachloroethane	V	79-34-5	N/A		N/A		µg/L	0/1	0%	0.05 – 0.05	0.05	MDL	0.076		RSL	4.18	No	No	MDL ≤ SL
1,1,2-Trichloroethane	V	79-00-5	N/A		N/A		µg/L	0/1	0%	0.042 – 0.042	0.042	MDL	0.041		RSL	0.779	No	See DSA	MDL > SL
1,1,2-Trichlorotrifluoroethane (Freon 113)	V	76-13-1	N/A		N/A		µg/L	0/1	0%	0.099 – 0.099	0.099	MDL	1000		RSL	28.5	No	No	MDL ≤ SL
1,1-Dichloroethane	V	75-34-3	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	2.8		RSL	9.09	No	No	MDL ≤ SL
1,1-Dichloroethene	V	75-35-4	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	28		RSL	22.7	No	No	MDL ≤ SL
1,2,3-Trichlorobenzene	V	87-61-6	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	0.7		RSL	No SL	No	No	MDL ≤ SL
1,2,3-Trichloropropane	V	96-18-4	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	0.00075		RSL	2.89	No	See DSA	MDL > SL
1,2,4-Trichlorobenzene	V	120-82-1	N/A		N/A		µg/L	0/1	0%	0.068 – 0.068	0.068	MDL	0.4		RSL	4.97	No	No	MDL ≤ SL
1,2,4-Trimethylbenzene	V	95-63-6	N/A		N/A		µg/L	0/1	0%	0.051 – 0.051	0.051	MDL	5.6		RSL	33	No	No	MDL ≤ SL
1,2-Dibromo-3-chloropropane	V	96-12-8	N/A		N/A		µg/L	0/1	0%	0.14 – 0.14	0.14	MDL	0.00033		RSL	0.0381	See DSA	See DSA	MDL > SL
1,2-Dibromoethane	V	106-93-4	N/A		N/A		µg/L	0/1	0%	0.052 – 0.052	0.052	MDL	0.0075		RSL	0.221	No	See DSA	MDL > SL
1,2-Dichlorobenzene	V	95-50-1	N/A		N/A		µg/L	0/1	0%	0.045 – 0.045	0.045	MDL	30		RSL	351	No	No	MDL ≤ SL
1,2-Dichloroethane	V	107-06-2	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.17		RSL	2.74	No	No	MDL ≤ SL
1,2-Dichloropropane	V	78-87-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.82		RSL	4.44	No	No	MDL ≤ SL
1,3,5-Trimethylbenzene	V	108-67-8	N/A		N/A		µg/L	0/1	0%	0.067 – 0.067	0.067	MDL	6		RSL	23.2	No	No	MDL ≤ SL
1,3-Dichlorobenzene	V	541-73-1	N/A		N/A		µg/L	0/1	0%	0.071 – 0.071	0.071	MDL	30	*	RSL	351	No	No	MDL ≤ SL
1,4-Dichlorobenzene	V	106-46-7	N/A		N/A		µg/L	0/1	0%	0.047 – 0.047	0.047	MDL	0.48		RSL	3.42	No	No	MDL ≤ SL
1,4-Dioxane	V	123-91-1	N/A		N/A		µg/L	0/1	0%	0.88 – 0.88	0.88	MDL	0.46		RSL	3570	No	See DSA	MDL > SL
2-Butanone (MEK)	V	78-93-3	N/A		N/A		µg/L	0/1	0%	1.5 – 1.5	1.5	MDL	560		RSL	274000	No	No	MDL ≤ SL
2-Hexanone	V	591-78-6	N/A		N/A		µg/L	0/1	0%	0.68 – 0.68	0.68	MDL	3.8		RSL	1060	No	No	MDL ≤ SL
4-Methyl-2-pentanone (MIBK)	V	108-10-1	N/A		N/A		µg/L	0/1	0%	0.71 – 0.71	0.71	MDL	630		RSL	70200	No	No	MDL ≤ SL
Acetone	V	67-64-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	1800		RSL	No SL	No	No	MDL ≤ SL
Benzene	V	71-43-2	N/A		N/A		µg/L	0/1	0%	0.085 – 0.085	0.085	MDL	0.46		RSL	1.92	No	No	MDL ≤ SL
Bromochloromethane	V	74-97-5	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	8.3		RSL	83.9	No	No	MDL ≤ SL
Bromodichloromethane	V	75-27-4	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.13		RSL	1.08	No	No	MDL ≤ SL
Bromoform	V	75-25-2	N/A		N/A		µg/L	0/1	0%	0.095 – 0.095	0.095	MDL	3.3		RSL	152	No	No	MDL ≤ SL
Bromomethane	V	74-83-9	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	0.75		RSL	1.98	No	No	MDL ≤ SL
Carbon disulfide	V	75-15-0	N/A		N/A		µg/L	0/1	0%	0.092 – 0.092	0.092	MDL	81		RSL	145	No	No	MDL ≤ SL
Carbon tetrachloride	V	56-23-5	N/A		N/A		µg/L	0/1	0%	0.086 – 0.086	0.086	MDL	0.46		RSL	0.499	No	No	MDL ≤ SL
Chlorobenzene	V	108-90-7	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	7.8		RSL	51.9	No	No	MDL ≤ SL
Chloroethane	V	75-00-3	N/A		N/A		µg/L	0/1	0%	0.074 – 0.074	0.074	MDL	830		RSL	1050	No	No	MDL ≤ SL
Chloroform	V	67-66-3	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.22		RSL	0.972	No	No	MDL ≤ SL
Chloromethane	V	74-87-3	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	19		RSL	28.9	No	No	MDL ≤ SL
cis-1,2-Dichloroethene	V	156-59-2	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
cis-1,3-Dichloropropene	V	10061-01-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Cyclohexane	V	110-82-7	N/A		N/A		µg/L	0/1	0%	0.065 – 0.065	0.065	MDL	1300		RSL	123	No	No	MDL ≤ SL
Dibromochloromethane	V	124-48-1	N/A		N/A		µg/L	0/1	0%	0.073 – 0.073	0.073	MDL	0.87		RSL	No SL	No	No	MDL ≤ SL
Dichlorodifluoromethane	V	75-71-8	N/A		N/A		µg/L	0/1	0%	0.12 – 0.12	0.12	MDL	20		RSL	0.815	No	No	MDL ≤ SL
Ethylbenzene	V	100-41-4	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	1.5		RSL	4.45	No	No	MDL ≤ SL

Table A2-2
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0155)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0155

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Isopropylbenzene	V	98-82-8	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	45		RSL	121	No	No	MDL ≤ SL
m,p-Xylene	V	179601-23-1	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	19	*	RSL	45.5	No	No	MDL ≤ SL
Methyl Acetate	V	79-20-9	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	2000		RSL	No SL	No	No	MDL ≤ SL
Methyl Tert Butyl Ether	V	1634-04-4	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	14		RSL	533	No	No	MDL ≤ SL
Methylcyclohexane	V	108-87-2	N/A		N/A		µg/L	0/1	0%	0.08 – 0.08	0.08	MDL	1300	*	RSL	123	No	No	MDL ≤ SL
Methylene chloride	V	75-09-2	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	11		RSL	555	No	No	MDL ≤ SL
o-Xylene	V	95-47-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	19		RSL	63.3	No	No	MDL ≤ SL
Styrene	V	100-42-5	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	120		RSL	1210	No	No	MDL ≤ SL
Tetrachloroethene	V	127-18-4	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	4.1		RSL	7.25	No	No	MDL ≤ SL
Toluene	V	108-88-3	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	110		RSL	2390	No	No	MDL ≤ SL
trans-1,2-Dichloroethene	V	156-60-5	N/A		N/A		µg/L	0/1	0%	0.081 – 0.081	0.081	MDL	6.8		RSL	12.9	No	No	MDL ≤ SL
trans-1,3-Dichloropropene	V	10061-02-6	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Trichloroethene	V	79-01-6	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.28		RSL	0.632	No	No	MDL ≤ SL
Trichlorofluoromethane	V	75-69-4	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	520		RSL	No SL	No	No	MDL ≤ SL
Vinyl chloride	V	75-01-4	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.019		RSL	0.164	No	See DSA	MDL > SL
Semi-Volatile Organic Compounds (SVOCs)																			
1,1'-Biphenyl	V	92-52-4	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.083		RSL	4.71	No	See DSA	MDL > SL
1,2,4,5-Tetrachlorobenzene	V	95-94-3	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.017		RSL	No SL	No	See DSA	MDL > SL
1-Methylnaphthalene	V	90-12-0	N/A		N/A		µg/L	0/1	0%	0.0052 – 0.0052	0.0052	MDL	1.1		RSL	No SL	No	No	MDL ≤ SL
2,3,4,6-Tetrachlorophenol		58-90-2	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	24		RSL	No SL	No	No	MDL ≤ SL
2,4,5-Trichlorophenol		95-95-4	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	120		RSL	No SL	No	No	MDL ≤ SL
2,4,6-Trichlorophenol		88-06-2	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	1.2		RSL	No SL	No	See DSA	MDL > SL
2,4-Dichlorophenol		120-83-2	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4.6		RSL	No SL	No	No	MDL ≤ SL
2,4-Dimethylphenol		105-67-9	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	36		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrophenol		51-28-5	N/A		N/A		µg/L	0/1	0%	0.96 – 0.96	0.96	MDL	3.9		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrotoluene		121-14-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	0.24		RSL	No SL	No	See DSA	MDL > SL
2,6-Dinitrotoluene		606-20-2	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.049		RSL	No SL	No	See DSA	MDL > SL
2-Chloronaphthalene	V	91-58-7	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	75		RSL	No SL	No	No	MDL ≤ SL
2-Chlorophenol	V	95-57-8	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	9.1		RSL	No SL	No	No	MDL ≤ SL
2-Methylnaphthalene	V	91-57-6	N/A		N/A		µg/L	0/1	0%	0.0063 – 0.0063	0.0063	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
2-Methylphenol		95-48-7	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	93		RSL	No SL	No	No	MDL ≤ SL
2-Nitroaniline		88-74-4	N/A		N/A		µg/L	0/1	0%	3.3 – 3.3	3.3	MDL	19		RSL	No SL	No	No	MDL ≤ SL
2-Nitrophenol		88-75-5	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
3,3'-Dichlorobenzidine		91-94-1	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	0.13		RSL	No SL	No	See DSA	MDL > SL
3-Nitroaniline		99-09-2	N/A		N/A		µg/L	0/1	0%	0.66 – 0.66	0.66	MDL	19	*	RSL	No SL	No	No	MDL ≤ SL
4,6-Dinitro-o-cresol		534-52-1	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.15		RSL	No SL	No	See DSA	MDL > SL
4-Bromophenyl phenyl ether	V	101-55-3	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Chloro-3-methyl phenol		59-50-7	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	140		RSL	No SL	No	No	MDL ≤ SL
4-Chloroaniline		106-47-8	N/A		N/A		µg/L	0/1	0%	4.5 – 4.5	4.5	MDL	0.37		RSL	No SL	No	See DSA	MDL > SL
4-Chlorophenyl phenyl ether	V	7005-72-3	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Methylphenol		106-44-5	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	37		RSL	No SL	No	No	MDL ≤ SL

Table A2-2
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0155)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0155

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
4-Nitroaniline		100-01-6	N/A		N/A		µg/L	0/1	0%	0.83 – 0.83	0.83	MDL	3.8		RSL	No SL	No	No	MDL ≤ SL
4-Nitrophenol		100-02-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
Acenaphthene	V	83-32-9	N/A		N/A		µg/L	0/1	0%	0.0058 – 0.0058	0.0058	MDL	53		RSL	No SL	No	No	MDL ≤ SL
Acenaphthylene	V	208-96-8	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	53	*	RSL	No SL	No	No	MDL ≤ SL
Acetophenone	V	98-86-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	190		RSL	No SL	No	No	MDL ≤ SL
Anthracene	V	120-12-7	N/A		N/A		µg/L	0/1	0%	0.01 – 0.01	0.01	MDL	180		RSL	No SL	No	No	MDL ≤ SL
Atrazine		1912-24-9	N/A		N/A		µg/L	0/1	0%	0.47 – 0.47	0.47	MDL	0.3		RSL	No SL	No	See DSA	MDL > SL
Benzaldehyde	V	100-52-7	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	19		RSL	No SL	No	No	MDL ≤ SL
Benzo(a)anthracene	V	56-55-3	N/A		N/A		µg/L	0/1	0%	0.009 – 0.009	0.009	MDL	0.03		RSL	62.3	No	No	MDL ≤ SL
Benzo(a)pyrene		50-32-8	N/A		N/A		µg/L	0/1	0%	0.016 – 0.016	0.016	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Benzo(b)fluoranthene		205-99-2	N/A		N/A		µg/L	0/1	0%	0.0078 – 0.0078	0.0078	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Benzo(g,h,i)perylene	V	191-24-2	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	12	*	RSL	No SL	No	No	MDL ≤ SL
Benzo(k)fluoranthene		207-08-9	N/A		N/A		µg/L	0/1	0%	0.0039 – 0.0039	0.0039	MDL	2.5		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethoxy)methane		111-91-1	N/A		N/A		µg/L	0/1	0%	2.8 – 2.8	2.8	MDL	5.9		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethyl)ether	V	111-44-4	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.014		RSL	17	No	See DSA	MDL > SL
bis(2-Chloroisopropyl)ether	V	108-60-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	71		RSL	No SL	No	No	MDL ≤ SL
bis(2-Ethylhexyl)phthalate		117-81-7	N/A		N/A		µg/L	0/1	0%	0.8 – 0.8	0.8	MDL	5.6		RSL	No SL	No	No	MDL ≤ SL
Butyl benzyl phthalate		85-68-7	N/A		N/A		µg/L	0/1	0%	1.4 – 1.4	1.4	MDL	16		RSL	No SL	No	No	MDL ≤ SL
Caprolactam		105-60-2	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	990		RSL	No SL	No	No	MDL ≤ SL
Carbazole	V	86-74-8	N/A		N/A		µg/L	0/1	0%	3.1 – 3.1	3.1	MDL	29	*	RSL	No SL	No	No	MDL ≤ SL
Chrysene		218-01-9	N/A		N/A		µg/L	0/1	0%	0.0051 – 0.0051	0.0051	MDL	25		RSL	No SL	No	No	MDL ≤ SL
Dibenzo(a,h)anthracene		53-70-3	N/A		N/A		µg/L	0/1	0%	0.0056 – 0.0056	0.0056	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Dibenzofuran	V	132-64-9	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	0.79		RSL	No SL	No	See DSA	MDL > SL
Diethyl phthalate		84-66-2	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	1500		RSL	No SL	No	No	MDL ≤ SL
Dimethyl phthalate		131-11-3	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	1500	*	RSL	No SL	No	No	MDL ≤ SL
Di-n-butyl phthalate		84-74-2	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	90		RSL	No SL	No	No	MDL ≤ SL
Di-n-octyl phthalate		117-84-0	N/A		N/A		µg/L	0/1	0%	0.63 – 0.63	0.63	MDL	20		RSL	No SL	No	No	MDL ≤ SL
Fluoranthene		206-44-0	N/A		N/A		µg/L	0/1	0%	0.011 – 0.011	0.011	MDL	80		RSL	No SL	No	No	MDL ≤ SL
Fluorene	V	86-73-7	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	29		RSL	No SL	No	No	MDL ≤ SL
Hexachlorobenzene	V	118-74-1	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.0098		RSL	0.133	See DSA	See DSA	MDL > SL
Hexachlorobutadiene	V	87-68-3	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	0.14		RSL	0.414	See DSA	See DSA	MDL > SL
Hexachloroethane	V	67-72-1	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	0.33		RSL	2.29	See DSA	See DSA	MDL > SL
Indeno(1,2,3-cd)pyrene		193-39-5	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Isophorone		78-59-1	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	78		RSL	No SL	No	No	MDL ≤ SL
Naphthalene	V	91-20-3	N/A		N/A		µg/L	0/1	0%	0.0073 – 0.0073	0.0073	MDL	0.12		RSL	6.29	No	No	MDL ≤ SL
Nitrobenzene	V	98-95-3	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	0.14		RSL	99.3	No	See DSA	MDL > SL
N-Nitroso-di-n-propylamine		621-64-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.011		RSL	No SL	No	See DSA	MDL > SL
N-Nitrosodiphenylamine		86-30-6	N/A		N/A		µg/L	0/1	0%	3.5 – 3.5	3.5	MDL	12		RSL	No SL	No	No	MDL ≤ SL
Pentachlorophenol		87-86-5	N/A		N/A		µg/L	0/1	0%	0.023 – 0.023	0.023	MDL	0.041		RSL	No SL	No	No	MDL ≤ SL
Phenanthrene	V	85-01-8	N/A		N/A		µg/L	0/1	0%	0.0083 – 0.0083	0.0083	MDL	180	*	RSL	No SL	No	No	MDL ≤ SL
Phenol		108-95-2	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	580		RSL	No SL	No	No	MDL ≤ SL

Table A2-2
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0155)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0155

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Pyrene	V	129-00-0	N/A		N/A		µg/L	0/1	0%	0.013 – 0.013	0.013	MDL	12		RSL	No SL	No	No	MDL ≤ SL
DIOX																			
Total PCDD/F TEQ (Mammal)	V	TEQ-M-DF	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
PCB																			
Total PCB TEQ (Mammal)	V	TEQ-M-PCB	2.6E-10		2.6E-10		µg/L	1/1	100%	N/A	2.6E-10	MDC	0.00000012	*	RSL	3.61E-05	No	No	MDC < SL
Total PCB Congener	V	TPCB_CON	0.00013	J	0.00013	J	µg/L	1/1	100%	N/A	0.00013	MDC	0.044	*	RSL	1.65	No	No	MDC < SL
Perfluorinated Compounds																			
Perfluorononanoic acid (PFNA)		375-95-1	N/A		N/A		µg/L	0/1	0%	0.0017 – 0.0017	0.0017	MDL	0.0059		RSL	No SL	No	No	MDL ≤ SL
Perfluorohexanesulfonic acid (PFHxS)		355-46-4	N/A		N/A		µg/L	0/1	0%	0.0017 – 0.0017	0.0017	MDL	0.039		RSL	No SL	No	No	MDL ≤ SL
Perfluorobutanesulfonic acid (PFBS)		375-73-5	N/A		N/A		µg/L	0/1	0%	0.00035 – 0.00035	0.00035	MDL	0.6		RSL	No SL	No	No	MDL ≤ SL
Perfluorooctanesulfonic acid (PFOS)		1763-23-1	0.00059	J	0.00059	J	µg/L	1/1	100%	0.00035 – 0.00035	0.00059	MDC	0.004		RSL	No SL	No	No	MDC < SL
Perfluorooctanoic acid (PFOA)		335-67-1	0.0012	J	0.0012	J	µg/L	1/1	100%	0.00035 – 0.00035	0.0012	MDC	0.006		RSL	No SL	No	No	MDC < SL
Total Metals																			
Aluminum		7429-90-5	180		180		µg/L	1/1	100%	4 – 4	180	MDC	2000		RSL	No SL	No	No	MDC < SL
Antimony		7440-36-0	N/A		N/A		µg/L	0/1	0%	0.32 – 0.32	0.32	MDL	0.78		RSL	No SL	No	No	MDL ≤ SL
Arsenic		7440-38-2	0.38	J	0.38	J	µg/L	1/1	100%	0.33 – 0.33	0.38	MDC	0.052		RSL	No SL	No	Yes	MDC ≥ SL
Barium		7440-39-3	1100		1100		µg/L	1/1	100%	1.9 – 1.9	1100	MDC	380		RSL	No SL	No	Yes	MDC ≥ SL
Beryllium		7440-41-7	1.5		1.5		µg/L	1/1	100%	0.17 – 0.17	1.5	MDC	2.5		RSL	No SL	No	No	MDC < SL
Cadmium		7440-43-9	0.33	J	0.33	J	µg/L	1/1	100%	0.14 – 0.14	0.33	MDC	0.18		RSL	No SL	No	Yes	MDC ≥ SL
Calcium		7440-70-2	8700		8700		µg/L	1/1	100%	120 – 120	8700	MDC	Nutrient		N/A	Nutrient	No	No	Classified as an essential nutrient
Chromium, Total		7440-47-3	0.73	J	0.73	J	µg/L	1/1	100%	0.32 – 0.32	0.73	MDC	2200	*	RSL	No SL	No	No	MDC < SL
Chromium, Hexavalent		18540-29-9	N/A		N/A		µg/L	0/1	0%	1 – 1	1	MDL	0.035		RSL	No SL	No	See DSA	MDL > SL
Cobalt		7440-48-4	15		15		µg/L	1/1	100%	0.19 – 0.19	15	MDC	0.6		RSL	No SL	No	Yes	MDC ≥ SL
Copper		7440-50-8	140		140		µg/L	1/1	100%	0.4 – 0.4	140	MDC	80		RSL	No SL	No	Yes	MDC ≥ SL
Iron		7439-89-6	N/A		N/A		µg/L	0/1	0%	54 – 54	54	MDL	1400		RSL	No SL	No	No	MDL ≤ SL
Lead		7439-92-1	23		23		µg/L	1/1	100%	0.21 – 0.21	23	MDC	15		RSL	No SL	No	Yes	MDC ≥ SL
Manganese		7439-96-5	120		120		µg/L	1/1	100%	0.17 – 0.17	120	MDC	43		RSL	No SL	No	Yes	MDC ≥ SL
Mercury		7439-97-6	N/A		N/A		µg/L	0/1	0%	0.06 – 0.06	0.06	MDL	0.2	*	RSL	No SL	No	No	MDL ≤ SL
Nickel		7440-02-0	8.8	JB+	8.8	JB+	µg/L	1/1	100%	0.2 – 0.2	8.8	MDC	39		RSL	No SL	No	No	MDC < SL
Selenium		7782-49-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	10		RSL	No SL	No	No	MDL ≤ SL
Silver		7440-22-4	N/A		N/A		µg/L	0/1	0%	0.18 – 0.18	0.18	MDL	9.4		RSL	No SL	No	No	MDL ≤ SL
Thallium		7440-28-0	N/A		N/A		µg/L	0/1	0%	0.23 – 0.23	0.23	MDL	0.02		RSL	No SL	No	See DSA	MDL > SL
Vanadium		7440-62-2	3.1	J	3.1	J	µg/L	1/1	100%	1.2 – 1.2	3.1	MDC	8.6		RSL	No SL	No	No	MDC < SL
Zinc		7440-66-6	270		270		µg/L	1/1	100%	1.6 – 1.6	270	MDC	600		RSL	No SL	No	No	MDC < SL
Total Cyanide																			
Cyanide	V	57-12-5	4.8	J	4.8	J	µg/L	1/1	100%	2.6 – 2.6	4.8	MDC	0.15		RSL	20.1	No	Yes	MDC ≥ SL

Notes:

% = Percent
AL = Action Level
CASRN = Chemical Abstracts Service Registry Number

Table A2-2
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0155)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current and Future
Medium:	Groundwater (Drinking Water)
Well:	0155

Chemical [1]	CASRN	Minimum Detected Concentration	Maximum Detected Concentration	Units	Detection Frequency	Range of Method Detection Limits	Screening Concentration	Screening Level [2, 3, 5, 6]	Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion

COPC = Chemical of Potential Concern
DSA = Data Sensitivity Analysis
HAL = Health Advisory Level
J = Indicates an estimated value
MCL = Maximum Contaminant Level
MDC = Maximum Detected Concentration
N/A = Not Applicable
ND = Non-Detect or Not Detected
"PFOA and PFOS Combined" = Combined total of the detected concentrations of PFOA and PFOS (non-detect results were not included in the summation).
RL = Reporting Limit
RSL = Regional Screening Level
µg/L = micrograms per liter
USEPA = United States Environmental Protection Agency
(1) "V" indicates that the chemical is volatile.
(2) Groundwater data screened against USEPA Tap Water RSLs, last updated May 2022 (TR = 1E-6, THQ = 0.1).
(3) An asterisk,"*", indicates surrogate toxicity information was used to derive a Screening Level (see Table A2-14).
(4) Groundwater data screened against USEPA Residential Groundwater VISLs, last updated May 2022 (TR = 1E-6, THQ = 0.1). Site-specific, system temperature was set to 20.5 Celsius (average of recorded temperatures taken in field).
(6) Lead is compared to the EPA tap water RSL of 15 µg/L, which represents the 90th percentile concentration of lead found in tap water samples collected nationwide (Lead and Copper Rule, 56 Federal Register 26460-26564, dated June 7, 1991) and is not a risk-based number, but rather an action level.

Table A2-3
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0170)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0170

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Volatile Organic Compounds (VOCs)																			
1,1,1-Trichloroethane	V	71-55-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	800		RSL	893	No	No	MDL ≤ SL
1,1,2,2-Tetrachloroethane	V	79-34-5	N/A		N/A		µg/L	0/1	0%	0.05 – 0.05	0.05	MDL	0.076		RSL	4.18	No	No	MDL ≤ SL
1,1,2-Trichloroethane	V	79-00-5	N/A		N/A		µg/L	0/1	0%	0.042 – 0.042	0.042	MDL	0.041		RSL	0.779	No	See DSA	MDL > SL
1,1,2-Trichlorotrifluoroethane (Freon 113)	V	76-13-1	N/A		N/A		µg/L	0/1	0%	0.099 – 0.099	0.099	MDL	1000		RSL	28.5	No	No	MDL ≤ SL
1,1-Dichloroethane	V	75-34-3	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	2.8		RSL	9.09	No	No	MDL ≤ SL
1,1-Dichloroethene	V	75-35-4	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	28		RSL	22.7	No	No	MDL ≤ SL
1,2,3-Trichlorobenzene	V	87-61-6	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	0.7		RSL	No SL	No	No	MDL ≤ SL
1,2,3-Trichloropropane	V	96-18-4	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	0.00075		RSL	2.89	No	See DSA	MDL > SL
1,2,4-Trichlorobenzene	V	120-82-1	N/A		N/A		µg/L	0/1	0%	0.068 – 0.068	0.068	MDL	0.4		RSL	4.97	No	No	MDL ≤ SL
1,2,4-Trimethylbenzene	V	95-63-6	N/A		N/A		µg/L	0/1	0%	0.051 – 0.051	0.051	MDL	5.6		RSL	33	No	No	MDL ≤ SL
1,2-Dibromo-3-chloropropane	V	96-12-8	N/A		N/A		µg/L	0/1	0%	0.14 – 0.14	0.14	MDL	0.00033		RSL	0.0381	See DSA	See DSA	MDL > SL
1,2-Dibromoethane	V	106-93-4	N/A		N/A		µg/L	0/1	0%	0.052 – 0.052	0.052	MDL	0.0075		RSL	0.221	No	See DSA	MDL > SL
1,2-Dichlorobenzene	V	95-50-1	N/A		N/A		µg/L	0/1	0%	0.045 – 0.045	0.045	MDL	30		RSL	351	No	No	MDL ≤ SL
1,2-Dichloroethane	V	107-06-2	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.17		RSL	2.74	No	No	MDL ≤ SL
1,2-Dichloropropane	V	78-87-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.82		RSL	4.44	No	No	MDL ≤ SL
1,3,5-Trimethylbenzene	V	108-67-8	N/A		N/A		µg/L	0/1	0%	0.067 – 0.067	0.067	MDL	6		RSL	23.2	No	No	MDL ≤ SL
1,3-Dichlorobenzene	V	541-73-1	N/A		N/A		µg/L	0/1	0%	0.071 – 0.071	0.071	MDL	30	*	RSL	351	No	No	MDL ≤ SL
1,4-Dichlorobenzene	V	106-46-7	N/A		N/A		µg/L	0/1	0%	0.047 – 0.047	0.047	MDL	0.48		RSL	3.42	No	No	MDL ≤ SL
1,4-Dioxane	V	123-91-1	N/A		N/A		µg/L	0/1	0%	0.9 – 0.9	0.9	MDL	0.46		RSL	3570	No	See DSA	MDL > SL
2-Butanone (MEK)	V	78-93-3	N/A		N/A		µg/L	0/1	0%	1.5 – 1.5	1.5	MDL	560		RSL	274000	No	No	MDL ≤ SL
2-Hexanone	V	591-78-6	N/A		N/A		µg/L	0/1	0%	0.68 – 0.68	0.68	MDL	3.8		RSL	1060	No	No	MDL ≤ SL
4-Methyl-2-pentanone (MIBK)	V	108-10-1	N/A		N/A		µg/L	0/1	0%	0.71 – 0.71	0.71	MDL	630		RSL	70200	No	No	MDL ≤ SL
Acetone	V	67-64-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	1800		RSL	No SL	No	No	MDL ≤ SL
Benzene	V	71-43-2	N/A		N/A		µg/L	0/1	0%	0.085 – 0.085	0.085	MDL	0.46		RSL	1.92	No	No	MDL ≤ SL
Bromochloromethane	V	74-97-5	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	8.3		RSL	83.9	No	No	MDL ≤ SL
Bromodichloromethane	V	75-27-4	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.13		RSL	1.08	No	No	MDL ≤ SL
Bromoform	V	75-25-2	N/A		N/A		µg/L	0/1	0%	0.095 – 0.095	0.095	MDL	3.3		RSL	152	No	No	MDL ≤ SL
Bromomethane	V	74-83-9	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	0.75		RSL	1.98	No	No	MDL ≤ SL
Carbon disulfide	V	75-15-0	N/A		N/A		µg/L	0/1	0%	0.092 – 0.092	0.092	MDL	81		RSL	145	No	No	MDL ≤ SL
Carbon tetrachloride	V	56-23-5	N/A		N/A		µg/L	0/1	0%	0.086 – 0.086	0.086	MDL	0.46		RSL	0.499	No	No	MDL ≤ SL
Chlorobenzene	V	108-90-7	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	7.8		RSL	51.9	No	No	MDL ≤ SL
Chloroethane	V	75-00-3	N/A		N/A		µg/L	0/1	0%	0.074 – 0.074	0.074	MDL	830		RSL	1050	No	No	MDL ≤ SL
Chloroform	V	67-66-3	1.4		1.4		µg/L	1/1	100%	0.079 – 0.079	1.4	MDC	0.22		RSL	0.972	Yes	Yes	MDC ≥ SL
Chloromethane	V	74-87-3	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	19		RSL	28.9	No	No	MDL ≤ SL
cis-1,2-Dichloroethene	V	156-59-2	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
cis-1,3-Dichloropropene	V	10061-01-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Cyclohexane	V	110-82-7	N/A		N/A		µg/L	0/1	0%	0.065 – 0.065	0.065	MDL	1300		RSL	123	No	No	MDL ≤ SL
Dibromochloromethane	V	124-48-1	N/A		N/A		µg/L	0/1	0%	0.073 – 0.073	0.073	MDL	0.87		RSL	No SL	No	No	MDL ≤ SL
Dichlorodifluoromethane	V	75-71-8	N/A		N/A		µg/L	0/1	0%	0.12 – 0.12	0.12	MDL	20		RSL	0.815	No	No	MDL ≤ SL
Ethylbenzene	V	100-41-4	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	1.5		RSL	4.45	No	No	MDL ≤ SL

Table A2-3
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0170)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0170

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Isopropylbenzene	V	98-82-8	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	45		RSL	121	No	No	MDL ≤ SL
m,p-Xylene	V	179601-23-1	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	19	*	RSL	45.5	No	No	MDL ≤ SL
Methyl Acetate	V	79-20-9	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	2000		RSL	No SL	No	No	MDL ≤ SL
Methyl Tert Butyl Ether	V	1634-04-4	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	14		RSL	533	No	No	MDL ≤ SL
Methylcyclohexane	V	108-87-2	N/A		N/A		µg/L	0/1	0%	0.08 – 0.08	0.08	MDL	1300	*	RSL	123	No	No	MDL ≤ SL
Methylene chloride	V	75-09-2	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	11		RSL	555	No	No	MDL ≤ SL
o-Xylene	V	95-47-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	19		RSL	63.3	No	No	MDL ≤ SL
Styrene	V	100-42-5	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	120		RSL	1210	No	No	MDL ≤ SL
Tetrachloroethene	V	127-18-4	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	4.1		RSL	7.25	No	No	MDL ≤ SL
Toluene	V	108-88-3	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	110		RSL	2390	No	No	MDL ≤ SL
trans-1,2-Dichloroethene	V	156-60-5	N/A		N/A		µg/L	0/1	0%	0.081 – 0.081	0.081	MDL	6.8		RSL	12.9	No	No	MDL ≤ SL
trans-1,3-Dichloropropene	V	10061-02-6	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Trichloroethene	V	79-01-6	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.28		RSL	0.632	No	No	MDL ≤ SL
Trichlorofluoromethane	V	75-69-4	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	520		RSL	No SL	No	No	MDL ≤ SL
Vinyl chloride	V	75-01-4	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.019		RSL	0.164	No	See DSA	MDL > SL
Semi-Volatile Organic Compounds (SVOCs)																			
1,1'-Biphenyl	V	92-52-4	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.083		RSL	4.71	No	See DSA	MDL > SL
1,2,4,5-Tetrachlorobenzene	V	95-94-3	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.017		RSL	No SL	No	See DSA	MDL > SL
1-Methylnaphthalene	V	90-12-0	N/A		N/A		µg/L	0/1	0%	0.0055 – 0.0055	0.0055	MDL	1.1		RSL	No SL	No	No	MDL ≤ SL
2,3,4,6-Tetrachlorophenol		58-90-2	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	24		RSL	No SL	No	No	MDL ≤ SL
2,4,5-Trichlorophenol		95-95-4	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	120		RSL	No SL	No	No	MDL ≤ SL
2,4,6-Trichlorophenol		88-06-2	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	1.2		RSL	No SL	No	See DSA	MDL > SL
2,4-Dichlorophenol		120-83-2	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4.6		RSL	No SL	No	No	MDL ≤ SL
2,4-Dimethylphenol		105-67-9	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	36		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrophenol		51-28-5	N/A		N/A		µg/L	0/1	0%	0.98 – 0.98	0.98	MDL	3.9		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrotoluene		121-14-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	0.24		RSL	No SL	No	See DSA	MDL > SL
2,6-Dinitrotoluene		606-20-2	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.049		RSL	No SL	No	See DSA	MDL > SL
2-Chloronaphthalene	V	91-58-7	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	75		RSL	No SL	No	No	MDL ≤ SL
2-Chlorophenol	V	95-57-8	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	9.1		RSL	No SL	No	No	MDL ≤ SL
2-Methylnaphthalene	V	91-57-6	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
2-Methylphenol		95-48-7	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	93		RSL	No SL	No	No	MDL ≤ SL
2-Nitroaniline		88-74-4	N/A		N/A		µg/L	0/1	0%	3.4 – 3.4	3.4	MDL	19		RSL	No SL	No	No	MDL ≤ SL
2-Nitrophenol		88-75-5	N/A		N/A		µg/L	0/1	0%	2.7 – 2.7	2.7	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
3,3'-Dichlorobenzidine		91-94-1	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	0.13		RSL	No SL	No	See DSA	MDL > SL
3-Nitroaniline		99-09-2	N/A		N/A		µg/L	0/1	0%	0.67 – 0.67	0.67	MDL	19	*	RSL	No SL	No	No	MDL ≤ SL
4,6-Dinitro-o-cresol		534-52-1	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.15		RSL	No SL	No	See DSA	MDL > SL
4-Bromophenyl phenyl ether	V	101-55-3	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Chloro-3-methyl phenol		59-50-7	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	140		RSL	No SL	No	No	MDL ≤ SL
4-Chloroaniline		106-47-8	N/A		N/A		µg/L	0/1	0%	4.6 – 4.6	4.6	MDL	0.37		RSL	No SL	No	See DSA	MDL > SL
4-Chlorophenyl phenyl ether	V	7005-72-3	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Methylphenol		106-44-5	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	37		RSL	No SL	No	No	MDL ≤ SL

Table A2-3
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0170)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0170

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
4-Nitroaniline		100-01-6	N/A		N/A		µg/L	0/1	0%	0.85 – 0.85	0.85	MDL	3.8		RSL	No SL	No	No	MDL ≤ SL
4-Nitrophenol		100-02-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
Acenaphthene	V	83-32-9	N/A		N/A		µg/L	0/1	0%	0.0061 – 0.0061	0.0061	MDL	53		RSL	No SL	No	No	MDL ≤ SL
Acenaphthylene	V	208-96-8	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	53	*	RSL	No SL	No	No	MDL ≤ SL
Acetophenone	V	98-86-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	190		RSL	No SL	No	No	MDL ≤ SL
Anthracene	V	120-12-7	N/A		N/A		µg/L	0/1	0%	0.011 – 0.011	0.011	MDL	180		RSL	No SL	No	No	MDL ≤ SL
Atrazine		1912-24-9	N/A		N/A		µg/L	0/1	0%	0.48 – 0.48	0.48	MDL	0.3		RSL	No SL	No	See DSA	MDL > SL
Benzaldehyde	V	100-52-7	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	19		RSL	No SL	No	No	MDL ≤ SL
Benzo(a)anthracene	V	56-55-3	N/A		N/A		µg/L	0/1	0%	0.0094 – 0.0094	0.0094	MDL	0.03		RSL	62.3	No	No	MDL ≤ SL
Benzo(a)pyrene		50-32-8	N/A		N/A		µg/L	0/1	0%	0.017 – 0.017	0.017	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Benzo(b)fluoranthene		205-99-2	N/A		N/A		µg/L	0/1	0%	0.0082 – 0.0082	0.0082	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Benzo(g,h,i)perylene	V	191-24-2	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	12	*	RSL	No SL	No	No	MDL ≤ SL
Benzo(k)fluoranthene		207-08-9	N/A		N/A		µg/L	0/1	0%	0.0041 – 0.0041	0.0041	MDL	2.5		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethoxy)methane		111-91-1	N/A		N/A		µg/L	0/1	0%	2.9 – 2.9	2.9	MDL	5.9		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethyl)ether	V	111-44-4	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.014		RSL	17	No	See DSA	MDL > SL
bis(2-Chloroisopropyl)ether	V	108-60-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	71		RSL	No SL	No	No	MDL ≤ SL
bis(2-Ethylhexyl)phthalate		117-81-7	N/A		N/A		µg/L	0/1	0%	0.82 – 0.82	0.82	MDL	5.6		RSL	No SL	No	No	MDL ≤ SL
Butyl benzyl phthalate		85-68-7	N/A		N/A		µg/L	0/1	0%	1.4 – 1.4	1.4	MDL	16		RSL	No SL	No	No	MDL ≤ SL
Caprolactam		105-60-2	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	990		RSL	No SL	No	No	MDL ≤ SL
Carbazole	V	86-74-8	N/A		N/A		µg/L	0/1	0%	3.2 – 3.2	3.2	MDL	29	*	RSL	No SL	No	No	MDL ≤ SL
Chrysene		218-01-9	N/A		N/A		µg/L	0/1	0%	0.0054 – 0.0054	0.0054	MDL	25		RSL	No SL	No	No	MDL ≤ SL
Dibenzo(a,h)anthracene		53-70-3	N/A		N/A		µg/L	0/1	0%	0.0059 – 0.0059	0.0059	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Dibenzofuran	V	132-64-9	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	0.79		RSL	No SL	No	See DSA	MDL > SL
Diethyl phthalate		84-66-2	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	1500		RSL	No SL	No	No	MDL ≤ SL
Dimethyl phthalate		131-11-3	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	1500	*	RSL	No SL	No	No	MDL ≤ SL
Di-n-butyl phthalate		84-74-2	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	90		RSL	No SL	No	No	MDL ≤ SL
Di-n-octyl phthalate		117-84-0	N/A		N/A		µg/L	0/1	0%	0.64 – 0.64	0.64	MDL	20		RSL	No SL	No	No	MDL ≤ SL
Fluoranthene		206-44-0	N/A		N/A		µg/L	0/1	0%	0.012 – 0.012	0.012	MDL	80		RSL	No SL	No	No	MDL ≤ SL
Fluorene	V	86-73-7	N/A		N/A		µg/L	0/1	0%	0.0072 – 0.0072	0.0072	MDL	29		RSL	No SL	No	No	MDL ≤ SL
Hexachlorobenzene	V	118-74-1	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.0098		RSL	0.133	See DSA	See DSA	MDL > SL
Hexachlorobutadiene	V	87-68-3	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	0.14		RSL	0.414	See DSA	See DSA	MDL > SL
Hexachlorocyclopentadiene	V	77-47-4	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	0.041		RSL	0.0786	See DSA	See DSA	MDL > SL
Hexachloroethane	V	67-72-1	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	0.33		RSL	2.29	See DSA	See DSA	MDL > SL
Indeno(1,2,3-cd)pyrene		193-39-5	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Isophorone		78-59-1	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	78		RSL	No SL	No	No	MDL ≤ SL
Naphthalene	V	91-20-3	N/A		N/A		µg/L	0/1	0%	0.0077 – 0.0077	0.0077	MDL	0.12		RSL	6.29	No	No	MDL ≤ SL
Nitrobenzene	V	98-95-3	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	0.14		RSL	99.3	No	See DSA	MDL > SL
N-Nitroso-di-n-propylamine		621-64-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.011		RSL	No SL	No	See DSA	MDL > SL
N-Nitrosodiphenylamine		86-30-6	N/A		N/A		µg/L	0/1	0%	3.6 – 3.6	3.6	MDL	12		RSL	No SL	No	No	MDL ≤ SL
Pentachlorophenol		87-86-5	N/A		N/A		µg/L	0/1	0%	0.024 – 0.024	0.024	MDL	0.041		RSL	No SL	No	No	MDL ≤ SL
Phenanthrene	V	85-01-8	N/A		N/A		µg/L	0/1	0%	0.0087 – 0.0087	0.0087	MDL	180	*	RSL	No SL	No	No	MDL ≤ SL

Table A2-3
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0170)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0170

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Phenol		108-95-2	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	580		RSL	No SL	No	No	MDL ≤ SL
Pyrene	V	129-00-0	N/A		N/A		µg/L	0/1	0%	0.014 – 0.014	0.014	MDL	12		RSL	No SL	No	No	MDL ≤ SL
DIOX																			
Total PCDD/F TEQ (Mammal)	V	TEQ-M-DF	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
PCB																			
Total PCB TEQ (Mammal)	V	TEQ-M-PCB	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
Total PCB Congener	V	TPCB_CON	0.00014	J	0.00014	J	µg/L	1/1	100%	N/A	0.00014	MDC	0.044	*	RSL	1.65	No	No	MDC < SL
Perfluorinated Compounds																			
Perfluorononanoic acid (PFNA)		375-95-1	0.0029		0.0029		µg/L	1/1	100%	0.0018 – 0.0018	0.0029	MDC	0.0059		RSL	No SL	No	No	MDC < SL
Perfluorohexanesulfonic acid (PFHxS)		355-46-4	0.0064		0.0064		µg/L	1/1	100%	0.0018 – 0.0018	0.0064	MDC	0.039		RSL	No SL	No	No	MDC < SL
Perfluorobutanesulfonic acid (PFBS)		375-73-5	0.31		0.31		µg/L	1/1	100%	0.0035 – 0.0035	0.31	MDC	0.6		RSL	No SL	No	No	MDC < SL
Perfluorooctanesulfonic acid (PFOS)		1763-23-1	0.26		0.26		µg/L	1/1	100%	0.0035 – 0.0035	0.26	MDC	0.004		RSL	No SL	No	Yes	MDC ≥ SL
Perfluorooctanoic acid (PFOA)		335-67-1	0.015		0.015		µg/L	1/1	100%	0.00035 – 0.00035	0.015	MDC	0.006		RSL	No SL	No	Yes	MDC ≥ SL
Total Metals																			
Aluminum		7429-90-5	110		110		µg/L	1/1	100%	4 – 4	110	MDC	2000		RSL	No SL	No	No	MDC < SL
Antimony		7440-36-0	N/A		N/A		µg/L	0/1	0%	0.32 – 0.32	0.32	MDL	0.78		RSL	No SL	No	No	MDL ≤ SL
Arsenic		7440-38-2	N/A		N/A		µg/L	0/1	0%	0.33 – 0.33	0.33	MDL	0.052		RSL	No SL	No	See DSA	MDL > SL
Barium		7440-39-3	69		69		µg/L	1/1	100%	1.9 – 1.9	69	MDC	380		RSL	No SL	No	No	MDC < SL
Beryllium		7440-41-7	0.34	J	0.34	J	µg/L	1/1	100%	0.17 – 0.17	0.34	MDC	2.5		RSL	No SL	No	No	MDC < SL
Cadmium		7440-43-9	N/A		N/A		µg/L	0/1	0%	0.14 – 0.14	0.14	MDL	0.18		RSL	No SL	No	No	MDL ≤ SL
Calcium		7440-70-2	9500		9500		µg/L	1/1	100%	120 – 120	9500	MDC	Nutrient		N/A	Nutrient	No	No	Classified as an essential nutrient
Chromium, Total		7440-47-3	6.6	J+	6.6	J+	µg/L	1/1	100%	0.32 – 0.32	6.6	MDC	2200	*	RSL	No SL	No	No	MDC < SL
Chromium, Hexavalent		18540-29-9	5.87		5.87		µg/L	1/1	100%	5.9 – 5.9	5.87	MDC	0.035		RSL	No SL	No	Yes	MDC ≥ SL
Cobalt		7440-48-4	6.5		6.5		µg/L	1/1	100%	0.19 – 0.19	6.5	MDC	0.6		RSL	No SL	No	Yes	MDC ≥ SL
Copper		7440-50-8	63		63		µg/L	1/1	100%	0.4 – 0.4	63	MDC	80		RSL	No SL	No	No	MDC < SL
Iron		7439-89-6	N/A		N/A		µg/L	0/1	0%	54 – 54	54	MDL	1400		RSL	No SL	No	No	MDL ≤ SL
Lead		7439-92-1	2.5		2.5		µg/L	1/1	100%	0.21 – 0.21	2.5	MDC	15		RSL	No SL	No	No	MDC < SL
Manganese		7439-96-5	40	J+	40	J+	µg/L	1/1	100%	0.17 – 0.17	40	MDC	43		RSL	No SL	No	No	MDC < SL
Mercury		7439-97-6	N/A		N/A		µg/L	0/1	0%	0.06 – 0.06	0.06	MDL	0.2	*	RSL	No SL	No	No	MDL ≤ SL
Nickel		7440-02-0	53		53		µg/L	1/1	100%	0.2 – 0.2	53	MDC	39		RSL	No SL	No	Yes	MDC ≥ SL
Selenium		7782-49-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	10		RSL	No SL	No	No	MDL ≤ SL
Silver		7440-22-4	N/A		N/A		µg/L	0/1	0%	0.18 – 0.18	0.18	MDL	9.4		RSL	No SL	No	No	MDL ≤ SL
Thallium		7440-28-0	N/A		N/A		µg/L	0/1	0%	0.23 – 0.23	0.23	MDL	0.02		RSL	No SL	No	See DSA	MDL > SL
Vanadium		7440-62-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	8.6		RSL	No SL	No	No	MDL ≤ SL
Zinc		7440-66-6	38		38		µg/L	1/1	100%	1.6 – 1.6	38	MDC	600		RSL	No SL	No	No	MDC < SL
Total Cyanide																			
Cyanide	V	57-12-5	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	0.15		RSL	20.1	No	See DSA	MDL > SL

Notes:
% = Percent
AL = Action Level

Table A2-3
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0170)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current and Future
Medium:	Groundwater (Drinking Water)
Well:	0170

Chemical [1]	CASRN	Minimum Detected Concentration	Maximum Detected Concentration	Units	Detection Frequency	Range of Method Detection Limits	Screening Concentration	Screening Level [2, 3, 5, 6]	Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion

CASRN = Chemical Abstracts Service Registry Number
COPC = Chemical of Potential Concern
DSA = Data Sensitivity Analysis
HAL = Health Advisory Level
J = Indicates an estimated value
J+ = The result is an estimated quantity, but the result may be biased high.
MCL = Maximum Contaminant Level
MDC = Maximum Detected Concentration
N/A = Not Applicable
ND = Non-Detect or Not Detected
"PFOA and PFOS Combined" = Combined total of the detected concentrations of PFOA and PFOS (non-detect results were not included in the summation).
RL = Reporting Limit
RSL = Regional Screening Level
µg/L = micrograms per liter
USEPA = United States Environmental Protection Agency
(1) "V" indicates that the chemical is volatile.
(2) Groundwater data screened against USEPA Tap Water RSLs, last updated May 2022 (TR = 1E-6, THQ = 0.1).
(3) An asterisk,"*", indicates surrogate toxicity information was used to derive a Screening Level (see Table A2-14).
(4) Groundwater data screened against USEPA Residential Groundwater VISLs, last updated May 2022 (TR = 1E-6, THQ = 0.1). Site-specific, system temperature was set to 20.5 Celsius (average of recorded temperatures taken in field).
(6) Lead is compared to the EPA tap water RSL of 15 µg/L, which represents the 90th percentile concentration of lead found in tap water samples collected nationwide (Lead and Copper Rule, 56 Federal Register 26460-26564, dated June 7, 1991) and is not a risk-based number, but rather an action level.

Table A2-4
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0173)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0173

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Volatile Organic Compounds (VOCs)																			
1,1,1-Trichloroethane	V	71-55-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	800		RSL	893	No	No	MDL ≤ SL
1,1,2,2-Tetrachloroethane	V	79-34-5	N/A		N/A		µg/L	0/1	0%	0.05 – 0.05	0.05	MDL	0.076		RSL	4.18	No	No	MDL ≤ SL
1,1,2-Trichloroethane	V	79-00-5	N/A		N/A		µg/L	0/1	0%	0.042 – 0.042	0.042	MDL	0.041		RSL	0.779	No	See DSA	MDL > SL
1,1,2-Trichlorotrifluoroethane (Freon 113)	V	76-13-1	N/A		N/A		µg/L	0/1	0%	0.099 – 0.099	0.099	MDL	1000		RSL	28.5	No	No	MDL ≤ SL
1,1-Dichloroethane	V	75-34-3	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	2.8		RSL	9.09	No	No	MDL ≤ SL
1,1-Dichloroethene	V	75-35-4	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	28		RSL	22.7	No	No	MDL ≤ SL
1,2,3-Trichlorobenzene	V	87-61-6	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	0.7		RSL	No SL	No	No	MDL ≤ SL
1,2,3-Trichloropropane	V	96-18-4	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	0.00075		RSL	2.89	No	See DSA	MDL > SL
1,2,4-Trichlorobenzene	V	120-82-1	N/A		N/A		µg/L	0/1	0%	0.068 – 0.068	0.068	MDL	0.4		RSL	4.97	No	No	MDL ≤ SL
1,2,4-Trimethylbenzene	V	95-63-6	N/A		N/A		µg/L	0/1	0%	0.051 – 0.051	0.051	MDL	5.6		RSL	33	No	No	MDL ≤ SL
1,2-Dibromo-3-chloropropane	V	96-12-8	N/A		N/A		µg/L	0/1	0%	0.14 – 0.14	0.14	MDL	0.00033		RSL	0.0381	See DSA	See DSA	MDL > SL
1,2-Dibromoethane	V	106-93-4	N/A		N/A		µg/L	0/1	0%	0.052 – 0.052	0.052	MDL	0.0075		RSL	0.221	No	See DSA	MDL > SL
1,2-Dichlorobenzene	V	95-50-1	N/A		N/A		µg/L	0/1	0%	0.045 – 0.045	0.045	MDL	30		RSL	351	No	No	MDL ≤ SL
1,2-Dichloroethane	V	107-06-2	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.17		RSL	2.74	No	No	MDL ≤ SL
1,2-Dichloropropane	V	78-87-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.82		RSL	4.44	No	No	MDL ≤ SL
1,3,5-Trimethylbenzene	V	108-67-8	N/A		N/A		µg/L	0/1	0%	0.067 – 0.067	0.067	MDL	6		RSL	23.2	No	No	MDL ≤ SL
1,3-Dichlorobenzene	V	541-73-1	N/A		N/A		µg/L	0/1	0%	0.071 – 0.071	0.071	MDL	30	*	RSL	351	No	No	MDL ≤ SL
1,4-Dichlorobenzene	V	106-46-7	N/A		N/A		µg/L	0/1	0%	0.047 – 0.047	0.047	MDL	0.48		RSL	3.42	No	No	MDL ≤ SL
1,4-Dioxane	V	123-91-1	N/A		N/A		µg/L	0/1	0%	0.86 – 0.86	0.86	MDL	0.46		RSL	3570	No	See DSA	MDL > SL
2-Butanone (MEK)	V	78-93-3	N/A		N/A		µg/L	0/1	0%	1.5 – 1.5	1.5	MDL	560		RSL	274000	No	No	MDL ≤ SL
2-Hexanone	V	591-78-6	N/A		N/A		µg/L	0/1	0%	0.68 – 0.68	0.68	MDL	3.8		RSL	1060	No	No	MDL ≤ SL
4-Methyl-2-pentanone (MIBK)	V	108-10-1	N/A		N/A		µg/L	0/1	0%	0.71 – 0.71	0.71	MDL	630		RSL	70200	No	No	MDL ≤ SL
Acetone	V	67-64-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	1800		RSL	No SL	No	No	MDL ≤ SL
Benzene	V	71-43-2	N/A		N/A		µg/L	0/1	0%	0.085 – 0.085	0.085	MDL	0.46		RSL	1.92	No	No	MDL ≤ SL
Bromochloromethane	V	74-97-5	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	8.3		RSL	83.9	No	No	MDL ≤ SL
Bromodichloromethane	V	75-27-4	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.13		RSL	1.08	No	No	MDL ≤ SL
Bromoform	V	75-25-2	N/A		N/A		µg/L	0/1	0%	0.095 – 0.095	0.095	MDL	3.3		RSL	152	No	No	MDL ≤ SL
Bromomethane	V	74-83-9	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	0.75		RSL	1.98	No	No	MDL ≤ SL
Carbon disulfide	V	75-15-0	N/A		N/A		µg/L	0/1	0%	0.092 – 0.092	0.092	MDL	81		RSL	145	No	No	MDL ≤ SL
Carbon tetrachloride	V	56-23-5	N/A		N/A		µg/L	0/1	0%	0.086 – 0.086	0.086	MDL	0.46		RSL	0.499	No	No	MDL ≤ SL
Chlorobenzene	V	108-90-7	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	7.8		RSL	51.9	No	No	MDL ≤ SL
Chloroethane	V	75-00-3	N/A		N/A		µg/L	0/1	0%	0.074 – 0.074	0.074	MDL	830		RSL	1050	No	No	MDL ≤ SL
Chloroform	V	67-66-3	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.22		RSL	0.972	No	No	MDL ≤ SL
Chloromethane	V	74-87-3	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	19		RSL	28.9	No	No	MDL ≤ SL
cis-1,2-Dichloroethene	V	156-59-2	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
cis-1,3-Dichloropropene	V	10061-01-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Cyclohexane	V	110-82-7	N/A		N/A		µg/L	0/1	0%	0.065 – 0.065	0.065	MDL	1300		RSL	123	No	No	MDL ≤ SL
Dibromochloromethane	V	124-48-1	N/A		N/A		µg/L	0/1	0%	0.073 – 0.073	0.073	MDL	0.87		RSL	No SL	No	No	MDL ≤ SL
Dichlorodifluoromethane	V	75-71-8	N/A		N/A		µg/L	0/1	0%	0.12 – 0.12	0.12	MDL	20		RSL	0.815	No	No	MDL ≤ SL
Ethylbenzene	V	100-41-4	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	1.5		RSL	4.45	No	No	MDL ≤ SL

Table A2-4
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0173)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0173

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Isopropylbenzene	V	98-82-8	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	45		RSL	121	No	No	MDL ≤ SL
m,p-Xylene	V	179601-23-1	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	19	*	RSL	45.5	No	No	MDL ≤ SL
Methyl Acetate	V	79-20-9	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	2000		RSL	No SL	No	No	MDL ≤ SL
Methyl Tert Butyl Ether	V	1634-04-4	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	14		RSL	533	No	No	MDL ≤ SL
Methylcyclohexane	V	108-87-2	N/A		N/A		µg/L	0/1	0%	0.08 – 0.08	0.08	MDL	1300	*	RSL	123	No	No	MDL ≤ SL
Methylene chloride	V	75-09-2	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	11		RSL	555	No	No	MDL ≤ SL
o-Xylene	V	95-47-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	19		RSL	63.3	No	No	MDL ≤ SL
Styrene	V	100-42-5	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	120		RSL	1210	No	No	MDL ≤ SL
Tetrachloroethene	V	127-18-4	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	4.1		RSL	7.25	No	No	MDL ≤ SL
Toluene	V	108-88-3	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	110		RSL	2390	No	No	MDL ≤ SL
trans-1,2-Dichloroethene	V	156-60-5	N/A		N/A		µg/L	0/1	0%	0.081 – 0.081	0.081	MDL	6.8		RSL	12.9	No	No	MDL ≤ SL
trans-1,3-Dichloropropene	V	10061-02-6	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Trichloroethene	V	79-01-6	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.28		RSL	0.632	No	No	MDL ≤ SL
Trichlorofluoromethane	V	75-69-4	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	520		RSL	No SL	No	No	MDL ≤ SL
Vinyl chloride	V	75-01-4	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.019		RSL	0.164	No	See DSA	MDL > SL
Semi-Volatile Organic Compounds (SVOCs)																			
1,1'-Biphenyl	V	92-52-4	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	0.083		RSL	4.71	No	See DSA	MDL > SL
1,2,4,5-Tetrachlorobenzene	V	95-94-3	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	0.017		RSL	No SL	No	See DSA	MDL > SL
1-Methylnaphthalene	V	90-12-0	N/A		N/A		µg/L	0/1	0%	0.0052 – 0.0052	0.0052	MDL	1.1		RSL	No SL	No	No	MDL ≤ SL
2,3,4,6-Tetrachlorophenol		58-90-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	24		RSL	No SL	No	No	MDL ≤ SL
2,4,5-Trichlorophenol		95-95-4	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	120		RSL	No SL	No	No	MDL ≤ SL
2,4,6-Trichlorophenol		88-06-2	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	1.2		RSL	No SL	No	See DSA	MDL > SL
2,4-Dichlorophenol		120-83-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	4.6		RSL	No SL	No	No	MDL ≤ SL
2,4-Dimethylphenol		105-67-9	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	36		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrophenol		51-28-5	N/A		N/A		µg/L	0/1	0%	0.93 – 0.93	0.93	MDL	3.9		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrotoluene		121-14-2	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.24		RSL	No SL	No	See DSA	MDL > SL
2,6-Dinitrotoluene		606-20-2	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	0.049		RSL	No SL	No	See DSA	MDL > SL
2-Chloronaphthalene	V	91-58-7	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	75		RSL	No SL	No	No	MDL ≤ SL
2-Chlorophenol	V	95-57-8	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	9.1		RSL	No SL	No	No	MDL ≤ SL
2-Methylnaphthalene	V	91-57-6	N/A		N/A		µg/L	0/1	0%	0.0063 – 0.0063	0.0063	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
2-Methylphenol		95-48-7	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	93		RSL	No SL	No	No	MDL ≤ SL
2-Nitroaniline		88-74-4	N/A		N/A		µg/L	0/1	0%	3.2 – 3.2	3.2	MDL	19		RSL	No SL	No	No	MDL ≤ SL
2-Nitrophenol		88-75-5	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
3,3'-Dichlorobenzidine		91-94-1	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	0.13		RSL	No SL	No	See DSA	MDL > SL
3-Nitroaniline		99-09-2	N/A		N/A		µg/L	0/1	0%	0.64 – 0.64	0.64	MDL	19	*	RSL	No SL	No	No	MDL ≤ SL
4,6-Dinitro-o-cresol		534-52-1	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	0.15		RSL	No SL	No	See DSA	MDL > SL
4-Bromophenyl phenyl ether	V	101-55-3	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Chloro-3-methyl phenol		59-50-7	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	140		RSL	No SL	No	No	MDL ≤ SL
4-Chloroaniline		106-47-8	N/A		N/A		µg/L	0/1	0%	4.4 – 4.4	4.4	MDL	0.37		RSL	No SL	No	See DSA	MDL > SL
4-Chlorophenyl phenyl ether	V	7005-72-3	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Methylphenol		106-44-5	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	37		RSL	No SL	No	No	MDL ≤ SL

Table A2-4
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0173)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0173

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
4-Nitroaniline		100-01-6	N/A		N/A		µg/L	0/1	0%	0.81 – 0.81	0.81	MDL	3.8		RSL	No SL	No	No	MDL ≤ SL
4-Nitrophenol		100-02-7	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
Acenaphthene	V	83-32-9	N/A		N/A		µg/L	0/1	0%	0.0058 – 0.0058	0.0058	MDL	53		RSL	No SL	No	No	MDL ≤ SL
Acenaphthylene	V	208-96-8	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	53	*	RSL	No SL	No	No	MDL ≤ SL
Acetophenone	V	98-86-2	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	190		RSL	No SL	No	No	MDL ≤ SL
Anthracene	V	120-12-7	N/A		N/A		µg/L	0/1	0%	0.01 – 0.01	0.01	MDL	180		RSL	No SL	No	No	MDL ≤ SL
Atrazine		1912-24-9	N/A		N/A		µg/L	0/1	0%	0.46 – 0.46	0.46	MDL	0.3		RSL	No SL	No	See DSA	MDL > SL
Benzaldehyde	V	100-52-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	19		RSL	No SL	No	No	MDL ≤ SL
Benzo(a)anthracene	V	56-55-3	N/A		N/A		µg/L	0/1	0%	0.009 – 0.009	0.009	MDL	0.03		RSL	62.3	No	No	MDL ≤ SL
Benzo(a)pyrene		50-32-8	N/A		N/A		µg/L	0/1	0%	0.016 – 0.016	0.016	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Benzo(b)fluoranthene		205-99-2	N/A		N/A		µg/L	0/1	0%	0.0078 – 0.0078	0.0078	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Benzo(g,h,i)perylene	V	191-24-2	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	12	*	RSL	No SL	No	No	MDL ≤ SL
Benzo(k)fluoranthene		207-08-9	N/A		N/A		µg/L	0/1	0%	0.0039 – 0.0039	0.0039	MDL	2.5		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethoxy)methane		111-91-1	N/A		N/A		µg/L	0/1	0%	2.8 – 2.8	2.8	MDL	5.9		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethyl)ether	V	111-44-4	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	0.014		RSL	17	No	See DSA	MDL > SL
bis(2-Chloroisopropyl)ether	V	108-60-1	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	71		RSL	No SL	No	No	MDL ≤ SL
bis(2-Ethylhexyl)phthalate		117-81-7	N/A		N/A		µg/L	0/1	0%	0.78 – 0.78	0.78	MDL	5.6		RSL	No SL	No	No	MDL ≤ SL
Butyl benzyl phthalate		85-68-7	N/A		N/A		µg/L	0/1	0%	1.3 – 1.3	1.3	MDL	16		RSL	No SL	No	No	MDL ≤ SL
Caprolactam		105-60-2	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	990		RSL	No SL	No	No	MDL ≤ SL
Carbazole	V	86-74-8	N/A		N/A		µg/L	0/1	0%	3 – 3	3	MDL	29	*	RSL	No SL	No	No	MDL ≤ SL
Chrysene		218-01-9	N/A		N/A		µg/L	0/1	0%	0.0051 – 0.0051	0.0051	MDL	25		RSL	No SL	No	No	MDL ≤ SL
Dibenzo(a,h)anthracene		53-70-3	N/A		N/A		µg/L	0/1	0%	0.0056 – 0.0056	0.0056	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Dibenzofuran	V	132-64-9	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.79		RSL	No SL	No	See DSA	MDL > SL
Diethyl phthalate		84-66-2	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	1500		RSL	No SL	No	No	MDL ≤ SL
Dimethyl phthalate		131-11-3	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	1500	*	RSL	No SL	No	No	MDL ≤ SL
Di-n-butyl phthalate		84-74-2	N/A		N/A		µg/L	0/1	0%	1.5 – 1.5	1.5	MDL	90		RSL	No SL	No	No	MDL ≤ SL
Di-n-octyl phthalate		117-84-0	N/A		N/A		µg/L	0/1	0%	0.61 – 0.61	0.61	MDL	20		RSL	No SL	No	No	MDL ≤ SL
Fluoranthene		206-44-0	N/A		N/A		µg/L	0/1	0%	0.011 – 0.011	0.011	MDL	80		RSL	No SL	No	No	MDL ≤ SL
Fluorene	V	86-73-7	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	29		RSL	No SL	No	No	MDL ≤ SL
Hexachlorobenzene	V	118-74-1	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	0.0098		RSL	0.133	See DSA	See DSA	MDL > SL
Hexachlorobutadiene	V	87-68-3	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	0.14		RSL	0.414	See DSA	See DSA	MDL > SL
Hexachloroethane	V	67-72-1	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	0.33		RSL	2.29	See DSA	See DSA	MDL > SL
Indeno(1,2,3-cd)pyrene		193-39-5	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Isophorone		78-59-1	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	78		RSL	No SL	No	No	MDL ≤ SL
Naphthalene	V	91-20-3	N/A		N/A		µg/L	0/1	0%	0.0073 – 0.0073	0.0073	MDL	0.12		RSL	6.29	No	No	MDL ≤ SL
Nitrobenzene	V	98-95-3	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.14		RSL	99.3	No	See DSA	MDL > SL
N-Nitroso-di-n-propylamine		621-64-7	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	0.011		RSL	No SL	No	See DSA	MDL > SL
N-Nitrosodiphenylamine		86-30-6	N/A		N/A		µg/L	0/1	0%	3.4 – 3.4	3.4	MDL	12		RSL	No SL	No	No	MDL ≤ SL
Pentachlorophenol		87-86-5	N/A		N/A		µg/L	0/1	0%	0.023 – 0.023	0.023	MDL	0.041		RSL	No SL	No	No	MDL ≤ SL
Phenanthrene	V	85-01-8	N/A		N/A		µg/L	0/1	0%	0.0083 – 0.0083	0.0083	MDL	180	*	RSL	No SL	No	No	MDL ≤ SL
Phenol		108-95-2	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	580		RSL	No SL	No	No	MDL ≤ SL

Table A2-4
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0173)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0173

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Pyrene	V	129-00-0	N/A		N/A		µg/L	0/1	0%	0.013 – 0.013	0.013	MDL	12		RSL	No SL	No	No	MDL ≤ SL
DIOX																			
Total PCDD/F TEQ (Mammal)	V	TEQ-M-DF	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
PCB																			
Total PCB TEQ (Mammal)	V	TEQ-M-PCB	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
Total PCB Congener	V	TPCB_CON	0.000049	J	0.000049	J	µg/L	1/1	100%	N/A	0.000049	MDC	0.044	*	RSL	1.65	No	No	MDC < SL
Perfluorinated Compounds																			
Perfluorononanoic acid (PFNA)		375-95-1	N/A		N/A		µg/L	0/1	0%	0.0018 – 0.0018	0.0018	MDL	0.0059		RSL	No SL	No	No	MDL ≤ SL
Perfluorohexanesulfonic acid (PFHxS)		355-46-4	0.00086	J	0.00086	J	µg/L	1/1	100%	0.0018 – 0.0018	0.00086	MDC	0.039		RSL	No SL	No	No	MDC < SL
Perfluorobutanesulfonic acid (PFBS)		375-73-5	0.0078		0.0078		µg/L	1/1	100%	0.00035 – 0.00035	0.0078	MDC	0.6		RSL	No SL	No	No	MDC < SL
Perfluorooctanesulfonic acid (PFOS)		1763-23-1	0.024	J	0.024	J	µg/L	1/1	100%	0.00035 – 0.00035	0.024	MDC	0.004		RSL	No SL	No	Yes	MDC ≥ SL
Perfluorooctanoic acid (PFOA)		335-67-1	0.0023		0.0023		µg/L	1/1	100%	0.00035 – 0.00035	0.0023	MDC	0.006		RSL	No SL	No	No	MDC < SL
Total Metals																			
Aluminum		7429-90-5	85		85		µg/L	1/1	100%	4 – 4	85	MDC	2000		RSL	No SL	No	No	MDC < SL
Antimony		7440-36-0	N/A		N/A		µg/L	0/1	0%	0.32 – 0.32	0.32	MDL	0.78		RSL	No SL	No	No	MDL ≤ SL
Arsenic		7440-38-2	N/A		N/A		µg/L	0/1	0%	0.33 – 0.33	0.33	MDL	0.052		RSL	No SL	No	See DSA	MDL > SL
Barium		7440-39-3	430		430		µg/L	1/1	100%	1.9 – 1.9	430	MDC	380		RSL	No SL	No	Yes	MDC ≥ SL
Beryllium		7440-41-7	1.1		1.1		µg/L	1/1	100%	0.17 – 0.17	1.1	MDC	2.5		RSL	No SL	No	No	MDC < SL
Cadmium		7440-43-9	0.16	J	0.16	J	µg/L	1/1	100%	0.14 – 0.14	0.16	MDC	0.18		RSL	No SL	No	No	MDC < SL
Calcium		7440-70-2	6800		6800		µg/L	1/1	100%	120 – 120	6800	MDC	Nutrient		N/A	Nutrient	No	No	Classified as an essential nutrient
Chromium, Total		7440-47-3	0.63	J	0.63	J	µg/L	1/1	100%	0.32 – 0.32	0.63	MDC	2200	*	RSL	No SL	No	No	MDC < SL
Chromium, Hexavalent		18540-29-9	N/A		N/A		µg/L	0/1	0%	1 – 1	1	MDL	0.035		RSL	No SL	No	See DSA	MDL > SL
Cobalt		7440-48-4	22		22		µg/L	1/1	100%	0.19 – 0.19	22	MDC	0.6		RSL	No SL	No	Yes	MDC ≥ SL
Copper		7440-50-8	60		60		µg/L	1/1	100%	0.4 – 0.4	60	MDC	80		RSL	No SL	No	No	MDC < SL
Iron		7439-89-6	N/A		N/A		µg/L	0/1	0%	54 – 54	54	MDL	1400		RSL	No SL	No	No	MDL ≤ SL
Lead		7439-92-1	2.9		2.9		µg/L	1/1	100%	0.21 – 0.21	2.9	MDC	15		RSL	No SL	No	No	MDC < SL
Manganese		7439-96-5	220		220		µg/L	1/1	100%	0.17 – 0.17	220	MDC	43		RSL	No SL	No	Yes	MDC ≥ SL
Mercury		7439-97-6	N/A		N/A		µg/L	0/1	0%	0.06 – 0.06	0.06	MDL	0.2	*	RSL	No SL	No	No	MDL ≤ SL
Nickel		7440-02-0	7.3	JB+	7.3	JB+	µg/L	1/1	100%	0.2 – 0.2	7.3	MDC	39		RSL	No SL	No	No	MDC < SL
Selenium		7782-49-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	10		RSL	No SL	No	No	MDL ≤ SL
Silver		7440-22-4	N/A		N/A		µg/L	0/1	0%	0.18 – 0.18	0.18	MDL	9.4		RSL	No SL	No	No	MDL ≤ SL
Thallium		7440-28-0	N/A		N/A		µg/L	0/1	0%	0.23 – 0.23	0.23	MDL	0.02		RSL	No SL	No	See DSA	MDL > SL
Vanadium		7440-62-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	8.6		RSL	No SL	No	No	MDL ≤ SL
Zinc		7440-66-6	70		70		µg/L	1/1	100%	1.6 – 1.6	70	MDC	600		RSL	No SL	No	No	MDC < SL
Total Cyanide																			
Cyanide	V	57-12-5	9.5	J	9.5	J	µg/L	1/1	100%	2.6 – 2.6	9.5	MDC	0.15		RSL	20.1	No	Yes	MDC ≥ SL

Notes:

% = Percent
AL = Action Level
CASRN = Chemical Abstracts Service Registry Number

Table A2-4
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0173)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current and Future
Medium:	Groundwater (Drinking Water)
Well:	0173

Chemical [1]	CASRN	Minimum Detected Concentration	Maximum Detected Concentration	Units	Detection Frequency	Range of Method Detection Limits	Screening Concentration	Screening Level [2, 3, 5, 6]	Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion

COPC = Chemical of Potential Concern
DSA = Data Sensitivity Analysis
HAL = Health Advisory Level
J = Indicates an estimated value
MCL = Maximum Contaminant Level
MDC = Maximum Detected Concentration
N/A = Not Applicable
ND = Non-Detect or Not Detected
"PFOA and PFOS Combined" = Combined total of the detected concentrations of PFOA and PFOS (non-detect results were not included in the summation).
RL = Reporting Limit
RSL = Regional Screening Level
µg/L = micrograms per liter
USEPA = United States Environmental Protection Agency
(1) "V" indicates that the chemical is volatile.
(2) Groundwater data screened against USEPA Tap Water RSLs, last updated May 2022 (TR = 1E-6, THQ = 0.1).
(3) An asterisk,"*", indicates surrogate toxicity information was used to derive a Screening Level (see Table A2-14).
(4) Groundwater data screened against USEPA Residential Groundwater VISLs, last updated May 2022 (TR = 1E-6, THQ = 0.1). Site-specific, system temperature was set to 20.5 Celsius (average of recorded temperatures taken in field).
(6) Lead is compared to the EPA tap water RSL of 15 µg/L, which represents the 90th percentile concentration of lead found in tap water samples collected nationwide (Lead and Copper Rule, 56 Federal Register 26460-26564, dated June 7, 1991) and is not a risk-based number, but rather an action level.

Table A2-5
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0176)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0176

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Volatile Organic Compounds (VOCs)																			
1,1,1-Trichloroethane	V	71-55-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	800		RSL	893	No	No	MDL ≤ SL
1,1,2,2-Tetrachloroethane	V	79-34-5	N/A		N/A		µg/L	0/1	0%	0.05 – 0.05	0.05	MDL	0.076		RSL	4.18	No	No	MDL ≤ SL
1,1,2-Trichloroethane	V	79-00-5	N/A		N/A		µg/L	0/1	0%	0.042 – 0.042	0.042	MDL	0.041		RSL	0.779	No	See DSA	MDL > SL
1,1,2-Trichlorotrifluoroethane (Freon 113)	V	76-13-1	N/A		N/A		µg/L	0/1	0%	0.099 – 0.099	0.099	MDL	1000		RSL	28.5	No	No	MDL ≤ SL
1,1-Dichloroethane	V	75-34-3	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	2.8		RSL	9.09	No	No	MDL ≤ SL
1,1-Dichloroethene	V	75-35-4	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	28		RSL	22.7	No	No	MDL ≤ SL
1,2,3-Trichlorobenzene	V	87-61-6	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	0.7		RSL	No SL	No	No	MDL ≤ SL
1,2,3-Trichloropropane	V	96-18-4	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	0.00075		RSL	2.89	No	See DSA	MDL > SL
1,2,4-Trichlorobenzene	V	120-82-1	N/A		N/A		µg/L	0/1	0%	0.068 – 0.068	0.068	MDL	0.4		RSL	4.97	No	No	MDL ≤ SL
1,2,4-Trimethylbenzene	V	95-63-6	N/A		N/A		µg/L	0/1	0%	0.051 – 0.051	0.051	MDL	5.6		RSL	33	No	No	MDL ≤ SL
1,2-Dibromo-3-chloropropane	V	96-12-8	N/A		N/A		µg/L	0/1	0%	0.14 – 0.14	0.14	MDL	0.00033		RSL	0.0381	See DSA	See DSA	MDL > SL
1,2-Dibromoethane	V	106-93-4	N/A		N/A		µg/L	0/1	0%	0.052 – 0.052	0.052	MDL	0.0075		RSL	0.221	No	See DSA	MDL > SL
1,2-Dichlorobenzene	V	95-50-1	N/A		N/A		µg/L	0/1	0%	0.045 – 0.045	0.045	MDL	30		RSL	351	No	No	MDL ≤ SL
1,2-Dichloroethane	V	107-06-2	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.17		RSL	2.74	No	No	MDL ≤ SL
1,2-Dichloropropane	V	78-87-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.82		RSL	4.44	No	No	MDL ≤ SL
1,3,5-Trimethylbenzene	V	108-67-8	N/A		N/A		µg/L	0/1	0%	0.067 – 0.067	0.067	MDL	6		RSL	23.2	No	No	MDL ≤ SL
1,3-Dichlorobenzene	V	541-73-1	N/A		N/A		µg/L	0/1	0%	0.071 – 0.071	0.071	MDL	30	*	RSL	351	No	No	MDL ≤ SL
1,4-Dichlorobenzene	V	106-46-7	N/A		N/A		µg/L	0/1	0%	0.047 – 0.047	0.047	MDL	0.48		RSL	3.42	No	No	MDL ≤ SL
1,4-Dioxane	V	123-91-1	N/A		N/A		µg/L	0/1	0%	0.86 – 0.86	0.86	MDL	0.46		RSL	3570	No	See DSA	MDL > SL
2-Butanone (MEK)	V	78-93-3	N/A		N/A		µg/L	0/1	0%	1.5 – 1.5	1.5	MDL	560		RSL	274000	No	No	MDL ≤ SL
2-Hexanone	V	591-78-6	N/A		N/A		µg/L	0/1	0%	0.68 – 0.68	0.68	MDL	3.8		RSL	1060	No	No	MDL ≤ SL
4-Methyl-2-pentanone (MIBK)	V	108-10-1	N/A		N/A		µg/L	0/1	0%	0.71 – 0.71	0.71	MDL	630		RSL	70200	No	No	MDL ≤ SL
Acetone	V	67-64-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	1800		RSL	No SL	No	No	MDL ≤ SL
Benzene	V	71-43-2	N/A		N/A		µg/L	0/1	0%	0.085 – 0.085	0.085	MDL	0.46		RSL	1.92	No	No	MDL ≤ SL
Bromochloromethane	V	74-97-5	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	8.3		RSL	83.9	No	No	MDL ≤ SL
Bromodichloromethane	V	75-27-4	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.13		RSL	1.08	No	No	MDL ≤ SL
Bromoform	V	75-25-2	N/A		N/A		µg/L	0/1	0%	0.095 – 0.095	0.095	MDL	3.3		RSL	152	No	No	MDL ≤ SL
Bromomethane	V	74-83-9	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	0.75		RSL	1.98	No	No	MDL ≤ SL
Carbon disulfide	V	75-15-0	N/A		N/A		µg/L	0/1	0%	0.092 – 0.092	0.092	MDL	81		RSL	145	No	No	MDL ≤ SL
Carbon tetrachloride	V	56-23-5	N/A		N/A		µg/L	0/1	0%	0.086 – 0.086	0.086	MDL	0.46		RSL	0.499	No	No	MDL ≤ SL
Chlorobenzene	V	108-90-7	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	7.8		RSL	51.9	No	No	MDL ≤ SL
Chloroethane	V	75-00-3	N/A		N/A		µg/L	0/1	0%	0.074 – 0.074	0.074	MDL	830		RSL	1050	No	No	MDL ≤ SL
Chloroform	V	67-66-3	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.22		RSL	0.972	No	No	MDL ≤ SL
Chloromethane	V	74-87-3	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	19		RSL	28.9	No	No	MDL ≤ SL
cis-1,2-Dichloroethene	V	156-59-2	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
cis-1,3-Dichloropropene	V	10061-01-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Cyclohexane	V	110-82-7	N/A		N/A		µg/L	0/1	0%	0.065 – 0.065	0.065	MDL	1300		RSL	123	No	No	MDL ≤ SL
Dibromochloromethane	V	124-48-1	N/A		N/A		µg/L	0/1	0%	0.073 – 0.073	0.073	MDL	0.87		RSL	No SL	No	No	MDL ≤ SL
Dichlorodifluoromethane	V	75-71-8	N/A		N/A		µg/L	0/1	0%	0.12 – 0.12	0.12	MDL	20		RSL	0.815	No	No	MDL ≤ SL
Ethylbenzene	V	100-41-4	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	1.5		RSL	4.45	No	No	MDL ≤ SL

Table A2-5
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0176)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0176

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Isopropylbenzene	V	98-82-8	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	45		RSL	121	No	No	MDL ≤ SL
m,p-Xylene	V	179601-23-1	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	19	*	RSL	45.5	No	No	MDL ≤ SL
Methyl Acetate	V	79-20-9	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	2000		RSL	No SL	No	No	MDL ≤ SL
Methyl Tert Butyl Ether	V	1634-04-4	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	14		RSL	533	No	No	MDL ≤ SL
Methylcyclohexane	V	108-87-2	N/A		N/A		µg/L	0/1	0%	0.08 – 0.08	0.08	MDL	1300	*	RSL	123	No	No	MDL ≤ SL
Methylene chloride	V	75-09-2	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	11		RSL	555	No	No	MDL ≤ SL
o-Xylene	V	95-47-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	19		RSL	63.3	No	No	MDL ≤ SL
Styrene	V	100-42-5	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	120		RSL	1210	No	No	MDL ≤ SL
Tetrachloroethene	V	127-18-4	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	4.1		RSL	7.25	No	No	MDL ≤ SL
Toluene	V	108-88-3	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	110		RSL	2390	No	No	MDL ≤ SL
trans-1,2-Dichloroethene	V	156-60-5	N/A		N/A		µg/L	0/1	0%	0.081 – 0.081	0.081	MDL	6.8		RSL	12.9	No	No	MDL ≤ SL
trans-1,3-Dichloropropene	V	10061-02-6	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Trichloroethene	V	79-01-6	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.28		RSL	0.632	No	No	MDL ≤ SL
Trichlorofluoromethane	V	75-69-4	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	520		RSL	No SL	No	No	MDL ≤ SL
Vinyl chloride	V	75-01-4	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.019		RSL	0.164	No	See DSA	MDL > SL
Semi-Volatile Organic Compounds (SVOCs)																			
1,1'-Biphenyl	V	92-52-4	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	0.083		RSL	4.71	No	See DSA	MDL > SL
1,2,4,5-Tetrachlorobenzene	V	95-94-3	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	0.017		RSL	No SL	No	See DSA	MDL > SL
1-Methylnaphthalene	V	90-12-0	N/A		N/A		µg/L	0/1	0%	0.0052 – 0.0052	0.0052	MDL	1.1		RSL	No SL	No	No	MDL ≤ SL
2,3,4,6-Tetrachlorophenol		58-90-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	24		RSL	No SL	No	No	MDL ≤ SL
2,4,5-Trichlorophenol		95-95-4	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	120		RSL	No SL	No	No	MDL ≤ SL
2,4,6-Trichlorophenol		88-06-2	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	1.2		RSL	No SL	No	See DSA	MDL > SL
2,4-Dichlorophenol		120-83-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	4.6		RSL	No SL	No	No	MDL ≤ SL
2,4-Dimethylphenol		105-67-9	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	36		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrophenol		51-28-5	N/A		N/A		µg/L	0/1	0%	0.93 – 0.93	0.93	MDL	3.9		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrotoluene		121-14-2	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.24		RSL	No SL	No	See DSA	MDL > SL
2,6-Dinitrotoluene		606-20-2	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	0.049		RSL	No SL	No	See DSA	MDL > SL
2-Chloronaphthalene	V	91-58-7	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	75		RSL	No SL	No	No	MDL ≤ SL
2-Chlorophenol	V	95-57-8	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	9.1		RSL	No SL	No	No	MDL ≤ SL
2-Methylnaphthalene	V	91-57-6	N/A		N/A		µg/L	0/1	0%	0.0063 – 0.0063	0.0063	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
2-Methylphenol		95-48-7	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	93		RSL	No SL	No	No	MDL ≤ SL
2-Nitroaniline		88-74-4	N/A		N/A		µg/L	0/1	0%	3.2 – 3.2	3.2	MDL	19		RSL	No SL	No	No	MDL ≤ SL
2-Nitrophenol		88-75-5	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
3,3'-Dichlorobenzidine		91-94-1	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	0.13		RSL	No SL	No	See DSA	MDL > SL
3-Nitroaniline		99-09-2	N/A		N/A		µg/L	0/1	0%	0.64 – 0.64	0.64	MDL	19	*	RSL	No SL	No	No	MDL ≤ SL
4,6-Dinitro-o-cresol		534-52-1	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	0.15		RSL	No SL	No	See DSA	MDL > SL
4-Bromophenyl phenyl ether	V	101-55-3	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Chloro-3-methyl phenol		59-50-7	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	140		RSL	No SL	No	No	MDL ≤ SL
4-Chloroaniline		106-47-8	N/A		N/A		µg/L	0/1	0%	4.4 – 4.4	4.4	MDL	0.37		RSL	No SL	No	See DSA	MDL > SL
4-Chlorophenyl phenyl ether	V	7005-72-3	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Methylphenol		106-44-5	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	37		RSL	No SL	No	No	MDL ≤ SL

Table A2-5
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0176)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0176

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
4-Nitroaniline		100-01-6	N/A		N/A		µg/L	0/1	0%	0.81 – 0.81	0.81	MDL	3.8		RSL	No SL	No	No	MDL ≤ SL
4-Nitrophenol		100-02-7	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
Acenaphthene	V	83-32-9	N/A		N/A		µg/L	0/1	0%	0.0058 – 0.0058	0.0058	MDL	53		RSL	No SL	No	No	MDL ≤ SL
Acenaphthylene	V	208-96-8	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	53	*	RSL	No SL	No	No	MDL ≤ SL
Acetophenone	V	98-86-2	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	190		RSL	No SL	No	No	MDL ≤ SL
Anthracene	V	120-12-7	N/A		N/A		µg/L	0/1	0%	0.01 – 0.01	0.01	MDL	180		RSL	No SL	No	No	MDL ≤ SL
Atrazine		1912-24-9	N/A		N/A		µg/L	0/1	0%	0.46 – 0.46	0.46	MDL	0.3		RSL	No SL	No	See DSA	MDL > SL
Benzaldehyde	V	100-52-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	19		RSL	No SL	No	No	MDL ≤ SL
Benzo(a)anthracene	V	56-55-3	N/A		N/A		µg/L	0/1	0%	0.009 – 0.009	0.009	MDL	0.03		RSL	62.3	No	No	MDL ≤ SL
Benzo(a)pyrene		50-32-8	N/A		N/A		µg/L	0/1	0%	0.016 – 0.016	0.016	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Benzo(b)fluoranthene		205-99-2	N/A		N/A		µg/L	0/1	0%	0.0078 – 0.0078	0.0078	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Benzo(g,h,i)perylene	V	191-24-2	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	12	*	RSL	No SL	No	No	MDL ≤ SL
Benzo(k)fluoranthene		207-08-9	N/A		N/A		µg/L	0/1	0%	0.0039 – 0.0039	0.0039	MDL	2.5		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethoxy)methane		111-91-1	N/A		N/A		µg/L	0/1	0%	2.8 – 2.8	2.8	MDL	5.9		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethyl)ether	V	111-44-4	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	0.014		RSL	17	No	See DSA	MDL > SL
bis(2-Chloroisopropyl)ether	V	108-60-1	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	71		RSL	No SL	No	No	MDL ≤ SL
bis(2-Ethylhexyl)phthalate		117-81-7	N/A		N/A		µg/L	0/1	0%	0.78 – 0.78	0.78	MDL	5.6		RSL	No SL	No	No	MDL ≤ SL
Butyl benzyl phthalate		85-68-7	N/A		N/A		µg/L	0/1	0%	1.3 – 1.3	1.3	MDL	16		RSL	No SL	No	No	MDL ≤ SL
Caprolactam		105-60-2	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	990		RSL	No SL	No	No	MDL ≤ SL
Carbazole	V	86-74-8	N/A		N/A		µg/L	0/1	0%	3 – 3	3	MDL	29	*	RSL	No SL	No	No	MDL ≤ SL
Chrysene		218-01-9	N/A		N/A		µg/L	0/1	0%	0.0051 – 0.0051	0.0051	MDL	25		RSL	No SL	No	No	MDL ≤ SL
Dibenzo(a,h)anthracene		53-70-3	N/A		N/A		µg/L	0/1	0%	0.0056 – 0.0056	0.0056	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Dibenzofuran	V	132-64-9	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.79		RSL	No SL	No	See DSA	MDL > SL
Diethyl phthalate		84-66-2	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	1500		RSL	No SL	No	No	MDL ≤ SL
Dimethyl phthalate		131-11-3	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	1500	*	RSL	No SL	No	No	MDL ≤ SL
Di-n-butyl phthalate		84-74-2	N/A		N/A		µg/L	0/1	0%	1.5 – 1.5	1.5	MDL	90		RSL	No SL	No	No	MDL ≤ SL
Di-n-octyl phthalate		117-84-0	N/A		N/A		µg/L	0/1	0%	0.61 – 0.61	0.61	MDL	20		RSL	No SL	No	No	MDL ≤ SL
Fluoranthene		206-44-0	N/A		N/A		µg/L	0/1	0%	0.011 – 0.011	0.011	MDL	80		RSL	No SL	No	No	MDL ≤ SL
Fluorene	V	86-73-7	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	29		RSL	No SL	No	No	MDL ≤ SL
Hexachlorobenzene	V	118-74-1	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	0.0098		RSL	0.133	See DSA	See DSA	MDL > SL
Hexachlorobutadiene	V	87-68-3	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	0.14		RSL	0.414	See DSA	See DSA	MDL > SL
Hexachloroethane	V	67-72-1	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	0.33		RSL	2.29	See DSA	See DSA	MDL > SL
Indeno(1,2,3-cd)pyrene		193-39-5	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Isophorone		78-59-1	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	78		RSL	No SL	No	No	MDL ≤ SL
Naphthalene	V	91-20-3	0.017	JB	0.017	JB	µg/L	1/1	100%	0.0073 – 0.0073	0.017	MDC	0.12		RSL	6.29	No	No	MDC < SL
Nitrobenzene	V	98-95-3	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.14		RSL	99.3	No	See DSA	MDL > SL
N-Nitroso-di-n-propylamine		621-64-7	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	0.011		RSL	No SL	No	See DSA	MDL > SL
N-Nitrosodiphenylamine		86-30-6	N/A		N/A		µg/L	0/1	0%	3.4 – 3.4	3.4	MDL	12		RSL	No SL	No	No	MDL ≤ SL
Pentachlorophenol		87-86-5	N/A		N/A		µg/L	0/1	0%	0.023 – 0.023	0.023	MDL	0.041		RSL	No SL	No	No	MDL ≤ SL
Phenanthrene	V	85-01-8	N/A		N/A		µg/L	0/1	0%	0.0083 – 0.0083	0.0083	MDL	180	*	RSL	No SL	No	No	MDL ≤ SL
Phenol		108-95-2	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	580		RSL	No SL	No	No	MDL ≤ SL

Table A2-5
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0176)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0176

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Pyrene	V	129-00-0	N/A		N/A		µg/L	0/1	0%	0.013 – 0.013	0.013	MDL	12		RSL	No SL	No	No	MDL ≤ SL
DIOX																			
Total PCDD/F TEQ (Mammal)	V	TEQ-M-DF	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
PCB																			
Total PCB TEQ (Mammal)	V	TEQ-M-PCB	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
Total PCB Congener	V	TPCB_CON	0.000043	J	0.000043	J	µg/L	1/1	100%	N/A	0.000043	MDC	0.044	*	RSL	1.65	No	No	MDC < SL
Perfluorinated Compounds																			
Perfluorononanoic acid (PFNA)		375-95-1	N/A		N/A		µg/L	0/1	0%	0.0018 – 0.0018	0.0018	MDL	0.0059		RSL	No SL	No	No	MDL ≤ SL
Perfluorohexanesulfonic acid (PFHxS)		355-46-4	N/A		N/A		µg/L	0/1	0%	0.0018 – 0.0018	0.0018	MDL	0.039		RSL	No SL	No	No	MDL ≤ SL
Perfluorobutanesulfonic acid (PFBS)		375-73-5	N/A		N/A		µg/L	0/1	0%	0.00036 – 0.00036	0.00036	MDL	0.6		RSL	No SL	No	No	MDL ≤ SL
Perfluorooctanesulfonic acid (PFOS)		1763-23-1	N/A		N/A		µg/L	0/1	0%	0.00036 – 0.00036	0.00036	MDL	0.004		RSL	No SL	No	No	MDL ≤ SL
Perfluorooctanoic acid (PFOA)		335-67-1	N/A		N/A		µg/L	0/1	0%	0.00036 – 0.00036	0.00036	MDL	0.006		RSL	No SL	No	No	MDL ≤ SL
Total Metals																			
Aluminum		7429-90-5	47		47		µg/L	1/1	100%	4 – 4	47	MDC	2000		RSL	No SL	No	No	MDC < SL
Antimony		7440-36-0	N/A		N/A		µg/L	0/1	0%	0.32 – 0.32	0.32	MDL	0.78		RSL	No SL	No	No	MDL ≤ SL
Arsenic		7440-38-2	N/A		N/A		µg/L	0/1	0%	0.33 – 0.33	0.33	MDL	0.052		RSL	No SL	No	See DSA	MDL > SL
Barium		7440-39-3	420		420		µg/L	1/1	100%	1.9 – 1.9	420	MDC	380		RSL	No SL	No	Yes	MDC ≥ SL
Beryllium		7440-41-7	0.93	J	0.93	J	µg/L	1/1	100%	0.17 – 0.17	0.93	MDC	2.5		RSL	No SL	No	No	MDC < SL
Cadmium		7440-43-9	0.2	J	0.2	J	µg/L	1/1	100%	0.14 – 0.14	0.2	MDC	0.18		RSL	No SL	No	Yes	MDC ≥ SL
Calcium		7440-70-2	7800		7800		µg/L	1/1	100%	120 – 120	7800	MDC	Nutrient		N/A	Nutrient	No	No	Classified as an essential nutrient
Chromium, Total		7440-47-3	0.61	J	0.61	J	µg/L	1/1	100%	0.32 – 0.32	0.61	MDC	2200	*	RSL	No SL	No	No	MDC < SL
Chromium, Hexavalent		18540-29-9	N/A		N/A		µg/L	0/1	0%	1 – 1	1	MDL	0.035		RSL	No SL	No	See DSA	MDL > SL
Cobalt		7440-48-4	14		14		µg/L	1/1	100%	0.19 – 0.19	14	MDC	0.6		RSL	No SL	No	Yes	MDC ≥ SL
Copper		7440-50-8	70		70		µg/L	1/1	100%	0.4 – 0.4	70	MDC	80		RSL	No SL	No	No	MDC < SL
Iron		7439-89-6	320		320		µg/L	1/1	100%	54 – 54	320	MDC	1400		RSL	No SL	No	No	MDC < SL
Lead		7439-92-1	15		15		µg/L	1/1	100%	0.21 – 0.21	15	MDC	15		RSL	No SL	No	Yes	MDC ≥ SL
Manganese		7439-96-5	160		160		µg/L	1/1	100%	0.17 – 0.17	160	MDC	43		RSL	No SL	No	Yes	MDC ≥ SL
Mercury		7439-97-6	N/A		N/A		µg/L	0/1	0%	0.06 – 0.06	0.06	MDL	0.2	*	RSL	No SL	No	No	MDL ≤ SL
Nickel		7440-02-0	6.6	JB+	6.6	JB+	µg/L	1/1	100%	0.2 – 0.2	6.6	MDC	39		RSL	No SL	No	No	MDC < SL
Selenium		7782-49-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	10		RSL	No SL	No	No	MDL ≤ SL
Silver		7440-22-4	N/A		N/A		µg/L	0/1	0%	0.18 – 0.18	0.18	MDL	9.4		RSL	No SL	No	No	MDL ≤ SL
Thallium		7440-28-0	N/A		N/A		µg/L	0/1	0%	0.23 – 0.23	0.23	MDL	0.02		RSL	No SL	No	See DSA	MDL > SL
Vanadium		7440-62-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	8.6		RSL	No SL	No	No	MDL ≤ SL
Zinc		7440-66-6	120		120		µg/L	1/1	100%	1.6 – 1.6	120	MDC	600		RSL	No SL	No	No	MDC < SL
Total Cyanide																			
Cyanide	V	57-12-5	9	J	9	J	µg/L	1/1	100%	2.6 – 2.6	9	MDC	0.15		RSL	20.1	No	Yes	MDC ≥ SL

Notes:

% = Percent
AL = Action Level
CASRN = Chemical Abstracts Service Registry Number

Table A2-5
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0176)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current and Future
Medium:	Groundwater (Drinking Water)
Well:	0176

Chemical [1]	CASRN	Minimum Detected Concentration	Maximum Detected Concentration	Units	Detection Frequency	Range of Method Detection Limits	Screening Concentration	Screening Level [2, 3, 5, 6]	Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion

COPC = Chemical of Potential Concern
DSA = Data Sensitivity Analysis
HAL = Health Advisory Level
J = Indicates an estimated value
MCL = Maximum Contaminant Level
MDC = Maximum Detected Concentration
N/A = Not Applicable
ND = Non-Detect or Not Detected
"PFOA and PFOS Combined" = Combined total of the detected concentrations of PFOA and PFOS (non-detect results were not included in the summation).
RL = Reporting Limit
RSL = Regional Screening Level
µg/L = micrograms per liter
USEPA = United States Environmental Protection Agency
(1) "V" indicates that the chemical is volatile.
(2) Groundwater data screened against USEPA Tap Water RSLs, last updated May 2022 (TR = 1E-6, THQ = 0.1).
(3) An asterisk,"*", indicates surrogate toxicity information was used to derive a Screening Level (see Table A2-14).
(4) Groundwater data screened against USEPA Residential Groundwater VISLs, last updated May 2022 (TR = 1E-6, THQ = 0.1). Site-specific, system temperature was set to 20.5 Celsius (average of recorded temperatures taken in field).
(6) Lead is compared to the EPA tap water RSL of 15 µg/L, which represents the 90th percentile concentration of lead found in tap water samples collected nationwide (Lead and Copper Rule, 56 Federal Register 26460-26564, dated June 7, 1991) and is not a risk-based number, but rather an action level.

Table A2-6
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0182)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0182

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Volatile Organic Compounds (VOCs)																			
1,1,1-Trichloroethane	V	71-55-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	800		RSL	893	No	No	MDL ≤ SL
1,1,2,2-Tetrachloroethane	V	79-34-5	N/A		N/A		µg/L	0/1	0%	0.05 – 0.05	0.05	MDL	0.076		RSL	4.18	No	No	MDL ≤ SL
1,1,2-Trichloroethane	V	79-00-5	N/A		N/A		µg/L	0/1	0%	0.042 – 0.042	0.042	MDL	0.041		RSL	0.779	No	See DSA	MDL > SL
1,1,2-Trichlorotrifluoroethane (Freon 113)	V	76-13-1	N/A		N/A		µg/L	0/1	0%	0.099 – 0.099	0.099	MDL	1000		RSL	28.5	No	No	MDL ≤ SL
1,1-Dichloroethane	V	75-34-3	0.069	J	0.069	J	µg/L	1/1	100%	0.058 – 0.058	0.069	MDC	2.8		RSL	9.09	No	No	MDC < SL
1,1-Dichloroethene	V	75-35-4	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	28		RSL	22.7	No	No	MDL ≤ SL
1,2,3-Trichlorobenzene	V	87-61-6	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	0.7		RSL	No SL	No	No	MDL ≤ SL
1,2,3-Trichloropropane	V	96-18-4	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	0.00075		RSL	2.89	No	See DSA	MDL > SL
1,2,4-Trichlorobenzene	V	120-82-1	N/A		N/A		µg/L	0/1	0%	0.068 – 0.068	0.068	MDL	0.4		RSL	4.97	No	No	MDL ≤ SL
1,2,4-Trimethylbenzene	V	95-63-6	N/A		N/A		µg/L	0/1	0%	0.051 – 0.051	0.051	MDL	5.6		RSL	33	No	No	MDL ≤ SL
1,2-Dibromo-3-chloropropane	V	96-12-8	N/A		N/A		µg/L	0/1	0%	0.14 – 0.14	0.14	MDL	0.00033		RSL	0.0381	See DSA	See DSA	MDL > SL
1,2-Dibromoethane	V	106-93-4	N/A		N/A		µg/L	0/1	0%	0.052 – 0.052	0.052	MDL	0.0075		RSL	0.221	No	See DSA	MDL > SL
1,2-Dichlorobenzene	V	95-50-1	N/A		N/A		µg/L	0/1	0%	0.045 – 0.045	0.045	MDL	30		RSL	351	No	No	MDL ≤ SL
1,2-Dichloroethane	V	107-06-2	0.15	J	0.15	J	µg/L	1/1	100%	0.079 – 0.079	0.15	MDC	0.17		RSL	2.74	No	No	MDC < SL
1,2-Dichloropropane	V	78-87-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.82		RSL	4.44	No	No	MDL ≤ SL
1,3,5-Trimethylbenzene	V	108-67-8	N/A		N/A		µg/L	0/1	0%	0.067 – 0.067	0.067	MDL	6		RSL	23.2	No	No	MDL ≤ SL
1,3-Dichlorobenzene	V	541-73-1	N/A		N/A		µg/L	0/1	0%	0.071 – 0.071	0.071	MDL	30	*	RSL	351	No	No	MDL ≤ SL
1,4-Dichlorobenzene	V	106-46-7	N/A		N/A		µg/L	0/1	0%	0.047 – 0.047	0.047	MDL	0.48		RSL	3.42	No	No	MDL ≤ SL
1,4-Dioxane	V	123-91-1	N/A		N/A		µg/L	0/1	0%	0.9 – 0.9	0.9	MDL	0.46		RSL	3570	No	See DSA	MDL > SL
2-Butanone (MEK)	V	78-93-3	N/A		N/A		µg/L	0/1	0%	1.5 – 1.5	1.5	MDL	560		RSL	274000	No	No	MDL ≤ SL
2-Hexanone	V	591-78-6	N/A		N/A		µg/L	0/1	0%	0.68 – 0.68	0.68	MDL	3.8		RSL	1060	No	No	MDL ≤ SL
4-Methyl-2-pentanone (MIBK)	V	108-10-1	N/A		N/A		µg/L	0/1	0%	0.71 – 0.71	0.71	MDL	630		RSL	70200	No	No	MDL ≤ SL
Acetone	V	67-64-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	1800		RSL	No SL	No	No	MDL ≤ SL
Benzene	V	71-43-2	N/A		N/A		µg/L	0/1	0%	0.085 – 0.085	0.085	MDL	0.46		RSL	1.92	No	No	MDL ≤ SL
Bromochloromethane	V	74-97-5	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	8.3		RSL	83.9	No	No	MDL ≤ SL
Bromodichloromethane	V	75-27-4	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.13		RSL	1.08	No	No	MDL ≤ SL
Bromoform	V	75-25-2	N/A		N/A		µg/L	0/1	0%	0.095 – 0.095	0.095	MDL	3.3		RSL	152	No	No	MDL ≤ SL
Bromomethane	V	74-83-9	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	0.75		RSL	1.98	No	No	MDL ≤ SL
Carbon disulfide	V	75-15-0	N/A		N/A		µg/L	0/1	0%	0.092 – 0.092	0.092	MDL	81		RSL	145	No	No	MDL ≤ SL
Carbon tetrachloride	V	56-23-5	N/A		N/A		µg/L	0/1	0%	0.086 – 0.086	0.086	MDL	0.46		RSL	0.499	No	No	MDL ≤ SL
Chlorobenzene	V	108-90-7	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	7.8		RSL	51.9	No	No	MDL ≤ SL
Chloroethane	V	75-00-3	N/A		N/A		µg/L	0/1	0%	0.074 – 0.074	0.074	MDL	830		RSL	1050	No	No	MDL ≤ SL
Chloroform	V	67-66-3	0.14	J	0.14	J	µg/L	1/1	100%	0.079 – 0.079	0.14	MDC	0.22		RSL	0.972	No	No	MDC < SL
Chloromethane	V	74-87-3	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	19		RSL	28.9	No	No	MDL ≤ SL
cis-1,2-Dichloroethene	V	156-59-2	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
cis-1,3-Dichloropropene	V	10061-01-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Cyclohexane	V	110-82-7	N/A		N/A		µg/L	0/1	0%	0.065 – 0.065	0.065	MDL	1300		RSL	123	No	No	MDL ≤ SL
Dibromochloromethane	V	124-48-1	N/A		N/A		µg/L	0/1	0%	0.073 – 0.073	0.073	MDL	0.87		RSL	No SL	No	No	MDL ≤ SL
Dichlorodifluoromethane	V	75-71-8	N/A		N/A		µg/L	0/1	0%	0.12 – 0.12	0.12	MDL	20		RSL	0.815	No	No	MDL ≤ SL
Ethylbenzene	V	100-41-4	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	1.5		RSL	4.45	No	No	MDL ≤ SL

Table A2-6
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0182)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0182

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Isopropylbenzene	V	98-82-8	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	45		RSL	121	No	No	MDL ≤ SL
m,p-Xylene	V	179601-23-1	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	19	*	RSL	45.5	No	No	MDL ≤ SL
Methyl Acetate	V	79-20-9	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	2000		RSL	No SL	No	No	MDL ≤ SL
Methyl Tert Butyl Ether	V	1634-04-4	0.16	J	0.16	J	µg/L	1/1	100%	0.053 – 0.053	0.16	MDC	14		RSL	533	No	No	MDC < SL
Methylcyclohexane	V	108-87-2	N/A		N/A		µg/L	0/1	0%	0.08 – 0.08	0.08	MDL	1300	*	RSL	123	No	No	MDL ≤ SL
Methylene chloride	V	75-09-2	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	11		RSL	555	No	No	MDL ≤ SL
o-Xylene	V	95-47-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	19		RSL	63.3	No	No	MDL ≤ SL
Styrene	V	100-42-5	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	120		RSL	1210	No	No	MDL ≤ SL
Tetrachloroethene	V	127-18-4	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	4.1		RSL	7.25	No	No	MDL ≤ SL
Toluene	V	108-88-3	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	110		RSL	2390	No	No	MDL ≤ SL
trans-1,2-Dichloroethene	V	156-60-5	N/A		N/A		µg/L	0/1	0%	0.081 – 0.081	0.081	MDL	6.8		RSL	12.9	No	No	MDL ≤ SL
trans-1,3-Dichloropropene	V	10061-02-6	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Trichloroethene	V	79-01-6	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.28		RSL	0.632	No	No	MDL ≤ SL
Trichlorofluoromethane	V	75-69-4	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	520		RSL	No SL	No	No	MDL ≤ SL
Vinyl chloride	V	75-01-4	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.019		RSL	0.164	No	See DSA	MDL > SL
Semi-Volatile Organic Compounds (SVOCs)																			
1,1'-Biphenyl	V	92-52-4	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.083		RSL	4.71	No	See DSA	MDL > SL
1,2,4,5-Tetrachlorobenzene	V	95-94-3	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.017		RSL	No SL	No	See DSA	MDL > SL
1-Methylnaphthalene	V	90-12-0	N/A		N/A		µg/L	0/1	0%	0.0055 – 0.0055	0.0055	MDL	1.1		RSL	No SL	No	No	MDL ≤ SL
2,3,4,6-Tetrachlorophenol		58-90-2	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	24		RSL	No SL	No	No	MDL ≤ SL
2,4,5-Trichlorophenol		95-95-4	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	120		RSL	No SL	No	No	MDL ≤ SL
2,4,6-Trichlorophenol		88-06-2	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	1.2		RSL	No SL	No	See DSA	MDL > SL
2,4-Dichlorophenol		120-83-2	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4.6		RSL	No SL	No	No	MDL ≤ SL
2,4-Dimethylphenol		105-67-9	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	36		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrophenol		51-28-5	N/A		N/A		µg/L	0/1	0%	0.98 – 0.98	0.98	MDL	3.9		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrotoluene		121-14-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	0.24		RSL	No SL	No	See DSA	MDL > SL
2,6-Dinitrotoluene		606-20-2	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.049		RSL	No SL	No	See DSA	MDL > SL
2-Chloronaphthalene	V	91-58-7	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	75		RSL	No SL	No	No	MDL ≤ SL
2-Chlorophenol	V	95-57-8	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	9.1		RSL	No SL	No	No	MDL ≤ SL
2-Methylnaphthalene	V	91-57-6	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
2-Methylphenol		95-48-7	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	93		RSL	No SL	No	No	MDL ≤ SL
2-Nitroaniline		88-74-4	N/A		N/A		µg/L	0/1	0%	3.4 – 3.4	3.4	MDL	19		RSL	No SL	No	No	MDL ≤ SL
2-Nitrophenol		88-75-5	N/A		N/A		µg/L	0/1	0%	2.7 – 2.7	2.7	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
3,3'-Dichlorobenzidine		91-94-1	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	0.13		RSL	No SL	No	See DSA	MDL > SL
3-Nitroaniline		99-09-2	N/A		N/A		µg/L	0/1	0%	0.67 – 0.67	0.67	MDL	19	*	RSL	No SL	No	No	MDL ≤ SL
4,6-Dinitro-o-cresol		534-52-1	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.15		RSL	No SL	No	See DSA	MDL > SL
4-Bromophenyl phenyl ether	V	101-55-3	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Chloro-3-methyl phenol		59-50-7	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	140		RSL	No SL	No	No	MDL ≤ SL
4-Chloroaniline		106-47-8	N/A		N/A		µg/L	0/1	0%	4.6 – 4.6	4.6	MDL	0.37		RSL	No SL	No	See DSA	MDL > SL
4-Chlorophenyl phenyl ether	V	7005-72-3	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Methylphenol		106-44-5	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	37		RSL	No SL	No	No	MDL ≤ SL

Table A2-6
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0182)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0182

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
4-Nitroaniline		100-01-6	N/A		N/A		µg/L	0/1	0%	0.85 – 0.85	0.85	MDL	3.8		RSL	No SL	No	No	MDL ≤ SL
4-Nitrophenol		100-02-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
Acenaphthene	V	83-32-9	N/A		N/A		µg/L	0/1	0%	0.0061 – 0.0061	0.0061	MDL	53		RSL	No SL	No	No	MDL ≤ SL
Acenaphthylene	V	208-96-8	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	53	*	RSL	No SL	No	No	MDL ≤ SL
Acetophenone	V	98-86-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	190		RSL	No SL	No	No	MDL ≤ SL
Anthracene	V	120-12-7	N/A		N/A		µg/L	0/1	0%	0.011 – 0.011	0.011	MDL	180		RSL	No SL	No	No	MDL ≤ SL
Atrazine		1912-24-9	N/A		N/A		µg/L	0/1	0%	0.48 – 0.48	0.48	MDL	0.3		RSL	No SL	No	See DSA	MDL > SL
Benzaldehyde	V	100-52-7	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	19		RSL	No SL	No	No	MDL ≤ SL
Benzo(a)anthracene	V	56-55-3	N/A		N/A		µg/L	0/1	0%	0.0094 – 0.0094	0.0094	MDL	0.03		RSL	62.3	No	No	MDL ≤ SL
Benzo(a)pyrene		50-32-8	N/A		N/A		µg/L	0/1	0%	0.017 – 0.017	0.017	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Benzo(b)fluoranthene		205-99-2	N/A		N/A		µg/L	0/1	0%	0.0082 – 0.0082	0.0082	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Benzo(g,h,i)perylene	V	191-24-2	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	12	*	RSL	No SL	No	No	MDL ≤ SL
Benzo(k)fluoranthene		207-08-9	N/A		N/A		µg/L	0/1	0%	0.0041 – 0.0041	0.0041	MDL	2.5		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethoxy)methane		111-91-1	N/A		N/A		µg/L	0/1	0%	2.9 – 2.9	2.9	MDL	5.9		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethyl)ether	V	111-44-4	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.014		RSL	17	No	See DSA	MDL > SL
bis(2-Chloroisopropyl)ether	V	108-60-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	71		RSL	No SL	No	No	MDL ≤ SL
bis(2-Ethylhexyl)phthalate		117-81-7	N/A		N/A		µg/L	0/1	0%	0.82 – 0.82	0.82	MDL	5.6		RSL	No SL	No	No	MDL ≤ SL
Butyl benzyl phthalate		85-68-7	N/A		N/A		µg/L	0/1	0%	1.4 – 1.4	1.4	MDL	16		RSL	No SL	No	No	MDL ≤ SL
Caprolactam		105-60-2	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	990		RSL	No SL	No	No	MDL ≤ SL
Carbazole	V	86-74-8	N/A		N/A		µg/L	0/1	0%	3.2 – 3.2	3.2	MDL	29	*	RSL	No SL	No	No	MDL ≤ SL
Chrysene		218-01-9	N/A		N/A		µg/L	0/1	0%	0.0054 – 0.0054	0.0054	MDL	25		RSL	No SL	No	No	MDL ≤ SL
Dibenzo(a,h)anthracene		53-70-3	N/A		N/A		µg/L	0/1	0%	0.0059 – 0.0059	0.0059	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Dibenzofuran	V	132-64-9	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	0.79		RSL	No SL	No	See DSA	MDL > SL
Diethyl phthalate		84-66-2	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	1500		RSL	No SL	No	No	MDL ≤ SL
Dimethyl phthalate		131-11-3	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	1500	*	RSL	No SL	No	No	MDL ≤ SL
Di-n-butyl phthalate		84-74-2	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	90		RSL	No SL	No	No	MDL ≤ SL
Di-n-octyl phthalate		117-84-0	N/A		N/A		µg/L	0/1	0%	0.64 – 0.64	0.64	MDL	20		RSL	No SL	No	No	MDL ≤ SL
Fluoranthene		206-44-0	N/A		N/A		µg/L	0/1	0%	0.012 – 0.012	0.012	MDL	80		RSL	No SL	No	No	MDL ≤ SL
Fluorene	V	86-73-7	N/A		N/A		µg/L	0/1	0%	0.0072 – 0.0072	0.0072	MDL	29		RSL	No SL	No	No	MDL ≤ SL
Hexachlorobenzene	V	118-74-1	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.0098		RSL	0.133	See DSA	See DSA	MDL > SL
Hexachlorobutadiene	V	87-68-3	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	0.14		RSL	0.414	See DSA	See DSA	MDL > SL
Hexachlorocyclopentadiene	V	77-47-4	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	0.041		RSL	0.0786	See DSA	See DSA	MDL > SL
Hexachloroethane	V	67-72-1	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	0.33		RSL	2.29	See DSA	See DSA	MDL > SL
Indeno(1,2,3-cd)pyrene		193-39-5	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Isophorone		78-59-1	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	78		RSL	No SL	No	No	MDL ≤ SL
Naphthalene	V	91-20-3	N/A		N/A		µg/L	0/1	0%	0.0077 – 0.0077	0.0077	MDL	0.12		RSL	6.29	No	No	MDL ≤ SL
Nitrobenzene	V	98-95-3	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	0.14		RSL	99.3	No	See DSA	MDL > SL
N-Nitroso-di-n-propylamine		621-64-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.011		RSL	No SL	No	See DSA	MDL > SL
N-Nitrosodiphenylamine		86-30-6	N/A		N/A		µg/L	0/1	0%	3.6 – 3.6	3.6	MDL	12		RSL	No SL	No	No	MDL ≤ SL
Pentachlorophenol		87-86-5	N/A		N/A		µg/L	0/1	0%	0.024 – 0.024	0.024	MDL	0.041		RSL	No SL	No	No	MDL ≤ SL
Phenanthrene	V	85-01-8	N/A		N/A		µg/L	0/1	0%	0.0087 – 0.0087	0.0087	MDL	180	*	RSL	No SL	No	No	MDL ≤ SL

Table A2-6
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0182)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0182

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Phenol		108-95-2	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	580		RSL	No SL	No	No	MDL ≤ SL
Pyrene	V	129-00-0	N/A		N/A		µg/L	0/1	0%	0.014 – 0.014	0.014	MDL	12		RSL	No SL	No	No	MDL ≤ SL
DIOX																			
Total PCDD/F TEQ (Mammal)	V	TEQ-M-DF	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
PCB																			
Total PCB TEQ (Mammal)	V	TEQ-M-PCB	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
Total PCB Congener	V	TPCB_CON	0.000036	J	0.000036	J	µg/L	1/1	100%	N/A	0.000036	MDC	0.044	*	RSL	1.65	No	No	MDC < SL
Perfluorinated Compounds																			
Perfluorononanoic acid (PFNA)		375-95-1	0.0011	J	0.0011	J	µg/L	1/1	100%	0.0019 – 0.0019	0.0011	MDC	0.0059		RSL	No SL	No	No	MDC < SL
Perfluorohexanesulfonic acid (PFHxS)		355-46-4	0.0078		0.0078		µg/L	1/1	100%	0.0019 – 0.0019	0.0078	MDC	0.039		RSL	No SL	No	No	MDC < SL
Perfluorobutanesulfonic acid (PFBS)		375-73-5	0.052		0.052		µg/L	1/1	100%	0.00038 – 0.00038	0.052	MDC	0.6		RSL	No SL	No	No	MDC < SL
Perfluorooctanesulfonic acid (PFOS)		1763-23-1	0.22		0.22		µg/L	1/1	100%	0.0019 – 0.0019	0.22	MDC	0.004		RSL	No SL	No	Yes	MDC ≥ SL
Perfluorooctanoic acid (PFOA)		335-67-1	0.013		0.013		µg/L	1/1	100%	0.00038 – 0.00038	0.013	MDC	0.006		RSL	No SL	No	Yes	MDC ≥ SL
Total Metals																			
Aluminum		7429-90-5	19	J	19	J	µg/L	1/1	100%	4 – 4	19	MDC	2000		RSL	No SL	No	No	MDC < SL
Antimony		7440-36-0	N/A		N/A		µg/L	0/1	0%	0.32 – 0.32	0.32	MDL	0.78		RSL	No SL	No	No	MDL ≤ SL
Arsenic		7440-38-2	N/A		N/A		µg/L	0/1	0%	0.33 – 0.33	0.33	MDL	0.052		RSL	No SL	No	See DSA	MDL > SL
Barium		7440-39-3	180		180		µg/L	1/1	100%	1.9 – 1.9	180	MDC	380		RSL	No SL	No	No	MDC < SL
Beryllium		7440-41-7	0.27	J	0.27	J	µg/L	1/1	100%	0.17 – 0.17	0.27	MDC	2.5		RSL	No SL	No	No	MDC < SL
Cadmium		7440-43-9	N/A		N/A		µg/L	0/1	0%	0.14 – 0.14	0.14	MDL	0.18		RSL	No SL	No	No	MDL ≤ SL
Calcium		7440-70-2	11000		11000		µg/L	1/1	100%	120 – 120	11000	MDC	Nutrient		N/A	Nutrient	No	No	Classified as an essential nutrient
Chromium, Total		7440-47-3	N/A		N/A		µg/L	0/1	0%	0.32 – 0.32	0.32	MDL	2200	*	RSL	No SL	No	No	MDL ≤ SL
Chromium, Hexavalent		18540-29-9	N/A		N/A		µg/L	0/1	0%	1 – 1	1	MDL	0.035		RSL	No SL	No	See DSA	MDL > SL
Cobalt		7440-48-4	25		25		µg/L	1/1	100%	0.19 – 0.19	25	MDC	0.6		RSL	No SL	No	Yes	MDC ≥ SL
Copper		7440-50-8	4.6		4.6		µg/L	1/1	100%	0.4 – 0.4	4.6	MDC	80		RSL	No SL	No	No	MDC < SL
Iron		7439-89-6	470		470		µg/L	1/1	100%	54 – 54	470	MDC	1400		RSL	No SL	No	No	MDC < SL
Lead		7439-92-1	0.73	J	0.73	J	µg/L	1/1	100%	0.21 – 0.21	0.73	MDC	15		RSL	No SL	No	No	MDC < SL
Manganese		7439-96-5	380		380		µg/L	1/1	100%	0.17 – 0.17	380	MDC	43		RSL	No SL	No	Yes	MDC ≥ SL
Mercury		7439-97-6	N/A		N/A		µg/L	0/1	0%	0.06 – 0.06	0.06	MDL	0.2	*	RSL	No SL	No	No	MDL ≤ SL
Nickel		7440-02-0	2.5		2.5		µg/L	1/1	100%	0.2 – 0.2	2.5	MDC	39		RSL	No SL	No	No	MDC < SL
Selenium		7782-49-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	10		RSL	No SL	No	No	MDL ≤ SL
Silver		7440-22-4	N/A		N/A		µg/L	0/1	0%	0.18 – 0.18	0.18	MDL	9.4		RSL	No SL	No	No	MDL ≤ SL
Thallium		7440-28-0	N/A		N/A		µg/L	0/1	0%	0.23 – 0.23	0.23	MDL	0.02		RSL	No SL	No	See DSA	MDL > SL
Vanadium		7440-62-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	8.6		RSL	No SL	No	No	MDL ≤ SL
Zinc		7440-66-6	16		16		µg/L	1/1	100%	1.6 – 1.6	16	MDC	600		RSL	No SL	No	No	MDC < SL
Total Cyanide																			
Cyanide	V	57-12-5	3.6	J	3.6	J	µg/L	1/1	100%	2.6 – 2.6	3.6	MDC	0.15		RSL	20.1	No	Yes	MDC ≥ SL

Notes:
% = Percent
AL = Action Level

Table A2-6
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0182)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current and Future
Medium:	Groundwater (Drinking Water)
Well:	0182

Chemical [1]	CASRN	Minimum Detected Concentration	Maximum Detected Concentration	Units	Detection Frequency	Range of Method Detection Limits	Screening Concentration	Screening Level [2, 3, 5, 6]	Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion

CASRN = Chemical Abstracts Service Registry Number
COPC = Chemical of Potential Concern
DSA = Data Sensitivity Analysis
HAL = Health Advisory Level
J = Indicates an estimated value
MCL = Maximum Contaminant Level
MDC = Maximum Detected Concentration
N/A = Not Applicable
ND = Non-Detect or Not Detected
"PFOA and PFOS Combined" = Combined total of the detected concentrations of PFOA and PFOS (non-detect results were not included in the summation).
RL = Reporting Limit
RSL = Regional Screening Level
µg/L = micrograms per liter
USEPA = United States Environmental Protection Agency

(1) "V" indicates that the chemical is volatile.
(2) Groundwater data screened against USEPA Tap Water RSLs, last updated May 2022 (TR = 1E-6, THQ = 0.1).
(3) An asterisk,"*", indicates surrogate toxicity information was used to derive a Screening Level (see Table A2-14).
(4) Groundwater data screened against USEPA Residential Groundwater VISLs, last updated May 2022 (TR = 1E-6, THQ = 0.1). Site-specific, system temperature was set to 20.5 Celsius (average of recorded temperatures taken in field).
(6) Lead is compared to the EPA tap water RSL of 15 µg/L, which represents the 90th percentile concentration of lead found in tap water samples collected nationwide (Lead and Copper Rule, 56 Federal Register 26460-26564, dated June 7, 1991) and is not a risk-based number, but rather an action level.

Table A2-7
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0197)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0197

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Volatile Organic Compounds (VOCs)																			
1,1,1-Trichloroethane	V	71-55-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	800		RSL	893	No	No	MDL ≤ SL
1,1,2,2-Tetrachloroethane	V	79-34-5	N/A		N/A		µg/L	0/1	0%	0.05 – 0.05	0.05	MDL	0.076		RSL	4.18	No	No	MDL ≤ SL
1,1,2-Trichloroethane	V	79-00-5	N/A		N/A		µg/L	0/1	0%	0.042 – 0.042	0.042	MDL	0.041		RSL	0.779	No	See DSA	MDL > SL
1,1,2-Trichlorotrifluoroethane (Freon 113)	V	76-13-1	N/A		N/A		µg/L	0/1	0%	0.099 – 0.099	0.099	MDL	1000		RSL	28.5	No	No	MDL ≤ SL
1,1-Dichloroethane	V	75-34-3	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	2.8		RSL	9.09	No	No	MDL ≤ SL
1,1-Dichloroethene	V	75-35-4	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	28		RSL	22.7	No	No	MDL ≤ SL
1,2,3-Trichlorobenzene	V	87-61-6	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	0.7		RSL	No SL	No	No	MDL ≤ SL
1,2,3-Trichloropropane	V	96-18-4	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	0.00075		RSL	2.89	No	See DSA	MDL > SL
1,2,4-Trichlorobenzene	V	120-82-1	N/A		N/A		µg/L	0/1	0%	0.068 – 0.068	0.068	MDL	0.4		RSL	4.97	No	No	MDL ≤ SL
1,2,4-Trimethylbenzene	V	95-63-6	N/A		N/A		µg/L	0/1	0%	0.051 – 0.051	0.051	MDL	5.6		RSL	33	No	No	MDL ≤ SL
1,2-Dibromo-3-chloropropane	V	96-12-8	N/A		N/A		µg/L	0/1	0%	0.14 – 0.14	0.14	MDL	0.00033		RSL	0.0381	See DSA	See DSA	MDL > SL
1,2-Dibromoethane	V	106-93-4	N/A		N/A		µg/L	0/1	0%	0.052 – 0.052	0.052	MDL	0.0075		RSL	0.221	No	See DSA	MDL > SL
1,2-Dichlorobenzene	V	95-50-1	N/A		N/A		µg/L	0/1	0%	0.045 – 0.045	0.045	MDL	30		RSL	351	No	No	MDL ≤ SL
1,2-Dichloroethane	V	107-06-2	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.17		RSL	2.74	No	No	MDL ≤ SL
1,2-Dichloropropane	V	78-87-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.82		RSL	4.44	No	No	MDL ≤ SL
1,3,5-Trimethylbenzene	V	108-67-8	N/A		N/A		µg/L	0/1	0%	0.067 – 0.067	0.067	MDL	6		RSL	23.2	No	No	MDL ≤ SL
1,3-Dichlorobenzene	V	541-73-1	N/A		N/A		µg/L	0/1	0%	0.071 – 0.071	0.071	MDL	30	*	RSL	351	No	No	MDL ≤ SL
1,4-Dichlorobenzene	V	106-46-7	N/A		N/A		µg/L	0/1	0%	0.047 – 0.047	0.047	MDL	0.48		RSL	3.42	No	No	MDL ≤ SL
1,4-Dioxane	V	123-91-1	N/A		N/A		µg/L	0/1	0%	0.9 – 0.9	0.9	MDL	0.46		RSL	3570	No	See DSA	MDL > SL
2-Butanone (MEK)	V	78-93-3	N/A		N/A		µg/L	0/1	0%	1.5 – 1.5	1.5	MDL	560		RSL	274000	No	No	MDL ≤ SL
2-Hexanone	V	591-78-6	N/A		N/A		µg/L	0/1	0%	0.68 – 0.68	0.68	MDL	3.8		RSL	1060	No	No	MDL ≤ SL
4-Methyl-2-pentanone (MIBK)	V	108-10-1	N/A		N/A		µg/L	0/1	0%	0.71 – 0.71	0.71	MDL	630		RSL	70200	No	No	MDL ≤ SL
Acetone	V	67-64-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	1800		RSL	No SL	No	No	MDL ≤ SL
Benzene	V	71-43-2	N/A		N/A		µg/L	0/1	0%	0.085 – 0.085	0.085	MDL	0.46		RSL	1.92	No	No	MDL ≤ SL
Bromochloromethane	V	74-97-5	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	8.3		RSL	83.9	No	No	MDL ≤ SL
Bromodichloromethane	V	75-27-4	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.13		RSL	1.08	No	No	MDL ≤ SL
Bromoform	V	75-25-2	N/A		N/A		µg/L	0/1	0%	0.095 – 0.095	0.095	MDL	3.3		RSL	152	No	No	MDL ≤ SL
Bromomethane	V	74-83-9	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	0.75		RSL	1.98	No	No	MDL ≤ SL
Carbon disulfide	V	75-15-0	N/A		N/A		µg/L	0/1	0%	0.092 – 0.092	0.092	MDL	81		RSL	145	No	No	MDL ≤ SL
Carbon tetrachloride	V	56-23-5	N/A		N/A		µg/L	0/1	0%	0.086 – 0.086	0.086	MDL	0.46		RSL	0.499	No	No	MDL ≤ SL
Chlorobenzene	V	108-90-7	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	7.8		RSL	51.9	No	No	MDL ≤ SL
Chloroethane	V	75-00-3	N/A		N/A		µg/L	0/1	0%	0.074 – 0.074	0.074	MDL	830		RSL	1050	No	No	MDL ≤ SL
Chloroform	V	67-66-3	0.51		0.51		µg/L	1/1	100%	0.079 – 0.079	0.51	MDC	0.22		RSL	0.972	No	Yes	MDC ≥ SL
Chloromethane	V	74-87-3	0.19	J	0.19	J	µg/L	1/1	100%	0.082 – 0.082	0.19	MDC	19		RSL	28.9	No	No	MDC < SL
cis-1,2-Dichloroethene	V	156-59-2	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
cis-1,3-Dichloropropene	V	10061-01-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Cyclohexane	V	110-82-7	N/A		N/A		µg/L	0/1	0%	0.065 – 0.065	0.065	MDL	1300		RSL	123	No	No	MDL ≤ SL
Dibromochloromethane	V	124-48-1	N/A		N/A		µg/L	0/1	0%	0.073 – 0.073	0.073	MDL	0.87		RSL	No SL	No	No	MDL ≤ SL
Dichlorodifluoromethane	V	75-71-8	N/A		N/A		µg/L	0/1	0%	0.12 – 0.12	0.12	MDL	20		RSL	0.815	No	No	MDL ≤ SL
Ethylbenzene	V	100-41-4	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	1.5		RSL	4.45	No	No	MDL ≤ SL

Table A2-7
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0197)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0197

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Isopropylbenzene	V	98-82-8	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	45		RSL	121	No	No	MDL ≤ SL
m,p-Xylene	V	179601-23-1	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	19	*	RSL	45.5	No	No	MDL ≤ SL
Methyl Acetate	V	79-20-9	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	2000		RSL	No SL	No	No	MDL ≤ SL
Methyl Tert Butyl Ether	V	1634-04-4	0.13	J	0.13	J	µg/L	1/1	100%	0.053 – 0.053	0.13	MDC	14		RSL	533	No	No	MDC < SL
Methylcyclohexane	V	108-87-2	N/A		N/A		µg/L	0/1	0%	0.08 – 0.08	0.08	MDL	1300	*	RSL	123	No	No	MDL ≤ SL
Methylene chloride	V	75-09-2	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	11		RSL	555	No	No	MDL ≤ SL
o-Xylene	V	95-47-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	19		RSL	63.3	No	No	MDL ≤ SL
Styrene	V	100-42-5	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	120		RSL	1210	No	No	MDL ≤ SL
Tetrachloroethene	V	127-18-4	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	4.1		RSL	7.25	No	No	MDL ≤ SL
Toluene	V	108-88-3	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	110		RSL	2390	No	No	MDL ≤ SL
trans-1,2-Dichloroethene	V	156-60-5	N/A		N/A		µg/L	0/1	0%	0.081 – 0.081	0.081	MDL	6.8		RSL	12.9	No	No	MDL ≤ SL
trans-1,3-Dichloropropene	V	10061-02-6	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Trichloroethene	V	79-01-6	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.28		RSL	0.632	No	No	MDL ≤ SL
Trichlorofluoromethane	V	75-69-4	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	520		RSL	No SL	No	No	MDL ≤ SL
Vinyl chloride	V	75-01-4	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.019		RSL	0.164	No	See DSA	MDL > SL
Semi-Volatile Organic Compounds (SVOCs)																			
1,1'-Biphenyl	V	92-52-4	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.083		RSL	4.71	No	See DSA	MDL > SL
1,2,4,5-Tetrachlorobenzene	V	95-94-3	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.017		RSL	No SL	No	See DSA	MDL > SL
1-Methylnaphthalene	V	90-12-0	N/A		N/A		µg/L	0/1	0%	0.0055 – 0.0055	0.0055	MDL	1.1		RSL	No SL	No	No	MDL ≤ SL
2,3,4,6-Tetrachlorophenol		58-90-2	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	24		RSL	No SL	No	No	MDL ≤ SL
2,4,5-Trichlorophenol		95-95-4	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	120		RSL	No SL	No	No	MDL ≤ SL
2,4,6-Trichlorophenol		88-06-2	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	1.2		RSL	No SL	No	See DSA	MDL > SL
2,4-Dichlorophenol		120-83-2	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4.6		RSL	No SL	No	No	MDL ≤ SL
2,4-Dimethylphenol		105-67-9	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	36		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrophenol		51-28-5	N/A		N/A		µg/L	0/1	0%	0.98 – 0.98	0.98	MDL	3.9		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrotoluene		121-14-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	0.24		RSL	No SL	No	See DSA	MDL > SL
2,6-Dinitrotoluene		606-20-2	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.049		RSL	No SL	No	See DSA	MDL > SL
2-Chloronaphthalene	V	91-58-7	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	75		RSL	No SL	No	No	MDL ≤ SL
2-Chlorophenol	V	95-57-8	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	9.1		RSL	No SL	No	No	MDL ≤ SL
2-Methylnaphthalene	V	91-57-6	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
2-Methylphenol		95-48-7	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	93		RSL	No SL	No	No	MDL ≤ SL
2-Nitroaniline		88-74-4	N/A		N/A		µg/L	0/1	0%	3.4 – 3.4	3.4	MDL	19		RSL	No SL	No	No	MDL ≤ SL
2-Nitrophenol		88-75-5	N/A		N/A		µg/L	0/1	0%	2.7 – 2.7	2.7	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
3,3'-Dichlorobenzidine		91-94-1	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	0.13		RSL	No SL	No	See DSA	MDL > SL
3-Nitroaniline		99-09-2	N/A		N/A		µg/L	0/1	0%	0.67 – 0.67	0.67	MDL	19	*	RSL	No SL	No	No	MDL ≤ SL
4,6-Dinitro-o-cresol		534-52-1	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.15		RSL	No SL	No	See DSA	MDL > SL
4-Bromophenyl phenyl ether	V	101-55-3	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Chloro-3-methyl phenol		59-50-7	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	140		RSL	No SL	No	No	MDL ≤ SL
4-Chloroaniline		106-47-8	N/A		N/A		µg/L	0/1	0%	4.6 – 4.6	4.6	MDL	0.37		RSL	No SL	No	See DSA	MDL > SL
4-Chlorophenyl phenyl ether	V	7005-72-3	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Methylphenol		106-44-5	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	37		RSL	No SL	No	No	MDL ≤ SL

Table A2-7
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0197)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0197

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
4-Nitroaniline		100-01-6	N/A		N/A		µg/L	0/1	0%	0.85 – 0.85	0.85	MDL	3.8		RSL	No SL	No	No	MDL ≤ SL
4-Nitrophenol		100-02-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
Acenaphthene	V	83-32-9	N/A		N/A		µg/L	0/1	0%	0.0061 – 0.0061	0.0061	MDL	53		RSL	No SL	No	No	MDL ≤ SL
Acenaphthylene	V	208-96-8	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	53	*	RSL	No SL	No	No	MDL ≤ SL
Acetophenone	V	98-86-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	190		RSL	No SL	No	No	MDL ≤ SL
Anthracene	V	120-12-7	N/A		N/A		µg/L	0/1	0%	0.011 – 0.011	0.011	MDL	180		RSL	No SL	No	No	MDL ≤ SL
Atrazine		1912-24-9	N/A		N/A		µg/L	0/1	0%	0.48 – 0.48	0.48	MDL	0.3		RSL	No SL	No	See DSA	MDL > SL
Benzaldehyde	V	100-52-7	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	19		RSL	No SL	No	No	MDL ≤ SL
Benzo(a)anthracene	V	56-55-3	N/A		N/A		µg/L	0/1	0%	0.0094 – 0.0094	0.0094	MDL	0.03		RSL	62.3	No	No	MDL ≤ SL
Benzo(a)pyrene		50-32-8	N/A		N/A		µg/L	0/1	0%	0.017 – 0.017	0.017	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Benzo(b)fluoranthene		205-99-2	N/A		N/A		µg/L	0/1	0%	0.0082 – 0.0082	0.0082	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Benzo(g,h,i)perylene	V	191-24-2	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	12	*	RSL	No SL	No	No	MDL ≤ SL
Benzo(k)fluoranthene		207-08-9	N/A		N/A		µg/L	0/1	0%	0.0041 – 0.0041	0.0041	MDL	2.5		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethoxy)methane		111-91-1	N/A		N/A		µg/L	0/1	0%	2.9 – 2.9	2.9	MDL	5.9		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethyl)ether	V	111-44-4	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.014		RSL	17	No	See DSA	MDL > SL
bis(2-Chloroisopropyl)ether	V	108-60-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	71		RSL	No SL	No	No	MDL ≤ SL
bis(2-Ethylhexyl)phthalate		117-81-7	N/A		N/A		µg/L	0/1	0%	0.82 – 0.82	0.82	MDL	5.6		RSL	No SL	No	No	MDL ≤ SL
Butyl benzyl phthalate		85-68-7	N/A		N/A		µg/L	0/1	0%	1.4 – 1.4	1.4	MDL	16		RSL	No SL	No	No	MDL ≤ SL
Caprolactam		105-60-2	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	990		RSL	No SL	No	No	MDL ≤ SL
Carbazole	V	86-74-8	N/A		N/A		µg/L	0/1	0%	3.2 – 3.2	3.2	MDL	29	*	RSL	No SL	No	No	MDL ≤ SL
Chrysene		218-01-9	N/A		N/A		µg/L	0/1	0%	0.0054 – 0.0054	0.0054	MDL	25		RSL	No SL	No	No	MDL ≤ SL
Dibenzo(a,h)anthracene		53-70-3	N/A		N/A		µg/L	0/1	0%	0.0059 – 0.0059	0.0059	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Dibenzofuran	V	132-64-9	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	0.79		RSL	No SL	No	See DSA	MDL > SL
Diethyl phthalate		84-66-2	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	1500		RSL	No SL	No	No	MDL ≤ SL
Dimethyl phthalate		131-11-3	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	1500	*	RSL	No SL	No	No	MDL ≤ SL
Di-n-butyl phthalate		84-74-2	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	90		RSL	No SL	No	No	MDL ≤ SL
Di-n-octyl phthalate		117-84-0	N/A		N/A		µg/L	0/1	0%	0.64 – 0.64	0.64	MDL	20		RSL	No SL	No	No	MDL ≤ SL
Fluoranthene		206-44-0	N/A		N/A		µg/L	0/1	0%	0.012 – 0.012	0.012	MDL	80		RSL	No SL	No	No	MDL ≤ SL
Fluorene	V	86-73-7	N/A		N/A		µg/L	0/1	0%	0.0072 – 0.0072	0.0072	MDL	29		RSL	No SL	No	No	MDL ≤ SL
Hexachlorobenzene	V	118-74-1	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.0098		RSL	0.133	See DSA	See DSA	MDL > SL
Hexachlorobutadiene	V	87-68-3	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	0.14		RSL	0.414	See DSA	See DSA	MDL > SL
Hexachlorocyclopentadiene	V	77-47-4	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	0.041		RSL	0.0786	See DSA	See DSA	MDL > SL
Hexachloroethane	V	67-72-1	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	0.33		RSL	2.29	See DSA	See DSA	MDL > SL
Indeno(1,2,3-cd)pyrene		193-39-5	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Isophorone		78-59-1	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	78		RSL	No SL	No	No	MDL ≤ SL
Naphthalene	V	91-20-3	N/A		N/A		µg/L	0/1	0%	0.0077 – 0.0077	0.0077	MDL	0.12		RSL	6.29	No	No	MDL ≤ SL
Nitrobenzene	V	98-95-3	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	0.14		RSL	99.3	No	See DSA	MDL > SL
N-Nitroso-di-n-propylamine		621-64-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.011		RSL	No SL	No	See DSA	MDL > SL
N-Nitrosodiphenylamine		86-30-6	N/A		N/A		µg/L	0/1	0%	3.6 – 3.6	3.6	MDL	12		RSL	No SL	No	No	MDL ≤ SL
Pentachlorophenol		87-86-5	N/A		N/A		µg/L	0/1	0%	0.024 – 0.024	0.024	MDL	0.041		RSL	No SL	No	No	MDL ≤ SL
Phenanthrene	V	85-01-8	N/A		N/A		µg/L	0/1	0%	0.0087 – 0.0087	0.0087	MDL	180	*	RSL	No SL	No	No	MDL ≤ SL

Table A2-7
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0197)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0197

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Phenol		108-95-2	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	580		RSL	No SL	No	No	MDL ≤ SL
Pyrene	V	129-00-0	N/A		N/A		µg/L	0/1	0%	0.014 – 0.014	0.014	MDL	12		RSL	No SL	No	No	MDL ≤ SL
DIOX																			
Total PCDD/F TEQ (Mammal)	V	TEQ-M-DF	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
PCB																			
Total PCB TEQ (Mammal)	V	TEQ-M-PCB	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
Total PCB Congener	V	TPCB_CON	0.000041	J	0.000041	J	µg/L	1/1	100%	N/A	0.000041	MDC	0.044	*	RSL	1.65	No	No	MDC < SL
Perfluorinated Compounds																			
Perfluorononanoic acid (PFNA)		375-95-1	0.0024		0.0024		µg/L	1/1	100%	0.0019 – 0.0019	0.0024	MDC	0.0059		RSL	No SL	No	No	MDC < SL
Perfluorohexanesulfonic acid (PFHxS)		355-46-4	0.0084		0.0084		µg/L	1/1	100%	0.0019 – 0.0019	0.0084	MDC	0.039		RSL	No SL	No	No	MDC < SL
Perfluorobutanesulfonic acid (PFBS)		375-73-5	0.05		0.05		µg/L	1/1	100%	0.00037 – 0.00037	0.05	MDC	0.6		RSL	No SL	No	No	MDC < SL
Perfluorooctanesulfonic acid (PFOS)		1763-23-1	0.15		0.15		µg/L	1/1	100%	0.0019 – 0.0019	0.15	MDC	0.004		RSL	No SL	No	Yes	MDC ≥ SL
Perfluorooctanoic acid (PFOA)		335-67-1	0.016		0.016		µg/L	1/1	100%	0.00037 – 0.00037	0.016	MDC	0.006		RSL	No SL	No	Yes	MDC ≥ SL
Total Metals																			
Aluminum		7429-90-5	N/A		N/A		µg/L	0/1	0%	4 – 4	4	MDL	2000		RSL	No SL	No	No	MDL ≤ SL
Antimony		7440-36-0	N/A		N/A		µg/L	0/1	0%	0.32 – 0.32	0.32	MDL	0.78		RSL	No SL	No	No	MDL ≤ SL
Arsenic		7440-38-2	N/A		N/A		µg/L	0/1	0%	0.33 – 0.33	0.33	MDL	0.052		RSL	No SL	No	See DSA	MDL > SL
Barium		7440-39-3	160		160		µg/L	1/1	100%	1.9 – 1.9	160	MDC	380		RSL	No SL	No	No	MDC < SL
Beryllium		7440-41-7	N/A		N/A		µg/L	0/1	0%	0.17 – 0.17	0.17	MDL	2.5		RSL	No SL	No	No	MDL ≤ SL
Cadmium		7440-43-9	0.33	J	0.33	J	µg/L	1/1	100%	0.14 – 0.14	0.33	MDC	0.18		RSL	No SL	No	Yes	MDC ≥ SL
Calcium		7440-70-2	12000		12000		µg/L	1/1	100%	120 – 120	12000	MDC	Nutrient		N/A	Nutrient	No	No	Classified as an essential nutrient
Chromium, Total		7440-47-3	0.46	J	0.46	J	µg/L	1/1	100%	0.32 – 0.32	0.46	MDC	2200	*	RSL	No SL	No	No	MDC < SL
Chromium, Hexavalent		18540-29-9	N/A		N/A		µg/L	0/1	0%	1 – 1	1	MDL	0.035		RSL	No SL	No	See DSA	MDL > SL
Cobalt		7440-48-4	13		13		µg/L	1/1	100%	0.19 – 0.19	13	MDC	0.6		RSL	No SL	No	Yes	MDC ≥ SL
Copper		7440-50-8	17		17		µg/L	1/1	100%	0.4 – 0.4	17	MDC	80		RSL	No SL	No	No	MDC < SL
Iron		7439-89-6	N/A		N/A		µg/L	0/1	0%	54 – 54	54	MDL	1400		RSL	No SL	No	No	MDL ≤ SL
Lead		7439-92-1	0.47	J	0.47	J	µg/L	1/1	100%	0.21 – 0.21	0.47	MDC	15		RSL	No SL	No	No	MDC < SL
Manganese		7439-96-5	180		180		µg/L	1/1	100%	0.17 – 0.17	180	MDC	43		RSL	No SL	No	Yes	MDC ≥ SL
Mercury		7439-97-6	N/A		N/A		µg/L	0/1	0%	0.06 – 0.06	0.06	MDL	0.2	*	RSL	No SL	No	No	MDL ≤ SL
Nickel		7440-02-0	1.8		1.8		µg/L	1/1	100%	0.2 – 0.2	1.8	MDC	39		RSL	No SL	No	No	MDC < SL
Selenium		7782-49-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	10		RSL	No SL	No	No	MDL ≤ SL
Silver		7440-22-4	N/A		N/A		µg/L	0/1	0%	0.18 – 0.18	0.18	MDL	9.4		RSL	No SL	No	No	MDL ≤ SL
Thallium		7440-28-0	N/A		N/A		µg/L	0/1	0%	0.23 – 0.23	0.23	MDL	0.02		RSL	No SL	No	See DSA	MDL > SL
Vanadium		7440-62-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	8.6		RSL	No SL	No	No	MDL ≤ SL
Zinc		7440-66-6	18		18		µg/L	1/1	100%	1.6 – 1.6	18	MDC	600		RSL	No SL	No	No	MDC < SL
Total Cyanide																			
Cyanide	V	57-12-5	3.2	J	3.2	J	µg/L	1/1	100%	2.6 – 2.6	3.2	MDC	0.15		RSL	20.1	No	Yes	MDC ≥ SL

Notes:
% = Percent
AL = Action Level

Table A2-7
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0197)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current and Future
Medium:	Groundwater (Drinking Water)
Well:	0197

Chemical [1]	CASRN	Minimum Detected Concentration	Maximum Detected Concentration	Units	Detection Frequency	Range of Method Detection Limits	Screening Concentration	Screening Level [2, 3, 5, 6]	Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion

CASRN = Chemical Abstracts Service Registry Number
COPC = Chemical of Potential Concern
DSA = Data Sensitivity Analysis
HAL = Health Advisory Level
J = Indicates an estimated value
MCL = Maximum Contaminant Level
MDC = Maximum Detected Concentration
N/A = Not Applicable
ND = Non-Detect or Not Detected
"PFOA and PFOS Combined" = Combined total of the detected concentrations of PFOA and PFOS (non-detect results were not included in the summation).
RL = Reporting Limit
RSL = Regional Screening Level
µg/L = micrograms per liter
USEPA = United States Environmental Protection Agency

(1) "V" indicates that the chemical is volatile.
(2) Groundwater data screened against USEPA Tap Water RSLs, last updated May 2022 (TR = 1E-6, THQ = 0.1).
(3) An asterisk,"*", indicates surrogate toxicity information was used to derive a Screening Level (see Table A2-14).
(4) Groundwater data screened against USEPA Residential Groundwater VISLs, last updated May 2022 (TR = 1E-6, THQ = 0.1). Site-specific, system temperature was set to 20.5 Celsius (average of recorded temperatures taken in field).
(6) Lead is compared to the EPA tap water RSL of 15 µg/L, which represents the 90th percentile concentration of lead found in tap water samples collected nationwide (Lead and Copper Rule, 56 Federal Register 26460-26564, dated June 7, 1991) and is not a risk-based number, but rather an action level.

Table A2-8
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0212)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0212

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Volatile Organic Compounds (VOCs)																			
1,1,1-Trichloroethane	V	71-55-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	800		RSL	893	No	No	MDL ≤ SL
1,1,2,2-Tetrachloroethane	V	79-34-5	N/A		N/A		µg/L	0/1	0%	0.05 – 0.05	0.05	MDL	0.076		RSL	4.18	No	No	MDL ≤ SL
1,1,2-Trichloroethane	V	79-00-5	N/A		N/A		µg/L	0/1	0%	0.042 – 0.042	0.042	MDL	0.041		RSL	0.779	No	See DSA	MDL > SL
1,1,2-Trichlorotrifluoroethane (Freon 113)	V	76-13-1	N/A		N/A		µg/L	0/1	0%	0.099 – 0.099	0.099	MDL	1000		RSL	28.5	No	No	MDL ≤ SL
1,1-Dichloroethane	V	75-34-3	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	2.8		RSL	9.09	No	No	MDL ≤ SL
1,1-Dichloroethene	V	75-35-4	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	28		RSL	22.7	No	No	MDL ≤ SL
1,2,3-Trichlorobenzene	V	87-61-6	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	0.7		RSL	No SL	No	No	MDL ≤ SL
1,2,3-Trichloropropane	V	96-18-4	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	0.00075		RSL	2.89	No	See DSA	MDL > SL
1,2,4-Trichlorobenzene	V	120-82-1	N/A		N/A		µg/L	0/1	0%	0.068 – 0.068	0.068	MDL	0.4		RSL	4.97	No	No	MDL ≤ SL
1,2,4-Trimethylbenzene	V	95-63-6	N/A		N/A		µg/L	0/1	0%	0.051 – 0.051	0.051	MDL	5.6		RSL	33	No	No	MDL ≤ SL
1,2-Dibromo-3-chloropropane	V	96-12-8	N/A		N/A		µg/L	0/1	0%	0.14 – 0.14	0.14	MDL	0.00033		RSL	0.0381	See DSA	See DSA	MDL > SL
1,2-Dibromoethane	V	106-93-4	N/A		N/A		µg/L	0/1	0%	0.052 – 0.052	0.052	MDL	0.0075		RSL	0.221	No	See DSA	MDL > SL
1,2-Dichlorobenzene	V	95-50-1	N/A		N/A		µg/L	0/1	0%	0.045 – 0.045	0.045	MDL	30		RSL	351	No	No	MDL ≤ SL
1,2-Dichloroethane	V	107-06-2	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.17		RSL	2.74	No	No	MDL ≤ SL
1,2-Dichloropropane	V	78-87-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.82		RSL	4.44	No	No	MDL ≤ SL
1,3,5-Trimethylbenzene	V	108-67-8	N/A		N/A		µg/L	0/1	0%	0.067 – 0.067	0.067	MDL	6		RSL	23.2	No	No	MDL ≤ SL
1,3-Dichlorobenzene	V	541-73-1	N/A		N/A		µg/L	0/1	0%	0.071 – 0.071	0.071	MDL	30	*	RSL	351	No	No	MDL ≤ SL
1,4-Dichlorobenzene	V	106-46-7	N/A		N/A		µg/L	0/1	0%	0.047 – 0.047	0.047	MDL	0.48		RSL	3.42	No	No	MDL ≤ SL
1,4-Dioxane	V	123-91-1	N/A		N/A		µg/L	0/1	0%	0.9 – 0.9	0.9	MDL	0.46		RSL	3570	No	See DSA	MDL > SL
2-Butanone (MEK)	V	78-93-3	N/A		N/A		µg/L	0/1	0%	1.5 – 1.5	1.5	MDL	560		RSL	274000	No	No	MDL ≤ SL
2-Hexanone	V	591-78-6	N/A		N/A		µg/L	0/1	0%	0.68 – 0.68	0.68	MDL	3.8		RSL	1060	No	No	MDL ≤ SL
4-Methyl-2-pentanone (MIBK)	V	108-10-1	N/A		N/A		µg/L	0/1	0%	0.71 – 0.71	0.71	MDL	630		RSL	70200	No	No	MDL ≤ SL
Acetone	V	67-64-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	1800		RSL	No SL	No	No	MDL ≤ SL
Benzene	V	71-43-2	N/A		N/A		µg/L	0/1	0%	0.085 – 0.085	0.085	MDL	0.46		RSL	1.92	No	No	MDL ≤ SL
Bromochloromethane	V	74-97-5	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	8.3		RSL	83.9	No	No	MDL ≤ SL
Bromodichloromethane	V	75-27-4	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.13		RSL	1.08	No	No	MDL ≤ SL
Bromoform	V	75-25-2	N/A		N/A		µg/L	0/1	0%	0.095 – 0.095	0.095	MDL	3.3		RSL	152	No	No	MDL ≤ SL
Bromomethane	V	74-83-9	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	0.75		RSL	1.98	No	No	MDL ≤ SL
Carbon disulfide	V	75-15-0	N/A		N/A		µg/L	0/1	0%	0.092 – 0.092	0.092	MDL	81		RSL	145	No	No	MDL ≤ SL
Carbon tetrachloride	V	56-23-5	N/A		N/A		µg/L	0/1	0%	0.086 – 0.086	0.086	MDL	0.46		RSL	0.499	No	No	MDL ≤ SL
Chlorobenzene	V	108-90-7	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	7.8		RSL	51.9	No	No	MDL ≤ SL
Chloroethane	V	75-00-3	N/A		N/A		µg/L	0/1	0%	0.074 – 0.074	0.074	MDL	830		RSL	1050	No	No	MDL ≤ SL
Chloroform	V	67-66-3	0.28	J	0.28	J	µg/L	1/1	100%	0.079 – 0.079	0.28	MDC	0.22		RSL	0.972	No	Yes	MDC ≥ SL
Chloromethane	V	74-87-3	0.24	J	0.24	J	µg/L	1/1	100%	0.082 – 0.082	0.24	MDC	19		RSL	28.9	No	No	MDC < SL
cis-1,2-Dichloroethene	V	156-59-2	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
cis-1,3-Dichloropropene	V	10061-01-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Cyclohexane	V	110-82-7	N/A		N/A		µg/L	0/1	0%	0.065 – 0.065	0.065	MDL	1300		RSL	123	No	No	MDL ≤ SL
Dibromochloromethane	V	124-48-1	N/A		N/A		µg/L	0/1	0%	0.073 – 0.073	0.073	MDL	0.87		RSL	No SL	No	No	MDL ≤ SL
Dichlorodifluoromethane	V	75-71-8	N/A		N/A		µg/L	0/1	0%	0.12 – 0.12	0.12	MDL	20		RSL	0.815	No	No	MDL ≤ SL
Ethylbenzene	V	100-41-4	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	1.5		RSL	4.45	No	No	MDL ≤ SL

Table A2-8
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0212)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0212

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Isopropylbenzene	V	98-82-8	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	45		RSL	121	No	No	MDL ≤ SL
m,p-Xylene	V	179601-23-1	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	19	*	RSL	45.5	No	No	MDL ≤ SL
Methyl Acetate	V	79-20-9	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	2000		RSL	No SL	No	No	MDL ≤ SL
Methyl Tert Butyl Ether	V	1634-04-4	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	14		RSL	533	No	No	MDL ≤ SL
Methylcyclohexane	V	108-87-2	N/A		N/A		µg/L	0/1	0%	0.08 – 0.08	0.08	MDL	1300	*	RSL	123	No	No	MDL ≤ SL
Methylene chloride	V	75-09-2	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	11		RSL	555	No	No	MDL ≤ SL
o-Xylene	V	95-47-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	19		RSL	63.3	No	No	MDL ≤ SL
Styrene	V	100-42-5	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	120		RSL	1210	No	No	MDL ≤ SL
Tetrachloroethene	V	127-18-4	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	4.1		RSL	7.25	No	No	MDL ≤ SL
Toluene	V	108-88-3	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	110		RSL	2390	No	No	MDL ≤ SL
trans-1,2-Dichloroethene	V	156-60-5	N/A		N/A		µg/L	0/1	0%	0.081 – 0.081	0.081	MDL	6.8		RSL	12.9	No	No	MDL ≤ SL
trans-1,3-Dichloropropene	V	10061-02-6	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Trichloroethene	V	79-01-6	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.28		RSL	0.632	No	No	MDL ≤ SL
Trichlorofluoromethane	V	75-69-4	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	520		RSL	No SL	No	No	MDL ≤ SL
Vinyl chloride	V	75-01-4	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.019		RSL	0.164	No	See DSA	MDL > SL
Semi-Volatile Organic Compounds (SVOCs)																			
1,1'-Biphenyl	V	92-52-4	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.083		RSL	4.71	No	See DSA	MDL > SL
1,2,4,5-Tetrachlorobenzene	V	95-94-3	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.017		RSL	No SL	No	See DSA	MDL > SL
1-Methylnaphthalene	V	90-12-0	N/A		N/A		µg/L	0/1	0%	0.0055 – 0.0055	0.0055	MDL	1.1		RSL	No SL	No	No	MDL ≤ SL
2,3,4,6-Tetrachlorophenol		58-90-2	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	24		RSL	No SL	No	No	MDL ≤ SL
2,4,5-Trichlorophenol		95-95-4	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	120		RSL	No SL	No	No	MDL ≤ SL
2,4,6-Trichlorophenol		88-06-2	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	1.2		RSL	No SL	No	See DSA	MDL > SL
2,4-Dichlorophenol		120-83-2	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4.6		RSL	No SL	No	No	MDL ≤ SL
2,4-Dimethylphenol		105-67-9	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	36		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrophenol		51-28-5	N/A		N/A		µg/L	0/1	0%	0.98 – 0.98	0.98	MDL	3.9		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrotoluene		121-14-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	0.24		RSL	No SL	No	See DSA	MDL > SL
2,6-Dinitrotoluene		606-20-2	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.049		RSL	No SL	No	See DSA	MDL > SL
2-Chloronaphthalene	V	91-58-7	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	75		RSL	No SL	No	No	MDL ≤ SL
2-Chlorophenol	V	95-57-8	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	9.1		RSL	No SL	No	No	MDL ≤ SL
2-Methylnaphthalene	V	91-57-6	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
2-Methylphenol		95-48-7	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	93		RSL	No SL	No	No	MDL ≤ SL
2-Nitroaniline		88-74-4	N/A		N/A		µg/L	0/1	0%	3.4 – 3.4	3.4	MDL	19		RSL	No SL	No	No	MDL ≤ SL
2-Nitrophenol		88-75-5	N/A		N/A		µg/L	0/1	0%	2.7 – 2.7	2.7	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
3,3'-Dichlorobenzidine		91-94-1	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	0.13		RSL	No SL	No	See DSA	MDL > SL
3-Nitroaniline		99-09-2	N/A		N/A		µg/L	0/1	0%	0.67 – 0.67	0.67	MDL	19	*	RSL	No SL	No	No	MDL ≤ SL
4,6-Dinitro-o-cresol		534-52-1	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.15		RSL	No SL	No	See DSA	MDL > SL
4-Bromophenyl phenyl ether	V	101-55-3	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Chloro-3-methyl phenol		59-50-7	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	140		RSL	No SL	No	No	MDL ≤ SL
4-Chloroaniline		106-47-8	N/A		N/A		µg/L	0/1	0%	4.6 – 4.6	4.6	MDL	0.37		RSL	No SL	No	See DSA	MDL > SL
4-Chlorophenyl phenyl ether	V	7005-72-3	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Methylphenol		106-44-5	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	37		RSL	No SL	No	No	MDL ≤ SL

Table A2-8
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0212)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0212

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
4-Nitroaniline		100-01-6	N/A		N/A		µg/L	0/1	0%	0.85 – 0.85	0.85	MDL	3.8		RSL	No SL	No	No	MDL ≤ SL
4-Nitrophenol		100-02-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
Acenaphthene	V	83-32-9	N/A		N/A		µg/L	0/1	0%	0.0061 – 0.0061	0.0061	MDL	53		RSL	No SL	No	No	MDL ≤ SL
Acenaphthylene	V	208-96-8	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	53	*	RSL	No SL	No	No	MDL ≤ SL
Acetophenone	V	98-86-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	190		RSL	No SL	No	No	MDL ≤ SL
Anthracene	V	120-12-7	N/A		N/A		µg/L	0/1	0%	0.011 – 0.011	0.011	MDL	180		RSL	No SL	No	No	MDL ≤ SL
Atrazine		1912-24-9	N/A		N/A		µg/L	0/1	0%	0.48 – 0.48	0.48	MDL	0.3		RSL	No SL	No	See DSA	MDL > SL
Benzaldehyde	V	100-52-7	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	19		RSL	No SL	No	No	MDL ≤ SL
Benzo(a)anthracene	V	56-55-3	N/A		N/A		µg/L	0/1	0%	0.0094 – 0.0094	0.0094	MDL	0.03		RSL	62.3	No	No	MDL ≤ SL
Benzo(a)pyrene		50-32-8	N/A		N/A		µg/L	0/1	0%	0.017 – 0.017	0.017	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Benzo(b)fluoranthene		205-99-2	N/A		N/A		µg/L	0/1	0%	0.0082 – 0.0082	0.0082	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Benzo(g,h,i)perylene	V	191-24-2	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	12	*	RSL	No SL	No	No	MDL ≤ SL
Benzo(k)fluoranthene		207-08-9	N/A		N/A		µg/L	0/1	0%	0.0041 – 0.0041	0.0041	MDL	2.5		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethoxy)methane		111-91-1	N/A		N/A		µg/L	0/1	0%	2.9 – 2.9	2.9	MDL	5.9		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethyl)ether	V	111-44-4	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.014		RSL	17	No	See DSA	MDL > SL
bis(2-Chloroisopropyl)ether	V	108-60-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	71		RSL	No SL	No	No	MDL ≤ SL
bis(2-Ethylhexyl)phthalate		117-81-7	N/A		N/A		µg/L	0/1	0%	0.82 – 0.82	0.82	MDL	5.6		RSL	No SL	No	No	MDL ≤ SL
Butyl benzyl phthalate		85-68-7	N/A		N/A		µg/L	0/1	0%	1.4 – 1.4	1.4	MDL	16		RSL	No SL	No	No	MDL ≤ SL
Caprolactam		105-60-2	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	990		RSL	No SL	No	No	MDL ≤ SL
Carbazole	V	86-74-8	N/A		N/A		µg/L	0/1	0%	3.2 – 3.2	3.2	MDL	29	*	RSL	No SL	No	No	MDL ≤ SL
Chrysene		218-01-9	N/A		N/A		µg/L	0/1	0%	0.0054 – 0.0054	0.0054	MDL	25		RSL	No SL	No	No	MDL ≤ SL
Dibenzo(a,h)anthracene		53-70-3	N/A		N/A		µg/L	0/1	0%	0.0059 – 0.0059	0.0059	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Dibenzofuran	V	132-64-9	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	0.79		RSL	No SL	No	See DSA	MDL > SL
Diethyl phthalate		84-66-2	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	1500		RSL	No SL	No	No	MDL ≤ SL
Dimethyl phthalate		131-11-3	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	1500	*	RSL	No SL	No	No	MDL ≤ SL
Di-n-butyl phthalate		84-74-2	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	90		RSL	No SL	No	No	MDL ≤ SL
Di-n-octyl phthalate		117-84-0	N/A		N/A		µg/L	0/1	0%	0.64 – 0.64	0.64	MDL	20		RSL	No SL	No	No	MDL ≤ SL
Fluoranthene		206-44-0	N/A		N/A		µg/L	0/1	0%	0.012 – 0.012	0.012	MDL	80		RSL	No SL	No	No	MDL ≤ SL
Fluorene	V	86-73-7	N/A		N/A		µg/L	0/1	0%	0.0072 – 0.0072	0.0072	MDL	29		RSL	No SL	No	No	MDL ≤ SL
Hexachlorobenzene	V	118-74-1	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.0098		RSL	0.133	See DSA	See DSA	MDL > SL
Hexachlorobutadiene	V	87-68-3	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	0.14		RSL	0.414	See DSA	See DSA	MDL > SL
Hexachlorocyclopentadiene	V	77-47-4	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	0.041		RSL	0.0786	See DSA	See DSA	MDL > SL
Hexachloroethane	V	67-72-1	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	0.33		RSL	2.29	See DSA	See DSA	MDL > SL
Indeno(1,2,3-cd)pyrene		193-39-5	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Isophorone		78-59-1	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	78		RSL	No SL	No	No	MDL ≤ SL
Naphthalene	V	91-20-3	N/A		N/A		µg/L	0/1	0%	0.0077 – 0.0077	0.0077	MDL	0.12		RSL	6.29	No	No	MDL ≤ SL
Nitrobenzene	V	98-95-3	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	0.14		RSL	99.3	No	See DSA	MDL > SL
N-Nitroso-di-n-propylamine		621-64-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.011		RSL	No SL	No	See DSA	MDL > SL
N-Nitrosodiphenylamine		86-30-6	N/A		N/A		µg/L	0/1	0%	3.6 – 3.6	3.6	MDL	12		RSL	No SL	No	No	MDL ≤ SL
Pentachlorophenol		87-86-5	N/A		N/A		µg/L	0/1	0%	0.024 – 0.024	0.024	MDL	0.041		RSL	No SL	No	No	MDL ≤ SL
Phenanthrene	V	85-01-8	N/A		N/A		µg/L	0/1	0%	0.0087 – 0.0087	0.0087	MDL	180	*	RSL	No SL	No	No	MDL ≤ SL

Table A2-8
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0212)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0212

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Phenol		108-95-2	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	580		RSL	No SL	No	No	MDL ≤ SL
Pyrene	V	129-00-0	N/A		N/A		µg/L	0/1	0%	0.014 – 0.014	0.014	MDL	12		RSL	No SL	No	No	MDL ≤ SL
DIOX																			
Total PCDD/F TEQ (Mammal)	V	TEQ-M-DF	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
PCB																			
Total PCB TEQ (Mammal)	V	TEQ-M-PCB	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
Total PCB Congener	V	TPCB_CON	0.000061	J	0.000061	J	µg/L	1/1	100%	N/A	0.000061	MDC	0.044	*	RSL	1.65	No	No	MDC < SL
Perfluorinated Compounds																			
Perfluorononanoic acid (PFNA)		375-95-1	0.0034		0.0034		µg/L	1/1	100%	0.0019 – 0.0019	0.0034	MDC	0.0059		RSL	No SL	No	No	MDC < SL
Perfluorohexanesulfonic acid (PFHxS)		355-46-4	0.0024		0.0024		µg/L	1/1	100%	0.0019 – 0.0019	0.0024	MDC	0.039		RSL	No SL	No	No	MDC < SL
Perfluorobutanesulfonic acid (PFBS)		375-73-5	0.0096		0.0096		µg/L	1/1	100%	0.00037 – 0.00037	0.0096	MDC	0.6		RSL	No SL	No	No	MDC < SL
Perfluorooctanesulfonic acid (PFOS)		1763-23-1	0.057		0.057		µg/L	1/1	100%	0.00037 – 0.00037	0.057	MDC	0.004		RSL	No SL	No	Yes	MDC ≥ SL
Perfluorooctanoic acid (PFOA)		335-67-1	0.011		0.011		µg/L	1/1	100%	0.00037 – 0.00037	0.011	MDC	0.006		RSL	No SL	No	Yes	MDC ≥ SL
Total Metals																			
Aluminum		7429-90-5	130		130		µg/L	1/1	100%	4 – 4	130	MDC	2000		RSL	No SL	No	No	MDC < SL
Antimony		7440-36-0	N/A		N/A		µg/L	0/1	0%	0.32 – 0.32	0.32	MDL	0.78		RSL	No SL	No	No	MDL ≤ SL
Arsenic		7440-38-2	N/A		N/A		µg/L	0/1	0%	0.33 – 0.33	0.33	MDL	0.052		RSL	No SL	No	See DSA	MDL > SL
Barium		7440-39-3	67		67		µg/L	1/1	100%	1.9 – 1.9	67	MDC	380		RSL	No SL	No	No	MDC < SL
Beryllium		7440-41-7	0.27	J	0.27	J	µg/L	1/1	100%	0.17 – 0.17	0.27	MDC	2.5		RSL	No SL	No	No	MDC < SL
Cadmium		7440-43-9	N/A		N/A		µg/L	0/1	0%	0.14 – 0.14	0.14	MDL	0.18		RSL	No SL	No	No	MDL ≤ SL
Calcium		7440-70-2	7100		7100		µg/L	1/1	100%	120 – 120	7100	MDC	Nutrient		N/A	Nutrient	No	No	Classified as an essential nutrient
Chromium, Total		7440-47-3	0.39	J	0.39	J	µg/L	1/1	100%	0.32 – 0.32	0.39	MDC	2200	*	RSL	No SL	No	No	MDC < SL
Chromium, Hexavalent		18540-29-9	N/A		N/A		µg/L	0/1	0%	1 – 1	1	MDL	0.035		RSL	No SL	No	See DSA	MDL > SL
Cobalt		7440-48-4	1.6		1.6		µg/L	1/1	100%	0.19 – 0.19	1.6	MDC	0.6		RSL	No SL	No	Yes	MDC ≥ SL
Copper		7440-50-8	290		290		µg/L	1/1	100%	0.4 – 0.4	290	MDC	80		RSL	No SL	No	Yes	MDC ≥ SL
Iron		7439-89-6	810		810		µg/L	1/1	100%	54 – 54	810	MDC	1400		RSL	No SL	No	No	MDC < SL
Lead		7439-92-1	16		16		µg/L	1/1	100%	0.21 – 0.21	16	MDC	15		RSL	No SL	No	Yes	MDC ≥ SL
Manganese		7439-96-5	24	J+	24	J+	µg/L	1/1	100%	0.17 – 0.17	24	MDC	43		RSL	No SL	No	No	MDC < SL
Mercury		7439-97-6	N/A		N/A		µg/L	0/1	0%	0.06 – 0.06	0.06	MDL	0.2	*	RSL	No SL	No	No	MDL ≤ SL
Nickel		7440-02-0	2.1		2.1		µg/L	1/1	100%	0.2 – 0.2	2.1	MDC	39		RSL	No SL	No	No	MDC < SL
Selenium		7782-49-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	10		RSL	No SL	No	No	MDL ≤ SL
Silver		7440-22-4	N/A		N/A		µg/L	0/1	0%	0.18 – 0.18	0.18	MDL	9.4		RSL	No SL	No	No	MDL ≤ SL
Thallium		7440-28-0	N/A		N/A		µg/L	0/1	0%	0.23 – 0.23	0.23	MDL	0.02		RSL	No SL	No	See DSA	MDL > SL
Vanadium		7440-62-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	8.6		RSL	No SL	No	No	MDL ≤ SL
Zinc		7440-66-6	72		72		µg/L	1/1	100%	1.6 – 1.6	72	MDC	600		RSL	No SL	No	No	MDC < SL
Total Cyanide																			
Cyanide	V	57-12-5	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	0.15		RSL	20.1	No	See DSA	MDL > SL

Notes:
% = Percent
AL = Action Level

Table A2-8
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0212)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current and Future
Medium:	Groundwater (Drinking Water)
Well:	0212

Chemical [1]	CASRN	Minimum Detected Concentration	Maximum Detected Concentration	Units	Detection Frequency	Range of Method Detection Limits	Screening Concentration	Screening Level [2, 3, 5, 6]	Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion

CASRN = Chemical Abstracts Service Registry Number
COPC = Chemical of Potential Concern
DSA = Data Sensitivity Analysis
HAL = Health Advisory Level
J = Indicates an estimated value
J+ = The result is an estimated quantity, but the result may be biased high.
MCL = Maximum Contaminant Level
MDC = Maximum Detected Concentration
N/A = Not Applicable
ND = Non-Detect or Not Detected
"PFOA and PFOS Combined" = Combined total of the detected concentrations of PFOA and PFOS (non-detect results were not included in the summation).
RL = Reporting Limit
RSL = Regional Screening Level
µg/L = micrograms per liter
USEPA = United States Environmental Protection Agency
(1) "V" indicates that the chemical is volatile.
(2) Groundwater data screened against USEPA Tap Water RSLs, last updated May 2022 (TR = 1E-6, THQ = 0.1).
(3) An asterisk,"*", indicates surrogate toxicity information was used to derive a Screening Level (see Table A2-14).
(4) Groundwater data screened against USEPA Residential Groundwater VISLs, last updated May 2022 (TR = 1E-6, THQ = 0.1). Site-specific, system temperature was set to 20.5 Celsius (average of recorded temperatures taken in field).
(6) Lead is compared to the EPA tap water RSL of 15 µg/L, which represents the 90th percentile concentration of lead found in tap water samples collected nationwide (Lead and Copper Rule, 56 Federal Register 26460-26564, dated June 7, 1991) and is not a risk-based number, but rather an action level.

Table A2-9
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0275)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0275

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Volatile Organic Compounds (VOCs)																			
1,1,1-Trichloroethane	V	71-55-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	800		RSL	893	No	No	MDL ≤ SL
1,1,2,2-Tetrachloroethane	V	79-34-5	N/A		N/A		µg/L	0/1	0%	0.05 – 0.05	0.05	MDL	0.076		RSL	4.18	No	No	MDL ≤ SL
1,1,2-Trichloroethane	V	79-00-5	N/A		N/A		µg/L	0/1	0%	0.042 – 0.042	0.042	MDL	0.041		RSL	0.779	No	See DSA	MDL > SL
1,1,2-Trichlorotrifluoroethane (Freon 113)	V	76-13-1	N/A		N/A		µg/L	0/1	0%	0.099 – 0.099	0.099	MDL	1000		RSL	28.5	No	No	MDL ≤ SL
1,1-Dichloroethane	V	75-34-3	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	2.8		RSL	9.09	No	No	MDL ≤ SL
1,1-Dichloroethene	V	75-35-4	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	28		RSL	22.7	No	No	MDL ≤ SL
1,2,3-Trichlorobenzene	V	87-61-6	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	0.7		RSL	No SL	No	No	MDL ≤ SL
1,2,3-Trichloropropane	V	96-18-4	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	0.00075		RSL	2.89	No	See DSA	MDL > SL
1,2,4-Trichlorobenzene	V	120-82-1	N/A		N/A		µg/L	0/1	0%	0.068 – 0.068	0.068	MDL	0.4		RSL	4.97	No	No	MDL ≤ SL
1,2,4-Trimethylbenzene	V	95-63-6	N/A		N/A		µg/L	0/1	0%	0.051 – 0.051	0.051	MDL	5.6		RSL	33	No	No	MDL ≤ SL
1,2-Dibromo-3-chloropropane	V	96-12-8	N/A		N/A		µg/L	0/1	0%	0.14 – 0.14	0.14	MDL	0.00033		RSL	0.0381	See DSA	See DSA	MDL > SL
1,2-Dibromoethane	V	106-93-4	N/A		N/A		µg/L	0/1	0%	0.052 – 0.052	0.052	MDL	0.0075		RSL	0.221	No	See DSA	MDL > SL
1,2-Dichlorobenzene	V	95-50-1	N/A		N/A		µg/L	0/1	0%	0.045 – 0.045	0.045	MDL	30		RSL	351	No	No	MDL ≤ SL
1,2-Dichloroethane	V	107-06-2	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.17		RSL	2.74	No	No	MDL ≤ SL
1,2-Dichloropropane	V	78-87-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.82		RSL	4.44	No	No	MDL ≤ SL
1,3,5-Trimethylbenzene	V	108-67-8	N/A		N/A		µg/L	0/1	0%	0.067 – 0.067	0.067	MDL	6		RSL	23.2	No	No	MDL ≤ SL
1,3-Dichlorobenzene	V	541-73-1	N/A		N/A		µg/L	0/1	0%	0.071 – 0.071	0.071	MDL	30	*	RSL	351	No	No	MDL ≤ SL
1,4-Dichlorobenzene	V	106-46-7	N/A		N/A		µg/L	0/1	0%	0.047 – 0.047	0.047	MDL	0.48		RSL	3.42	No	No	MDL ≤ SL
1,4-Dioxane	V	123-91-1	N/A		N/A		µg/L	0/1	0%	0.9 – 0.9	0.9	MDL	0.46		RSL	3570	No	See DSA	MDL > SL
2-Butanone (MEK)	V	78-93-3	N/A		N/A		µg/L	0/1	0%	1.5 – 1.5	1.5	MDL	560		RSL	274000	No	No	MDL ≤ SL
2-Hexanone	V	591-78-6	N/A		N/A		µg/L	0/1	0%	0.68 – 0.68	0.68	MDL	3.8		RSL	1060	No	No	MDL ≤ SL
4-Methyl-2-pentanone (MIBK)	V	108-10-1	N/A		N/A		µg/L	0/1	0%	0.71 – 0.71	0.71	MDL	630		RSL	70200	No	No	MDL ≤ SL
Acetone	V	67-64-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	1800		RSL	No SL	No	No	MDL ≤ SL
Benzene	V	71-43-2	N/A		N/A		µg/L	0/1	0%	0.085 – 0.085	0.085	MDL	0.46		RSL	1.92	No	No	MDL ≤ SL
Bromochloromethane	V	74-97-5	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	8.3		RSL	83.9	No	No	MDL ≤ SL
Bromodichloromethane	V	75-27-4	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.13		RSL	1.08	No	No	MDL ≤ SL
Bromoform	V	75-25-2	N/A		N/A		µg/L	0/1	0%	0.095 – 0.095	0.095	MDL	3.3		RSL	152	No	No	MDL ≤ SL
Bromomethane	V	74-83-9	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	0.75		RSL	1.98	No	No	MDL ≤ SL
Carbon disulfide	V	75-15-0	N/A		N/A		µg/L	0/1	0%	0.092 – 0.092	0.092	MDL	81		RSL	145	No	No	MDL ≤ SL
Carbon tetrachloride	V	56-23-5	N/A		N/A		µg/L	0/1	0%	0.086 – 0.086	0.086	MDL	0.46		RSL	0.499	No	No	MDL ≤ SL
Chlorobenzene	V	108-90-7	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	7.8		RSL	51.9	No	No	MDL ≤ SL
Chloroethane	V	75-00-3	N/A		N/A		µg/L	0/1	0%	0.074 – 0.074	0.074	MDL	830		RSL	1050	No	No	MDL ≤ SL
Chloroform	V	67-66-3	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.22		RSL	0.972	No	No	MDL ≤ SL
Chloromethane	V	74-87-3	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	19		RSL	28.9	No	No	MDL ≤ SL
cis-1,2-Dichloroethene	V	156-59-2	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
cis-1,3-Dichloropropene	V	10061-01-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Cyclohexane	V	110-82-7	N/A		N/A		µg/L	0/1	0%	0.065 – 0.065	0.065	MDL	1300		RSL	123	No	No	MDL ≤ SL
Dibromochloromethane	V	124-48-1	N/A		N/A		µg/L	0/1	0%	0.073 – 0.073	0.073	MDL	0.87		RSL	No SL	No	No	MDL ≤ SL
Dichlorodifluoromethane	V	75-71-8	N/A		N/A		µg/L	0/1	0%	0.12 – 0.12	0.12	MDL	20		RSL	0.815	No	No	MDL ≤ SL
Ethylbenzene	V	100-41-4	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	1.5		RSL	4.45	No	No	MDL ≤ SL

Table A2-9
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0275)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0275

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Isopropylbenzene	V	98-82-8	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	45		RSL	121	No	No	MDL ≤ SL
m,p-Xylene	V	179601-23-1	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	19	*	RSL	45.5	No	No	MDL ≤ SL
Methyl Acetate	V	79-20-9	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	2000		RSL	No SL	No	No	MDL ≤ SL
Methyl Tert Butyl Ether	V	1634-04-4	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	14		RSL	533	No	No	MDL ≤ SL
Methylcyclohexane	V	108-87-2	N/A		N/A		µg/L	0/1	0%	0.08 – 0.08	0.08	MDL	1300	*	RSL	123	No	No	MDL ≤ SL
Methylene chloride	V	75-09-2	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	11		RSL	555	No	No	MDL ≤ SL
o-Xylene	V	95-47-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	19		RSL	63.3	No	No	MDL ≤ SL
Styrene	V	100-42-5	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	120		RSL	1210	No	No	MDL ≤ SL
Tetrachloroethene	V	127-18-4	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	4.1		RSL	7.25	No	No	MDL ≤ SL
Toluene	V	108-88-3	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	110		RSL	2390	No	No	MDL ≤ SL
trans-1,2-Dichloroethene	V	156-60-5	N/A		N/A		µg/L	0/1	0%	0.081 – 0.081	0.081	MDL	6.8		RSL	12.9	No	No	MDL ≤ SL
trans-1,3-Dichloropropene	V	10061-02-6	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Trichloroethene	V	79-01-6	0.068	J	0.068	J	µg/L	1/1	100%	0.062 – 0.062	0.068	MDC	0.28		RSL	0.632	No	No	MDC < SL
Trichlorofluoromethane	V	75-69-4	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	520		RSL	No SL	No	No	MDL ≤ SL
Vinyl chloride	V	75-01-4	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.019		RSL	0.164	No	See DSA	MDL > SL
Semi-Volatile Organic Compounds (SVOCs)																			
1,1'-Biphenyl	V	92-52-4	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.083		RSL	4.71	No	See DSA	MDL > SL
1,2,4,5-Tetrachlorobenzene	V	95-94-3	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.017		RSL	No SL	No	See DSA	MDL > SL
1-Methylnaphthalene	V	90-12-0	N/A		N/A		µg/L	0/1	0%	0.0055 – 0.0055	0.0055	MDL	1.1		RSL	No SL	No	No	MDL ≤ SL
2,3,4,6-Tetrachlorophenol		58-90-2	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	24		RSL	No SL	No	No	MDL ≤ SL
2,4,5-Trichlorophenol		95-95-4	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	120		RSL	No SL	No	No	MDL ≤ SL
2,4,6-Trichlorophenol		88-06-2	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	1.2		RSL	No SL	No	See DSA	MDL > SL
2,4-Dichlorophenol		120-83-2	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4.6		RSL	No SL	No	No	MDL ≤ SL
2,4-Dimethylphenol		105-67-9	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	36		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrophenol		51-28-5	N/A		N/A		µg/L	0/1	0%	0.98 – 0.98	0.98	MDL	3.9		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrotoluene		121-14-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	0.24		RSL	No SL	No	See DSA	MDL > SL
2,6-Dinitrotoluene		606-20-2	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.049		RSL	No SL	No	See DSA	MDL > SL
2-Chloronaphthalene	V	91-58-7	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	75		RSL	No SL	No	No	MDL ≤ SL
2-Chlorophenol	V	95-57-8	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	9.1		RSL	No SL	No	No	MDL ≤ SL
2-Methylnaphthalene	V	91-57-6	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
2-Methylphenol		95-48-7	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	93		RSL	No SL	No	No	MDL ≤ SL
2-Nitroaniline		88-74-4	N/A		N/A		µg/L	0/1	0%	3.4 – 3.4	3.4	MDL	19		RSL	No SL	No	No	MDL ≤ SL
2-Nitrophenol		88-75-5	N/A		N/A		µg/L	0/1	0%	2.7 – 2.7	2.7	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
3,3'-Dichlorobenzidine		91-94-1	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	0.13		RSL	No SL	No	See DSA	MDL > SL
3-Nitroaniline		99-09-2	N/A		N/A		µg/L	0/1	0%	0.67 – 0.67	0.67	MDL	19	*	RSL	No SL	No	No	MDL ≤ SL
4,6-Dinitro-o-cresol		534-52-1	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.15		RSL	No SL	No	See DSA	MDL > SL
4-Bromophenyl phenyl ether	V	101-55-3	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Chloro-3-methyl phenol		59-50-7	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	140		RSL	No SL	No	No	MDL ≤ SL
4-Chloroaniline		106-47-8	N/A		N/A		µg/L	0/1	0%	4.6 – 4.6	4.6	MDL	0.37		RSL	No SL	No	See DSA	MDL > SL
4-Chlorophenyl phenyl ether	V	7005-72-3	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Methylphenol		106-44-5	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	37		RSL	No SL	No	No	MDL ≤ SL

Table A2-9
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0275)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0275

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
4-Nitroaniline		100-01-6	N/A		N/A		µg/L	0/1	0%	0.85 – 0.85	0.85	MDL	3.8		RSL	No SL	No	No	MDL ≤ SL
4-Nitrophenol		100-02-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
Acenaphthene	V	83-32-9	N/A		N/A		µg/L	0/1	0%	0.0061 – 0.0061	0.0061	MDL	53		RSL	No SL	No	No	MDL ≤ SL
Acenaphthylene	V	208-96-8	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	53	*	RSL	No SL	No	No	MDL ≤ SL
Acetophenone	V	98-86-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	190		RSL	No SL	No	No	MDL ≤ SL
Anthracene	V	120-12-7	N/A		N/A		µg/L	0/1	0%	0.011 – 0.011	0.011	MDL	180		RSL	No SL	No	No	MDL ≤ SL
Atrazine		1912-24-9	N/A		N/A		µg/L	0/1	0%	0.48 – 0.48	0.48	MDL	0.3		RSL	No SL	No	See DSA	MDL > SL
Benzaldehyde	V	100-52-7	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	19		RSL	No SL	No	No	MDL ≤ SL
Benzo(a)anthracene	V	56-55-3	N/A		N/A		µg/L	0/1	0%	0.0094 – 0.0094	0.0094	MDL	0.03		RSL	62.3	No	No	MDL ≤ SL
Benzo(a)pyrene		50-32-8	N/A		N/A		µg/L	0/1	0%	0.017 – 0.017	0.017	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Benzo(b)fluoranthene		205-99-2	N/A		N/A		µg/L	0/1	0%	0.0082 – 0.0082	0.0082	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Benzo(g,h,i)perylene	V	191-24-2	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	12	*	RSL	No SL	No	No	MDL ≤ SL
Benzo(k)fluoranthene		207-08-9	N/A		N/A		µg/L	0/1	0%	0.0041 – 0.0041	0.0041	MDL	2.5		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethoxy)methane		111-91-1	N/A		N/A		µg/L	0/1	0%	2.9 – 2.9	2.9	MDL	5.9		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethyl)ether	V	111-44-4	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.014		RSL	17	No	See DSA	MDL > SL
bis(2-Chloroisopropyl)ether	V	108-60-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	71		RSL	No SL	No	No	MDL ≤ SL
bis(2-Ethylhexyl)phthalate		117-81-7	N/A		N/A		µg/L	0/1	0%	0.82 – 0.82	0.82	MDL	5.6		RSL	No SL	No	No	MDL ≤ SL
Butyl benzyl phthalate		85-68-7	N/A		N/A		µg/L	0/1	0%	1.4 – 1.4	1.4	MDL	16		RSL	No SL	No	No	MDL ≤ SL
Caprolactam		105-60-2	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	990		RSL	No SL	No	No	MDL ≤ SL
Carbazole	V	86-74-8	N/A		N/A		µg/L	0/1	0%	3.2 – 3.2	3.2	MDL	29	*	RSL	No SL	No	No	MDL ≤ SL
Chrysene		218-01-9	N/A		N/A		µg/L	0/1	0%	0.0054 – 0.0054	0.0054	MDL	25		RSL	No SL	No	No	MDL ≤ SL
Dibenzo(a,h)anthracene		53-70-3	N/A		N/A		µg/L	0/1	0%	0.0059 – 0.0059	0.0059	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Dibenzofuran	V	132-64-9	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	0.79		RSL	No SL	No	See DSA	MDL > SL
Diethyl phthalate		84-66-2	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	1500		RSL	No SL	No	No	MDL ≤ SL
Dimethyl phthalate		131-11-3	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	1500	*	RSL	No SL	No	No	MDL ≤ SL
Di-n-butyl phthalate		84-74-2	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	90		RSL	No SL	No	No	MDL ≤ SL
Di-n-octyl phthalate		117-84-0	N/A		N/A		µg/L	0/1	0%	0.64 – 0.64	0.64	MDL	20		RSL	No SL	No	No	MDL ≤ SL
Fluoranthene		206-44-0	N/A		N/A		µg/L	0/1	0%	0.012 – 0.012	0.012	MDL	80		RSL	No SL	No	No	MDL ≤ SL
Fluorene	V	86-73-7	N/A		N/A		µg/L	0/1	0%	0.0072 – 0.0072	0.0072	MDL	29		RSL	No SL	No	No	MDL ≤ SL
Hexachlorobenzene	V	118-74-1	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.0098		RSL	0.133	See DSA	See DSA	MDL > SL
Hexachlorobutadiene	V	87-68-3	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	0.14		RSL	0.414	See DSA	See DSA	MDL > SL
Hexachlorocyclopentadiene	V	77-47-4	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	0.041		RSL	0.0786	See DSA	See DSA	MDL > SL
Hexachloroethane	V	67-72-1	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	0.33		RSL	2.29	See DSA	See DSA	MDL > SL
Indeno(1,2,3-cd)pyrene		193-39-5	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Isophorone		78-59-1	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	78		RSL	No SL	No	No	MDL ≤ SL
Naphthalene	V	91-20-3	N/A		N/A		µg/L	0/1	0%	0.0077 – 0.0077	0.0077	MDL	0.12		RSL	6.29	No	No	MDL ≤ SL
Nitrobenzene	V	98-95-3	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	0.14		RSL	99.3	No	See DSA	MDL > SL
N-Nitroso-di-n-propylamine		621-64-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.011		RSL	No SL	No	See DSA	MDL > SL
N-Nitrosodiphenylamine		86-30-6	N/A		N/A		µg/L	0/1	0%	3.6 – 3.6	3.6	MDL	12		RSL	No SL	No	No	MDL ≤ SL
Pentachlorophenol		87-86-5	N/A		N/A		µg/L	0/1	0%	0.024 – 0.024	0.024	MDL	0.041		RSL	No SL	No	No	MDL ≤ SL
Phenanthrene	V	85-01-8	N/A		N/A		µg/L	0/1	0%	0.0087 – 0.0087	0.0087	MDL	180	*	RSL	No SL	No	No	MDL ≤ SL

Table A2-9
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0275)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0275

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Phenol		108-95-2	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	580		RSL	No SL	No	No	MDL ≤ SL
Pyrene	V	129-00-0	N/A		N/A		µg/L	0/1	0%	0.014 – 0.014	0.014	MDL	12		RSL	No SL	No	No	MDL ≤ SL
DIOX																			
Total PCDD/F TEQ (Mammal)	V	TEQ-M-DF	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
PCB																			
Total PCB TEQ (Mammal)	V	TEQ-M-PCB	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
Total PCB Congener	V	TPCB_CON	0.00017	J	0.00017	J	µg/L	1/1	100%	N/A	0.00017	MDC	0.044	*	RSL	1.65	No	No	MDC < SL
Perfluorinated Compounds																			
Perfluorononanoic acid (PFNA)		375-95-1	N/A		N/A		µg/L	0/1	0%	0.0017 – 0.0017	0.0017	MDL	0.0059		RSL	No SL	No	No	MDL ≤ SL
Perfluorohexanesulfonic acid (PFHxS)		355-46-4	0.0026		0.0026		µg/L	1/1	100%	0.0017 – 0.0017	0.0026	MDC	0.039		RSL	No SL	No	No	MDC < SL
Perfluorobutanesulfonic acid (PFBS)		375-73-5	0.02		0.02		µg/L	1/1	100%	0.00035 – 0.00035	0.02	MDC	0.6		RSL	No SL	No	No	MDC < SL
Perfluorooctanesulfonic acid (PFOS)		1763-23-1	0.06		0.06		µg/L	1/1	100%	0.00035 – 0.00035	0.06	MDC	0.004		RSL	No SL	No	Yes	MDC ≥ SL
Perfluorooctanoic acid (PFOA)		335-67-1	0.0074		0.0074		µg/L	1/1	100%	0.00035 – 0.00035	0.0074	MDC	0.006		RSL	No SL	No	Yes	MDC ≥ SL
Total Metals																			
Aluminum		7429-90-5	6.4	J	6.4	J	µg/L	1/1	100%	4 – 4	6.4	MDC	2000		RSL	No SL	No	No	MDC < SL
Antimony		7440-36-0	N/A		N/A		µg/L	0/1	0%	0.32 – 0.32	0.32	MDL	0.78		RSL	No SL	No	No	MDL ≤ SL
Arsenic		7440-38-2	N/A		N/A		µg/L	0/1	0%	0.33 – 0.33	0.33	MDL	0.052		RSL	No SL	No	See DSA	MDL > SL
Barium		7440-39-3	110		110		µg/L	1/1	100%	1.9 – 1.9	110	MDC	380		RSL	No SL	No	No	MDC < SL
Beryllium		7440-41-7	N/A		N/A		µg/L	0/1	0%	0.17 – 0.17	0.17	MDL	2.5		RSL	No SL	No	No	MDL ≤ SL
Cadmium		7440-43-9	0.2	J	0.2	J	µg/L	1/1	100%	0.14 – 0.14	0.2	MDC	0.18		RSL	No SL	No	Yes	MDC ≥ SL
Calcium		7440-70-2	12000		12000		µg/L	1/1	100%	120 – 120	12000	MDC	Nutrient		N/A	Nutrient	No	No	Classified as an essential nutrient
Chromium, Total		7440-47-3	N/A		N/A		µg/L	0/1	0%	0.32 – 0.32	0.32	MDL	2200	*	RSL	No SL	No	No	MDL ≤ SL
Chromium, Hexavalent		18540-29-9	N/A		N/A		µg/L	0/1	0%	1 – 1	1	MDL	0.035		RSL	No SL	No	See DSA	MDL > SL
Cobalt		7440-48-4	1.8		1.8		µg/L	1/1	100%	0.19 – 0.19	1.8	MDC	0.6		RSL	No SL	No	Yes	MDC ≥ SL
Copper		7440-50-8	63		63		µg/L	1/1	100%	0.4 – 0.4	63	MDC	80		RSL	No SL	No	No	MDC < SL
Iron		7439-89-6	2900		2900		µg/L	1/1	100%	54 – 54	2900	MDC	1400		RSL	No SL	No	Yes	MDC ≥ SL
Lead		7439-92-1	2.5		2.5		µg/L	1/1	100%	0.21 – 0.21	2.5	MDC	15		RSL	No SL	No	No	MDC < SL
Manganese		7439-96-5	56	J+	56	J+	µg/L	1/1	100%	0.17 – 0.17	56	MDC	43		RSL	No SL	No	Yes	MDC ≥ SL
Mercury		7439-97-6	N/A		N/A		µg/L	0/1	0%	0.06 – 0.06	0.06	MDL	0.2	*	RSL	No SL	No	No	MDL ≤ SL
Nickel		7440-02-0	1.9		1.9		µg/L	1/1	100%	0.2 – 0.2	1.9	MDC	39		RSL	No SL	No	No	MDC < SL
Selenium		7782-49-2	1.2	J	1.2	J	µg/L	1/1	100%	1.2 – 1.2	1.2	MDC	10		RSL	No SL	No	No	MDC < SL
Silver		7440-22-4	N/A		N/A		µg/L	0/1	0%	0.18 – 0.18	0.18	MDL	9.4		RSL	No SL	No	No	MDL ≤ SL
Thallium		7440-28-0	N/A		N/A		µg/L	0/1	0%	0.23 – 0.23	0.23	MDL	0.02		RSL	No SL	No	See DSA	MDL > SL
Vanadium		7440-62-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	8.6		RSL	No SL	No	No	MDL ≤ SL
Zinc		7440-66-6	180		180		µg/L	1/1	100%	1.6 – 1.6	180	MDC	600		RSL	No SL	No	No	MDC < SL
Total Cyanide																			
Cyanide	V	57-12-5	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	0.15		RSL	20.1	No	See DSA	MDL > SL

Notes:
% = Percent
AL = Action Level

Table A2-9
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0275)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current and Future
Medium:	Groundwater (Drinking Water)
Well:	0275

Chemical [1]	CASRN	Minimum Detected Concentration	Maximum Detected Concentration	Units	Detection Frequency	Range of Method Detection Limits	Screening Concentration	Screening Level [2, 3, 5, 6]	Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion

CASRN = Chemical Abstracts Service Registry Number
COPC = Chemical of Potential Concern
DSA = Data Sensitivity Analysis
HAL = Health Advisory Level
J = Indicates an estimated value
J+ = The result is an estimated quantity, but the result may be biased high.
MCL = Maximum Contaminant Level
MDC = Maximum Detected Concentration
N/A = Not Applicable
ND = Non-Detect or Not Detected
"PFOA and PFOS Combined" = Combined total of the detected concentrations of PFOA and PFOS (non-detect results were not included in the summation).
RL = Reporting Limit
RSL = Regional Screening Level
µg/L = micrograms per liter
USEPA = United States Environmental Protection Agency
(1) "V" indicates that the chemical is volatile.
(2) Groundwater data screened against USEPA Tap Water RSLs, last updated May 2022 (TR = 1E-6, THQ = 0.1).
(3) An asterisk,"*", indicates surrogate toxicity information was used to derive a Screening Level (see Table A2-14).
(4) Groundwater data screened against USEPA Residential Groundwater VISLs, last updated May 2022 (TR = 1E-6, THQ = 0.1). Site-specific, system temperature was set to 20.5 Celsius (average of recorded temperatures taken in field).
(6) Lead is compared to the EPA tap water RSL of 15 µg/L, which represents the 90th percentile concentration of lead found in tap water samples collected nationwide (Lead and Copper Rule, 56 Federal Register 26460-26564, dated June 7, 1991) and is not a risk-based number, but rather an action level.

Table A2-10
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0500)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0500

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Volatile Organic Compounds (VOCs)																			
1,1,1-Trichloroethane	V	71-55-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	800		RSL	893	No	No	MDL ≤ SL
1,1,2,2-Tetrachloroethane	V	79-34-5	N/A		N/A		µg/L	0/1	0%	0.05 – 0.05	0.05	MDL	0.076		RSL	4.18	No	No	MDL ≤ SL
1,1,2-Trichloroethane	V	79-00-5	N/A		N/A		µg/L	0/1	0%	0.042 – 0.042	0.042	MDL	0.041		RSL	0.779	No	See DSA	MDL > SL
1,1,2-Trichlorotrifluoroethane (Freon 113)	V	76-13-1	N/A		N/A		µg/L	0/1	0%	0.099 – 0.099	0.099	MDL	1000		RSL	28.5	No	No	MDL ≤ SL
1,1-Dichloroethane	V	75-34-3	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	2.8		RSL	9.09	No	No	MDL ≤ SL
1,1-Dichloroethene	V	75-35-4	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	28		RSL	22.7	No	No	MDL ≤ SL
1,2,3-Trichlorobenzene	V	87-61-6	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	0.7		RSL	No SL	No	No	MDL ≤ SL
1,2,3-Trichloropropane	V	96-18-4	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	0.00075		RSL	2.89	No	See DSA	MDL > SL
1,2,4-Trichlorobenzene	V	120-82-1	N/A		N/A		µg/L	0/1	0%	0.068 – 0.068	0.068	MDL	0.4		RSL	4.97	No	No	MDL ≤ SL
1,2,4-Trimethylbenzene	V	95-63-6	N/A		N/A		µg/L	0/1	0%	0.051 – 0.051	0.051	MDL	5.6		RSL	33	No	No	MDL ≤ SL
1,2-Dibromo-3-chloropropane	V	96-12-8	N/A		N/A		µg/L	0/1	0%	0.14 – 0.14	0.14	MDL	0.00033		RSL	0.0381	See DSA	See DSA	MDL > SL
1,2-Dibromoethane	V	106-93-4	N/A		N/A		µg/L	0/1	0%	0.052 – 0.052	0.052	MDL	0.0075		RSL	0.221	No	See DSA	MDL > SL
1,2-Dichlorobenzene	V	95-50-1	N/A		N/A		µg/L	0/1	0%	0.045 – 0.045	0.045	MDL	30		RSL	351	No	No	MDL ≤ SL
1,2-Dichloroethane	V	107-06-2	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.17		RSL	2.74	No	No	MDL ≤ SL
1,2-Dichloropropane	V	78-87-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.82		RSL	4.44	No	No	MDL ≤ SL
1,3,5-Trimethylbenzene	V	108-67-8	N/A		N/A		µg/L	0/1	0%	0.067 – 0.067	0.067	MDL	6		RSL	23.2	No	No	MDL ≤ SL
1,3-Dichlorobenzene	V	541-73-1	N/A		N/A		µg/L	0/1	0%	0.071 – 0.071	0.071	MDL	30	*	RSL	351	No	No	MDL ≤ SL
1,4-Dichlorobenzene	V	106-46-7	N/A		N/A		µg/L	0/1	0%	0.047 – 0.047	0.047	MDL	0.48		RSL	3.42	No	No	MDL ≤ SL
1,4-Dioxane	V	123-91-1	N/A		N/A		µg/L	0/1	0%	0.9 – 0.9	0.9	MDL	0.46		RSL	3570	No	See DSA	MDL > SL
2-Butanone (MEK)	V	78-93-3	N/A		N/A		µg/L	0/1	0%	1.5 – 1.5	1.5	MDL	560		RSL	274000	No	No	MDL ≤ SL
2-Hexanone	V	591-78-6	N/A		N/A		µg/L	0/1	0%	0.68 – 0.68	0.68	MDL	3.8		RSL	1060	No	No	MDL ≤ SL
4-Methyl-2-pentanone (MIBK)	V	108-10-1	N/A		N/A		µg/L	0/1	0%	0.71 – 0.71	0.71	MDL	630		RSL	70200	No	No	MDL ≤ SL
Acetone	V	67-64-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	1800		RSL	No SL	No	No	MDL ≤ SL
Benzene	V	71-43-2	N/A		N/A		µg/L	0/1	0%	0.085 – 0.085	0.085	MDL	0.46		RSL	1.92	No	No	MDL ≤ SL
Bromochloromethane	V	74-97-5	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	8.3		RSL	83.9	No	No	MDL ≤ SL
Bromodichloromethane	V	75-27-4	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.13		RSL	1.08	No	No	MDL ≤ SL
Bromoform	V	75-25-2	N/A		N/A		µg/L	0/1	0%	0.095 – 0.095	0.095	MDL	3.3		RSL	152	No	No	MDL ≤ SL
Bromomethane	V	74-83-9	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	0.75		RSL	1.98	No	No	MDL ≤ SL
Carbon disulfide	V	75-15-0	N/A		N/A		µg/L	0/1	0%	0.092 – 0.092	0.092	MDL	81		RSL	145	No	No	MDL ≤ SL
Carbon tetrachloride	V	56-23-5	N/A		N/A		µg/L	0/1	0%	0.086 – 0.086	0.086	MDL	0.46		RSL	0.499	No	No	MDL ≤ SL
Chlorobenzene	V	108-90-7	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	7.8		RSL	51.9	No	No	MDL ≤ SL
Chloroethane	V	75-00-3	N/A		N/A		µg/L	0/1	0%	0.074 – 0.074	0.074	MDL	830		RSL	1050	No	No	MDL ≤ SL
Chloroform	V	67-66-3	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.22		RSL	0.972	No	No	MDL ≤ SL
Chloromethane	V	74-87-3	0.11	J	0.11	J	µg/L	1/1	100%	0.082 – 0.082	0.11	MDC	19		RSL	28.9	No	No	MDC < SL
cis-1,2-Dichloroethene	V	156-59-2	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
cis-1,3-Dichloropropene	V	10061-01-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Cyclohexane	V	110-82-7	N/A		N/A		µg/L	0/1	0%	0.065 – 0.065	0.065	MDL	1300		RSL	123	No	No	MDL ≤ SL
Dibromochloromethane	V	124-48-1	N/A		N/A		µg/L	0/1	0%	0.073 – 0.073	0.073	MDL	0.87		RSL	No SL	No	No	MDL ≤ SL
Dichlorodifluoromethane	V	75-71-8	N/A		N/A		µg/L	0/1	0%	0.12 – 0.12	0.12	MDL	20		RSL	0.815	No	No	MDL ≤ SL
Ethylbenzene	V	100-41-4	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	1.5		RSL	4.45	No	No	MDL ≤ SL

Table A2-10
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0500)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0500

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Isopropylbenzene	V	98-82-8	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	45		RSL	121	No	No	MDL ≤ SL
m,p-Xylene	V	179601-23-1	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	19	*	RSL	45.5	No	No	MDL ≤ SL
Methyl Acetate	V	79-20-9	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	2000		RSL	No SL	No	No	MDL ≤ SL
Methyl Tert Butyl Ether	V	1634-04-4	0.36	J	0.36	J	µg/L	1/1	100%	0.053 – 0.053	0.36	MDC	14		RSL	533	No	No	MDC < SL
Methylcyclohexane	V	108-87-2	N/A		N/A		µg/L	0/1	0%	0.08 – 0.08	0.08	MDL	1300	*	RSL	123	No	No	MDL ≤ SL
Methylene chloride	V	75-09-2	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	11		RSL	555	No	No	MDL ≤ SL
o-Xylene	V	95-47-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	19		RSL	63.3	No	No	MDL ≤ SL
Styrene	V	100-42-5	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	120		RSL	1210	No	No	MDL ≤ SL
Tetrachloroethene	V	127-18-4	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	4.1		RSL	7.25	No	No	MDL ≤ SL
Toluene	V	108-88-3	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	110		RSL	2390	No	No	MDL ≤ SL
trans-1,2-Dichloroethene	V	156-60-5	N/A		N/A		µg/L	0/1	0%	0.081 – 0.081	0.081	MDL	6.8		RSL	12.9	No	No	MDL ≤ SL
trans-1,3-Dichloropropene	V	10061-02-6	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Trichloroethene	V	79-01-6	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.28		RSL	0.632	No	No	MDL ≤ SL
Trichlorofluoromethane	V	75-69-4	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	520		RSL	No SL	No	No	MDL ≤ SL
Vinyl chloride	V	75-01-4	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.019		RSL	0.164	No	See DSA	MDL > SL
Semi-Volatile Organic Compounds (SVOCs)																			
1,1'-Biphenyl	V	92-52-4	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.083		RSL	4.71	No	See DSA	MDL > SL
1,2,4,5-Tetrachlorobenzene	V	95-94-3	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.017		RSL	No SL	No	See DSA	MDL > SL
1-Methylnaphthalene	V	90-12-0	N/A		N/A		µg/L	0/1	0%	0.0055 – 0.0055	0.0055	MDL	1.1		RSL	No SL	No	No	MDL ≤ SL
2,3,4,6-Tetrachlorophenol		58-90-2	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	24		RSL	No SL	No	No	MDL ≤ SL
2,4,5-Trichlorophenol		95-95-4	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	120		RSL	No SL	No	No	MDL ≤ SL
2,4,6-Trichlorophenol		88-06-2	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	1.2		RSL	No SL	No	See DSA	MDL > SL
2,4-Dichlorophenol		120-83-2	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4.6		RSL	No SL	No	No	MDL ≤ SL
2,4-Dimethylphenol		105-67-9	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	36		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrophenol		51-28-5	N/A		N/A		µg/L	0/1	0%	0.98 – 0.98	0.98	MDL	3.9		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrotoluene		121-14-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	0.24		RSL	No SL	No	See DSA	MDL > SL
2,6-Dinitrotoluene		606-20-2	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.049		RSL	No SL	No	See DSA	MDL > SL
2-Chloronaphthalene	V	91-58-7	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	75		RSL	No SL	No	No	MDL ≤ SL
2-Chlorophenol	V	95-57-8	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	9.1		RSL	No SL	No	No	MDL ≤ SL
2-Methylnaphthalene	V	91-57-6	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
2-Methylphenol		95-48-7	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	93		RSL	No SL	No	No	MDL ≤ SL
2-Nitroaniline		88-74-4	N/A		N/A		µg/L	0/1	0%	3.4 – 3.4	3.4	MDL	19		RSL	No SL	No	No	MDL ≤ SL
2-Nitrophenol		88-75-5	N/A		N/A		µg/L	0/1	0%	2.7 – 2.7	2.7	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
3,3'-Dichlorobenzidine		91-94-1	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	0.13		RSL	No SL	No	See DSA	MDL > SL
3-Nitroaniline		99-09-2	N/A		N/A		µg/L	0/1	0%	0.67 – 0.67	0.67	MDL	19	*	RSL	No SL	No	No	MDL ≤ SL
4,6-Dinitro-o-cresol		534-52-1	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.15		RSL	No SL	No	See DSA	MDL > SL
4-Bromophenyl phenyl ether	V	101-55-3	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Chloro-3-methyl phenol		59-50-7	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	140		RSL	No SL	No	No	MDL ≤ SL
4-Chloroaniline		106-47-8	N/A		N/A		µg/L	0/1	0%	4.6 – 4.6	4.6	MDL	0.37		RSL	No SL	No	See DSA	MDL > SL
4-Chlorophenyl phenyl ether	V	7005-72-3	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Methylphenol		106-44-5	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	37		RSL	No SL	No	No	MDL ≤ SL

Table A2-10
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0500)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0500

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
4-Nitroaniline		100-01-6	N/A		N/A		µg/L	0/1	0%	0.85 – 0.85	0.85	MDL	3.8		RSL	No SL	No	No	MDL ≤ SL
4-Nitrophenol		100-02-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
Acenaphthene	V	83-32-9	N/A		N/A		µg/L	0/1	0%	0.0061 – 0.0061	0.0061	MDL	53		RSL	No SL	No	No	MDL ≤ SL
Acenaphthylene	V	208-96-8	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	53	*	RSL	No SL	No	No	MDL ≤ SL
Acetophenone	V	98-86-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	190		RSL	No SL	No	No	MDL ≤ SL
Anthracene	V	120-12-7	N/A		N/A		µg/L	0/1	0%	0.011 – 0.011	0.011	MDL	180		RSL	No SL	No	No	MDL ≤ SL
Atrazine		1912-24-9	N/A		N/A		µg/L	0/1	0%	0.48 – 0.48	0.48	MDL	0.3		RSL	No SL	No	See DSA	MDL > SL
Benzaldehyde	V	100-52-7	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	19		RSL	No SL	No	No	MDL ≤ SL
Benzo(a)anthracene	V	56-55-3	N/A		N/A		µg/L	0/1	0%	0.0094 – 0.0094	0.0094	MDL	0.03		RSL	62.3	No	No	MDL ≤ SL
Benzo(a)pyrene		50-32-8	N/A		N/A		µg/L	0/1	0%	0.017 – 0.017	0.017	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Benzo(b)fluoranthene		205-99-2	N/A		N/A		µg/L	0/1	0%	0.0082 – 0.0082	0.0082	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Benzo(g,h,i)perylene	V	191-24-2	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	12	*	RSL	No SL	No	No	MDL ≤ SL
Benzo(k)fluoranthene		207-08-9	N/A		N/A		µg/L	0/1	0%	0.0041 – 0.0041	0.0041	MDL	2.5		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethoxy)methane		111-91-1	N/A		N/A		µg/L	0/1	0%	2.9 – 2.9	2.9	MDL	5.9		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethyl)ether	V	111-44-4	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.014		RSL	17	No	See DSA	MDL > SL
bis(2-Chloroisopropyl)ether	V	108-60-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	71		RSL	No SL	No	No	MDL ≤ SL
bis(2-Ethylhexyl)phthalate		117-81-7	N/A		N/A		µg/L	0/1	0%	0.82 – 0.82	0.82	MDL	5.6		RSL	No SL	No	No	MDL ≤ SL
Butyl benzyl phthalate		85-68-7	N/A		N/A		µg/L	0/1	0%	1.4 – 1.4	1.4	MDL	16		RSL	No SL	No	No	MDL ≤ SL
Caprolactam		105-60-2	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	990		RSL	No SL	No	No	MDL ≤ SL
Carbazole	V	86-74-8	N/A		N/A		µg/L	0/1	0%	3.2 – 3.2	3.2	MDL	29	*	RSL	No SL	No	No	MDL ≤ SL
Chrysene		218-01-9	N/A		N/A		µg/L	0/1	0%	0.0054 – 0.0054	0.0054	MDL	25		RSL	No SL	No	No	MDL ≤ SL
Dibenzo(a,h)anthracene		53-70-3	N/A		N/A		µg/L	0/1	0%	0.0059 – 0.0059	0.0059	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Dibenzofuran	V	132-64-9	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	0.79		RSL	No SL	No	See DSA	MDL > SL
Diethyl phthalate		84-66-2	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	1500		RSL	No SL	No	No	MDL ≤ SL
Dimethyl phthalate		131-11-3	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	1500	*	RSL	No SL	No	No	MDL ≤ SL
Di-n-butyl phthalate		84-74-2	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	90		RSL	No SL	No	No	MDL ≤ SL
Di-n-octyl phthalate		117-84-0	N/A		N/A		µg/L	0/1	0%	0.64 – 0.64	0.64	MDL	20		RSL	No SL	No	No	MDL ≤ SL
Fluoranthene		206-44-0	N/A		N/A		µg/L	0/1	0%	0.012 – 0.012	0.012	MDL	80		RSL	No SL	No	No	MDL ≤ SL
Fluorene	V	86-73-7	N/A		N/A		µg/L	0/1	0%	0.0072 – 0.0072	0.0072	MDL	29		RSL	No SL	No	No	MDL ≤ SL
Hexachlorobenzene	V	118-74-1	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.0098		RSL	0.133	See DSA	See DSA	MDL > SL
Hexachlorobutadiene	V	87-68-3	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	0.14		RSL	0.414	See DSA	See DSA	MDL > SL
Hexachlorocyclopentadiene	V	77-47-4	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	0.041		RSL	0.0786	See DSA	See DSA	MDL > SL
Hexachloroethane	V	67-72-1	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	0.33		RSL	2.29	See DSA	See DSA	MDL > SL
Indeno(1,2,3-cd)pyrene		193-39-5	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Isophorone		78-59-1	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	78		RSL	No SL	No	No	MDL ≤ SL
Naphthalene	V	91-20-3	N/A		N/A		µg/L	0/1	0%	0.0077 – 0.0077	0.0077	MDL	0.12		RSL	6.29	No	No	MDL ≤ SL
Nitrobenzene	V	98-95-3	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	0.14		RSL	99.3	No	See DSA	MDL > SL
N-Nitroso-di-n-propylamine		621-64-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.011		RSL	No SL	No	See DSA	MDL > SL
N-Nitrosodiphenylamine		86-30-6	N/A		N/A		µg/L	0/1	0%	3.6 – 3.6	3.6	MDL	12		RSL	No SL	No	No	MDL ≤ SL
Pentachlorophenol		87-86-5	N/A		N/A		µg/L	0/1	0%	0.024 – 0.024	0.024	MDL	0.041		RSL	No SL	No	No	MDL ≤ SL
Phenanthrene	V	85-01-8	N/A		N/A		µg/L	0/1	0%	0.0087 – 0.0087	0.0087	MDL	180	*	RSL	No SL	No	No	MDL ≤ SL

Table A2-10
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0500)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0500

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Phenol		108-95-2	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	580		RSL	No SL	No	No	MDL ≤ SL
Pyrene	V	129-00-0	N/A		N/A		µg/L	0/1	0%	0.014 – 0.014	0.014	MDL	12		RSL	No SL	No	No	MDL ≤ SL
DIOX																			
Total PCDD/F TEQ (Mammal)	V	TEQ-M-DF	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
PCB																			
Total PCB TEQ (Mammal)	V	TEQ-M-PCB	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
Total PCB Congener	V	TPCB_CON	0.000082	J	0.000082	J	µg/L	1/1	100%	N/A	0.000082	MDC	0.044	*	RSL	1.65	No	No	MDC < SL
Perfluorinated Compounds																			
Perfluorononanoic acid (PFNA)		375-95-1	N/A		N/A		µg/L	0/1	0%	0.0018 – 0.0018	0.0018	MDL	0.0059		RSL	No SL	No	No	MDL ≤ SL
Perfluorohexanesulfonic acid (PFHxS)		355-46-4	N/A		N/A		µg/L	0/1	0%	0.0018 – 0.0018	0.0018	MDL	0.039		RSL	No SL	No	No	MDL ≤ SL
Perfluorobutanesulfonic acid (PFBS)		375-73-5	N/A		N/A		µg/L	0/1	0%	0.00035 – 0.00035	0.00035	MDL	0.6		RSL	No SL	No	No	MDL ≤ SL
Perfluorooctanesulfonic acid (PFOS)		1763-23-1	N/A		N/A		µg/L	0/1	0%	0.00035 – 0.00035	0.00035	MDL	0.004		RSL	No SL	No	No	MDL ≤ SL
Perfluorooctanoic acid (PFOA)		335-67-1	N/A		N/A		µg/L	0/1	0%	0.00035 – 0.00035	0.00035	MDL	0.006		RSL	No SL	No	No	MDL ≤ SL
Total Metals																			
Aluminum		7429-90-5	110		110		µg/L	1/1	100%	4 – 4	110	MDC	2000		RSL	No SL	No	No	MDC < SL
Antimony		7440-36-0	N/A		N/A		µg/L	0/1	0%	0.32 – 0.32	0.32	MDL	0.78		RSL	No SL	No	No	MDL ≤ SL
Arsenic		7440-38-2	N/A		N/A		µg/L	0/1	0%	0.33 – 0.33	0.33	MDL	0.052		RSL	No SL	No	See DSA	MDL > SL
Barium		7440-39-3	690		690		µg/L	1/1	100%	1.9 – 1.9	690	MDC	380		RSL	No SL	No	Yes	MDC ≥ SL
Beryllium		7440-41-7	3.6		3.6		µg/L	1/1	100%	0.17 – 0.17	3.6	MDC	2.5		RSL	No SL	No	Yes	MDC ≥ SL
Cadmium		7440-43-9	0.44	J	0.44	J	µg/L	1/1	100%	0.14 – 0.14	0.44	MDC	0.18		RSL	No SL	No	Yes	MDC ≥ SL
Calcium		7440-70-2	8600		8600		µg/L	1/1	100%	120 – 120	8600	MDC	Nutrient		N/A	Nutrient	No	No	Classified as an essential nutrient
Chromium, Total		7440-47-3	N/A		N/A		µg/L	0/1	0%	0.32 – 0.32	0.32	MDL	2200	*	RSL	No SL	No	No	MDL ≤ SL
Chromium, Hexavalent		18540-29-9	N/A		N/A		µg/L	0/1	0%	1 – 1	1	MDL	0.035		RSL	No SL	No	See DSA	MDL > SL
Cobalt		7440-48-4	26		26		µg/L	1/1	100%	0.19 – 0.19	26	MDC	0.6		RSL	No SL	No	Yes	MDC ≥ SL
Copper		7440-50-8	53		53		µg/L	1/1	100%	0.4 – 0.4	53	MDC	80		RSL	No SL	No	No	MDC < SL
Iron		7439-89-6	N/A		N/A		µg/L	0/1	0%	54 – 54	54	MDL	1400		RSL	No SL	No	No	MDL ≤ SL
Lead		7439-92-1	2.6		2.6		µg/L	1/1	100%	0.21 – 0.21	2.6	MDC	15		RSL	No SL	No	No	MDC < SL
Manganese		7439-96-5	180	J+	180	J+	µg/L	1/1	100%	0.17 – 0.17	180	MDC	43		RSL	No SL	No	Yes	MDC ≥ SL
Mercury		7439-97-6	N/A		N/A		µg/L	0/1	0%	0.06 – 0.06	0.06	MDL	0.2	*	RSL	No SL	No	No	MDL ≤ SL
Nickel		7440-02-0	13		13		µg/L	1/1	100%	0.2 – 0.2	13	MDC	39		RSL	No SL	No	No	MDC < SL
Selenium		7782-49-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	10		RSL	No SL	No	No	MDL ≤ SL
Silver		7440-22-4	N/A		N/A		µg/L	0/1	0%	0.18 – 0.18	0.18	MDL	9.4		RSL	No SL	No	No	MDL ≤ SL
Thallium		7440-28-0	N/A		N/A		µg/L	0/1	0%	0.23 – 0.23	0.23	MDL	0.02		RSL	No SL	No	See DSA	MDL > SL
Vanadium		7440-62-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	8.6		RSL	No SL	No	No	MDL ≤ SL
Zinc		7440-66-6	220		220		µg/L	1/1	100%	1.6 – 1.6	220	MDC	600		RSL	No SL	No	No	MDC < SL
Total Cyanide																			
Cyanide	V	57-12-5	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	0.15		RSL	20.1	No	See DSA	MDL > SL

Notes:
% = Percent
AL = Action Level

Table A2-10
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0500)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current and Future
Medium:	Groundwater (Drinking Water)
Well:	0500

Chemical [1]	CASRN	Minimum Detected Concentration	Maximum Detected Concentration	Units	Detection Frequency	Range of Method Detection Limits	Screening Concentration	Screening Level [2, 3, 5, 6]	Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion

CASRN = Chemical Abstracts Service Registry Number
COPC = Chemical of Potential Concern
DSA = Data Sensitivity Analysis
HAL = Health Advisory Level
J = Indicates an estimated value
J+ = The result is an estimated quantity, but the result may be biased high.
MCL = Maximum Contaminant Level
MDC = Maximum Detected Concentration
N/A = Not Applicable
ND = Non-Detect or Not Detected
"PFOA and PFOS Combined" = Combined total of the detected concentrations of PFOA and PFOS (non-detect results were not included in the summation).
RL = Reporting Limit
RSL = Regional Screening Level
µg/L = micrograms per liter
USEPA = United States Environmental Protection Agency
(1) "V" indicates that the chemical is volatile.
(2) Groundwater data screened against USEPA Tap Water RSLs, last updated May 2022 (TR = 1E-6, THQ = 0.1).
(3) An asterisk,"*", indicates surrogate toxicity information was used to derive a Screening Level (see Table A2-14).
(4) Groundwater data screened against USEPA Residential Groundwater VISLs, last updated May 2022 (TR = 1E-6, THQ = 0.1). Site-specific, system temperature was set to 20.5 Celsius (average of recorded temperatures taken in field).
(6) Lead is compared to the EPA tap water RSL of 15 µg/L, which represents the 90th percentile concentration of lead found in tap water samples collected nationwide (Lead and Copper Rule, 56 Federal Register 26460-26564, dated June 7, 1991) and is not a risk-based number, but rather an action level.

Table A2-11
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0501)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0501

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Volatile Organic Compounds (VOCs)																			
1,1,1-Trichloroethane	V	71-55-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	800		RSL	893	No	No	MDL ≤ SL
1,1,2,2-Tetrachloroethane	V	79-34-5	N/A		N/A		µg/L	0/1	0%	0.05 – 0.05	0.05	MDL	0.076		RSL	4.18	No	No	MDL ≤ SL
1,1,2-Trichloroethane	V	79-00-5	N/A		N/A		µg/L	0/1	0%	0.042 – 0.042	0.042	MDL	0.041		RSL	0.779	No	See DSA	MDL > SL
1,1,2-Trichlorotrifluoroethane (Freon 113)	V	76-13-1	N/A		N/A		µg/L	0/1	0%	0.099 – 0.099	0.099	MDL	1000		RSL	28.5	No	No	MDL ≤ SL
1,1-Dichloroethane	V	75-34-3	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	2.8		RSL	9.09	No	No	MDL ≤ SL
1,1-Dichloroethene	V	75-35-4	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	28		RSL	22.7	No	No	MDL ≤ SL
1,2,3-Trichlorobenzene	V	87-61-6	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	0.7		RSL	No SL	No	No	MDL ≤ SL
1,2,3-Trichloropropane	V	96-18-4	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	0.00075		RSL	2.89	No	See DSA	MDL > SL
1,2,4-Trichlorobenzene	V	120-82-1	N/A		N/A		µg/L	0/1	0%	0.068 – 0.068	0.068	MDL	0.4		RSL	4.97	No	No	MDL ≤ SL
1,2,4-Trimethylbenzene	V	95-63-6	N/A		N/A		µg/L	0/1	0%	0.051 – 0.051	0.051	MDL	5.6		RSL	33	No	No	MDL ≤ SL
1,2-Dibromo-3-chloropropane	V	96-12-8	N/A		N/A		µg/L	0/1	0%	0.14 – 0.14	0.14	MDL	0.00033		RSL	0.0381	See DSA	See DSA	MDL > SL
1,2-Dibromoethane	V	106-93-4	N/A		N/A		µg/L	0/1	0%	0.052 – 0.052	0.052	MDL	0.0075		RSL	0.221	No	See DSA	MDL > SL
1,2-Dichlorobenzene	V	95-50-1	N/A		N/A		µg/L	0/1	0%	0.045 – 0.045	0.045	MDL	30		RSL	351	No	No	MDL ≤ SL
1,2-Dichloroethane	V	107-06-2	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.17		RSL	2.74	No	No	MDL ≤ SL
1,2-Dichloropropane	V	78-87-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.82		RSL	4.44	No	No	MDL ≤ SL
1,3,5-Trimethylbenzene	V	108-67-8	N/A		N/A		µg/L	0/1	0%	0.067 – 0.067	0.067	MDL	6		RSL	23.2	No	No	MDL ≤ SL
1,3-Dichlorobenzene	V	541-73-1	N/A		N/A		µg/L	0/1	0%	0.071 – 0.071	0.071	MDL	30	*	RSL	351	No	No	MDL ≤ SL
1,4-Dichlorobenzene	V	106-46-7	N/A		N/A		µg/L	0/1	0%	0.047 – 0.047	0.047	MDL	0.48		RSL	3.42	No	No	MDL ≤ SL
2-Butanone (MEK)	V	78-93-3	N/A		N/A		µg/L	0/1	0%	1.5 – 1.5	1.5	MDL	560		RSL	274000	No	No	MDL ≤ SL
2-Hexanone	V	591-78-6	N/A		N/A		µg/L	0/1	0%	0.68 – 0.68	0.68	MDL	3.8		RSL	1060	No	No	MDL ≤ SL
4-Methyl-2-pentanone (MIBK)	V	108-10-1	N/A		N/A		µg/L	0/1	0%	0.71 – 0.71	0.71	MDL	630		RSL	70200	No	No	MDL ≤ SL
Acetone	V	67-64-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	1800		RSL	No SL	No	No	MDL ≤ SL
Benzene	V	71-43-2	N/A		N/A		µg/L	0/1	0%	0.085 – 0.085	0.085	MDL	0.46		RSL	1.92	No	No	MDL ≤ SL
Bromochloromethane	V	74-97-5	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	8.3		RSL	83.9	No	No	MDL ≤ SL
Bromodichloromethane	V	75-27-4	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.13		RSL	1.08	No	No	MDL ≤ SL
Bromoform	V	75-25-2	N/A		N/A		µg/L	0/1	0%	0.095 – 0.095	0.095	MDL	3.3		RSL	152	No	No	MDL ≤ SL
Bromomethane	V	74-83-9	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	0.75		RSL	1.98	No	No	MDL ≤ SL
Carbon disulfide	V	75-15-0	N/A		N/A		µg/L	0/1	0%	0.092 – 0.092	0.092	MDL	81		RSL	145	No	No	MDL ≤ SL
Carbon tetrachloride	V	56-23-5	N/A		N/A		µg/L	0/1	0%	0.086 – 0.086	0.086	MDL	0.46		RSL	0.499	No	No	MDL ≤ SL
Chlorobenzene	V	108-90-7	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	7.8		RSL	51.9	No	No	MDL ≤ SL
Chloroethane	V	75-00-3	N/A		N/A		µg/L	0/1	0%	0.074 – 0.074	0.074	MDL	830		RSL	1050	No	No	MDL ≤ SL
Chloroform	V	67-66-3	0.96		0.96		µg/L	1/1	100%	0.079 – 0.079	0.96	MDC	0.22		RSL	0.972	No	Yes	MDC ≥ SL
Chloromethane	V	74-87-3	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	19		RSL	28.9	No	No	MDL ≤ SL
cis-1,2-Dichloroethene	V	156-59-2	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
cis-1,3-Dichloropropene	V	10061-01-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Cyclohexane	V	110-82-7	N/A		N/A		µg/L	0/1	0%	0.065 – 0.065	0.065	MDL	1300		RSL	123	No	No	MDL ≤ SL
Dibromochloromethane	V	124-48-1	N/A		N/A		µg/L	0/1	0%	0.073 – 0.073	0.073	MDL	0.87		RSL	No SL	No	No	MDL ≤ SL
Dichlorodifluoromethane	V	75-71-8	N/A		N/A		µg/L	0/1	0%	0.12 – 0.12	0.12	MDL	20		RSL	0.815	No	No	MDL ≤ SL
Ethylbenzene	V	100-41-4	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	1.5		RSL	4.45	No	No	MDL ≤ SL
Isopropylbenzene	V	98-82-8	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	45		RSL	121	No	No	MDL ≤ SL

Table A2-11
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0501)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0501

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
m,p-Xylene	V	179601-23-1	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	19	*	RSL	45.5	No	No	MDL ≤ SL
Methyl Acetate	V	79-20-9	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	2000		RSL	No SL	No	No	MDL ≤ SL
Methyl Tert Butyl Ether	V	1634-04-4	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	14		RSL	533	No	No	MDL ≤ SL
Methylcyclohexane	V	108-87-2	N/A		N/A		µg/L	0/1	0%	0.08 – 0.08	0.08	MDL	1300	*	RSL	123	No	No	MDL ≤ SL
Methylene chloride	V	75-09-2	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	11		RSL	555	No	No	MDL ≤ SL
o-Xylene	V	95-47-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	19		RSL	63.3	No	No	MDL ≤ SL
Styrene	V	100-42-5	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	120		RSL	1210	No	No	MDL ≤ SL
Tetrachloroethene	V	127-18-4	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	4.1		RSL	7.25	No	No	MDL ≤ SL
Toluene	V	108-88-3	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	110		RSL	2390	No	No	MDL ≤ SL
trans-1,2-Dichloroethene	V	156-60-5	N/A		N/A		µg/L	0/1	0%	0.081 – 0.081	0.081	MDL	6.8		RSL	12.9	No	No	MDL ≤ SL
trans-1,3-Dichloropropene	V	10061-02-6	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Trichloroethene	V	79-01-6	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.28		RSL	0.632	No	No	MDL ≤ SL
Trichlorofluoromethane	V	75-69-4	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	520		RSL	No SL	No	No	MDL ≤ SL
Vinyl chloride	V	75-01-4	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.019		RSL	0.164	No	See DSA	MDL > SL
Semi-Volatile Organic Compounds (SVOCs)																			
1-Methylnaphthalene	V	90-12-0	N/A		N/A		µg/L	0/1	0%	0.0055 – 0.0055	0.0055	MDL	1.1		RSL	No SL	No	No	MDL ≤ SL
2-Methylnaphthalene	V	91-57-6	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
Acenaphthene	V	83-32-9	N/A		N/A		µg/L	0/1	0%	0.0061 – 0.0061	0.0061	MDL	53		RSL	No SL	No	No	MDL ≤ SL
Acenaphthylene	V	208-96-8	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	53	*	RSL	No SL	No	No	MDL ≤ SL
Anthracene	V	120-12-7	N/A		N/A		µg/L	0/1	0%	0.011 – 0.011	0.011	MDL	180		RSL	No SL	No	No	MDL ≤ SL
Benzo(a)anthracene	V	56-55-3	N/A		N/A		µg/L	0/1	0%	0.0094 – 0.0094	0.0094	MDL	0.03		RSL	62.3	No	No	MDL ≤ SL
Benzo(a)pyrene		50-32-8	N/A		N/A		µg/L	0/1	0%	0.017 – 0.017	0.017	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Benzo(b)fluoranthene		205-99-2	N/A		N/A		µg/L	0/1	0%	0.0082 – 0.0082	0.0082	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Benzo(g,h,i)perylene	V	191-24-2	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	12	*	RSL	No SL	No	No	MDL ≤ SL
Benzo(k)fluoranthene		207-08-9	N/A		N/A		µg/L	0/1	0%	0.0041 – 0.0041	0.0041	MDL	2.5		RSL	No SL	No	No	MDL ≤ SL
Chrysene		218-01-9	N/A		N/A		µg/L	0/1	0%	0.0054 – 0.0054	0.0054	MDL	25		RSL	No SL	No	No	MDL ≤ SL
Dibenzo(a,h)anthracene		53-70-3	N/A		N/A		µg/L	0/1	0%	0.0059 – 0.0059	0.0059	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Fluoranthene		206-44-0	N/A		N/A		µg/L	0/1	0%	0.012 – 0.012	0.012	MDL	80		RSL	No SL	No	No	MDL ≤ SL
Fluorene	V	86-73-7	N/A		N/A		µg/L	0/1	0%	0.0072 – 0.0072	0.0072	MDL	29		RSL	No SL	No	No	MDL ≤ SL
Indeno(1,2,3-cd)pyrene		193-39-5	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Naphthalene	V	91-20-3	N/A		N/A		µg/L	0/1	0%	0.0077 – 0.0077	0.0077	MDL	0.12		RSL	6.29	No	No	MDL ≤ SL
Pentachlorophenol		87-86-5	N/A		N/A		µg/L	0/1	0%	0.024 – 0.024	0.024	MDL	0.041		RSL	No SL	No	No	MDL ≤ SL
Phenanthrene	V	85-01-8	N/A		N/A		µg/L	0/1	0%	0.0087 – 0.0087	0.0087	MDL	180	*	RSL	No SL	No	No	MDL ≤ SL
Pyrene	V	129-00-0	0.025	JB	0.025	JB	µg/L	1/1	100%	0.014 – 0.014	0.025	MDC	12		RSL	No SL	No	No	MDC < SL
DIOX																			
Total PCDD/F TEQ (Mammal)	V	TEQ-M-DF	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
PCB																			
Total PCB TEQ (Mammal)	V	TEQ-M-PCB	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
Total PCB Congener	V	TPCB_CON	0.00004	J	0.00004	J	µg/L	1/1	100%	N/A	0.00004	MDC	0.044	*	RSL	1.65	No	No	MDC < SL
Perfluorinated Compounds																			
Perfluorononanoic acid (PFNA)		375-95-1	0.0036		0.0036		µg/L	1/1	100%	0.0018 – 0.0018	0.0036	MDC	0.0059		RSL	No SL	No	No	MDC < SL

Table A2-11
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0501)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0501

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Perfluorohexanesulfonic acid (PFHxS)		355-46-4	0.012		0.012		µg/L	1/1	100%	0.0018 – 0.0018	0.012	MDC	0.039		RSL	No SL	No	No	MDC < SL
Perfluorobutanesulfonic acid (PFBS)		375-73-5	0.11		0.11		µg/L	1/1	100%	0.0018 – 0.0018	0.11	MDC	0.6		RSL	No SL	No	No	MDC < SL
Perfluorooctanesulfonic acid (PFOS)		1763-23-1	0.13		0.13		µg/L	1/1	100%	0.0018 – 0.0018	0.13	MDC	0.004		RSL	No SL	No	Yes	MDC ≥ SL
Perfluorooctanoic acid (PFOA)		335-67-1	0.017		0.017		µg/L	1/1	100%	0.00035 – 0.00035	0.017	MDC	0.006		RSL	No SL	No	Yes	MDC ≥ SL
Total Metals																			
Aluminum		7429-90-5	4	J	4	J	µg/L	1/1	100%	4 – 4	4	MDC	2000		RSL	No SL	No	No	MDC < SL
Antimony		7440-36-0	N/A		N/A		µg/L	0/1	0%	0.32 – 0.32	0.32	MDL	0.78		RSL	No SL	No	No	MDL ≤ SL
Arsenic		7440-38-2	N/A		N/A		µg/L	0/1	0%	0.33 – 0.33	0.33	MDL	0.052		RSL	No SL	No	See DSA	MDL > SL
Barium		7440-39-3	200		200		µg/L	1/1	100%	1.9 – 1.9	200	MDC	380		RSL	No SL	No	No	MDC < SL
Beryllium		7440-41-7	N/A		N/A		µg/L	0/1	0%	0.17 – 0.17	0.17	MDL	2.5		RSL	No SL	No	No	MDL ≤ SL
Cadmium		7440-43-9	N/A		N/A		µg/L	0/1	0%	0.14 – 0.14	0.14	MDL	0.18		RSL	No SL	No	No	MDL ≤ SL
Calcium		7440-70-2	15000		15000		µg/L	1/1	100%	120 – 120	15000	MDC	Nutrient		N/A	Nutrient	No	No	Classified as an essential nutrient
Chromium, Total		7440-47-3	1.7	J	1.7	J	µg/L	1/1	100%	0.32 – 0.32	1.7	MDC	2200	*	RSL	No SL	No	No	MDC < SL
Chromium, Hexavalent		18540-29-9	N/A		N/A		µg/L	0/1	0%	1 – 1	1	MDL	0.035		RSL	No SL	No	See DSA	MDL > SL
Cobalt		7440-48-4	16		16		µg/L	1/1	100%	0.19 – 0.19	16	MDC	0.6		RSL	No SL	No	Yes	MDC ≥ SL
Copper		7440-50-8	3.3		3.3		µg/L	1/1	100%	0.4 – 0.4	3.3	MDC	80		RSL	No SL	No	No	MDC < SL
Iron		7439-89-6	190	J	190	J	µg/L	1/1	100%	54 – 54	190	MDC	1400		RSL	No SL	No	No	MDC < SL
Lead		7439-92-1	0.22	J	0.22	J	µg/L	1/1	100%	0.21 – 0.21	0.22	MDC	15		RSL	No SL	No	No	MDC < SL
Manganese		7439-96-5	260		260		µg/L	1/1	100%	0.17 – 0.17	260	MDC	43		RSL	No SL	No	Yes	MDC ≥ SL
Mercury		7439-97-6	N/A		N/A		µg/L	0/1	0%	0.06 – 0.06	0.06	MDL	0.2	*	RSL	No SL	No	No	MDL ≤ SL
Nickel		7440-02-0	2.3	JB+	2.3	JB+	µg/L	1/1	100%	0.2 – 0.2	2.3	MDC	39		RSL	No SL	No	No	MDC < SL
Selenium		7782-49-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	10		RSL	No SL	No	No	MDL ≤ SL
Silver		7440-22-4	N/A		N/A		µg/L	0/1	0%	0.18 – 0.18	0.18	MDL	9.4		RSL	No SL	No	No	MDL ≤ SL
Thallium		7440-28-0	N/A		N/A		µg/L	0/1	0%	0.23 – 0.23	0.23	MDL	0.02		RSL	No SL	No	See DSA	MDL > SL
Vanadium		7440-62-2	3.2	J	3.2	J	µg/L	1/1	100%	1.2 – 1.2	3.2	MDC	8.6		RSL	No SL	No	No	MDC < SL
Zinc		7440-66-6	34		34		µg/L	1/1	100%	1.6 – 1.6	34	MDC	600		RSL	No SL	No	No	MDC < SL
Total Cyanide																			
Cyanide	V	57-12-5	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	0.15		RSL	20.1	No	See DSA	MDL > SL

Notes:

% = Percent
AL = Action Level
CASRN = Chemical Abstracts Service Registry Number
COPC = Chemical of Potential Concern
DSA = Data Sensitivity Analysis
HAL = Health Advisory Level
J = Indicates an estimated value
MCL = Maximum Contaminant Level
MDC = Maximum Detected Concentration
N/A = Not Applicable
ND = Non-Detect or Not Detected

Table A2-11
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0501)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current and Future
Medium:	Groundwater (Drinking Water)
Well:	0501

Chemical [1]	CASRN	Minimum Detected Concentration	Maximum Detected Concentration	Units	Detection Frequency	Range of Method Detection Limits	Screening Concentration	Screening Level [2, 3, 5, 6]	Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion

"PFOA and PFOS Combined" = Combined total of the detected concentrations of PFOA and PFOS (non-detect results were not included in the summation).
RL = Reporting Limit
RSL = Regional Screening Level
µg/L = micrograms per liter
USEPA = United States Environmental Protection Agency
(1) "V" indicates that the chemical is volatile.
(2) Groundwater data screened against USEPA Tap Water RSLs, last updated May 2022 (TR = 1E-6, THQ = 0.1).
(3) An asterisk,"*", indicates surrogate toxicity information was used to derive a Screening Level (see Table A2-14).
(4) Groundwater data screened against USEPA Residential Groundwater VISLs, last updated May 2022 (TR = 1E-6, THQ = 0.1). Site-specific, system temperature was set to 20.5 Celsius (average of recorded temperatures taken in field).
(6) Lead is compared to the EPA tap water RSL of 15 µg/L, which represents the 90th percentile concentration of lead found in tap water samples collected nationwide (Lead and Copper Rule, 56 Federal Register 26460-26564, dated June 7, 1991) and is not a risk-based number, but rather an action level.

Table A2-12
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0510)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0510

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Volatile Organic Compounds (VOCs)																			
1,1,1-Trichloroethane	V	71-55-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	800		RSL	893	No	No	MDL ≤ SL
1,1,2,2-Tetrachloroethane	V	79-34-5	N/A		N/A		µg/L	0/1	0%	0.05 – 0.05	0.05	MDL	0.076		RSL	4.18	No	No	MDL ≤ SL
1,1,2-Trichloroethane	V	79-00-5	N/A		N/A		µg/L	0/1	0%	0.042 – 0.042	0.042	MDL	0.041		RSL	0.779	No	See DSA	MDL > SL
1,1,2-Trichlorotrifluoroethane (Freon 113)	V	76-13-1	N/A		N/A		µg/L	0/1	0%	0.099 – 0.099	0.099	MDL	1000		RSL	28.5	No	No	MDL ≤ SL
1,1-Dichloroethane	V	75-34-3	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	2.8		RSL	9.09	No	No	MDL ≤ SL
1,1-Dichloroethene	V	75-35-4	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	28		RSL	22.7	No	No	MDL ≤ SL
1,2,3-Trichlorobenzene	V	87-61-6	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	0.7		RSL	No SL	No	No	MDL ≤ SL
1,2,3-Trichloropropane	V	96-18-4	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	0.00075		RSL	2.89	No	See DSA	MDL > SL
1,2,4-Trichlorobenzene	V	120-82-1	N/A		N/A		µg/L	0/1	0%	0.068 – 0.068	0.068	MDL	0.4		RSL	4.97	No	No	MDL ≤ SL
1,2,4-Trimethylbenzene	V	95-63-6	N/A		N/A		µg/L	0/1	0%	0.051 – 0.051	0.051	MDL	5.6		RSL	33	No	No	MDL ≤ SL
1,2-Dibromo-3-chloropropane	V	96-12-8	N/A		N/A		µg/L	0/1	0%	0.14 – 0.14	0.14	MDL	0.00033		RSL	0.0381	See DSA	See DSA	MDL > SL
1,2-Dibromoethane	V	106-93-4	N/A		N/A		µg/L	0/1	0%	0.052 – 0.052	0.052	MDL	0.0075		RSL	0.221	No	See DSA	MDL > SL
1,2-Dichlorobenzene	V	95-50-1	N/A		N/A		µg/L	0/1	0%	0.045 – 0.045	0.045	MDL	30		RSL	351	No	No	MDL ≤ SL
1,2-Dichloroethane	V	107-06-2	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.17		RSL	2.74	No	No	MDL ≤ SL
1,2-Dichloropropane	V	78-87-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.82		RSL	4.44	No	No	MDL ≤ SL
1,3,5-Trimethylbenzene	V	108-67-8	N/A		N/A		µg/L	0/1	0%	0.067 – 0.067	0.067	MDL	6		RSL	23.2	No	No	MDL ≤ SL
1,3-Dichlorobenzene	V	541-73-1	N/A		N/A		µg/L	0/1	0%	0.071 – 0.071	0.071	MDL	30	*	RSL	351	No	No	MDL ≤ SL
1,4-Dichlorobenzene	V	106-46-7	N/A		N/A		µg/L	0/1	0%	0.047 – 0.047	0.047	MDL	0.48		RSL	3.42	No	No	MDL ≤ SL
1,4-Dioxane	V	123-91-1	N/A		N/A		µg/L	0/1	0%	0.86 – 0.86	0.86	MDL	0.46		RSL	3570	No	See DSA	MDL > SL
2-Butanone (MEK)	V	78-93-3	N/A		N/A		µg/L	0/1	0%	1.5 – 1.5	1.5	MDL	560		RSL	274000	No	No	MDL ≤ SL
2-Hexanone	V	591-78-6	N/A		N/A		µg/L	0/1	0%	0.68 – 0.68	0.68	MDL	3.8		RSL	1060	No	No	MDL ≤ SL
4-Methyl-2-pentanone (MIBK)	V	108-10-1	N/A		N/A		µg/L	0/1	0%	0.71 – 0.71	0.71	MDL	630		RSL	70200	No	No	MDL ≤ SL
Acetone	V	67-64-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	1800		RSL	No SL	No	No	MDL ≤ SL
Benzene	V	71-43-2	N/A		N/A		µg/L	0/1	0%	0.085 – 0.085	0.085	MDL	0.46		RSL	1.92	No	No	MDL ≤ SL
Bromochloromethane	V	74-97-5	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	8.3		RSL	83.9	No	No	MDL ≤ SL
Bromodichloromethane	V	75-27-4	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.13		RSL	1.08	No	No	MDL ≤ SL
Bromoform	V	75-25-2	N/A		N/A		µg/L	0/1	0%	0.095 – 0.095	0.095	MDL	3.3		RSL	152	No	No	MDL ≤ SL
Bromomethane	V	74-83-9	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	0.75		RSL	1.98	No	No	MDL ≤ SL
Carbon disulfide	V	75-15-0	N/A		N/A		µg/L	0/1	0%	0.092 – 0.092	0.092	MDL	81		RSL	145	No	No	MDL ≤ SL
Carbon tetrachloride	V	56-23-5	N/A		N/A		µg/L	0/1	0%	0.086 – 0.086	0.086	MDL	0.46		RSL	0.499	No	No	MDL ≤ SL
Chlorobenzene	V	108-90-7	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	7.8		RSL	51.9	No	No	MDL ≤ SL
Chloroethane	V	75-00-3	N/A		N/A		µg/L	0/1	0%	0.074 – 0.074	0.074	MDL	830		RSL	1050	No	No	MDL ≤ SL
Chloroform	V	67-66-3	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.22		RSL	0.972	No	No	MDL ≤ SL
Chloromethane	V	74-87-3	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	19		RSL	28.9	No	No	MDL ≤ SL
cis-1,2-Dichloroethene	V	156-59-2	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
cis-1,3-Dichloropropene	V	10061-01-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Cyclohexane	V	110-82-7	N/A		N/A		µg/L	0/1	0%	0.065 – 0.065	0.065	MDL	1300		RSL	123	No	No	MDL ≤ SL
Dibromochloromethane	V	124-48-1	N/A		N/A		µg/L	0/1	0%	0.073 – 0.073	0.073	MDL	0.87		RSL	No SL	No	No	MDL ≤ SL
Dichlorodifluoromethane	V	75-71-8	N/A		N/A		µg/L	0/1	0%	0.12 – 0.12	0.12	MDL	20		RSL	0.815	No	No	MDL ≤ SL
Ethylbenzene	V	100-41-4	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	1.5		RSL	4.45	No	No	MDL ≤ SL

Table A2-12
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0510)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0510

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Isopropylbenzene	V	98-82-8	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	45		RSL	121	No	No	MDL ≤ SL
m,p-Xylene	V	179601-23-1	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	19	*	RSL	45.5	No	No	MDL ≤ SL
Methyl Acetate	V	79-20-9	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	2000		RSL	No SL	No	No	MDL ≤ SL
Methyl Tert Butyl Ether	V	1634-04-4	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	14		RSL	533	No	No	MDL ≤ SL
Methylcyclohexane	V	108-87-2	N/A		N/A		µg/L	0/1	0%	0.08 – 0.08	0.08	MDL	1300	*	RSL	123	No	No	MDL ≤ SL
Methylene chloride	V	75-09-2	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	11		RSL	555	No	No	MDL ≤ SL
o-Xylene	V	95-47-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	19		RSL	63.3	No	No	MDL ≤ SL
Styrene	V	100-42-5	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	120		RSL	1210	No	No	MDL ≤ SL
Tetrachloroethene	V	127-18-4	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	4.1		RSL	7.25	No	No	MDL ≤ SL
Toluene	V	108-88-3	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	110		RSL	2390	No	No	MDL ≤ SL
trans-1,2-Dichloroethene	V	156-60-5	N/A		N/A		µg/L	0/1	0%	0.081 – 0.081	0.081	MDL	6.8		RSL	12.9	No	No	MDL ≤ SL
trans-1,3-Dichloropropene	V	10061-02-6	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Trichloroethene	V	79-01-6	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.28		RSL	0.632	No	No	MDL ≤ SL
Trichlorofluoromethane	V	75-69-4	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	520		RSL	No SL	No	No	MDL ≤ SL
Vinyl chloride	V	75-01-4	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.019		RSL	0.164	No	See DSA	MDL > SL
Semi-Volatile Organic Compounds (SVOCs)																			
1,1'-Biphenyl	V	92-52-4	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	0.083		RSL	4.71	No	See DSA	MDL > SL
1,2,4,5-Tetrachlorobenzene	V	95-94-3	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	0.017		RSL	No SL	No	See DSA	MDL > SL
1-Methylnaphthalene	V	90-12-0	N/A		N/A		µg/L	0/1	0%	0.0052 – 0.0052	0.0052	MDL	1.1		RSL	No SL	No	No	MDL ≤ SL
2,3,4,6-Tetrachlorophenol		58-90-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	24		RSL	No SL	No	No	MDL ≤ SL
2,4,5-Trichlorophenol		95-95-4	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	120		RSL	No SL	No	No	MDL ≤ SL
2,4,6-Trichlorophenol		88-06-2	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	1.2		RSL	No SL	No	See DSA	MDL > SL
2,4-Dichlorophenol		120-83-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	4.6		RSL	No SL	No	No	MDL ≤ SL
2,4-Dimethylphenol		105-67-9	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	36		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrophenol		51-28-5	N/A		N/A		µg/L	0/1	0%	0.93 – 0.93	0.93	MDL	3.9		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrotoluene		121-14-2	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.24		RSL	No SL	No	See DSA	MDL > SL
2,6-Dinitrotoluene		606-20-2	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	0.049		RSL	No SL	No	See DSA	MDL > SL
2-Chloronaphthalene	V	91-58-7	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	75		RSL	No SL	No	No	MDL ≤ SL
2-Chlorophenol	V	95-57-8	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	9.1		RSL	No SL	No	No	MDL ≤ SL
2-Methylnaphthalene	V	91-57-6	N/A		N/A		µg/L	0/1	0%	0.0063 – 0.0063	0.0063	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
2-Methylphenol		95-48-7	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	93		RSL	No SL	No	No	MDL ≤ SL
2-Nitroaniline		88-74-4	N/A		N/A		µg/L	0/1	0%	3.2 – 3.2	3.2	MDL	19		RSL	No SL	No	No	MDL ≤ SL
2-Nitrophenol		88-75-5	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
3,3'-Dichlorobenzidine		91-94-1	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	0.13		RSL	No SL	No	See DSA	MDL > SL
3-Nitroaniline		99-09-2	N/A		N/A		µg/L	0/1	0%	0.64 – 0.64	0.64	MDL	19	*	RSL	No SL	No	No	MDL ≤ SL
4,6-Dinitro-o-cresol		534-52-1	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	0.15		RSL	No SL	No	See DSA	MDL > SL
4-Bromophenyl phenyl ether	V	101-55-3	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Chloro-3-methyl phenol		59-50-7	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	140		RSL	No SL	No	No	MDL ≤ SL
4-Chloroaniline		106-47-8	N/A		N/A		µg/L	0/1	0%	4.4 – 4.4	4.4	MDL	0.37		RSL	No SL	No	See DSA	MDL > SL
4-Chlorophenyl phenyl ether	V	7005-72-3	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Methylphenol		106-44-5	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	37		RSL	No SL	No	No	MDL ≤ SL

Table A2-12
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0510)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0510

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
4-Nitroaniline		100-01-6	N/A		N/A		µg/L	0/1	0%	0.81 – 0.81	0.81	MDL	3.8		RSL	No SL	No	No	MDL ≤ SL
4-Nitrophenol		100-02-7	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
Acenaphthene	V	83-32-9	N/A		N/A		µg/L	0/1	0%	0.0058 – 0.0058	0.0058	MDL	53		RSL	No SL	No	No	MDL ≤ SL
Acenaphthylene	V	208-96-8	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	53	*	RSL	No SL	No	No	MDL ≤ SL
Acetophenone	V	98-86-2	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	190		RSL	No SL	No	No	MDL ≤ SL
Anthracene	V	120-12-7	N/A		N/A		µg/L	0/1	0%	0.01 – 0.01	0.01	MDL	180		RSL	No SL	No	No	MDL ≤ SL
Atrazine		1912-24-9	N/A		N/A		µg/L	0/1	0%	0.46 – 0.46	0.46	MDL	0.3		RSL	No SL	No	See DSA	MDL > SL
Benzaldehyde	V	100-52-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	19		RSL	No SL	No	No	MDL ≤ SL
Benzo(a)anthracene	V	56-55-3	N/A		N/A		µg/L	0/1	0%	0.009 – 0.009	0.009	MDL	0.03		RSL	62.3	No	No	MDL ≤ SL
Benzo(a)pyrene		50-32-8	N/A		N/A		µg/L	0/1	0%	0.016 – 0.016	0.016	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Benzo(b)fluoranthene		205-99-2	N/A		N/A		µg/L	0/1	0%	0.0078 – 0.0078	0.0078	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Benzo(g,h,i)perylene	V	191-24-2	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	12	*	RSL	No SL	No	No	MDL ≤ SL
Benzo(k)fluoranthene		207-08-9	N/A		N/A		µg/L	0/1	0%	0.0039 – 0.0039	0.0039	MDL	2.5		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethoxy)methane		111-91-1	N/A		N/A		µg/L	0/1	0%	2.8 – 2.8	2.8	MDL	5.9		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethyl)ether	V	111-44-4	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	0.014		RSL	17	No	See DSA	MDL > SL
bis(2-Chloroisopropyl)ether	V	108-60-1	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	71		RSL	No SL	No	No	MDL ≤ SL
bis(2-Ethylhexyl)phthalate		117-81-7	N/A		N/A		µg/L	0/1	0%	0.78 – 0.78	0.78	MDL	5.6		RSL	No SL	No	No	MDL ≤ SL
Butyl benzyl phthalate		85-68-7	N/A		N/A		µg/L	0/1	0%	1.3 – 1.3	1.3	MDL	16		RSL	No SL	No	No	MDL ≤ SL
Caprolactam		105-60-2	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	990		RSL	No SL	No	No	MDL ≤ SL
Carbazole	V	86-74-8	N/A		N/A		µg/L	0/1	0%	3 – 3	3	MDL	29	*	RSL	No SL	No	No	MDL ≤ SL
Chrysene		218-01-9	N/A		N/A		µg/L	0/1	0%	0.0051 – 0.0051	0.0051	MDL	25		RSL	No SL	No	No	MDL ≤ SL
Dibenzo(a,h)anthracene		53-70-3	N/A		N/A		µg/L	0/1	0%	0.0056 – 0.0056	0.0056	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Dibenzofuran	V	132-64-9	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.79		RSL	No SL	No	See DSA	MDL > SL
Diethyl phthalate		84-66-2	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	1500		RSL	No SL	No	No	MDL ≤ SL
Dimethyl phthalate		131-11-3	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	1500	*	RSL	No SL	No	No	MDL ≤ SL
Di-n-butyl phthalate		84-74-2	N/A		N/A		µg/L	0/1	0%	1.5 – 1.5	1.5	MDL	90		RSL	No SL	No	No	MDL ≤ SL
Di-n-octyl phthalate		117-84-0	N/A		N/A		µg/L	0/1	0%	0.61 – 0.61	0.61	MDL	20		RSL	No SL	No	No	MDL ≤ SL
Fluoranthene		206-44-0	N/A		N/A		µg/L	0/1	0%	0.011 – 0.011	0.011	MDL	80		RSL	No SL	No	No	MDL ≤ SL
Fluorene	V	86-73-7	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	29		RSL	No SL	No	No	MDL ≤ SL
Hexachlorobenzene	V	118-74-1	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	0.0098		RSL	0.133	See DSA	See DSA	MDL > SL
Hexachlorobutadiene	V	87-68-3	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	0.14		RSL	0.414	See DSA	See DSA	MDL > SL
Hexachloroethane	V	67-72-1	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	0.33		RSL	2.29	See DSA	See DSA	MDL > SL
Indeno(1,2,3-cd)pyrene		193-39-5	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Isophorone		78-59-1	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	78		RSL	No SL	No	No	MDL ≤ SL
Naphthalene	V	91-20-3	N/A		N/A		µg/L	0/1	0%	0.0073 – 0.0073	0.0073	MDL	0.12		RSL	6.29	No	No	MDL ≤ SL
Nitrobenzene	V	98-95-3	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.14		RSL	99.3	No	See DSA	MDL > SL
N-Nitroso-di-n-propylamine		621-64-7	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	0.011		RSL	No SL	No	See DSA	MDL > SL
N-Nitrosodiphenylamine		86-30-6	N/A		N/A		µg/L	0/1	0%	3.4 – 3.4	3.4	MDL	12		RSL	No SL	No	No	MDL ≤ SL
Pentachlorophenol		87-86-5	N/A		N/A		µg/L	0/1	0%	0.023 – 0.023	0.023	MDL	0.041		RSL	No SL	No	No	MDL ≤ SL
Phenanthrene	V	85-01-8	N/A		N/A		µg/L	0/1	0%	0.0083 – 0.0083	0.0083	MDL	180	*	RSL	No SL	No	No	MDL ≤ SL
Phenol		108-95-2	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	580		RSL	No SL	No	No	MDL ≤ SL

Table A2-12
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0510)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0510

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Pyrene	V	129-00-0	N/A		N/A		µg/L	0/1	0%	0.013 – 0.013	0.013	MDL	12		RSL	No SL	No	No	MDL ≤ SL
DIOX																			
Total PCDD/F TEQ (Mammal)	V	TEQ-M-DF	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
PCB																			
Total PCB TEQ (Mammal)	V	TEQ-M-PCB	5.8E-10		5.8E-10		µg/L	1/1	100%	N/A	5.8E-10	MDC	0.00000012	*	RSL	3.61E-05	No	No	MDC < SL
Total PCB Congener	V	TPCB_CON	0.000044	J	0.000044	J	µg/L	1/1	100%	N/A	0.000044	MDC	0.044	*	RSL	1.65	No	No	MDC < SL
Perfluorinated Compounds																			
Perfluorononanoic acid (PFNA)		375-95-1	N/A		N/A		µg/L	0/1	0%	0.0018 – 0.0018	0.0018	MDL	0.0059		RSL	No SL	No	No	MDL ≤ SL
Perfluorohexanesulfonic acid (PFHxS)		355-46-4	N/A		N/A		µg/L	0/1	0%	0.0018 – 0.0018	0.0018	MDL	0.039		RSL	No SL	No	No	MDL ≤ SL
Perfluorobutanesulfonic acid (PFBS)		375-73-5	N/A		N/A		µg/L	0/1	0%	0.00035 – 0.00035	0.00035	MDL	0.6		RSL	No SL	No	No	MDL ≤ SL
Perfluorooctanesulfonic acid (PFOS)		1763-23-1	N/A		N/A		µg/L	0/1	0%	0.00035 – 0.00035	0.00035	MDL	0.004		RSL	No SL	No	No	MDL ≤ SL
Perfluorooctanoic acid (PFOA)		335-67-1	0.0011	J	0.0011	J	µg/L	1/1	100%	0.00035 – 0.00035	0.0011	MDC	0.006		RSL	No SL	No	No	MDC < SL
Total Metals																			
Aluminum		7429-90-5	90		90		µg/L	1/1	100%	4 – 4	90	MDC	2000		RSL	No SL	No	No	MDC < SL
Antimony		7440-36-0	N/A		N/A		µg/L	0/1	0%	0.32 – 0.32	0.32	MDL	0.78		RSL	No SL	No	No	MDL ≤ SL
Arsenic		7440-38-2	N/A		N/A		µg/L	0/1	0%	0.33 – 0.33	0.33	MDL	0.052		RSL	No SL	No	See DSA	MDL > SL
Barium		7440-39-3	1300		1300		µg/L	1/1	100%	1.9 – 1.9	1300	MDC	380		RSL	No SL	No	Yes	MDC ≥ SL
Beryllium		7440-41-7	1.6		1.6		µg/L	1/1	100%	0.17 – 0.17	1.6	MDC	2.5		RSL	No SL	No	No	MDC < SL
Cadmium		7440-43-9	0.39	J	0.39	J	µg/L	1/1	100%	0.14 – 0.14	0.39	MDC	0.18		RSL	No SL	No	Yes	MDC ≥ SL
Calcium		7440-70-2	9100		9100		µg/L	1/1	100%	120 – 120	9100	MDC	Nutrient		N/A	Nutrient	No	No	Classified as an essential nutrient
Chromium, Total		7440-47-3	0.69	J	0.69	J	µg/L	1/1	100%	0.32 – 0.32	0.69	MDC	2200	*	RSL	No SL	No	No	MDC < SL
Chromium, Hexavalent		18540-29-9	N/A		N/A		µg/L	0/1	0%	1 – 1	1	MDL	0.035		RSL	No SL	No	See DSA	MDL > SL
Cobalt		7440-48-4	20		20		µg/L	1/1	100%	0.19 – 0.19	20	MDC	0.6		RSL	No SL	No	Yes	MDC ≥ SL
Copper		7440-50-8	100		100		µg/L	1/1	100%	0.4 – 0.4	100	MDC	80		RSL	No SL	No	Yes	MDC ≥ SL
Iron		7439-89-6	N/A		N/A		µg/L	0/1	0%	54 – 54	54	MDL	1400		RSL	No SL	No	No	MDL ≤ SL
Lead		7439-92-1	5.6		5.6		µg/L	1/1	100%	0.21 – 0.21	5.6	MDC	15		RSL	No SL	No	No	MDC < SL
Manganese		7439-96-5	140		140		µg/L	1/1	100%	0.17 – 0.17	140	MDC	43		RSL	No SL	No	Yes	MDC ≥ SL
Mercury		7439-97-6	N/A		N/A		µg/L	0/1	0%	0.06 – 0.06	0.06	MDL	0.2	*	RSL	No SL	No	No	MDL ≤ SL
Nickel		7440-02-0	9.6	JB+	9.6	JB+	µg/L	1/1	100%	0.2 – 0.2	9.6	MDC	39		RSL	No SL	No	No	MDC < SL
Selenium		7782-49-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	10		RSL	No SL	No	No	MDL ≤ SL
Silver		7440-22-4	N/A		N/A		µg/L	0/1	0%	0.18 – 0.18	0.18	MDL	9.4		RSL	No SL	No	No	MDL ≤ SL
Thallium		7440-28-0	N/A		N/A		µg/L	0/1	0%	0.23 – 0.23	0.23	MDL	0.02		RSL	No SL	No	See DSA	MDL > SL
Vanadium		7440-62-2	3.1	J	3.1	J	µg/L	1/1	100%	1.2 – 1.2	3.1	MDC	8.6		RSL	No SL	No	No	MDC < SL
Zinc		7440-66-6	69		69		µg/L	1/1	100%	1.6 – 1.6	69	MDC	600		RSL	No SL	No	No	MDC < SL
Total Cyanide																			
Cyanide	V	57-12-5	11		11		µg/L	1/1	100%	2.6 – 2.6	11	MDC	0.15		RSL	20.1	No	Yes	MDC ≥ SL

Notes:

% = Percent
AL = Action Level
CASRN = Chemical Abstracts Service Registry Number

Table A2-12
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0510)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current and Future
Medium:	Groundwater (Drinking Water)
Well:	0510

Chemical [1]	CASRN	Minimum Detected Concentration	Maximum Detected Concentration	Units	Detection Frequency	Range of Method Detection Limits	Screening Concentration	Screening Level [2, 3, 5, 6]	Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion

COPC = Chemical of Potential Concern
DSA = Data Sensitivity Analysis
HAL = Health Advisory Level
J = Indicates an estimated value
MCL = Maximum Contaminant Level
MDC = Maximum Detected Concentration
N/A = Not Applicable
ND = Non-Detect or Not Detected
"PFOA and PFOS Combined" = Combined total of the detected concentrations of PFOA and PFOS (non-detect results were not included in the summation).
RL = Reporting Limit
RSL = Regional Screening Level
µg/L = micrograms per liter
USEPA = United States Environmental Protection Agency
(1) "V" indicates that the chemical is volatile.
(2) Groundwater data screened against USEPA Tap Water RSLs, last updated May 2022 (TR = 1E-6, THQ = 0.1).
(3) An asterisk,"*", indicates surrogate toxicity information was used to derive a Screening Level (see Table A2-14).
(4) Groundwater data screened against USEPA Residential Groundwater VISLs, last updated May 2022 (TR = 1E-6, THQ = 0.1). Site-specific, system temperature was set to 20.5 Celsius (average of recorded temperatures taken in field).
(6) Lead is compared to the EPA tap water RSL of 15 µg/L, which represents the 90th percentile concentration of lead found in tap water samples collected nationwide (Lead and Copper Rule, 56 Federal Register 26460-26564, dated June 7, 1991) and is not a risk-based number, but rather an action level.

Table A2-13
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0527)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0527

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Volatile Organic Compounds (VOCs)																			
1,1,1-Trichloroethane	V	71-55-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	800		RSL	893	No	No	MDL ≤ SL
1,1,2,2-Tetrachloroethane	V	79-34-5	N/A		N/A		µg/L	0/1	0%	0.05 – 0.05	0.05	MDL	0.076		RSL	4.18	No	No	MDL ≤ SL
1,1,2-Trichloroethane	V	79-00-5	N/A		N/A		µg/L	0/1	0%	0.042 – 0.042	0.042	MDL	0.041		RSL	0.779	No	See DSA	MDL > SL
1,1,2-Trichlorotrifluoroethane (Freon 113)	V	76-13-1	N/A		N/A		µg/L	0/1	0%	0.099 – 0.099	0.099	MDL	1000		RSL	28.5	No	No	MDL ≤ SL
1,1-Dichloroethane	V	75-34-3	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	2.8		RSL	9.09	No	No	MDL ≤ SL
1,1-Dichloroethene	V	75-35-4	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	28		RSL	22.7	No	No	MDL ≤ SL
1,2,3-Trichlorobenzene	V	87-61-6	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	0.7		RSL	No SL	No	No	MDL ≤ SL
1,2,3-Trichloropropane	V	96-18-4	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	0.00075		RSL	2.89	No	See DSA	MDL > SL
1,2,4-Trichlorobenzene	V	120-82-1	N/A		N/A		µg/L	0/1	0%	0.068 – 0.068	0.068	MDL	0.4		RSL	4.97	No	No	MDL ≤ SL
1,2,4-Trimethylbenzene	V	95-63-6	N/A		N/A		µg/L	0/1	0%	0.051 – 0.051	0.051	MDL	5.6		RSL	33	No	No	MDL ≤ SL
1,2-Dibromo-3-chloropropane	V	96-12-8	N/A		N/A		µg/L	0/1	0%	0.14 – 0.14	0.14	MDL	0.00033		RSL	0.0381	See DSA	See DSA	MDL > SL
1,2-Dibromoethane	V	106-93-4	N/A		N/A		µg/L	0/1	0%	0.052 – 0.052	0.052	MDL	0.0075		RSL	0.221	No	See DSA	MDL > SL
1,2-Dichlorobenzene	V	95-50-1	N/A		N/A		µg/L	0/1	0%	0.045 – 0.045	0.045	MDL	30		RSL	351	No	No	MDL ≤ SL
1,2-Dichloroethane	V	107-06-2	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.17		RSL	2.74	No	No	MDL ≤ SL
1,2-Dichloropropane	V	78-87-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.82		RSL	4.44	No	No	MDL ≤ SL
1,3,5-Trimethylbenzene	V	108-67-8	N/A		N/A		µg/L	0/1	0%	0.067 – 0.067	0.067	MDL	6		RSL	23.2	No	No	MDL ≤ SL
1,3-Dichlorobenzene	V	541-73-1	N/A		N/A		µg/L	0/1	0%	0.071 – 0.071	0.071	MDL	30	*	RSL	351	No	No	MDL ≤ SL
1,4-Dichlorobenzene	V	106-46-7	N/A		N/A		µg/L	0/1	0%	0.047 – 0.047	0.047	MDL	0.48		RSL	3.42	No	No	MDL ≤ SL
1,4-Dioxane	V	123-91-1	N/A		N/A		µg/L	0/1	0%	0.9 – 0.9	0.9	MDL	0.46		RSL	3570	No	See DSA	MDL > SL
2-Butanone (MEK)	V	78-93-3	N/A		N/A		µg/L	0/1	0%	1.5 – 1.5	1.5	MDL	560		RSL	274000	No	No	MDL ≤ SL
2-Hexanone	V	591-78-6	N/A		N/A		µg/L	0/1	0%	0.68 – 0.68	0.68	MDL	3.8		RSL	1060	No	No	MDL ≤ SL
4-Methyl-2-pentanone (MIBK)	V	108-10-1	N/A		N/A		µg/L	0/1	0%	0.71 – 0.71	0.71	MDL	630		RSL	70200	No	No	MDL ≤ SL
Acetone	V	67-64-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	1800		RSL	No SL	No	No	MDL ≤ SL
Benzene	V	71-43-2	N/A		N/A		µg/L	0/1	0%	0.085 – 0.085	0.085	MDL	0.46		RSL	1.92	No	No	MDL ≤ SL
Bromochloromethane	V	74-97-5	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	8.3		RSL	83.9	No	No	MDL ≤ SL
Bromodichloromethane	V	75-27-4	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.13		RSL	1.08	No	No	MDL ≤ SL
Bromoform	V	75-25-2	N/A		N/A		µg/L	0/1	0%	0.095 – 0.095	0.095	MDL	3.3		RSL	152	No	No	MDL ≤ SL
Bromomethane	V	74-83-9	N/A		N/A		µg/L	0/1	0%	0.058 – 0.058	0.058	MDL	0.75		RSL	1.98	No	No	MDL ≤ SL
Carbon disulfide	V	75-15-0	N/A		N/A		µg/L	0/1	0%	0.092 – 0.092	0.092	MDL	81		RSL	145	No	No	MDL ≤ SL
Carbon tetrachloride	V	56-23-5	N/A		N/A		µg/L	0/1	0%	0.086 – 0.086	0.086	MDL	0.46		RSL	0.499	No	No	MDL ≤ SL
Chlorobenzene	V	108-90-7	N/A		N/A		µg/L	0/1	0%	0.064 – 0.064	0.064	MDL	7.8		RSL	51.9	No	No	MDL ≤ SL
Chloroethane	V	75-00-3	N/A		N/A		µg/L	0/1	0%	0.074 – 0.074	0.074	MDL	830		RSL	1050	No	No	MDL ≤ SL
Chloroform	V	67-66-3	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	0.22		RSL	0.972	No	No	MDL ≤ SL
Chloromethane	V	74-87-3	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	19		RSL	28.9	No	No	MDL ≤ SL
cis-1,2-Dichloroethene	V	156-59-2	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
cis-1,3-Dichloropropene	V	10061-01-5	N/A		N/A		µg/L	0/1	0%	0.069 – 0.069	0.069	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Cyclohexane	V	110-82-7	N/A		N/A		µg/L	0/1	0%	0.065 – 0.065	0.065	MDL	1300		RSL	123	No	No	MDL ≤ SL
Dibromochloromethane	V	124-48-1	N/A		N/A		µg/L	0/1	0%	0.073 – 0.073	0.073	MDL	0.87		RSL	No SL	No	No	MDL ≤ SL
Dichlorodifluoromethane	V	75-71-8	N/A		N/A		µg/L	0/1	0%	0.12 – 0.12	0.12	MDL	20		RSL	0.815	No	No	MDL ≤ SL
Ethylbenzene	V	100-41-4	N/A		N/A		µg/L	0/1	0%	0.079 – 0.079	0.079	MDL	1.5		RSL	4.45	No	No	MDL ≤ SL

Table A2-13
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0527)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0527

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Isopropylbenzene	V	98-82-8	N/A		N/A		µg/L	0/1	0%	0.076 – 0.076	0.076	MDL	45		RSL	121	No	No	MDL ≤ SL
m,p-Xylene	V	179601-23-1	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	19	*	RSL	45.5	No	No	MDL ≤ SL
Methyl Acetate	V	79-20-9	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	2000		RSL	No SL	No	No	MDL ≤ SL
Methyl Tert Butyl Ether	V	1634-04-4	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	14		RSL	533	No	No	MDL ≤ SL
Methylcyclohexane	V	108-87-2	N/A		N/A		µg/L	0/1	0%	0.08 – 0.08	0.08	MDL	1300	*	RSL	123	No	No	MDL ≤ SL
Methylene chloride	V	75-09-2	N/A		N/A		µg/L	0/1	0%	0.053 – 0.053	0.053	MDL	11		RSL	555	No	No	MDL ≤ SL
o-Xylene	V	95-47-6	N/A		N/A		µg/L	0/1	0%	0.075 – 0.075	0.075	MDL	19		RSL	63.3	No	No	MDL ≤ SL
Styrene	V	100-42-5	N/A		N/A		µg/L	0/1	0%	0.082 – 0.082	0.082	MDL	120		RSL	1210	No	No	MDL ≤ SL
Tetrachloroethene	V	127-18-4	N/A		N/A		µg/L	0/1	0%	0.083 – 0.083	0.083	MDL	4.1		RSL	7.25	No	No	MDL ≤ SL
Toluene	V	108-88-3	N/A		N/A		µg/L	0/1	0%	0.077 – 0.077	0.077	MDL	110		RSL	2390	No	No	MDL ≤ SL
trans-1,2-Dichloroethene	V	156-60-5	N/A		N/A		µg/L	0/1	0%	0.081 – 0.081	0.081	MDL	6.8		RSL	12.9	No	No	MDL ≤ SL
trans-1,3-Dichloropropene	V	10061-02-6	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.47	*	RSL	6.04	No	No	MDL ≤ SL
Trichloroethene	V	79-01-6	N/A		N/A		µg/L	0/1	0%	0.062 – 0.062	0.062	MDL	0.28		RSL	0.632	No	No	MDL ≤ SL
Trichlorofluoromethane	V	75-69-4	N/A		N/A		µg/L	0/1	0%	0.11 – 0.11	0.11	MDL	520		RSL	No SL	No	No	MDL ≤ SL
Vinyl chloride	V	75-01-4	N/A		N/A		µg/L	0/1	0%	0.07 – 0.07	0.07	MDL	0.019		RSL	0.164	No	See DSA	MDL > SL
Semi-Volatile Organic Compounds (SVOCs)																			
1,1'-Biphenyl	V	92-52-4	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.083		RSL	4.71	No	See DSA	MDL > SL
1,2,4,5-Tetrachlorobenzene	V	95-94-3	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.017		RSL	No SL	No	See DSA	MDL > SL
1-Methylnaphthalene	V	90-12-0	N/A		N/A		µg/L	0/1	0%	0.0055 – 0.0055	0.0055	MDL	1.1		RSL	No SL	No	No	MDL ≤ SL
2,3,4,6-Tetrachlorophenol		58-90-2	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	24		RSL	No SL	No	No	MDL ≤ SL
2,4,5-Trichlorophenol		95-95-4	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	120		RSL	No SL	No	No	MDL ≤ SL
2,4,6-Trichlorophenol		88-06-2	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	1.2		RSL	No SL	No	See DSA	MDL > SL
2,4-Dichlorophenol		120-83-2	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4.6		RSL	No SL	No	No	MDL ≤ SL
2,4-Dimethylphenol		105-67-9	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	36		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrophenol		51-28-5	N/A		N/A		µg/L	0/1	0%	0.98 – 0.98	0.98	MDL	3.9		RSL	No SL	No	No	MDL ≤ SL
2,4-Dinitrotoluene		121-14-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	0.24		RSL	No SL	No	See DSA	MDL > SL
2,6-Dinitrotoluene		606-20-2	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.049		RSL	No SL	No	See DSA	MDL > SL
2-Chloronaphthalene	V	91-58-7	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	75		RSL	No SL	No	No	MDL ≤ SL
2-Chlorophenol	V	95-57-8	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	9.1		RSL	No SL	No	No	MDL ≤ SL
2-Methylnaphthalene	V	91-57-6	N/A		N/A		µg/L	0/1	0%	0.0066 – 0.0066	0.0066	MDL	3.6		RSL	No SL	No	No	MDL ≤ SL
2-Methylphenol		95-48-7	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	93		RSL	No SL	No	No	MDL ≤ SL
2-Nitroaniline		88-74-4	N/A		N/A		µg/L	0/1	0%	3.4 – 3.4	3.4	MDL	19		RSL	No SL	No	No	MDL ≤ SL
2-Nitrophenol		88-75-5	N/A		N/A		µg/L	0/1	0%	2.7 – 2.7	2.7	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
3,3'-Dichlorobenzidine		91-94-1	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	0.13		RSL	No SL	No	See DSA	MDL > SL
3-Nitroaniline		99-09-2	N/A		N/A		µg/L	0/1	0%	0.67 – 0.67	0.67	MDL	19	*	RSL	No SL	No	No	MDL ≤ SL
4,6-Dinitro-o-cresol		534-52-1	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.15		RSL	No SL	No	See DSA	MDL > SL
4-Bromophenyl phenyl ether	V	101-55-3	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Chloro-3-methyl phenol		59-50-7	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	140		RSL	No SL	No	No	MDL ≤ SL
4-Chloroaniline		106-47-8	N/A		N/A		µg/L	0/1	0%	4.6 – 4.6	4.6	MDL	0.37		RSL	No SL	No	See DSA	MDL > SL
4-Chlorophenyl phenyl ether	V	7005-72-3	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	4	*	RSL	No SL	No	No	MDL ≤ SL
4-Methylphenol		106-44-5	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	37		RSL	No SL	No	No	MDL ≤ SL

Table A2-13
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0527)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0527

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
4-Nitroaniline		100-01-6	N/A		N/A		µg/L	0/1	0%	0.85 – 0.85	0.85	MDL	3.8		RSL	No SL	No	No	MDL ≤ SL
4-Nitrophenol		100-02-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.2	*	RSL	No SL	No	See DSA	MDL > SL
Acenaphthene	V	83-32-9	N/A		N/A		µg/L	0/1	0%	0.0061 – 0.0061	0.0061	MDL	53		RSL	No SL	No	No	MDL ≤ SL
Acenaphthylene	V	208-96-8	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	53	*	RSL	No SL	No	No	MDL ≤ SL
Acetophenone	V	98-86-2	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	190		RSL	No SL	No	No	MDL ≤ SL
Anthracene	V	120-12-7	N/A		N/A		µg/L	0/1	0%	0.011 – 0.011	0.011	MDL	180		RSL	No SL	No	No	MDL ≤ SL
Atrazine		1912-24-9	N/A		N/A		µg/L	0/1	0%	0.48 – 0.48	0.48	MDL	0.3		RSL	No SL	No	See DSA	MDL > SL
Benzaldehyde	V	100-52-7	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	19		RSL	No SL	No	No	MDL ≤ SL
Benzo(a)anthracene	V	56-55-3	N/A		N/A		µg/L	0/1	0%	0.0094 – 0.0094	0.0094	MDL	0.03		RSL	62.3	No	No	MDL ≤ SL
Benzo(a)pyrene		50-32-8	N/A		N/A		µg/L	0/1	0%	0.017 – 0.017	0.017	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Benzo(b)fluoranthene		205-99-2	N/A		N/A		µg/L	0/1	0%	0.0082 – 0.0082	0.0082	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Benzo(g,h,i)perylene	V	191-24-2	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	12	*	RSL	No SL	No	No	MDL ≤ SL
Benzo(k)fluoranthene		207-08-9	N/A		N/A		µg/L	0/1	0%	0.0041 – 0.0041	0.0041	MDL	2.5		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethoxy)methane		111-91-1	N/A		N/A		µg/L	0/1	0%	2.9 – 2.9	2.9	MDL	5.9		RSL	No SL	No	No	MDL ≤ SL
bis(2-Chloroethyl)ether	V	111-44-4	N/A		N/A		µg/L	0/1	0%	2.1 – 2.1	2.1	MDL	0.014		RSL	17	No	See DSA	MDL > SL
bis(2-Chloroisopropyl)ether	V	108-60-1	N/A		N/A		µg/L	0/1	0%	2.3 – 2.3	2.3	MDL	71		RSL	No SL	No	No	MDL ≤ SL
bis(2-Ethylhexyl)phthalate		117-81-7	N/A		N/A		µg/L	0/1	0%	0.82 – 0.82	0.82	MDL	5.6		RSL	No SL	No	No	MDL ≤ SL
Butyl benzyl phthalate		85-68-7	N/A		N/A		µg/L	0/1	0%	1.4 – 1.4	1.4	MDL	16		RSL	No SL	No	No	MDL ≤ SL
Caprolactam		105-60-2	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	990		RSL	No SL	No	No	MDL ≤ SL
Carbazole	V	86-74-8	N/A		N/A		µg/L	0/1	0%	3.2 – 3.2	3.2	MDL	29	*	RSL	No SL	No	No	MDL ≤ SL
Chrysene		218-01-9	N/A		N/A		µg/L	0/1	0%	0.0054 – 0.0054	0.0054	MDL	25		RSL	No SL	No	No	MDL ≤ SL
Dibenzo(a,h)anthracene		53-70-3	N/A		N/A		µg/L	0/1	0%	0.0059 – 0.0059	0.0059	MDL	0.025		RSL	No SL	No	No	MDL ≤ SL
Dibenzofuran	V	132-64-9	N/A		N/A		µg/L	0/1	0%	2.2 – 2.2	2.2	MDL	0.79		RSL	No SL	No	See DSA	MDL > SL
Diethyl phthalate		84-66-2	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	1500		RSL	No SL	No	No	MDL ≤ SL
Dimethyl phthalate		131-11-3	N/A		N/A		µg/L	0/1	0%	2 – 2	2	MDL	1500	*	RSL	No SL	No	No	MDL ≤ SL
Di-n-butyl phthalate		84-74-2	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	90		RSL	No SL	No	No	MDL ≤ SL
Di-n-octyl phthalate		117-84-0	N/A		N/A		µg/L	0/1	0%	0.64 – 0.64	0.64	MDL	20		RSL	No SL	No	No	MDL ≤ SL
Fluoranthene		206-44-0	N/A		N/A		µg/L	0/1	0%	0.012 – 0.012	0.012	MDL	80		RSL	No SL	No	No	MDL ≤ SL
Fluorene	V	86-73-7	N/A		N/A		µg/L	0/1	0%	0.0072 – 0.0072	0.0072	MDL	29		RSL	No SL	No	No	MDL ≤ SL
Hexachlorobenzene	V	118-74-1	N/A		N/A		µg/L	0/1	0%	1.9 – 1.9	1.9	MDL	0.0098		RSL	0.133	See DSA	See DSA	MDL > SL
Hexachlorobutadiene	V	87-68-3	N/A		N/A		µg/L	0/1	0%	1.7 – 1.7	1.7	MDL	0.14		RSL	0.414	See DSA	See DSA	MDL > SL
Hexachlorocyclopentadiene	V	77-47-4	N/A		N/A		µg/L	0/1	0%	1.6 – 1.6	1.6	MDL	0.041		RSL	0.0786	See DSA	See DSA	MDL > SL
Hexachloroethane	V	67-72-1	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	0.33		RSL	2.29	See DSA	See DSA	MDL > SL
Indeno(1,2,3-cd)pyrene		193-39-5	N/A		N/A		µg/L	0/1	0%	0.0069 – 0.0069	0.0069	MDL	0.25		RSL	No SL	No	No	MDL ≤ SL
Isophorone		78-59-1	N/A		N/A		µg/L	0/1	0%	1.8 – 1.8	1.8	MDL	78		RSL	No SL	No	No	MDL ≤ SL
Naphthalene	V	91-20-3	N/A		N/A		µg/L	0/1	0%	0.0077 – 0.0077	0.0077	MDL	0.12		RSL	6.29	No	No	MDL ≤ SL
Nitrobenzene	V	98-95-3	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	0.14		RSL	99.3	No	See DSA	MDL > SL
N-Nitroso-di-n-propylamine		621-64-7	N/A		N/A		µg/L	0/1	0%	2.4 – 2.4	2.4	MDL	0.011		RSL	No SL	No	See DSA	MDL > SL
N-Nitrosodiphenylamine		86-30-6	N/A		N/A		µg/L	0/1	0%	3.6 – 3.6	3.6	MDL	12		RSL	No SL	No	No	MDL ≤ SL
Pentachlorophenol		87-86-5	N/A		N/A		µg/L	0/1	0%	0.024 – 0.024	0.024	MDL	0.041		RSL	No SL	No	No	MDL ≤ SL
Phenanthrene	V	85-01-8	N/A		N/A		µg/L	0/1	0%	0.0087 – 0.0087	0.0087	MDL	180	*	RSL	No SL	No	No	MDL ≤ SL

Table A2-13
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0527)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe: Current and Future
Medium: Groundwater (Drinking Water)
Well: 0527

Chemical [1]		CASRN	Minimum Detected Concentration		Maximum Detected Concentration		Units	Detection Frequency		Range of Method Detection Limits	Screening Concentration		Screening Level [2, 3, 5, 6]		Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion
Phenol		108-95-2	N/A		N/A		µg/L	0/1	0%	2.5 – 2.5	2.5	MDL	580		RSL	No SL	No	No	MDL ≤ SL
Pyrene	V	129-00-0	N/A		N/A		µg/L	0/1	0%	0.014 – 0.014	0.014	MDL	12		RSL	No SL	No	No	MDL ≤ SL
DIOX																			
Total PCDD/F TEQ (Mammal)	V	TEQ-M-DF	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
PCB																			
Total PCB TEQ (Mammal)	V	TEQ-M-PCB	N/A		N/A		µg/L	0/1	0%	N/A	N/A	--	0.00000012	*	RSL	3.61E-05	No	No	No values for dioxin TEQ
Total PCB Congener	V	TPCB_CON	0.000071	J	0.000071	J	µg/L	1/1	100%	N/A	0.000071	MDC	0.044	*	RSL	1.65	No	No	MDC < SL
Perfluorinated Compounds																			
Perfluorononanoic acid (PFNA)		375-95-1	N/A		N/A		µg/L	0/1	0%	0.0018 – 0.0018	0.0018	MDL	0.0059		RSL	No SL	No	No	MDL ≤ SL
Perfluorohexanesulfonic acid (PFHxS)		355-46-4	0.0017	J	0.0017	J	µg/L	1/1	100%	0.0018 – 0.0018	0.0017	MDC	0.039		RSL	No SL	No	No	MDC < SL
Perfluorobutanesulfonic acid (PFBS)		375-73-5	0.012		0.012		µg/L	1/1	100%	0.00037 – 0.00037	0.012	MDC	0.6		RSL	No SL	No	No	MDC < SL
Perfluorooctanesulfonic acid (PFOS)		1763-23-1	0.065		0.065		µg/L	1/1	100%	0.0018 – 0.0018	0.065	MDC	0.004		RSL	No SL	No	Yes	MDC ≥ SL
Perfluorooctanoic acid (PFOA)		335-67-1	0.0047		0.0047		µg/L	1/1	100%	0.00037 – 0.00037	0.0047	MDC	0.006		RSL	No SL	No	No	MDC < SL
Total Metals																			
Aluminum		7429-90-5	100		100		µg/L	1/1	100%	4 – 4	100	MDC	2000		RSL	No SL	No	No	MDC < SL
Antimony		7440-36-0	N/A		N/A		µg/L	0/1	0%	0.32 – 0.32	0.32	MDL	0.78		RSL	No SL	No	No	MDL ≤ SL
Arsenic		7440-38-2	N/A		N/A		µg/L	0/1	0%	0.33 – 0.33	0.33	MDL	0.052		RSL	No SL	No	See DSA	MDL > SL
Barium		7440-39-3	130		130		µg/L	1/1	100%	1.9 – 1.9	130	MDC	380		RSL	No SL	No	No	MDC < SL
Beryllium		7440-41-7	0.33	J	0.33	J	µg/L	1/1	100%	0.17 – 0.17	0.33	MDC	2.5		RSL	No SL	No	No	MDC < SL
Cadmium		7440-43-9	N/A		N/A		µg/L	0/1	0%	0.14 – 0.14	0.14	MDL	0.18		RSL	No SL	No	No	MDL ≤ SL
Calcium		7440-70-2	12000		12000		µg/L	1/1	100%	120 – 120	12000	MDC	Nutrient		N/A	Nutrient	No	No	Classified as an essential nutrient
Chromium, Total		7440-47-3	0.5	J	0.5	J	µg/L	1/1	100%	0.32 – 0.32	0.5	MDC	2200	*	RSL	No SL	No	No	MDC < SL
Chromium, Hexavalent		18540-29-9	N/A		N/A		µg/L	0/1	0%	1 – 1	1	MDL	0.035		RSL	No SL	No	See DSA	MDL > SL
Cobalt		7440-48-4	4.4		4.4		µg/L	1/1	100%	0.19 – 0.19	4.4	MDC	0.6		RSL	No SL	No	Yes	MDC ≥ SL
Copper		7440-50-8	7.7		7.7		µg/L	1/1	100%	0.4 – 0.4	7.7	MDC	80		RSL	No SL	No	No	MDC < SL
Iron		7439-89-6	290		290		µg/L	1/1	100%	54 – 54	290	MDC	1400		RSL	No SL	No	No	MDC < SL
Lead		7439-92-1	0.55	J	0.55	J	µg/L	1/1	100%	0.21 – 0.21	0.55	MDC	15		RSL	No SL	No	No	MDC < SL
Manganese		7439-96-5	56	J+	56	J+	µg/L	1/1	100%	0.17 – 0.17	56	MDC	43		RSL	No SL	No	Yes	MDC ≥ SL
Mercury		7439-97-6	N/A		N/A		µg/L	0/1	0%	0.06 – 0.06	0.06	MDL	0.2	*	RSL	No SL	No	No	MDL ≤ SL
Nickel		7440-02-0	3.2		3.2		µg/L	1/1	100%	0.2 – 0.2	3.2	MDC	39		RSL	No SL	No	No	MDC < SL
Selenium		7782-49-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	10		RSL	No SL	No	No	MDL ≤ SL
Silver		7440-22-4	N/A		N/A		µg/L	0/1	0%	0.18 – 0.18	0.18	MDL	9.4		RSL	No SL	No	No	MDL ≤ SL
Thallium		7440-28-0	N/A		N/A		µg/L	0/1	0%	0.23 – 0.23	0.23	MDL	0.02		RSL	No SL	No	See DSA	MDL > SL
Vanadium		7440-62-2	N/A		N/A		µg/L	0/1	0%	1.2 – 1.2	1.2	MDL	8.6		RSL	No SL	No	No	MDL ≤ SL
Zinc		7440-66-6	22		22		µg/L	1/1	100%	1.6 – 1.6	22	MDC	600		RSL	No SL	No	No	MDC < SL
Total Cyanide																			
Cyanide	V	57-12-5	N/A		N/A		µg/L	0/1	0%	2.6 – 2.6	2.6	MDL	0.15		RSL	20.1	No	See DSA	MDL > SL

Notes:
% = Percent
AL = Action Level

Table A2-13
Occurrence, Distribution, and Selection of Constituents of Interest (Direct Contact – OU2; Groundwater, Well 0527)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current and Future
Medium:	Groundwater (Drinking Water)
Well:	0527

Chemical [1]	CASRN	Minimum Detected Concentration	Maximum Detected Concentration	Units	Detection Frequency	Range of Method Detection Limits	Screening Concentration	Screening Level [2, 3, 5, 6]	Source	VISL [4]	Exceed VISL?	COPC Flag (Yes/No)	Rationale for Selection/Deletion

CASRN = Chemical Abstracts Service Registry Number
COPC = Chemical of Potential Concern
DSA = Data Sensitivity Analysis
HAL = Health Advisory Level
J = Indicates an estimated value
J+ = The result is an estimated quantity, but the result may be biased high.
MCL = Maximum Contaminant Level
MDC = Maximum Detected Concentration
N/A = Not Applicable
ND = Non-Detect or Not Detected
"PFOA and PFOS Combined" = Combined total of the detected concentrations of PFOA and PFOS (non-detect results were not included in the summation).
RL = Reporting Limit
RSL = Regional Screening Level
µg/L = micrograms per liter
USEPA = United States Environmental Protection Agency
(1) "V" indicates that the chemical is volatile.
(2) Groundwater data screened against USEPA Tap Water RSLs, last updated May 2022 (TR = 1E-6, THQ = 0.1).
(3) An asterisk,"*", indicates surrogate toxicity information was used to derive a Screening Level (see Table A2-14).
(4) Groundwater data screened against USEPA Residential Groundwater VISLs, last updated May 2022 (TR = 1E-6, THQ = 0.1). Site-specific, system temperature was set to 20.5 Celsius (average of recorded temperatures taken in field).
(6) Lead is compared to the EPA tap water RSL of 15 µg/L, which represents the 90th percentile concentration of lead found in tap water samples collected nationwide (Lead and Copper Rule, 56 Federal Register 26460-26564, dated June 7, 1991) and is not a risk-based number, but rather an action level.

Table A2-14
Surrogate Toxicity Used within Human Health Risk Assessment
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Chemical	CASRN	Surrogate	CASRN
1,1-Dichloropropene	563-58-6	1,3-Dichloropropene	542-75-6
1,3-Dichlorobenzene	541-73-1	1,2-Dichlorobenzene	95-50-1
1-Chlorohexane	544-10-5	Chlorobenzene	108-90-7
2,2-Dichloropropane	594-20-7	1,2-Dichloropropane	78-87-5
4-Isopropyltoluene	99-87-6	Cumene	98-82-8
cis-1,3-Dichloropropene	10061-01-5	1,3-Dichloropropene	542-75-6
m,p-Xylene	179601-23-1	m-Xylene	108-38-3
Methylcyclohexane	108-87-2	Cyclohexane	110-82-7
trans-1,3-Dichloropropene	10061-02-6	1,3-Dichloropropene	542-75-6
2-Nitrophenol	88-75-5	2-Amino-4,6-dinitrophenol	96-91-3
3&4-Methylphenol	108-39-4/106-44	3-Methylphenol	108-39-4
3-Nitroaniline	99-09-2	2-Nitroaniline	88-74-4
4-Bromophenyl phenyl ether	101-55-3	Pentabromodiphenyl ether	32534-81-9
4-Chlorophenyl phenyl ether	7005-72-3	Pentabromodiphenyl ether	32534-81-9
4-Nitrophenol	100-02-7	2-Amino-4,6-dinitrophenol	96-91-3
Acenaphthylene	208-96-8	Acenaphthene	83-32-9
Benzo(g,h,i)perylene	191-24-2	Pyrene	129-00-0
Carbazole	86-74-8	Fluorene	86-73-7
Dimethyl phthalate	131-11-3	Diethyl phthalate	84-66-2
Phenanthrene	85-01-8	Anthracene	120-12-7
Total PCDD/F TEQ (Mammal)	TEQ-M-DF	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6
Total PCB TEQ (Mammal)	TEQ-M-PCB	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6
Total PCB Congener	TPCB_CON	Polychlorinated Biphenyls (low risk)	1336-36-3L
Chromium, Total	7440-47-3	Chromium, Trivalent	16065-83-1
Mercury	7439-97-6	Methyl Mercury	22967-92-6

Notes:
PCB = Polychlorinated Biphenyls
PCDD = Polychlorinated Dibenzodioxins
CASRN = Chemical Abstracts Service Registry Number
TEQ = Toxicity Equivalence Factor

Attachment 3

Human Health Exposure Assessment Calculations

Table A3-1
Exposure Point Concentration Summary (Groundwater)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

COPC	Units	Detection Frequency	Minimum Concentration	Maximum Concentration	Exposure Point Concentration [1]		
					Value	Units	Statistic
Groundwater - Direct Contact (DC)							
Well 0124							
Perfluorooctanesulfonic acid (PFOS)	mg/L	1/1	0.000011	0.000011	0.000011	mg/L	Max
Barium	mg/L	1/1	0.48	0.48	0.48	mg/L	Max
Cobalt	mg/L	1/1	0.03	0.03	0.03	mg/L	Max
Copper	mg/L	1/1	0.25	0.25	0.25	mg/L	Max
Manganese	mg/L	1/1	0.19	0.19	0.19	mg/L	Max
Cyanide	mg/L	1/1	0.0046	0.0046	0.0046	mg/L	Max
Well 0155							
Arsenic	mg/L	1/1	0.00038	0.00038	0.00038	mg/L	Max
Barium	mg/L	1/1	1.1	1.1	1.1	mg/L	Max
Cadmium	mg/L	1/1	0.00033	0.00033	0.00033	mg/L	Max
Cobalt	mg/L	1/1	0.015	0.015	0.015	mg/L	Max
Copper	mg/L	1/1	0.14	0.14	0.14	mg/L	Max
Lead	mg/L	1/1	0.023	0.023	0.023	mg/L	Max
Manganese	mg/L	1/1	0.12	0.12	0.12	mg/L	Max
Cyanide	mg/L	1/1	0.0048	0.0048	0.0048	mg/L	Max
Well 0170							
Chloroform	mg/L	1/1	0.0014	0.0014	0.0014	mg/L	Max
Perfluorooctanesulfonic acid (PFOS)	mg/L	1/1	0.00026	0.00026	0.00026	mg/L	Max
Perfluorooctanoic acid (PFOA)	mg/L	1/1	0.000015	0.000015	0.000015	mg/L	Max
Chromium, Hexavalent	mg/L	1/1	0.00587	0.00587	0.00587	mg/L	Max
Cobalt	mg/L	1/1	0.0065	0.0065	0.0065	mg/L	Max
Nickel	mg/L	1/1	0.053	0.053	0.053	mg/L	Max
Well 0173							
Perfluorooctanesulfonic acid (PFOS)	mg/L	1/1	0.000024	0.000024	0.000024	mg/L	Max
Barium	mg/L	1/1	0.43	0.43	0.43	mg/L	Max
Cobalt	mg/L	1/1	0.022	0.022	0.022	mg/L	Max
Manganese	mg/L	1/1	0.22	0.22	0.22	mg/L	Max
Cyanide	mg/L	1/1	0.0095	0.0095	0.0095	mg/L	Max
Well 0176							
Barium	mg/L	1/1	0.42	0.42	0.42	mg/L	Max
Cadmium	mg/L	1/1	0.0002	0.0002	0.0002	mg/L	Max
Cobalt	mg/L	1/1	0.014	0.014	0.014	mg/L	Max
Lead	mg/L	1/1	0.015	0.015	0.015	mg/L	Max
Manganese	mg/L	1/1	0.16	0.16	0.16	mg/L	Max
Cyanide	mg/L	1/1	0.009	0.009	0.009	mg/L	Max
Well 0182							
Perfluorooctanesulfonic acid (PFOS)	mg/L	1/1	0.00022	0.00022	0.00022	mg/L	Max
Perfluorooctanoic acid (PFOA)	mg/L	1/1	0.000013	0.000013	0.000013	mg/L	Max
Cobalt	mg/L	1/1	0.025	0.025	0.025	mg/L	Max
Manganese	mg/L	1/1	0.38	0.38	0.38	mg/L	Max
Cyanide	mg/L	1/1	0.0036	0.0036	0.0036	mg/L	Max
Well 0197							
Chloroform	mg/L	1/1	0.00051	0.00051	0.00051	mg/L	Max

Table A3-1
Exposure Point Concentration Summary (Groundwater)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

COPC	Units	Detection Frequency	Minimum Concentration	Maximum Concentration	Exposure Point Concentration [1]		
					Value	Units	Statistic
Perfluorooctanesulfonic acid (PFOS)	mg/L	1/1	0.00015	0.00015	0.00015	mg/L	Max
Perfluorooctanoic acid (PFOA)	mg/L	1/1	0.000016	0.000016	0.000016	mg/L	Max
Cadmium	mg/L	1/1	0.00033	0.00033	0.00033	mg/L	Max
Cobalt	mg/L	1/1	0.013	0.013	0.013	mg/L	Max
Manganese	mg/L	1/1	0.18	0.18	0.18	mg/L	Max
Cyanide	mg/L	1/1	0.0032	0.0032	0.0032	mg/L	Max
Well 0212							
Chloroform	mg/L	1/1	0.00028	0.00028	0.00028	mg/L	Max
Perfluorooctanesulfonic acid (PFOS)	mg/L	1/1	0.000057	0.000057	0.000057	mg/L	Max
Perfluorooctanoic acid (PFOA)	mg/L	1/1	0.000011	0.000011	0.000011	mg/L	Max
Cobalt	mg/L	1/1	0.0016	0.0016	0.0016	mg/L	Max
Copper	mg/L	1/1	0.29	0.29	0.29	mg/L	Max
Lead	mg/L	1/1	0.016	0.016	0.016	mg/L	Max
Well 0275							
Perfluorooctanesulfonic acid (PFOS)	mg/L	1/1	0.00006	0.00006	0.00006	mg/L	Max
Perfluorooctanoic acid (PFOA)	mg/L	1/1	0.0000074	0.0000074	7.4E-06	mg/L	Max
Cadmium	mg/L	1/1	0.0002	0.0002	0.0002	mg/L	Max
Cobalt	mg/L	1/1	0.0018	0.0018	0.0018	mg/L	Max
Iron	mg/L	1/1	2.9	2.9	2.9	mg/L	Max
Manganese	mg/L	1/1	0.056	0.056	0.056	mg/L	Max
Well 0500							
Barium	mg/L	1/1	0.69	0.69	0.69	mg/L	Max
Beryllium	mg/L	1/1	0.0036	0.0036	0.0036	mg/L	Max
Cadmium	mg/L	1/1	0.00044	0.00044	0.00044	mg/L	Max
Cobalt	mg/L	1/1	0.026	0.026	0.026	mg/L	Max
Manganese	mg/L	1/1	0.18	0.18	0.18	mg/L	Max
Well 0501							
Chloroform	mg/L	1/1	0.00096	0.00096	0.00096	mg/L	Max
Perfluorooctanesulfonic acid (PFOS)	mg/L	1/1	0.00013	0.00013	0.00013	mg/L	Max
Perfluorooctanoic acid (PFOA)	mg/L	1/1	0.000017	0.000017	0.000017	mg/L	Max
Cobalt	mg/L	1/1	0.016	0.016	0.016	mg/L	Max
Manganese	mg/L	1/1	0.26	0.26	0.26	mg/L	Max
Well 0510							
Barium	mg/L	1/1	1.3	1.3	1.3	mg/L	Max
Cadmium	mg/L	1/1	0.00039	0.00039	0.00039	mg/L	Max
Cobalt	mg/L	1/1	0.02	0.02	0.02	mg/L	Max
Copper	mg/L	1/1	0.1	0.1	0.1	mg/L	Max
Manganese	mg/L	1/1	0.14	0.14	0.14	mg/L	Max
Cyanide	mg/L	1/1	0.011	0.011	0.011	mg/L	Max
Well 0527							
Perfluorooctanesulfonic acid (PFOS)	mg/L	1/1	0.000065	0.000065	0.000065	mg/L	Max
Cobalt	mg/L	1/1	0.0044	0.0044	0.0044	mg/L	Max
Manganese	mg/L	1/1	0.056	0.056	0.056	mg/L	Max

Notes:

Table A3-1
Exposure Point Concentration Summary (Groundwater)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

COPC	Units	Detection Frequency	Minimum Concentration	Maximum Concentration	Exposure Point Concentration [1]		
					Value	Units	Statistic

-- = Not Evaluated
mg/L = milligram per liter
COPC = Chemical of Potential Concern

(1) Data set too small to calculate meaningful statistics. Therefore, maximum concentration was used for exposure point concentration.

Table A3-2
Exposure Point Concentration Summary (Vapor Intrusion – Groundwater)
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

COPC	Units	Detection Frequency [1]	Minimum Concentration	Maximum Concentration	Exposure Point Concentration [1,2]		
					Value	Units	Statistic
Groundwater - Vapor Intrusion (VI) - Well 0170							
Chloroform	µg/L	1/1	1.4	1.4	0.176	µg/m3	Max

Notes:
-- = Not Evaluated
COPC = Chemical of Potential Concern
µg/m3 = micrograms per cubic meter
µg/L = microgram per liter

(1) Data set too small to calculate meaningful statistics. Therefore, maximum concentration was used for exposure point concentration.
(2) The maximum concentration was used to estimate an indoor air concentration using the USEPA Vapor Intrusion Screening Level (VISL) Calculator (see Table A3-3). A site-specific system temperature of 20.5 Celsius was used.

Table A3-3
Residential VISL Model Input Values for Vapor Intrusion from Groundwater
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Variable	Resident Air Default Value	Form-input Value
AF_{gw} (Attenuation Factor Groundwater) unitless	0.001	0.001
AF_{ss} (Attenuation Factor Sub-Slab) unitless	0.03	0.03
ED_{res} (exposure duration) years	26	26
ED_{0-2} (mutagenic exposure duration first phase) years	2	2
ED_{2-6} (mutagenic exposure duration second phase) years	4	4
ED_{6-16} (mutagenic exposure duration third phase) years	10	10
ED_{16-26} (mutagenic exposure duration fourth phase) years	10	10
EF_{res} (exposure frequency) days/year	350	350
EF_{0-2} (mutagenic exposure frequency first phase) days/year	350	350
EF_{2-6} (mutagenic exposure frequency second phase) days/year	350	350
EF_{6-16} (mutagenic exposure frequency third phase) days/year	350	350
EF_{16-26} (mutagenic exposure frequency fourth phase) days/year	350	350
ET_{res} (exposure time) hours/day	24	24
ET_{0-2} (mutagenic exposure time first phase) hours/day	24	24
ET_{2-6} (mutagenic exposure time second phase) hours/day	24	24
ET_{6-16} (mutagenic exposure time third phase) hours/day	24	24
ET_{16-26} (mutagenic exposure time fourth phase) hours/day	24	24
THQ (target hazard quotient) unitless	0.1	0.1
LT (lifetime) years	70	70
TR (target risk) unitless	0.000001	0.000001

Table A3-3
Residential VISL Model Input Values for Vapor Intrusion from Groundwater
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Resident Vapor Intrusion Screening Levels (VISL)

Chemical	CAS Number	Does the chemical meet the definition for volatility? (HLC>1E-5 or VP>1)	Does the chemical have inhalation toxicity data? (IUR and/or RfC)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source? (Cvp > Ci,a,Target?)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source? (Chc > Ci,a,Target?)	Target Indoor Air Concentration (TCR=1E-06 or THQ=0.1) MIN(Cia,c,Cia,nc) (µg/m3)	Toxicity Basis	Target Sub-Slab and Near-source Soil Gas Concentration (TCR=1E-06 or THQ=0.1) Csg,Target (µg/m3)
Chloroform	67-66-3	Yes	Yes	Yes	Yes	1.22E-01	Cancer	4.07E+00

Table A3-3
Residential VISL Model Input Values for Vapor Intrusion from Groundwater
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Resident Vapor Intrusion Screening Levels (VISL)

Chemical	Target Groundwater Concentration (TCR=1E-06 or THQ=0.1) Cgw,Target (µg/L)	Is Target Groundwater Concentration < MCL? (Cgw < MCL?)	Pure Phase Vapor Concentration Cvp (25 ℃) (µg/m3)	Maximum Groundwater Vapor Concentration Chc (µg/m3)	Temperature for Maximum Groundwater Vapor Concentration (℃)	Lower Explosive Limit LEL (% by volume)	LEL Ref	IUR (ug/m3)-1	IUR Ref	RfC (mg/m3)
Chloroform	9.72E-01	Yes (80)	1.26E+09	9.99E+08	2.05E+01	-		2.30E-05	IRIS	9.77E-02

Table A3-3
Residential VISL Model Input Values for Vapor Intrusion from Groundwater
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Resident Vapor Intrusion Screening Levels (VISL)

Chemical	RfC Ref	Mutagenic Indicator	Carcinogenic VISL TCR=1E-06 Cia,c(µg/m3)	Noncarcinogenic VISL THQ=0.1 Cia,nc(µg/m3)
Chloroform	ATSDR	No	1.22E-01	1.02E+01

Table A3-3
Residential VISL Model Input Values for Vapor Intrusion from Groundwater
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Resident Vapor Intrusion Risk

Chemical	CAS Number	Site Groundwater Concentration Cgw (µg/L)	Site Indoor Air Concentration Ci,a (µg/m3)	VI Carcinogenic Risk CDI (µg/m3)	VI Carcinogenic Risk CR	VI Hazard CDI (mg/m3)	VI Hazard HQ	IUR (ug/m3)-1	IUR Ref
Chloroform	67-66-3	1.40E+00	1.76E-01	6.26E-02	1.44E-06	1.69E-04	1.73E-03	2.30E-05	U
**Sum*		-	-	-	*1.44E-06*	-	*1.73E-03*	-	

Table A3-3
Residential VISL Model Input Values for Vapor Intrusion from Groundwater
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Resident Vapor Intrusion Risk

Chemical	Chronic RfC (mg/m3)	RfC Ref	Temperature (°C) for Groundwater Vapor Concentration	Mutagen?
Chloroform	9.77E-02	U	2.05E+01	No
**Sum*	-		-	

Table A3-3
Residential VISL Model Input Values for Vapor Intrusion from Groundwater
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Chemical Properties

Chemical	CAS Number	Does the chemical meet the definition for volatility? (HLC>1E-5 or VP>1)	Does the chemical have inhalation toxicity data? (IUR and/or RfC)	MW	MW Ref	S (mg/L)	S Ref	MCL (ug/L)	HLC (atm-m^3/mole)	Henry's Law Constant (unitless)
Chloroform	67-66-3	Yes	Yes	1.19E+02	PHYSPRO	7.95E+03	PHYSPRO	8.00E+01	3.67E-03	1.50E-01

Table A3-3
Residential VISL Model Input Values for Vapor Intrusion from Groundwater
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Chemical Properties

Chemical	Henry's Law Constant (20.5 ℃) (unitless)	Henry's Law Constant Used in Calcs (unitless)	H` and HLC Ref	Enthalpy of vaporization @ groundwater temperature $\Delta H_{v,gw}$ (cal/mol)	Enthalpy of vaporization at the normal boiling point ΔHv,b (cal/mol)	$\Delta H_{v,b}$ Ref	Normal Boiling Point BP (K)	BP Ref	Exponent for $\Delta H_{v,gw}$
Chloroform	1.26E-01	1.26E-01	PHYSPROP	7.45E+03	6.99E+03	CRC	3.34E+02	PHYSPROP	3.45E-01

Table A3-3
Residential VISL Model Input Values for Vapor Intrusion from Groundwater
Reasonable Maximum Exposure
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Chemical Properties

Chemical	Vapor Pressure VP (mm Hg)	VP Ref	Vapor Pressure VP (20.5 ℃) (mm Hg)	Critical Temperature T_C (K)	T_C Ref	Lower Explosive Limit LEL (% by volume)	LEL Ref
Chloroform	1.97E+02	PHYSPROP	1.62E+02	5.36E+02	CRC	-	

Attachment 4

Environmental Transport and Fate Models

Environmental Transport and Fate Models

Environmental transport and fate models are needed when data for chemical concentrations in certain exposure media and/or at certain exposure locations are not available. A transport and fate model may be a simple cross-media transfer calculation (e.g., volatilization from groundwater) or complex mathematical simulation. This appendix describes the methods and models for evaluating:

1) Permeability of inorganics and organics in water
    a) Risk Assessment Guidance for Superfund (RAGS) Part D dermal worksheet for groundwater (**Table A4-3** [Reasonable Maximum Exposure (RME)])
2) Volatilization of organics from groundwater
    a) Modeled groundwater to vapor concentrations while showering (**Table A4-4**)

Modeling the environmental transport and fate of chemicals requires the use of simplified assumptions to simulate the environment. In reality, migration, dispersion, uptake, and degradation of chemicals in environmental media involve many complex processes that are not always accurately represented in models. Although the use of models does introduce a source of uncertainty into the overall risk calculations, despite their shortcomings, models are useful tools for developing a general understanding of chemical movement in the environment, which allows the quantitative evaluation of some exposure pathways that would otherwise be limited to a qualitative or descriptive evaluation. The uncertainties associated with modeling environmental transport and fate is discussed in the uncertainty analysis in the human health risk assessment (HHRA) section.

Steady-State Concentrations from Dermal Absorption of Water

EPA's *RAGS Part E, Supplement Guidance for Dermal Risk Assessment* (EPA, 2004) provides a mathematical model to estimate chemical absorption from water through the skin of the receptor. Dermal absorption of the groundwater is addressed for the resident.

The skin is assumed to be composed of two main layers, the stratum corneum and the viable epidermis, with the stratum corneum as the main barrier to absorption. A two-compartment distributed model was developed to describe the absorption of chemicals from water through the skin as a function of both the thickness of the stratum corneum and the event duration (EPA, 2004).

The mathematical representation of the mass balance equation follows Fick's second law (as described in EPA's RAGS Part E guidance) and is a partial differential equation with concentration as a function of both time and distance. The exact solution of this model is approximated by two algebraic equations for organics:

- DA-Event 1: describes the absorption process when the chemical is only in the stratum corneum, i.e., non-steady state, where absorption is a function of t-event$^{1/2}$
- DA-Event 2: describes the absorption process as a function of lag time (Tau-event) once steady state is reached. One fundamental assumption is that absorption continues long after the exposure has ended, i.e., the final absorbed dose (DA_{event}) is estimated to be the total dose dissolved in the skin at the end of the exposure (EPA, 2004).

The DA-event equation for inorganics is solely based on the function of t-event. The DA-event equations for organics and inorganics are documented in **Table A4-3** using RAGS Part D Dermal Worksheet format for the RME groundwater.

For highly lipophilic chemicals or for chemicals that are not highly lipophilic but exhibit a long lag time (Tau-event), some of the chemical dissolved into the skin may be lost due to desquamation (skin peeling) during that absorption period. A fraction absorbed term (FA) is included in the evaluation of DA_{event} to account for this loss of chemical due to desquamation. For normal desquamation rates to completely replace the stratum corneum in about 14 days, only chemicals with log $K_{ow} > 3.5$ or chemicals with t-event > 10 hours (at any log K_{ow}) would be affected by this loss (EPA, 2004).

Volatilization of Organics from Groundwater

Vapor Concentrations while Showering

Modeled vapors in the shower due to volatilization from groundwater were estimated using the Foster-Chrostowski model (Foster, S.A. and P.C. Chrostowski, June 1987 and 2003). Although volatiles may gain access to ambient air from most typical household uses of groundwater, showering produces higher concentrations because the warm water temperature facilitates volatilization, and the volatilized chemicals and the receptor are confined in a relatively small space. Chemical-specific parameters for the model (e.g., molecular weight, Henry's Law Constant) were taken from EPA sources such as EPA's Regional Screening Level table (EPA, 2022a).

Table A4-4 presents the Foster-Chrostowski step-by-step equations used to estimate shower vapor concentrations.

Groundwater to Indoor Air (Vapor Intrusion)

Onsite groundwater was screened against EPA's groundwater vapor intrusion screening levels (VISLs) using EPA's on-line calculator (EPA, 2022b). VISLs were calculated using a residential scenario, a target risk of 1×10^{-6}, a target hazard quotient of 0.1, and a site-specific average groundwater temperature of 20.5 ^{o}C (68.9 ^{o}F). The site-specific temperature was generated by averaging the temperatures recorded in the field during sampling.

Volatile groundwater chemicals that exceeded the residential VISLs were carried forward as COPCs. VISL was used to estimate indoor air concentrations for the commercial/industrial worker and hypothetical resident scenarios. The VISL model output is provided in **Table A3-3**.

REFERENCES

EPA, 2004. *Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final*. Office of Superfund Remediation and Technology Innovation, EPA/540/R/99/005, OSWER 9285.7-02EP, July 2004.

EPA, 2011. *Exposure Factors Handbook: 2011 Edition*, National Center for Environmental Assessment, Office of Research and Development. EPA/600/R-09/052F, September 2011.

EPA, 2022a. User's Guide and Regional Screening Levels Tables Dated May 2022. http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/usersguide.htm.

EPA, 2022b. Vapor Intrusion Screening Level (VISL) On-Line Calculator. May 2022. http://www.epa.gov/oswer/vaporintrusion/guidance.html#Item6

Foster, S.A. and P.C. Chrostowski, 1987. "Inhalation Exposures to Volatile Organic Contaminants in the Shower." Presentation at the 80th Annual Meeting of the Air Pollution Control Association.

Foster and Chrostowski, 2003. Integrated Human Exposure Model, Version 2 (IHEM2) for Volatile Organic Compounds. Prepared for Syracuse Research Corporation/EPA under EPA Grant No. CR-8310921-0. December 26, 2003.

Table A4-1
Values Used for Daily Intake and Dermally Absorbed Dose Calculations
Reasonable Maximum Exposure: Incidental Ingestion and Dermal Absorption of Groundwater
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Groundwater (Drinking Water)

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake and Dermally Absorbed Dose Equations/ Model Name
Ingestion	On-Site Resident (Current/Future)	Adult	Ingestion of Groundwater (Potable Use)						Non-Mutagenic Constituents
				DI	Daily Intake	Calculated	mg/kg-day	See equations	Daily Intake (mg/kg-day) for carcinogens (adult) = $\frac{CGW \times IRGWa \times EF \times FI\text{-}GW \times EDa}{BWa \times ATc}$
				CGW	Exposure Point Concentration, groundwater	Site-Specific	mg/L	-	
				IRGWa	Ingestion Rate, groundwater - adult	2.5	L/day	USEPA, 2014 (USEPA, 2011; Table 3-33; 90th percentile of consumer-only ingestion of drinking water (≥ 21 years))	Daily Intake (mg/kg-day) for noncarcinogens (adult) = $\frac{CGW \times IRGWa \times EF \times FI\text{-}GW \times EDa}{BWa \times ATnc,a}$
				FI-GW	Fraction Ingested from Source, groundwater	1	unitless	USEPA, 1989 (Default of 1 (100%) is assumed)	
				EF	Exposure Frequency	350	days/year	USEPA, 2014 (USEPA, 1991; pg 15)	
				EDa	Exposure Duration, adult	20	years	USEPA, 2014 (EDr (26 years) - EDc (6 years))	
				BWa	Body Weight, adult	80	kg	USEPA, 2014 (USEPA, 2011; Tables 8-3; weighted mean values adults 21-78)	Daily Intake for carcinogens (lifetime) (mg/kg-day) = [DI for carcinogens (adult) + DI for carcinogens (child)]
				ATc	Averaging Time, carcinogens	25550	days	USEPA, 1989 (ED (70 years) x 365 days/year)	
				ATnc,a	Averaging Time, noncarcinogens - adult	7300	days	USEPA, 1989 (ED x 365 days/year)	
Ingestion	On-Site Resident (Current/Future)	Child	Ingestion of Groundwater (Potable Use)						Non-Mutagenic Constituents
				DI	Daily Intake	Calculated	mg/kg-day	See equations	Daily Intake (mg/kg-day) for carcinogens (child) = $\frac{CGW \times IRGWc \times EF \times FI\text{-}GW \times EDc}{BWc \times ATc}$
				CGW	Exposure Point Concentration, groundwater	Site-Specific	mg/L	-	
				IRGWc	Ingestion Rate, groundwater - child	0.78	L/day	USEPA, 2014 (USEPA, 2011; Tables 3-15 and 3-33; weighted average of 90th percentile consumer-only ingestion of drinking water (birth < 6 years))	Daily Intake (mg/kg-day) for noncarcinogens (child) = $\frac{CGW \times IRGWc \times EF \times FI\text{-}GW \times EDc}{BWc \times ATnc,c}$
				FI-GW	Fraction Ingested from Source, groundwater	1	unitless	USEPA, 1989 (Default of 1 (100%) is assumed)	
				EF	Exposure Frequency	350	days/year	USEPA, 2014 (USEPA, 1991; pg 15)	
				EDc	Exposure Duration, child	6	years	USEPA, 2014 (USEPA, 1991; pp 6 and 15)	
				BWc	Body Weight, child	15	kg	USEPA, 2014 (USEPA, 2011; Table 8-1; weighted average of mean body weights (birth to < 6 years))	Daily Intake for carcinogens (lifetime) (mg/kg-day) = [DI for carcinogens (adult) + DI for carcinogens (child)]
				ATc	Averaging Time, carcinogens	25550	days	USEPA, 1989 (ED (70 years) x 365 days/year)	
				ATnc,c	Averaging Time, noncarcinogens - child	2190	days	USEPA, 1989 (ED x 365 days/year)	
Ingestion	On-Site Resident (Current/Future)	Lifetime	Ingestion of Groundwater (Potable Use)						Mutagenic Constituents
				DI	Daily Intake	Calculated	mg/kg-day	See equations	Daily Intake (mg/kg-day) for mutagenic carcinogens (lifetime) = $\frac{CGW \times FI\text{-}GW \times IFWMadj}{ATc}$
				CGW	Exposure Point Concentration, groundwater	Site-Specific	mg/L	-	
				FI-GW	Fraction Ingested from Source, groundwater	1	unitless	USEPA, 1989 (Default of 1 (100%) is assumed)	
				IFWMadj	Mutagenic Water Ingestion Rate - Age-adjusted	1019.9	L/kg	See equations	
				ATc	Averaging Time, carcinogens	25550	days	USEPA, 1989 (ED (70 years) x 365 days/year)	Where IFWMadj (L/kg) = $\frac{EF \times IRGW_c}{BW_c} \times \left[(ED_{0-2} \times ADAF_{0-2}) + (ED_{2-6} \times ADAF_{2-6})\right] +$ $\frac{EF \times IRGW_a}{BW_a} \times \left[(ED_{6-16} \times ADAF_{6-16}) + (ED_{16-26} \times ADAF_{16-26})\right]$
				EF	Exposure Frequency	350	days/year	USEPA, 2014 (USEPA, 1991; pg 15)	
				IRGWc	Ingestion Rate, groundwater - child	0.78	L/day	USEPA, 2014 (USEPA, 2011; Tables 3-15 and 3-33; weighted average of 90th percentile consumer-only ingestion of drinking water (birth < 6 years))	
				BWc	Body Weight, child	15	kg	USEPA, 2014 (USEPA, 2011; Table 8-1; weighted average of mean body weights (birth to < 6 years))	
				ED0-2	Exposure Duration, 0-2 years	2	years	USEPA, 2005	
				ADAF0-2	Age Depend. Adjust. Factor, 0-2 years	10	unitless	USEPA, 2005	
				ED2-6	Exposure Duration, 2-6 years	4	years	USEPA, 2005	
				ADAF2-6	Age Depend. Adjust. Factor, 2-6 years	3	unitless	USEPA, 2005	
				ED6-16	Exposure Duration, 6-16 years	10	years	USEPA, 2005	
				ADAF6-16	Age Depend. Adjust. Factor, 6-16 years	3	unitless	USEPA, 2005	
				ED16-26	Exposure Duration, 16-26 years	10	years	USEPA, 2005	
				ADAF16-26	Age Depend. Adjust. Factor, 16-26 years	1	unitless	USEPA, 2005	
				IRGWa	Ingestion Rate, groundwater - adult	2.5	L/day	USEPA, 2014 (USEPA, 2011; Table 3-33; 90th percentile of consumer-only ingestion of drinking water (≥ 21 years))	
				BWa	Body Weight, adult	80	kg	USEPA, 2014 (USEPA, 2011; Tables 8-3; weighted mean values adults 21-78)	
				IFWadj	Water Ingestion Rate - Age-adjusted	327.95	L/kg	See equations	

Table A4-1
Values Used for Daily Intake and Dermally Absorbed Dose Calculations
Reasonable Maximum Exposure: Incidental Ingestion and Dermal Absorption of Groundwater
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Groundwater (Drinking Water)

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake and Dermally Absorbed Dose Equations/ Model Name
Dermal Absorption	On-Site Resident (Current/Future)	Adult	Dermal Absorption of Groundwater (Potable Use)						Non-Mutagenic Constituents
				DAD	Dermally Absorbed Dose	Calculated	mg/kg-day	See equations	Dermally Absorbed Dose (mg/kg-day) for carcinogens (adult) =
				DA-event	Absorbed Dose per Event	Calculated	mg/cm²-event	USEPA, 2004	$\frac{DA\text{-}event \times EV \times EF \times FC\text{-}GW \times EDa \times SA\text{-}GWa}{BWa \times ATc}$
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2014 (USEPA, 1991; pg 15)	
				FC-GW	Fraction of Contact from Source, groundwater	1	unitless	USEPA, 1989 (Default of 1 (100%) is assumed)	Dermally Absorbed Dose (mg/kg-day) for noncarcinogens (adult) =
				EDa	Exposure Duration, adult	20	years	USEPA, 2014 (EDr (26 years) - EDc (6 years))	$\frac{DA\text{-}event \times EV \times EF \times FC\text{-}GW \times EDa \times SA\text{-}GWa}{BWa \times ATnc,a}$
				SA-GWa	Skin Surface Area - groundwater, adult	19652	cm²	USEPA, 2014 (USEPA, 2011; Table 7-9; weighted average of mean values for male and female adults, 21-78))	Where:
				BWa	Body Weight, adult	80	kg	USEPA, 2014 (USEPA, 2011; Tables 8-3; weighted mean values adults 21-78)	For organic compounds in which t-event,a ≤ t-star:
				ATc	Averaging Time, carcinogens	25550	days	USEPA, 1989 (ED (70 years) x 365 days/year)	DA-event (Absorbed Dose per Event[mg/cm²-event]) =
				ATnc,a	Averaging Time, noncarcinogens - adult	7300	days	USEPA, 1989 (ED x 365 days/year)	$2 \times FA \times Kp \times CGW \times CF1 \times \sqrt{[6 \times tau\text{-}event \times t\text{-}event,a]/\pi}$
				t-star	Time to reach steady-state	Chemical-specific	hour	USEPA, 2004; tau-event x 2.4	For organic compounds in which t-event,a > t-star:
				FA	Fraction Absorbed, water	Chemical-specific	unitless	USEPA, 2004	DA-event (Absorbed Dose per Event[mg/cm²-event]) =
				Kp	Permeability Coefficient, water	Chemical-specific	cm/hour	USEPA, 2004	$FA \times Kp \times CGW \times CF1 \times \{[t\text{-}event,a / (1 + B)] + (2 \times tau\text{-}event) \times [(1 + 3B + 3B^2) / (1 + B)^2]\}$
				CGW	Exposure Point Concentration, groundwater	Site-Specific	mg/L	-	
				CF1	Conversion Factor 1	0.001	L/cm³	-	For inorganic compounds:
				tau-event	Lag time per event	Chemical-specific	hours/event	USEPA, 2004	DA-event (Absorbed Dose per Event[mg/cm²-event]) =
				t-event,a	Event Duration, adult	0.71	hours/event	USEPA, 2014 (USEPA, 2011; Tables 16-30 and 16-31; weighted average of adult (21 to 78) 90th percentile of time spent bathing/showering in a day, divided by mean number of baths/showers taken in a day)	$Kp \times CGW \times CF1 \times t\text{-}event,a$
				B	Ratio of Kp through stratum corneum relative to compound's Kp across the viable epidermis	Chemical-specific	unitless	USEPA, 2004	Dermally Absorbed Dose (mg/kg-day) for carcinogens (lifetime) = [DAD for carcinogens (adult) + DAD for carcinogens (child)]
Dermal Absorption	On-Site Resident (Current/Future)	Child	Dermal Absorption of Groundwater (Potable Use)						Non-Mutagenic Constituents
				DAD	Dermally Absorbed Dose	Calculated	mg/kg-day	See equations	Dermally Absorbed Dose (mg/kg-day) for carcinogens (child) =
				DA-event	Absorbed Dose per Event	Calculated	mg/cm²-event	USEPA, 2004	$\frac{DA\text{-}event \times EV \times EF \times FC\text{-}GW \times EDc \times SA\text{-}GWc}{BWc \times ATc}$
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2014 (USEPA, 1991; pg 15)	
				FC-GW	Fraction of Contact from Source, groundwater	1	unitless	USEPA, 1989 (Default of 1 (100%) is assumed)	Dermally Absorbed Dose (mg/kg-day) for noncarcinogens (child) =
				EDc	Exposure Duration, child	6	years	USEPA, 2014 (USEPA, 1991; pp 6 and 15)	$\frac{DA\text{-}event \times EV \times EF \times FC\text{-}GW \times EDc \times SA\text{-}GWc}{BWc \times ATnc,c}$
				SA-GWc	Skin Surface Area - groundwater, child	6365	cm²	USEPA, 2014 (USEPA, 2011; Table 7-9; weighted average of mean values for male and female children <6 years)	Where:
				BWc	Body Weight, child	15	kg	USEPA, 2014 (USEPA, 2011; Table 8-1; weighted average of mean body weights (birth to < 6 years))	For organic compounds in which t-event,c ≤ t-star:
				ATc	Averaging Time, carcinogens	25550	days	USEPA, 1989 (ED (70 years) x 365 days/year)	DA-event (Absorbed Dose per Event[mg/cm²-event]) =
				ATnc,c	Averaging Time, noncarcinogens - child	2190	days	USEPA, 1989 (ED x 365 days/year)	$2 \times FA \times Kp \times CGW \times CF1 \times \sqrt{[6 \times tau\text{-}event \times t\text{-}event,c)/\pi]}$
				t-star	Time to reach steady-state	Chemical-specific	hour	USEPA, 2004; tau-event x 2.4	For organic compounds in which t-event,c > t-star:
				FA	Fraction Absorbed, water	Chemical-specific	unitless	USEPA, 2004	DA-event (Absorbed Dose per Event[mg/cm²-event]) =
				Kp	Permeability Coefficient, water	Chemical-specific	cm/hour	USEPA, 2004	$FA \times Kp \times CGW \times CF1 \times \{[t\text{-}event,c / (1 + B)] + (2 \times tau\text{-}event) \times [(1 + 3B + 3B^2) / (1 + B)^2]\}$
				CGW	Exposure Point Concentration, groundwater	Site-Specific	mg/L	-	
				CF1	Conversion Factor 1	0.001	L/cm³	-	For inorganic compounds:
				tau-event	Lag time per event	Chemical-specific	hours/event	USEPA, 2004	DA-event (Absorbed Dose per Event[mg/cm²-event]) =
				t-event,c	Event Duration, child	0.54	hours/event	USEPA, 2014 (USEPA, 2011; Table 16-28; weighted average of 90th percentile time spent bathing (birth to < 6 years))	$Kp \times CGW \times CF1 \times t\text{-}event,c$
				B	Ratio of Kp through stratum corneum relative to compound's Kp across the viable epidermis	Chemical-specific	unitless	USEPA, 2004	Dermally Absorbed Dose (mg/kg-day) for carcinogens (lifetime) = [DAD for carcinogens (adult) + DAD for carcinogens (child)]
Dermal Absorption	On-Site Resident (Current/Future)	Lifetime	Dermal Absorption of Groundwater (Potable Use)						Mutagenic Constituents
				DAD	Dermally Absorbed Dose	Calculated	mg/kg-day	See equations	Dermally Absorbed Dose (mg/kg-day) for mutagenic carcinogens (lifetime) =
				DA-event	Absorbed Dose per Event	Calculated	mg/cm²-event	USEPA, 2004	$\frac{DA\text{-}event \times DFWMadj}{ATc}$
				DFWMadj	Mutagenic water dermal contact factor- age-adjusted	8191633	cm²-event/kg	See equations	
				ATc	Averaging Time, carcinogens	25550	days	USEPA, 1989 (ED (70 years) x 365 days/year)	Where:
				$ET_{event\text{-}res\text{-}adj}$	Resident Water Exposure Time - Age Adjusted	0.6708	hours/event	USEPA, 2005	For organic compounds in which $ET_{event\text{-}res\text{-}adj} \leq$ t-star:
				t-star	Time to reach steady-state	Chemical-specific	hour	USEPA, 2004; tau-event x 2.4	DA-event (Absorbed Dose per Event[mg/cm²-event]) =
				FA	Fraction Absorbed, water	Chemical-specific	unitless	USEPA, 2004	$2 \times FA \times Kp \times CGW \times CF1 \times \sqrt{([6 \times tau\text{-}event \times ET_{event\text{-}res\text{-}adj}]/\pi)}$
				Kp	Permeability Coefficient, water	Chemical-specific	cm/hour	USEPA, 2004	

Table A4-1
Values Used for Daily Intake and Dermally Absorbed Dose Calculations
Reasonable Maximum Exposure: Incidental Ingestion and Dermal Absorption of Groundwater
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Groundwater (Drinking Water)

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake and Dermally Absorbed Dose Equations/ Model Name
Dermal Absorption	On-Site Resident (Current/Future)	Lifetime	Dermal Absorption of Groundwater (Potable Use)	CGW	Exposure Point Concentration, groundwater	Site-Specific	mg/L	-	For organic compounds in which $ET_{event\text{-}res\text{-}adj}$ > t-star:
				CF1	Conversion Factor 1	0.001	L/cm³	-	DA-event (Absorbed Dose per Event[mg/cm²-event]) =
				tau-event	Lag time per event	Chemical-specific	hours/event	USEPA, 2004	FA x Kp x CGW x CF1 x {$[ET_{event\text{-}res\text{-}adj}$ / (1 + B)] + (2 x tau-event) x [(1 + 3B +3B²) / (1 + B)²]}
				B	Ratio of Kp through stratum corneum relative to compound's Kp across the viable epidermis	Chemical-specific	unitless	USEPA, 2004	For inorganic compounds:
				t-event,c	Event Duration, child	0.54	hours/event	USEPA, 2014 (USEPA, 2011; Table 16-28; weighted average of 90th percentile time spent bathing (birth to < 6 years))	DA-event (Absorbed Dose per Event[mg/cm²-event]) = Kp x CGW x CF1 x $ET_{event\text{-}res\text{-}adj}$
				ED0-2	Exposure Duration, 0-2 years	2	years	USEPA, 2005	Resident Water Exposure Time - Age Adjusted (hours/event) = $\frac{t\text{-}event,c \times (ED_{0-2} + ED_{2-6}) + t\text{-}event,a \times (ED_{6-16} + ED_{16-26})}{ED_{0-2} + ED_{2-6} + ED_{6-16} + ED_{16-26}}$
				ED2-6	Exposure Duration, 2-6 years	4	years	USEPA, 2005	
				ED6-16	Exposure Duration, 6-16 years	10	years	USEPA, 2005	
				ED16-26	Exposure Duration, 16-26 years	10	years	USEPA, 2005	
				ADAF0-2	Age Depend. Adjust. Factor, 0-2 years	10	unitless	USEPA, 2005	
				ADAF2-6	Age Depend. Adjust. Factor, 2-6 years	3	unitless	USEPA, 2005	
				ADAF6-16	Age Depend. Adjust. Factor, 6-16 years	3	unitless	USEPA, 2005	
				ADAF16-26	Age Depend. Adjust. Factor, 16-26 years	1	unitless	USEPA, 2005	Resident Water Dermal Contact Factor - Age Adjusted (cm²-event/kg) = $EV \times EF \times \left(\frac{ED_c \times SA\text{-}GW_c}{BW_c} + \frac{ED_a \times SA\text{-}GW_a}{BW_a}\right)$
				t-event,a	Event Duration, adult	0.71	hours/event	USEPA, 2014 (USEPA, 2011; Tables 16-30 and 16-31; weighted average of adult (21 to 78) 90th percentile of time spent bathing/showering in a day, divided by mean number of baths/showers taken in a day)	Resident Mutagenic Water Dermal Contact Factor - Age Adjusted (cm²-event/kg) = $EV \times EF \times \left[\frac{SA\text{-}GW_c}{BW_c} \times (ED_{0-2} \times ADAF_{0-2} + ED_{2-6} \times ADAF_{2-6}) + \frac{SA\text{-}GW_a}{BW_a} \times (ED_{6-16} \times ADAF_{6-16} + ED_{16-26} \times ADAF_{16-26})\right]$
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2014 (USEPA, 1991; pg 15)	
				SA-GWc	Skin Surface Area - groundwater, child	6365	cm²	USEPA, 2014 (USEPA, 2011; Table 7-9; weighted average of mean values for male and female children <6 years)	
				BWc	Body Weight, child	15	kg	USEPA, 2014 (USEPA, 2011; Table 8-1; weighted average of mean body weights (birth to < 6 years))	
				SA-GWa	Skin Surface Area - groundwater, adult	19652	cm²	USEPA, 2014 (USEPA, 2011; Table 7-9; weighted average of mean values for male and female adults, 21-78))	
				BWa	Body Weight, adult	80	kg	USEPA, 2014 (USEPA, 2011; Tables 8-3; weighted mean values adults 21-78)	
				DFWadj	Dermal water contact factor- age-adjusted	2610650	cm²-event/kg	See equations	
				EDc	Exposure Duration, child	6	years	USEPA, 2014 (USEPA, 1991; pp 6 and 15)	
				EDa	Exposure Duration, adult	20	years	USEPA, 2014 (EDr (26 years) - EDc (6 years))	

Notes:
- Not applicaple

References:

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Table A4-2
Values Used for Daily Intake Calculations
Reasonable Maximum Exposure: Inhalation of Vapors from Groundwater to Indoor Air (Shower/Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake and Dermally Absorbed Dose Equations/ Model Name
Inhalation	On-Site Resident (Current/Future)	Adult	Inhalation of Groundwater Vapors in Indoor Air (Showering)						Non-Mutagenic Constituents
				EC	Exposure concentration	Calculated	µg/m³	See equations	Exposure concentration (µg/m³) for carcinogens (lifetime) = $\frac{CA \times ETs \times EV \times EF \times FH\text{-}GW \times EDa \times CF2}{ATc \times CF1 \times CF2}$
				CA	Exposure Point Concentration, shower air	Modeled	µg/m³	Calculated (See Attachment A4)	
				ETs	Exposure Time, shower	0.33	hours/event	See equations	
				EV	Event Frequency	1	event/day		
				Ds	Shower Duration	0.71	hour/event	USEPA, 2014	Exposure concentration (µg/m³) for non-carcinogens (lifetime) = $\frac{CA \times ETs \times EV \times EF \times FH\text{-}GW \times EDa \times CF2}{ATnc,a \times CF1}$
				Ra	Air Exchange Rate	0.0167	1/hr	Foster and Chrostowski, 1987	
				ts,a	Total Time in Shower Room	1	hour	USEPA, 2011; Table 16-29, 95th percentile value of 60 min (1 hour) for 16 to <21 years, total time spent in bathroom for shower and remaining in enclosed bathroom.	Where:
				EF	Exposure Frequency	350	days/year	USEPA, 2014 (USEPA, 1991; pg 15)	Exposure Time, shower (hr/event) = $\left[Ds + \frac{e^{(-Ra \times ts,a)}}{Ra} - \frac{e^{(Ra \times (Ds - ts,a))}}{Ra}\right]$
				FH-GW	Fraction Inhaled from Source, groundwater	1	unitless	USEPA, 1989 (Default of 1 (100%) is assumed)	
				EDa	Exposure Duration, adult	20	years	USEPA, 2014 (EDr (26 years) - EDc (6 years))	
				ATc	Averaging Time, carcinogens	25550	days	USEPA, 1989 (ED (70 years) x 365 days/year)	
				ATnc,a	Averaging Time, noncarcinogens - adult	7300	days	USEPA, 1989 (ED x 365 days/year)	Note: It is assumed that the child resident does not take showers; however, early life exposure via bathing is taken into account with the mutagenic calculations.
				CF1	Conversion Factor 1	24	hours/day	-	
				CF2	Conversion Factor 2	1000	µg/mg	-	
Inhalation	On-Site Resident (Current/Future)	Lifetime	Inhalation of Groundwater Vapors in Indoor Air (Bathing/Shower)						Mutagenic Constituents
				EC	Exposure concentration	Calculated	µg/m³	See equations	Exposure concentration (µg/m³) for mutagenic carcinogens (lifetime) =
				CA	Exposure Point Concentration, shower air	Modeled	µg/m³	Calculated (See Attachment A4)	$\frac{CA \times EF \times EV \times ETs\text{-}adj}{AT_C \times CF1} \times \left[\left(\begin{array}{l} ED_{0-2} \times ADAF_{0-2} + ED_{2-6} \times ADAF_{2-6} + \\ ED_{6-16} \times ADAF_{6-16} + ED_{16-26} \times ADAF_{16-26} \end{array}\right)\right]$
				EF	Exposure Frequency	350	days/year	USEPA, 2014 (USEPA, 1991; pg 15)	
				ATc	Averaging Time, carcinogens	25550	days	USEPA, 1989 (ED (70 years) x 365 days/year)	
				CF1	Conversion Factor 1	24	hours/day	-	
				ED0-2	Exposure Duration, 0-2 years	2	years	USEPA, 2005	Where:
				ADAF0-2	Age Depend. Adjust. Factor, 0-2 years	10	unitless	USEPA, 2005	Exposure Time, shower - age adjusted (hr/event) =
				ED2-6	Exposure Duration, 2-6 years	4	years	USEPA, 2005	$\left[Ds + \frac{e^{(-Ra \times ts\text{-}adj)}}{Ra} - \frac{e^{(Ra \times (Ds - ts\text{-}adj))}}{Ra}\right]$
				ADAF2-6	Age Depend. Adjust. Factor, 2-6 years	3	unitless	USEPA, 2005	
				ED6-16	Exposure Duration, 6-16 years	10	years	USEPA, 2005	
				ADAF6-16	Age Depend. Adjust. Factor, 6-16 years	3	unitless	USEPA, 2005	
				ED16-26	Exposure Duration, 16-26 years	10	years	USEPA, 2005	Total Time in Shower Room - age adjusted (hour) =
				ADAF16-26	Age Depend. Adjust. Factor, 16-26 years	1	unitless	USEPA, 2005	$\frac{ts,c \times (ED_{0-2} + ED_{2-6}) + ts,a \times (ED_{6-16} + ED_{16-26})}{ED_{0-2} + ED_{2-6} + ED_{6-16} + ED_{16-26}}$
				EDr	Exposure Duration, lifetime	26	years	USEPA, 2014 (USEPA, 2011; Table 16-108; 90th percentile for current residence time)	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				CF2	Conversion Factor 2	0.0167	hr/min	-	
				ETs-adj	Exposure Time, shower - age adjusted	0.31	hours/event	See equations	
				Ds-adj	Shower Duration	0.625	hours/event	USEPA, 2014; average of child and adult resident water exposure times of 0.54 hours/event and 0.71 hours/event	
				Ra	Air Exchange Rate	0.0167	1/hr	Foster and Chrostowski, 1987	
				ts-adj	Total Time in Shower Room - age adjusted	1	hour	See equations	
				ts,c	Total Time in Bathroom - child	1	hour	USEPA, 2011; Table 16-29, 95th percentile value of 60 min (1 hour) for 3 to < 6 years old, total time spent taking a bath and remaining in enclosed bathroom.	
				ts,a	Total Time in Bathroom - adult	1	hour	USEPA, 2011; Table 16-29, 95th percentile value of 60 min (1 hour) for 16 to <21 years, total time spent in bathroom for shower and remaining in enclosed bathroom.	
Inhalation	On-Site Resident (Current/Future)	Adult	Inhalation of Groundwater Vapors in Indoor Air (Vapor Intrusion)						Non-Mutagenic Constituents
				EC	Exposure concentration	Calculated	µg/m³	See equations	Exposure concentration (µg/m³) for carcinogens (adult) = $\frac{CA \times ET \times EF \times FH\text{-}GW \times EDa}{ATc \times CF1}$
				CA	Exposure Point Concentration, indoor air	Modeled	µg/m³	Calculated (See Attachment A4)	
				ET	Exposure Time	24	hours/day	USEPA, 2014	
				EF	Exposure Frequency	350	days/year	USEPA, 2014 (USEPA, 1991; pg 15)	
				FH-GW	Fraction Inhaled from Source, groundwater	1	unitless	USEPA, 1989 (Default of 1 (100%) is assumed)	Exposure concentration (µg/m³) for non-carcinogens (adult) = $\frac{CA \times ET \times EF \times FH\text{-}GW \times EDa}{ATnc,a \times CF1}$
				EDa	Exposure Duration, adult	20	years	USEPA, 2014 (EDr (26 years) - EDc (6 years))	
				ATc	Averaging Time, carcinogens	25550	days	USEPA, 1989 (ED (70 years) x 365 days/year)	

Table A4-2
Values Used for Daily Intake Calculations
Reasonable Maximum Exposure: Inhalation of Vapors from Groundwater to Indoor Air (Shower/Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake and Dermally Absorbed Dose Equations/ Model Name
Inhalation	On-Site Resident (Current/Future)	Adult	Inhalation of Groundwater Vapors in Indoor Air (Vapor Intrusion)	ATnc,a	Averaging Time, noncarcinogens - adult	7300	days	USEPA, 1989 (ED x 365 days/year)	Exposure concentration (µg/m³) for carcinogens (lifetime) = [EC for carcinogens (adult) + EC for carcinogens (child)]
				CF1	Conversion Factor 1	24	hours/day	-	
Inhalation	On-Site Resident (Current/Future)	Child	Inhalation of Groundwater Vapors in Indoor Air (Vapor Intrusion)						Non-Mutagenic Constituents
				EC	Exposure concentration	Calculated	µg/m³	See equations	Exposure concentration (µg/m³) for carcinogens (child) = $\frac{CA \times ET \times EF \times FH\text{-}GW \times EDc}{ATc \times CF1}$
				CA	Exposure Point Concentration, indoor air	Modeled	µg/m³	Calculated (See Attachment A4)	
				ET	Exposure Time	24	hours/day	USEPA, 2014	
				EF	Exposure Frequency	350	days/year	USEPA, 2014 (USEPA, 1991; pg 15)	
				FH-GW	Fraction Inhaled from Source, groundwater	1	unitless	USEPA, 1989 (Default of 1 (100%) is assumed)	Exposure concentration (µg/m³) for non-carcinogens (child) = $\frac{CA \times ET \times EF \times FH\text{-}GW \times EDc}{ATnc,c \times CF1}$
				EDc	Exposure Duration, child	6	years	USEPA, 2014 (USEPA, 1991; pp 6 and 15)	
				ATc	Averaging Time, carcinogens	25550	days	USEPA, 1989 (ED (70 years) x 365 days/year)	
				ATnc,c	Averaging Time, noncarcinogens - child	2190	days	USEPA, 1989 (ED x 365 days/year)	
				CF1	Conversion Factor 1	24	hours/day	-	Exposure concentration (µg/m³) for carcinogens (lifetime) = [EC for carcinogens (adult) + EC for carcinogens (child)]
Inhalation	On-Site Resident (Current/Future)	Lifetime	Inhalation of Groundwater Vapors in Indoor Air (Vapor Intrusion)						Mutagenic Constituents
				EC	Exposure concentration	Calculated	µg/m³	See equations	Exposure concentration (µg/m³) for mutagenic carcinogens (lifetime) = $\frac{CA \times EF \times ET}{ATc \times CF1} \times \left[\left(\frac{ED_{0-2} \times ADAF_{0-2} + ED_{2-6} \times ADAF_{2-6}}{ED_{6-16} \times ADAF_{6-16} + ED_{16-26} \times ADAF_{16-26}}\right)\right]$
				CA	Exposure Point Concentration, indoor air	Modeled	µg/m³	Calculated (See Attachment A4)	
				EF	Exposure Frequency	350	days/year	USEPA, 2014 (USEPA, 1991; pg 15)	
				ET	Exposure Time	24	hours/day	USEPA, 2014	
				ATc	Averaging Time, carcinogens	25550	days	USEPA, 1989 (ED (70 years) x 365 days/year)	
				CF1	Conversion Factor 1	24	hours/day	-	
				ED0-2	Exposure Duration, 0-2 years	2	years	USEPA, 2005	
				ADAF0-2	Age Depend. Adjust. Factor, 0-2 years	10	unitless	USEPA, 2005	
				ED2-6	Exposure Duration, 2-6 years	4	years	USEPA, 2005	
				ADAF2-6	Age Depend. Adjust. Factor, 2-6 years	3	unitless	USEPA, 2005	
				ED6-16	Exposure Duration, 6-16 years	10	years	USEPA, 2005	
				ADAF6-16	Age Depend. Adjust. Factor, 6-16 years	3	unitless	USEPA, 2005	
				ED16-26	Exposure Duration, 16-26 years	10	years	USEPA, 2005	
				ADAF16-26	Age Depend. Adjust. Factor, 16-26 years	1	unitless	USEPA, 2005	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EDr	Exposure Duration, lifetime	26	years	USEPA, 2014 (USEPA, 2011; Table 16-108; 90th percentile for current residence time)	

Notes:
- Not applicaple

References:

Foster and Chrostowski, 1987. Inhalation Exposures to Volatile Organic Contaminants in the Shower. S.A. Foster and P.C. Chrostowski Presentation at the 80th annual Meeting of the Air Pollution Control Association.

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U.S. Environmental Protection Agency (USEPA), 1991. Human Health Evaluation Manual, Supplemental Guidance, Standard Default Exposure Factors. Office of Emergency and Remedial Response, Washington, DC. March.

U.S. Environmental Protection Agency (USEPA), 2004. Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final, July 2004.

U.S. Environmental Protection Agency (USEPA), 2005. Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens. Risk Assessment Forum, EPA, Washington, DC. 20460, EPA/630/R-03/003F. March.

U.S. Environmental Protection Agency (USEPA), 2011. Exposure Factors Handbook: 2011 Edition. EPA/ 600/ R-090/052F, September 2011.

U.S. Environmental Protection Agency (USEPA), 2014. Human Health Evaluation Manual. Supplemental Guidance: Update of Standard Default Exposure Factors. Office of Superfund Remediation and Technology Innovation. OSWER Directive 9200.1-120. February 6. Amended September 2015.

Table A4-3
Dermal Worksheet for Groundwater (Potable Use)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Groundwater Chemical of Potential Concern	CASRN	Source: USEPA, 2004, RAGS Part E Dermal Guidance					On-Site Hypothetical Resident (Child) - Groundwater (Potable Use)				On-Site Hypothetical Resident (Adult) - Groundwater (Potable Use)				On-Site Hypothetical Resident (Lifetime) - Groundwater (Potable Use)			
							t-event (hrs/event):	0.54	Selected DA-event		t-event (hrs/event):	0.71	Selected DA-event		t-event (hrs/event):	0.67	Selected DA-event	
		FA unitless	Kp cm/hr	Tau-event hrs/event	B Value	T* hr	DA-Event 1 (L/cm^2-event)	DA-Event 2 (L/cm^2-event)	Equation	DA-event (L/cm^2-event)	DA-Event 1 (L/cm^2-event)	DA-Event 2 (L/cm^2-event)	Equation	DA-event (L/cm^2-event)	DA-Event 1 (L/cm^2-event)	DA-Event 2 (L/cm^2-event)	Equation	DA-event (L/cm^2-event)
Volatile Organic Compounds (VOCs)																		
Chloroform	67-66-3	1	6.83E-03	4.90E-01	2.87E-02	1.18E+00	9.71E-06	1.05E-05	DA-Event 1	9.71E-06	1.11E-05	1.16E-05	DA-Event 1	1.11E-05	1.08E-05	1.13E-05	DA-Event 1	1.08E-05
Perfluorinated Compounds																		
Perfluorooctanoic acid (PFOA)	335-67-1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide																		
Cyanide	57-12-5	1	1.00E-03	1.47E-01	1.96E-03	3.53E-01	7.79E-07	8.34E-07	DA-Event 2	8.34E-07	8.93E-07	1.00E-06	DA-Event 2	1.00E-06	8.68E-07	9.64E-07	DA-Event 2	9.64E-07
Metals (Total)																		
Arsenic	7440-38-2	1	1.00E-03	2.76E-01	3.33E-03	6.63E-01	5.40E-07	--	DA-Event 1	5.40E-07	7.10E-07	--	DA-Event 1	7.10E-07	6.71E-07	--	DA-Event 1	6.71E-07
Barium	7440-39-3	1	1.00E-03	6.18E-01	4.51E-03	1.48E+00	5.40E-07	--	DA-Event 1	5.40E-07	7.10E-07	--	DA-Event 1	7.10E-07	6.71E-07	--	DA-Event 1	6.71E-07
Beryllium	7440-41-7	1	1.00E-03	1.18E-01	1.15E-03	2.83E-01	5.40E-07	--	DA-Event 1	5.40E-07	7.10E-07	--	DA-Event 1	7.10E-07	6.71E-07	--	DA-Event 1	6.71E-07
Cadmium (Water)	7440-43-9W	1	1.00E-03	4.48E-01	4.08E-03	1.08E+00	5.40E-07	--	DA-Event 1	5.40E-07	7.10E-07	--	DA-Event 1	7.10E-07	6.71E-07	--	DA-Event 1	6.71E-07
Chromium, Hexavalent	18540-29-9	1	2.00E-03	2.06E-01	5.55E-03	4.93E-01	1.08E-06	--	DA-Event 1	1.08E-06	1.42E-06	--	DA-Event 1	1.42E-06	1.34E-06	--	DA-Event 1	1.34E-06
Cobalt	7440-48-4	1	4.00E-04	2.25E-01	1.18E-03	5.40E-01	2.16E-07	--	DA-Event 1	2.16E-07	2.84E-07	--	DA-Event 1	2.84E-07	2.68E-07	--	DA-Event 1	2.68E-07
Copper	7440-50-8	1	1.00E-03	2.39E-01	3.07E-03	5.73E-01	5.40E-07	--	DA-Event 1	5.40E-07	7.10E-07	--	DA-Event 1	7.10E-07	6.71E-07	--	DA-Event 1	6.71E-07
Iron	7439-89-6	1	1.00E-03	2.16E-01	2.87E-03	5.19E-01	5.40E-07	--	DA-Event 1	5.40E-07	7.10E-07	--	DA-Event 1	7.10E-07	6.71E-07	--	DA-Event 1	6.71E-07
Manganese	7439-96-5	1	1.00E-03	2.14E-01	2.85E-03	5.13E-01	5.40E-07	--	DA-Event 1	5.40E-07	7.10E-07	--	DA-Event 1	7.10E-07	6.71E-07	--	DA-Event 1	6.71E-07
Nickel	7440-02-0	1	2.00E-04	2.24E-01	5.89E-04	5.38E-01	1.08E-07	--	DA-Event 1	1.08E-07	1.42E-07	--	DA-Event 1	1.42E-07	1.34E-07	--	DA-Event 1	1.34E-07

Parameters:
B = Dimensionless Ratio of the Permeability Coefficient of a Compound Through the Stratum Corneum Relative to its Permeability Coefficient Across the Viable Epidermis
CF3 = Conversion Factor 3, 0.001 L/cm3
FA = Fraction Absorbed Water
Kp = Dermal Permeability Coefficient of Compound in Water
T* = Time to Reach Steady-State
t-event = Event Duration (scenario-specific)
Tau-event = Lag Time per Event
DABS = Dermal Absorption Factor

References:
USEPA, 2004. Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment, Final, July, EPA/540/R/99/005.

For Organic Compounds:
If t-event ≤ T*, then: DA-event 1 =

$$2\ x\ FA\ x\ K_p\ x\ CF3\ x\ \sqrt{\frac{6\ x\ \tau_{event}\ x\ t_{event}}{\pi}}$$

If t-event > T*, then: DA-event 2 =

$$FA\ x\ CF3\ x\ K_p\ x\ \left[\frac{t_{event}}{1+B} + (2\ x\ \tau_{event})\ x\ \left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

For Inorganic Compounds:
DA-event 1 = KP x CF3 x t-event
No DA-event 2 equation for inorganics.

Table A4-4
Modeled Groundwater-to-Vapor Concentrations while Showering
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Groundwater Volatile COPC (Potable Use)	CASRN	MW (g/mol)	H ($atm\text{-}m^3/mol$)	k_l (cm/hr)	k_g (cm/hr)	K_L (cm/hr)	K_{aL} (cm/hr)	C_w (1) (ug/L)	C_{wd} (ug/L)	S ($ug/m^3\text{-}min$)	C_a (ug/m^3)
Volatile Organic Compounds (VOCs)											
Chloroform	67-66-3	1.19E+02	3.67E-03	1.21E+01	1.16E+03	1.14E+01	1.54E+01	1.00E+00	4.01E-01	1.34E+00	8.01E-02
Perfluorinated Compounds											
Perfluorooctanoic acid (PFOA)	335-67-1	--	--	--	--	--	--	--	--	--	--
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	--	--	--	--	--	--	--	--	--	--
Cyanide											
Cyanide	57-12-5	2.60E+01	1.01E-04	2.60E+01	2.50E+03	7.47E+00	1.01E+01	1.00E+00	2.86E-01	9.53E-01	5.72E-02
Metals (Total)											
Arsenic	7440-38-2	--	--	--	--	--	--	--	--	--	--
Barium	7440-39-3	--	--	--	--	--	--	--	--	--	--
Beryllium	7440-41-7	--	--	--	--	--	--	--	--	--	--
Cadmium (Water)	7440-43-9W	--	--	--	--	--	--	--	--	--	--
Chromium, Hexavalent	18540-29-9	--	--	--	--	--	--	--	--	--	--
Cobalt	7440-48-4	--	--	--	--	--	--	--	--	--	--
Copper	7440-50-8	--	--	--	--	--	--	--	--	--	--
Iron	7439-89-6	--	--	--	--	--	--	--	--	--	--
Manganese	7439-96-5	--	--	--	--	--	--	--	--	--	--
Nickel	7440-02-0	--	--	--	--	--	--	--	--	--	--

Notes:
(1) A value of 1 ug/L is used to calculate a shower concentration for all possible chemical of potential concerns (COPCs). The Site/COPC-specific groundwater exposure point concentration (EPC) will be multiplied by the generic air concentration value to model shower air.

-- = Not Evaluated; only volatile chemicals evaluated; CASRN = Chemical Abstract Services Registry Number

Equations used for Foster-Chrostowski (1987) model

1) Derivation of Liquid-Film Mass Transfer Coefficient for the Shower Model

$$k_l = 20 * (44 / MW)^{0.5}$$

Values		
calc	k_l	Liquid-film mass transfer coefficient (cm/hour)
20		Liquid-film mass transfer coefficient for carbon dioxide (cm/hour)
44		Conversion factor (molecular weight of carbon dioxide)
chem-specific	MW	Molecular Weight

2) Derivation of Gas-Film Mass Transfer Coefficient for the Shower Model

$$k_g = 3000 * (18 / MW)^{0.5}$$

Values		
calc	k_g	Gas-film mass transfer coefficient (cm/hour)
3000		Gas-film mass transfer coefficient for water (cm/hour)
18		Conversion factor (molecular weight of water)
chem-specific	MW	Molecular Weight

5) Derivation of Concentration Leaving Shower Droplet Shower Model

$$C_{wd} = C_0 * (1 - \exp [(-K_{aL} * t_s) / (60 * d)])$$

Values		
calc	C_{wd}	Concentration leaving shower droplet after time t_s (µg/L)
chem-specific	C_0	Initial concentration in tap water (µg/L)
calc	K_{aL}	Adjusted overall mass transfer coefficient (cm/hour)
2	t_s	Shower droplet drop time (sec)
60		Interficial area for droplet multiplied by conversion factors
1	d	Shower droplet diameter (mm)

6) Derivation of VOC in Air Generation Rate Shower Model

$$S = (C_{wd} * FR) / SV$$

Values		
calc	S	VOC in air generation rate ($\mu g/m^3\text{-}min$)
calc	C_{wd}	Concentration leaving shower droplet after time t_s (µg/L)

Table A4-5
Integrated Exposure Uptake Biokinetic (IEUBK) Model Results
Lead in Groundwater, Child Resident
Residential Well 0155 Tapwater Results
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Lead Site-Specific Information for the Child Resident Scenario			
Well ID	**Medium**	**EPC Value**	**Units**
0155	Groundwater	23	µg/L

IEUBK Model Parameters		Value	Units
Indoor air lead concentration (% of outdoor)		30 [a]	%
AIR (by year)			
Air Concentration			
Age (years) =	0 - 7	0.10 [a]	µg/m^3
Time Outdoors			
Age (months) =	6-12	1 [a]	hours
	12-24	2 [a]	hours
	24-36	3 [a]	hours
	36-48	4 [a]	hours
	48-60	4 [a]	hours
	60-72	4 [a]	hours
	72-84	4 [a]	hours
Ventilation Rate			
Age (months) =	6-12	3.216 [a]	m^3/day
	12-24	4.970 [a]	m^3/day
	24-36	6.086 [a]	m^3/day
	36-48	6.954 [a]	m^3/day
	48-60	7.682 [a]	m^3/day
	60-72	8.318 [a]	m^3/day
	72-84	8.887 [a]	m^3/day
Lung Absorption		32 [a]	%

Table A4-5
Integrated Exposure Uptake Biokinetic (IEUBK) Model Results
Lead in Groundwater, Child Resident
Residential Well 0155 Tapwater Results
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

DIET (by year)			
Dietary Lead Intake			
Age (months) =	6-12	2.26 [a]	µg/day
	12-24	5.03 [a]	µg/day
	24-36	5.21 [a]	µg/day
	36-48	5.38 [a]	µg/day
	48-60	5.64 [a]	µg/day
	60-72	6.04 [a]	µg/day
	72-84	5.95 [a]	µg/day
ALTERNATE DIET SOURCES (by food class)			
Used Alternate Diet Sources?		No	(Yes/No)
DRINKING WATER			
Lead Concentration in drinking water		23	µg Pb/L
Ingestion rate:			
Age (months) =	6-12	0.40 [a]	L/day
	12-24	0.43 [a]	L/day
	24-36	0.51 [a]	L/day
	36-48	0.54 [a]	L/day
	48-60	0.57 [a]	L/day
	60-72	0.60 [a]	L/day
	72-84	0.63 [a]	L/day

Table A4-5
Integrated Exposure Uptake Biokinetic (IEUBK) Model Results
Lead in Groundwater, Child Resident
Residential Well 0155 Tapwater Results
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

SOIL/DUST INGESTION			
Soil ingestion:			
Age (months) =	6-12	200 [a]	µg Pb/g
	12-24	200 [a]	µg Pb/g
	24-36	200 [a]	µg Pb/g
	36-48	200 [a]	µg Pb/g
	48-60	200 [a]	µg Pb/g
	60-72	200 [a]	µg Pb/g
	72-84	200 [a]	µg Pb/g
Household dust:			
Age (months) =	6-12	150 [a]	µg Pb/g
	12-24	150 [a]	µg Pb/g
	24-36	150 [a]	µg Pb/g
	36-48	150 [a]	µg Pb/g
	48-60	150 [a]	µg Pb/g
	60-72	150 [a]	µg Pb/g
	72-84	150 [a]	µg Pb/g
SOIL/DUST MULTIPLE SOURCE ANALYSIS			
Average multiple source concentration		150.00 [a]	µg /g
Mass fraction of outdoor soil to indoor dust conversion facto		0.70 [a]	unitless
Outdoor airborne lead to indoor household dust concentration		100 [a]	µg Pb/g dust per µg Pb/m^3 air
ALTERNATE INDOOR DUST Pb SOURCES			
Used Indoor Dust Pb Sources?		No	(Yes/No)

Table A4-5
Integrated Exposure Uptake Biokinetic (IEUBK) Model Results
Lead in Groundwater, Child Resident
Residential Well 0155 Tapwater Results
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

BIOAVAILABILITY FOR GUT ABSORPTION PATHWAYS			
Total lead absorption (at low intake):	Total Soil		
soil	30	[a]	%
dust	30	[a]	%
water	50	[a]	%
diet	50	[a]	%
alternate source	0	[a]	%
BIOAVAILABILITY FOR GUT ABSORPTION PATHWAYS (continued)			
Fraction of total net absorption at low intake rate that is attributable to non-saturable (passive) processes	0.2	[a]	unitless
MATERNAL-TO-NEWBORN LEAD EXPOSURE			
Mothers blood lead concentration at childbirth	0.6	[a]	µg/dL
PLOTTING AND RISK ESTIMATION			
Geometric standard deviation (GSD) for blood lead	1.6	[a]	unitless
Blood lead level (BLL) of concern	5	[a]	µg/dL
COMPUTATION OPTIONS			
Iteration time step for numerical integration	4	[a]	hours
PROBABILITY DISTRIBUTION PERCENT RESULTS			
Geometric mean	4.1	Calc	unitless
Age Range	12-72	[a]	months
Percent above allowable BLL	34	Calc	%

Notes:

[1] Young child = 0 - 7 years of age (12 - 72 months) (EPA 2021b).

[a] IEUBK model default value (EPA 2021a and 2021b).

L/day = liters per day

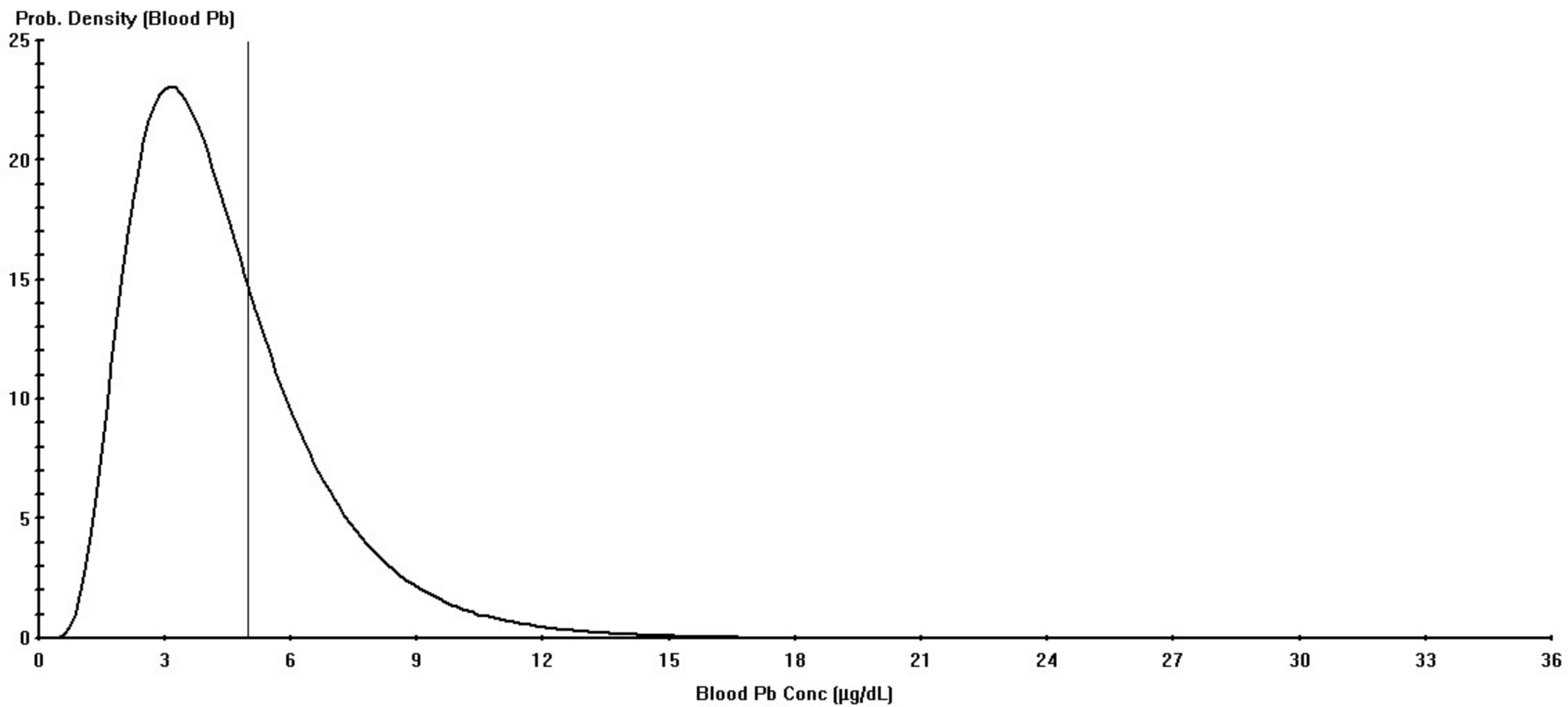
µg/dL = micrograms per deciliter

Table A4-5
Integrated Exposure Uptake Biokinetic (IEUBK) Model Results
Lead in Groundwater, Child Resident
Residential Well 0155 Tapwater Results
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Pb = lead
$\mu g/m^3$ = micrograms per cubic meter
µg/L = micrograms per liter
µg/g = micrograms per gram
mg/kg = milligrams per kilogram

References:

EPA 2021a. Integrated Exposure Uptake Biokinetic Model for Lead in Children, Windows® version (IEUBKwinv2 build 1.66) Dated May 2021.
EPA 2021b. User's Guide for the Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK) Windows® version 2 (Updated May 2021). The Technical Review Workgroup (TRW) Lead Committee.



Cutoff = 5.000 µg/dl
Geo Mean = 4.100
GSD = 1.600
% Above = 33.647
% Below = 66.353

Age Range = 12 to 72 months

Run Mode = Research
Comment = 0155 - 23 ug/L

These IEUBK Model results are valid as long as they were produced with an official, unmodified version of the IEUBK Model with a software certificate.
While IEUBK Model output is generally written with three digits to the right of the decimal point, the true precision of the output is strongly influenced by least precise input values.

Table A4-6
Integrated Exposure Uptake Biokinetic (IEUBK) Model Results
Lead in Groundwater, Child Resident
Residential Well 0176 Tapwater Results
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Lead Site-Specific Information for the Child Resident Scenario			
Well ID	**Medium**	**EPC Value**	**Units**
0176	Groundwater	15	µg/L

IEUBK Model Parameters		Value	Units
Indoor air lead concentration (% of outdoor)		30 [a]	%
AIR (by year)			
Air Concentration			
Age (years) =	0 - 7	0.10 [a]	µg/m^3
Time Outdoors			
Age (months) =	6-12	1 [a]	hours
	12-24	2 [a]	hours
	24-36	3 [a]	hours
	36-48	4 [a]	hours
	48-60	4 [a]	hours
	60-72	4 [a]	hours
	72-84	4 [a]	hours
Ventilation Rate			
Age (months) =	6-12	3.216 [a]	m^3/day
	12-24	4.97 [a]	m^3/day
	24-36	6.086 [a]	m^3/day
	36-48	6.954 [a]	m^3/day
	48-60	7.682 [a]	m^3/day
	60-72	8.318 [a]	m^3/day
	72-84	8.887 [a]	m^3/day
Lung Absorption		32 [a]	%

Table A4-6
Integrated Exposure Uptake Biokinetic (IEUBK) Model Results
Lead in Groundwater, Child Resident
Residential Well 0176 Tapwater Results
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

DIET (by year)			
Dietary Lead Intake			
Age (months) =	6-12	2.26 [a]	µg/day
	12-24	5.03 [a]	µg/day
	24-36	5.21 [a]	µg/day
	36-48	5.38 [a]	µg/day
	48-60	5.64 [a]	µg/day
	60-72	6.04 [a]	µg/day
	72-84	5.95 [a]	µg/day
ALTERNATE DIET SOURCES (by food class)			
Used Alternate Diet Sources?		No	(Yes/No)
DRINKING WATER			
Lead Concentration in drinking water		15	µg Pb/L
Ingestion rate:			
Age (months) =	6-12	0.40 [a]	L/day
	12-24	0.43 [a]	L/day
	24-36	0.51 [a]	L/day
	36-48	0.54 [a]	L/day
	48-60	0.57 [a]	L/day
	60-72	0.60 [a]	L/day
	72-84	0.63 [a]	L/day

Table A4-6
Integrated Exposure Uptake Biokinetic (IEUBK) Model Results
Lead in Groundwater, Child Resident
Residential Well 0176 Tapwater Results
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

SOIL/DUST INGESTION			
Soil ingestion:			
Age (months) =	6-12	200 [a]	µg Pb/g
	12-24	200 [a]	µg Pb/g
	24-36	200 [a]	µg Pb/g
	36-48	200 [a]	µg Pb/g
	48-60	200 [a]	µg Pb/g
	60-72	200 [a]	µg Pb/g
	72-84	200 [a]	µg Pb/g
Household dust:			
Age (months) =	6-12	150 [a]	µg Pb/g
	12-24	150 [a]	µg Pb/g
	24-36	150 [a]	µg Pb/g
	36-48	150 [a]	µg Pb/g
	48-60	150 [a]	µg Pb/g
	60-72	150 [a]	µg Pb/g
	72-84	150 [a]	µg Pb/g
SOIL/DUST MULTIPLE SOURCE ANALYSIS			
Average multiple source concentration		150.00 [a]	µg /g
Mass fraction of outdoor soil to indoor dust conversion facto		0.70 [a]	unitless
Outdoor airborne lead to indoor household dust concentration		100 [a]	µg Pb/g dust per µg Pb/m^3 air
ALTERNATE INDOOR DUST Pb SOURCES			
Used Indoor Dust Pb Sources?		No	(Yes/No)

Table A4-6
Integrated Exposure Uptake Biokinetic (IEUBK) Model Results
Lead in Groundwater, Child Resident
Residential Well 0176 Tapwater Results
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

BIOAVAILABILITY FOR GUT ABSORPTION PATHWAYS			
Total lead absorption (at low intake):	Total Soil		
soil	30	[a]	%
dust	30	[a]	%
water	50	[a]	%
diet	50	[a]	%
alternate source	0	[a]	%
BIOAVAILABILITY FOR GUT ABSORPTION PATHWAYS (continued)			
Fraction of total net absorption at low intake rate that is attributable to non-saturable (passive) processes	0.2	[a]	unitless
MATERNAL-TO-NEWBORN LEAD EXPOSURE			
Mothers blood lead concentration at childbirth	0.6	[a]	µg/dL
PLOTTING AND RISK ESTIMATION			
Geometric standard deviation (GSD) for blood lead	1.6	[a]	unitless
Blood lead level (BLL) of concern	5	[a]	µg/dL
COMPUTATION OPTIONS			
Iteration time step for numerical integration	4	[a]	hours
PROBABILITY DISTRIBUTION PERCENT RESULTS			
Geometric mean	3.466	Calc	unitless
Age Range	12-72	[a]	months
Percent above allowable BLL	22	Calc	%

Notes:

[1] Young child = 0 - 7 years of age (12 - 72 months) (EPA 2021b).

[a] IEUBK model default value (EPA 2021a and 2021b).

L/day = liters per day

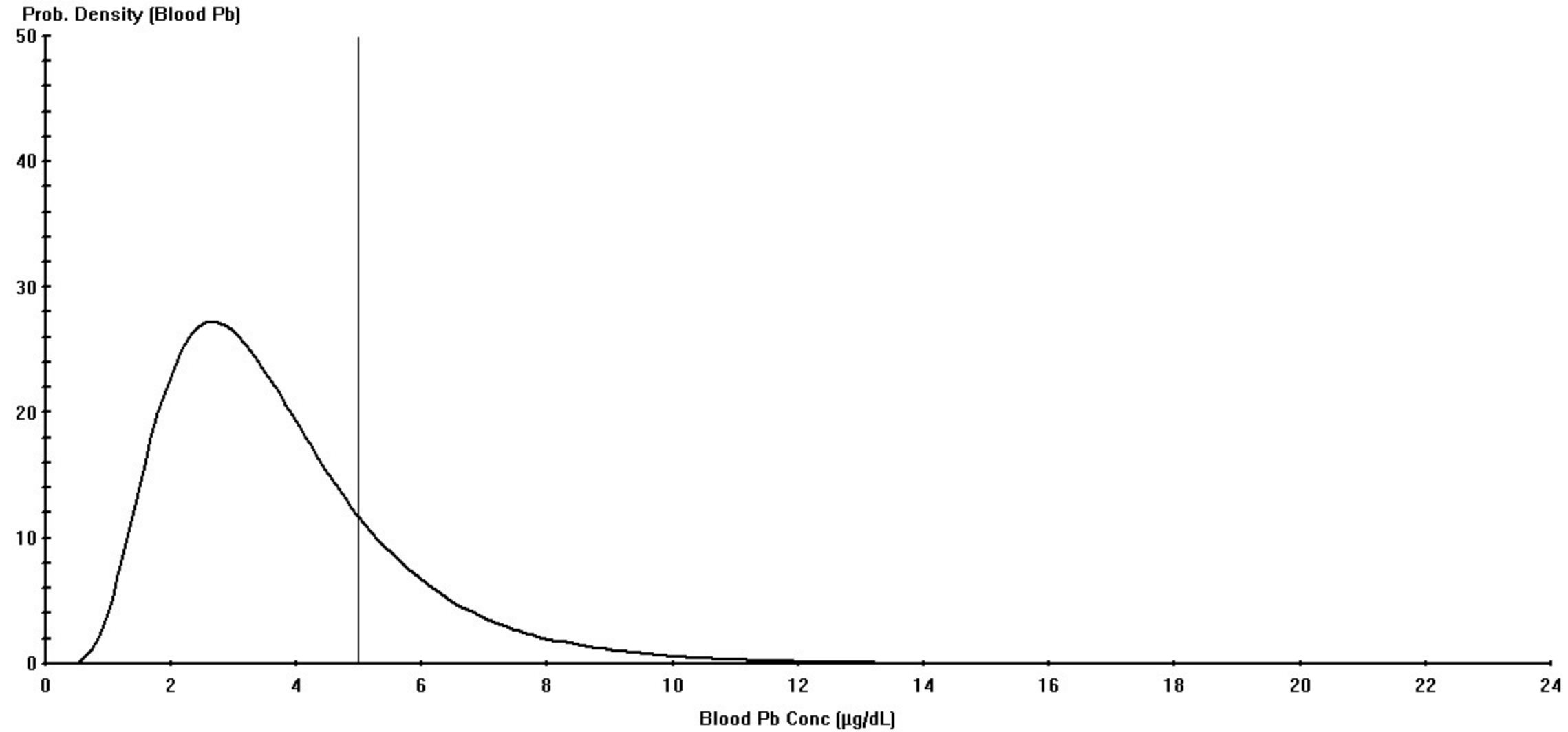
µg/dL = micrograms per deciliter

Table A4-6
Integrated Exposure Uptake Biokinetic (IEUBK) Model Results
Lead in Groundwater, Child Resident
Residential Well 0176 Tapwater Results
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Pb = lead
µg/m^3 = micrograms per cubic meter
µg/L = micrograms per liter
µg/g = micrograms per gram
mg/kg = milligrams per kilogram

References:

EPA 2021a. Integrated Exposure Uptake Biokinetic Model for Lead in Children, Windows® version (IEUBKwinv2 build 1.66) Dated May 2021.
EPA 2021b. User's Guide for the Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK) Windows® version 2 (Updated May 2021). The Technical Review Workgroup (TRW) Lead Committee.



Cutoff = 5.000 µg/dl
Geo Mean = 3.466
GSD = 1.600
% Above = 21.787
% Below = 78.213

Age Range = 12 to 72 months

Run Mode = Research
Comment = 0176 - 15 ug/L

These IEUBK Model results are valid as long as they were produced with an official, unmodified version of the IEUBK Model with a software certificate.
While IEUBK Model output is generally written with three digits to the right of the decimal point, the true precision of the output is strongly influenced by least precise input values.

Table A4-7
Integrated Exposure Uptake Biokinetic (IEUBK) Model Results
Lead in Groundwater, Child Resident
Residential Well 0212 Tapwater Results
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Lead Site-Specific Information for the Child Resident Scenario			
Well ID	**Medium**	**EPC Value**	**Units**
0212	Groundwater	16	µg/L

IEUBK Model Parameters		Value	Units
Indoor air lead concentration (% of outdoor)		30 [a]	%
AIR (by year)			
Air Concentration			
Age (years) =	0 - 7	0.10 [a]	µg/m^3
Time Outdoors			
Age (months) =	6-12	1 [a]	hours
	12-24	2 [a]	hours
	24-36	3 [a]	hours
	36-48	4 [a]	hours
	48-60	4 [a]	hours
	60-72	4 [a]	hours
	72-84	4 [a]	hours
Ventilation Rate			
Age (months) =	6-12	3.216 [a]	m^3/day
	12-24	4.97 [a]	m^3/day
	24-36	6.086 [a]	m^3/day
	36-48	6.954 [a]	m^3/day
	48-60	7.682 [a]	m^3/day
	60-72	8.318 [a]	m^3/day
	72-84	8.887 [a]	m^3/day
Lung Absorption		32 [a]	%

Table A4-7
Integrated Exposure Uptake Biokinetic (IEUBK) Model Results
Lead in Groundwater, Child Resident
Residential Well 0212 Tapwater Results
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

DIET (by year)			
Dietary Lead Intake			
Age (months) =	6-12	2.26 [a]	µg/day
	12-24	5.03 [a]	µg/day
	24-36	5.21 [a]	µg/day
	36-48	5.38 [a]	µg/day
	48-60	5.64 [a]	µg/day
	60-72	6.04 [a]	µg/day
	72-84	5.95 [a]	µg/day
ALTERNATE DIET SOURCES (by food class)			
Used Alternate Diet Sources?		No	(Yes/No)
DRINKING WATER			
Lead Concentration in drinking water		16	µg Pb/L
Ingestion rate:			
Age (months) =	6-12	0.40 [a]	L/day
	12-24	0.43 [a]	L/day
	24-36	0.51 [a]	L/day
	36-48	0.54 [a]	L/day
	48-60	0.57 [a]	L/day
	60-72	0.60 [a]	L/day
	72-84	0.63 [a]	L/day

Table A4-7
Integrated Exposure Uptake Biokinetic (IEUBK) Model Results
Lead in Groundwater, Child Resident
Residential Well 0212 Tapwater Results
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

SOIL/DUST INGESTION		
Soil ingestion:		
Age (months) = 6-12	200 [a]	µg Pb/g
12-24	200 [a]	µg Pb/g
24-36	200 [a]	µg Pb/g
36-48	200 [a]	µg Pb/g
48-60	200 [a]	µg Pb/g
60-72	200 [a]	µg Pb/g
72-84	200 [a]	µg Pb/g
Household dust:		
Age (months) = 6-12	150 [a]	µg Pb/g
12-24	150 [a]	µg Pb/g
24-36	150 [a]	µg Pb/g
36-48	150 [a]	µg Pb/g
48-60	150 [a]	µg Pb/g
60-72	150 [a]	µg Pb/g
72-84	150 [a]	µg Pb/g
SOIL/DUST MULTIPLE SOURCE ANALYSIS		
Average multiple source concentration	150.00 [a]	µg /g
Mass fraction of outdoor soil to indoor dust conversion factor	0.70 [a]	unitless
Outdoor airborne lead to indoor household dust concentration	100 [a]	µg Pb/g dust per µg Pb/m^3 air
ALTERNATE INDOOR DUST Pb SOURCES		
Used Indoor Dust Pb Sources?	No	(Yes/No)

Table A4-7
Integrated Exposure Uptake Biokinetic (IEUBK) Model Results
Lead in Groundwater, Child Resident
Residential Well 0212 Tapwater Results
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

BIOAVAILABILITY FOR GUT ABSORPTION PATHWAYS		
Total lead absorption (at low intake):	Total Soil	
soil	30 [a]	%
dust	30 [a]	%
water	50 [a]	%
diet	50 [a]	%
alternate source	0 [a]	%
BIOAVAILABILITY FOR GUT ABSORPTION PATHWAYS (continued)		
Fraction of total net absorption at low intake rate that is attributable to non-saturable (passive) processes	0.2 [a]	unitless
MATERNAL-TO-NEWBORN LEAD EXPOSURE		
Mothers blood lead concentration at childbirth	0.6 [a]	µg/dL
PLOTTING AND RISK ESTIMATION		
Geometric standard deviation (GSD) for blood lead	1.6 [a]	unitless
Blood lead level (BLL) of concern	5 [a]	µg/dL
COMPUTATION OPTIONS		
Iteration time step for numerical integration	4 [a]	hours
PROBABILITY DISTRIBUTION PERCENT RESULTS		
Geometric mean	3.547 Calc	unitless
Age Range	12-72 [a]	months
Percent above allowable BLL	23 Calc	%

Notes:

[1] Young child = 0 - 7 years of age (12 - 72 months) (EPA 2021b).

[a] IEUBK model default value (EPA 2021a and 2021b).

L/day = liters per day

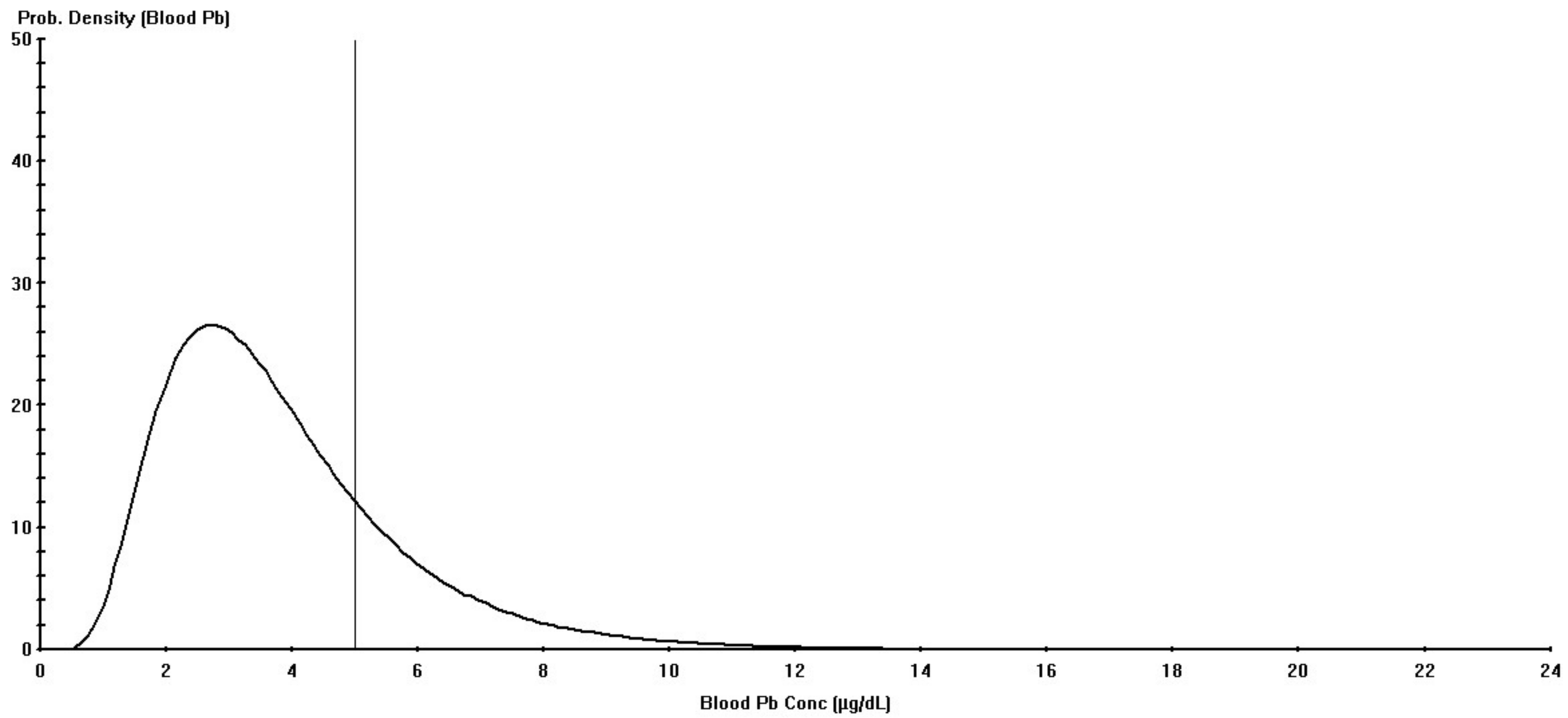
µg/dL = micrograms per deciliter

Table A4-7
Integrated Exposure Uptake Biokinetic (IEUBK) Model Results
Lead in Groundwater, Child Resident
Residential Well 0212 Tapwater Results
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Pb = lead
µg/m^3 = micrograms per cubic meter
µg/L = micrograms per liter
µg/g = micrograms per gram
mg/kg = milligrams per kilogram

References:

EPA 2021a. Integrated Exposure Uptake Biokinetic Model for Lead in Children, Windows® version (IEUBKwinv2 build 1.66) Dated May 2021.
EPA 2021b. User's Guide for the Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK) Windows® version 2 (Updated May 2021). The Technical Review Workgroup (TRW) Lead Committee.



Cutoff = 5.000 µg/dl
Geo Mean = 3.547
GSD = 1.600
% Above = 23.246
% Below = 76.754

Age Range = 12 to 72 months

Run Mode = Research
Comment = 0212 - 16 ug/L

These IEUBK Model results are valid as long as they were produced with an official, unmodified version of the IEUBK Model with a software certificate.
While IEUBK Model output is generally written with three digits to the right of the decimal point, the true precision of the output is strongly influenced by least precise input values.

Attachment 5

Human Health Carcinogenic Risk and Non-Carcinogenic Hazard Calculations

Table A5-1
Non-Cancer Toxicity Data - Oral/Dermal
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Constituent of Interest	Chronic/ Subchronic [3]	Oral RfD		Oral Absorption Effiency for Dermal [1]	Absorbed RfD for Dermal [2]		Primary Target Organ/System(s)	Combined Uncertainty/ Modifying Factors	RfD: Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)[4] (MM/DD/YYYY)
Volatile Organic Compounds (VOCs)										
Chloroform	Chronic	0.01	mg/kg-day	1	0.01	mg/kg-day	HP	100	IRIS	3/18/2022
Chloroform	Subchronic	0.1	mg/kg-day	1	0.1	mg/kg-day	HP	100	ATSDR	2/1/2022
Perfluorinated Compounds										
Perfluorooctanoic acid (PFOA)	Chronic	0.000003	mg/kg-day	1	3.00E-06	mg/kg-day	DV	300	ATSDR	6/9/2022
Perfluorooctanoic acid (PFOA)	Subchronic	0.000003	mg/kg-day	1	3.00E-06	mg/kg-day	DV	300	ATSDR	6/9/2022
Perfluorooctanesulfonic acid (PFOS)	Chronic	0.000002	mg/kg-day	1	2.00E-06	mg/kg-day	DV	30	ATSDR	6/8/2022
Perfluorooctanesulfonic acid (PFOS)	Subchronic	0.000002	mg/kg-day	1	2.00E-06	mg/kg-day	DV	30	ATSDR	6/8/2022
Cyanide										
Cyanide	Chronic	0.0006	mg/kg-day	1	0.0006	mg/kg-day	RP	3000	IRIS	4/7/2022
Cyanide	Subchronic	0.02	mg/kg-day	1	0.02	mg/kg-day	OT; EN; NV	500	HEAST	7/31/1997
Metals (Total)										
Arsenic	Chronic	0.0003	mg/kg-day	1	0.0003	mg/kg-day	DM; HM	3	IRIS	4/7/2022
Arsenic	Subchronic	0.005	mg/kg-day	1	0.005	mg/kg-day	DM	10	IRIS	4/7/2022
Barium	Chronic	0.2	mg/kg-day	0.07	0.014	mg/kg-day	NV	300	IRIS	4/7/2022
Barium	Subchronic	0.2	mg/kg-day	0.07	0.014	mg/kg-day	UR	10	ATSDR	2/1/2022
Beryllium	Chronic	0.002	mg/kg-day	0.007	0.000014	mg/kg-day	GI	300	IRIS	4/7/2022
Beryllium	Subchronic	0.005	mg/kg-day	0.007	0.000035	mg/kg-day	--	100	HEAST	7/31/1997
Cadmium (Water)	Chronic	0.0001	mg/kg-day	0.05	0.000005	mg/kg-day	UR	3	ATSDR	2/1/2022
Cadmium (Water)	Subchronic	0.0005	mg/kg-day	0.05	0.000025	mg/kg-day	MS	100	ATSDR	2/1/2022
Chromium, Hexavalent	Chronic	0.003	mg/kg-day	0.025	0.000075	mg/kg-day	--	900	IRIS	4/7/2022
Chromium, Hexavalent	Subchronic	0.005	mg/kg-day	0.025	0.000125	mg/kg-day	HM	100	ATSDR	2/1/2022
Cobalt	Chronic	0.0003	mg/kg-day	1	0.0003	mg/kg-day	EN	3000	PPRTV	4/7/2022
Cobalt	Subchronic	0.003	mg/kg-day	1	0.003	mg/kg-day	EN	300	PPRTV	4/7/2022
Copper	Chronic	0.04	mg/kg-day	1	0.04	mg/kg-day	GI	--	HEAST	7/31/1997
Copper	Subchronic	0.01	mg/kg-day	1	0.01	mg/kg-day	GI	3	ATSDR	2/1/2022
Iron	Chronic	0.7	mg/kg-day	1	0.7	mg/kg-day	GI	1.5	PPRTV	4/7/2022
Iron	Subchronic	0.7	mg/kg-day	1	0.7	mg/kg-day	GI	1.5	PPRTV	4/7/2022
Manganese	Chronic	0.024	mg/kg-day	0.04	0.00096	mg/kg-day	NV	3	--	4/7/2022
Manganese	Subchronic	--	mg/kg-day	0.04	--	mg/kg-day	--	--	--	4/7/2022
Nickel	Chronic	0.02	mg/kg-day	0.04	0.0008	mg/kg-day	OT	300	IRIS	4/7/2022
Nickel	Subchronic	0.02	mg/kg-day	0.04	0.0008	mg/kg-day	OT	300	HEAST	7/31/1997

Notes:

-- = No Value; mg/kg-day = milligrams per kilogram -day; RfD = Reference Dose

(1) Source: U.S. Environmental Protection Agency (EPA) July 2004. Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. Office of Emergency and Remedial Response. Washington D.C. EPA/540/R/99/005.

(2) To derive the Absorbed RfD for Dermal, the oral RfD is multiplied by the oral absorption efficiency.

RfD: Target Organ Source Information:

ATSDR = Agency for Toxic Substance & Disease Registry (https://www.atsdr.cdc.gov)

HEAST = Health Effects Assessment Summary Table (https://www.epa-heast.ornl.gov/)

IRIS = Integrated Risk Information System (https://www.epa.gov/iris)

PPRTV = Provisional Peer-Reviewed Toxicity Values (https://www.hhpprtv.ornl.gov/)

Table A5-1
Non-Cancer Toxicity Data - Oral/Dermal
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Constituent of Interest	Chronic/ Subchronic [3]	Oral RfD		Oral Absorption Effiency for Dermal [1]	Absorbed RfD for Dermal [2]		Primary Target Organ/System(s)	Combined Uncertainty/ Modifying Factors	RfD: Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)[4] (MM/DD/YYYY)

(3) If no subchronic toxicity value is available, then the chronic value is used in the calculations.

(4) With the exception of HEAST, source date represents when toxicity data were researched in on-line databases.

Target Organ Codes:

CV = Cardiovascular	HM = Hematological	OC = Ocular
DM = Dermal	HP = Hepatic	OT = Other
DV = Developmental	IM = Immune	RP = Reproductive
EN = Endocrine	MS = Musculoskeletal	UR = Urinary
GI = Gastrointestinal	NV = Nervous	

Table A5-2
Non-Cancer Toxicity Data - Inhalation
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Constituent of Interest	Chronic/ Subchronic	Inhalation RfC		Primary Target Organ/System(s)	Combined Uncertainty/ Modifying Factors	RfC: Target Organ(s)	
		Value	Units			Source(s)	Date(s)[1] (MM/DD/YYYY)
Volatile Organic Compounds (VOCs)							
Chloroform	Chronic	0.097652352	mg/m³	HP	100	ATSDR	2/1/2022
Chloroform	Subchronic	0.244130879	mg/m³	HP	100	ATSDR	2/1/2022
Perfluorinated Compounds							
Perfluorooctanoic acid (PFOA)	Chronic	--	--	--	--	--	6/9/2022
Perfluorooctanoic acid (PFOA)	Subchronic	--	--	--	--	--	6/9/2022
Perfluorooctanesulfonic acid (PFOS)	Chronic	--	--	--	--	--	6/8/2022
Perfluorooctanesulfonic acid (PFOS)	Subchronic	--	--	--	--	--	6/8/2022
Cyanide							
Cyanide	Chronic	0.0008	mg/m³	EN	3000	--	4/7/2022
Cyanide	Subchronic	--	--	--	--	--	4/7/2022
Metals (Total)							
Arsenic	Chronic	0.000015	mg/m³	--	--	Cal EPA	4/7/2022
Arsenic	Subchronic	--	mg/m³	--	--	--	4/7/2022
Barium	Chronic	0.0005	mg/m³	DV	1000	HEAST	7/31/1997
Barium	Subchronic	0.005	mg/m³	DV	100	HEAST	7/31/1997
Beryllium	Chronic	0.00002	mg/m³	IM; RS	10	IRIS	4/7/2022
Beryllium	Subchronic	--	mg/m³	--	--	--	4/7/2022
Cadmium (Water)	Chronic	0.00001	mg/m³	UR	3	ATSDR	2/1/2022
Cadmium (Water)	Subchronic	--	mg/m³	--	--	--	4/7/2022
Chromium, Hexavalent	Chronic	0.0001	mg/m³	RS	300	IRIS	4/7/2022
Chromium, Hexavalent	Subchronic	0.0003	mg/m³	RS	30	ATSDR	2/1/2022
Cobalt	Chronic	0.000006	mg/m³	RS	300	PPRTV	4/7/2022
Cobalt	Subchronic	0.00002	mg/m³	RS	100	PPRTV	4/7/2022
Copper	Chronic	--	--	--	--	--	4/7/2022
Copper	Subchronic	--	--	--	--	--	4/7/2022
Iron	Chronic	--	--	--	--	--	4/7/2022
Iron	Subchronic	--	--	--	--	--	4/7/2022
Manganese	Chronic	0.00005	mg/m³	NV	1000	IRIS	4/7/2022
Manganese	Subchronic	--	mg/m³	--	--	--	4/7/2022
Nickel	Chronic	0.00009	mg/m³	RS	30	ATSDR	2/1/2022
Nickel	Subchronic	0.0002	mg/m³	RS	30	ATSDR	2/1/2022

Notes:
-- = No Value
N/A = Not Available
RfC = Reference Concentration
µg/m³ = micrograms per cubic meter
(1) With the exception of HEAST, source date represents when toxicity data were researched in on-line databases.

Target Organ Source Information:
ATSDR = Agency for Toxic Substance & Disease Registry (https://www.atsdr.cdc.gov)
Cal EPA = California Environmental Protection Agency (https://calepa.ca.gov/)
HEAST = Health Effects Assessment Summary Table (https://www.epa-heast.ornl.gov/)
IRIS = Integrated Risk Information System (https://www.epa.gov/iris)
PPRTV = Provisional Peer-Reviewed Toxicity Values (https://www.hhpprtv.ornl.gov/)

Table A5-2
Non-Cancer Toxicity Data - Inhalation
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Constituent of Interest	Chronic/ Subchronic	Inhalation RfC		Primary Target Organ/System(s)	Combined Uncertainty/ Modifying Factors	RfC: Target Organ(s)	
		Value	Units			Source(s)	Date(s)[1] (MM/DD/YYYY)

Target Organ Codes:

CV = Cardiovascular	IM = Immune	RS = Respiratory
DM = Dermal	NV = Nervous	UR = Urinary
DV = Developmental	OC = Ocular	
HM = Hematological	OT = Other	
HP = Hepatic	RP = Reproductive	

Table A6-1
Cancer Toxicity Data - Oral/Dermal
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Constituent of Interest	Oral Cancer Slope Factor		Oral Absorption Effiency for Dermal [1]	Absorbed Cancer Slope Factor for Dermal [2]		Weight of Evidence/ Cancer Guideline Description	Cancer Slope Factor	
	Value	Units		Value	Units		Source(s)	Date(s)[3] (MM/DD/YYYY)
Volatile Organic Compounds (VOCs)								
Chloroform	0.031	kg-day/mg	1	0.031	kg-day/mg	N/A	Cal EPA	3/18/2022
Perfluorinated Compounds								
Perfluorooctanoic acid (PFOA)	7.00E-02	kg-day/mg	1	0.07	kg-day/mg	N/A	DWSHA	6/9/2022
Perfluorooctanesulfonic acid (PFOS)	--	kg-day/mg	1	--	kg-day/mg	--	--	6/8/2022
Cyanide								
Cyanide	--	--	1	--	--	--	--	4/7/2022
Metals (Total)								
Arsenic	1.5	kg-day/mg	1	1.5	kg-day/mg	A	IRIS	4/7/2022
Barium	--	--	0.07	--	--	--	--	4/7/2022
Beryllium	--	--	0.007	--	--	--	--	4/7/2022
Cadmium (Water)	--	--	0.05	--	--	--	--	4/7/2022
Chromium, Hexavalent	0.5	kg-day/mg	0.025	20	kg-day/mg	N/A	Cal EPA	4/7/2022
Cobalt	--	--	1	--	--	--	--	4/7/2022
Copper	--	--	1	--	--	--	--	4/7/2022
Iron	--	--	1	--	--	--	--	4/7/2022
Manganese	--	--	0.04	--	--	--	--	4/7/2022
Nickel	--	--	0.04	--	--	--	--	4/7/2022

Notes:

-- = No Value; $(mg/kg\text{-}day)^{-1}$ = one over milligrams per kilogram-day

(1) Source: U.S. Environmental Protection Agency (EPA) July 2004. Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. Office of Emergency and Remedial Response. Washington D.C. EPA/540/R/99/005.

(2) To derive the Absorbed Cancer Slope Factor for Dermal, the oral cancer slope factor is divided by the oral absorption efficiency for dermal.

(3) With the exception of HEAST, source date represents when toxicity data were researched in on-line databases.

Sources:

BaP x TEF = Carcinogenicity determined by adjusting benzo(a)pyrene (BaP) by a toxicity equivalence factor (TEF)
Cal EPA = California Environmental Protection Agency (https://calepa.ca.gov/)
DWSHA = Drinking Water Standards and Health Advisories (https://www.epa.gov/sdwa/epa-non-regulatory-health-based-drinking-water-levels)
HEAST = Health Effects Assessment Summary Table (https://www.epa-heast.ornl.gov/)
IRIS = Integrated Risk Information System (https://www.epa.gov/iris)
PPRTV = Provisional Peer Reviewed Toxicity Values for Superfund (https://hhpprtv.ornl.gov/)
USEPA, 1986 = Guidelines for Carcinogen Risk Assessment
USEPA, 1996 = Proposed Guidelines for Carcinogen Risk Assessment

Weight of Evidence:

A = Human Carcinogen (USEPA, 1986)
B1 = Probable Human Carcinogen - Based on Limited Evidence in Humans (USEPA, 1986)
B2 = Probable Human Carcinogen - Based on Sufficient Evidence in Animals (USEPA, 1986)
C = Possible Human Carcinogen (USEPA, 1986)
Carcinogenic to Humans (USEPA, 2005)
Known/Likely Human Carcinogen (USEPA, 1996)
LI = Likely to be Carcinogenic to Humans (PPRTV)
Likely to be Carcinogenic to Humans (USEPA, 2005)
N/A = Not Available
SU = Suggestive Evidence of Carcinogenicity in Humans (PPRTV)
Suggestive Evidence of Carcinogenic Potential (CP) (USEPA, 2005)

Table A6-1
Cancer Toxicity Data - Oral/Dermal
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Constituent of Interest	Oral Cancer Slope Factor		Oral Absorption Effiency for Dermal [1]	Absorbed Cancer Slope Factor for Dermal [2]		Weight of Evidence/ Cancer Guideline Description	Cancer Slope Factor	
	Value	Units		Value	Units		Source(s)	Date(s)[3] (MM/DD/YYYY)

USEPA, 1999 = Revised Draft Guidelines for Carcinogen Risk Assessment
USEPA, 2005 = Guidelines for Carcinogen Risk Assessment

Table A6-2
Cancer Toxicity Data - Inhalation
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Constituent of Interest	Inhalation Unit Risk		Weight of Evidence/ Cancer Guideline Description	Inhalation Unit Risk	
	Value	Units		Source(s)	Date(s)[(1)] (MM/DD/YYYY)
Volatile Organic Compounds (VOCs)					
Chloroform	0.000023	$m^3/\mu g$	Likely to be Carcinogenic to Humans	IRIS	3/18/2022
Perfluorinated Compounds					
Perfluorooctanoic acid (PFOA)	--	--	--	--	6/9/2022
Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	6/8/2022
Cyanide					
Cyanide	--	--	--	--	4/7/2022
Metals (Total)					
Arsenic	0.0043	$m^3/\mu g$	A	IRIS	4/7/2022
Barium	--	--	--	--	4/7/2022
Beryllium	0.0024	$m^3/\mu g$	Known/Likely Human Carcinogen	IRIS	4/7/2022
Cadmium (Water)	0.0018	$m^3/\mu g$	B1	IRIS	4/7/2022
Chromium, Hexavalent	0.084	$m^3/\mu g$	Known/Likely Human Carcinogen	Cal EPA	4/7/2022
Cobalt	0.009	$m^3/\mu g$	LI	PPRTV	4/7/2022
Copper	--	--	--	--	4/7/2022
Iron	--	--	--	--	4/7/2022
Manganese	--	--	--	--	4/7/2022
Nickel	0.00026	$m^3/\mu g$	N/A	Cal EPA	4/7/2022

Notes:
-- = No Value
$(\mu g/m^3)$-1 = one over micrograms per cubic meter
(1) With the exception of HEAST, source date represents when toxicity data were researched in on-line databases.

Sources:
BaP x TEF = Carcinogencity determined by adjusting benzo(a)pyrene (BaP) by a toxicity equivalence factor (TEF)
Cal EPA = California Environmental Protection Agency (https://calepa.ca.gov/)
HEAST = Health Effects Assessment Summary Table (https://www.epa-heast.ornl.gov/)
IRIS = Integrated Risk Information System (https://www.epa.gov/iris)
PPRTV = Provisional Peer Reviewed Toxicity Values for Superfund (https://hhpprtv.ornl.gov/)
USEPA, 1986 = Guidelines for Carcinogen Risk Assessment
USEPA, 1996 = Proposed Guidelines for Carcinogen Risk Assessment
USEPA, 1999 = Revised Draft Guidelines for Carcinogen Risk Assessment
USEPA, 2005 = Guidelines for Carcinogen Risk Assessment

Weight of Evidence:
A = Human Carcinogen (USEPA, 1986)
B1 = Probable Human Carcinogen - Based on Limited Evidence in Humans (USEPA, 1986)
B2 = Probable Human Carcinogen - Based on Sufficient Evidence in Animals (USEPA, 1986)
C = Possible Human Carcinogen (USEPA, 1986)
Carcinogenic to Humans (USEPA, 2005)
Known/Likely Human Carcinogen (USEPA, 1996)
LI = Likely to be Carcinogenic to Humans (PPRTV)
Likely to be Carcinogenic to Humans (USEPA, 2005)
N/A = Not Available
Suggestive Evidence of Carcinogenic Potential (USEPA, 2005)

Table A6-2
Cancer Toxicity Data - Inhalation
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Constituent of Interest	Inhalation Unit Risk		Weight of Evidence/ Cancer Guideline Description	Inhalation Unit Risk	
	Value	Units		Source(s)	Date(s)[1] (MM/DD/YYYY)

Table A7-1
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0124)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Perfluorinated Compounds												
				Perfluorooctanesulfonic acid (PFOS)	1.10E-05	mg/L	(2)	--	--	--	--	5.48E-07	mg/kg-day	2.00E-06	mg/kg-day	0.3
				Cyanide												
				Cyanide	4.60E-03	mg/L	(2)	--	--	--	--	2.29E-04	mg/kg-day	6.00E-04	mg/kg-day	0.4
				Metals (Total)												
				Barium	4.80E-01	mg/L	(2)	--	--	--	--	2.39E-02	mg/kg-day	2.00E-01	mg/kg-day	0.1
				Cobalt	3.00E-02	mg/L	(2)	--	--	--	--	1.50E-03	mg/kg-day	3.00E-04	mg/kg-day	5
				Copper	2.50E-01	mg/L	(2)	--	--	--	--	1.25E-02	mg/kg-day	4.00E-02	mg/kg-day	0.3
				Manganese	1.90E-01	mg/L	(2)	--	--	--	--	9.47E-03	mg/kg-day	2.40E-02	mg/kg-day	0.4
			Exp. Route Total								--					6
			Dermal													
				Cyanide												
				Cyanide	4.60E-03	mg/L	(2)	--	--	--	--	1.56E-06	mg/kg-day	6.00E-04	mg/kg-day	0.003
				Metals (Total)												
				Barium	4.80E-01	mg/L	(2)	--	--	--	--	1.05E-04	mg/kg-day	1.40E-02	mg/kg-day	0.008
				Cobalt	3.00E-02	mg/L	(2)	--	--	--	--	2.64E-06	mg/kg-day	3.00E-04	mg/kg-day	0.009
				Copper	2.50E-01	mg/L	(2)	--	--	--	--	5.49E-05	mg/kg-day	4.00E-02	mg/kg-day	0.001
				Manganese	1.90E-01	mg/L	(2)	--	--	--	--	4.17E-05	mg/kg-day	9.60E-04	mg/kg-day	0.04
			Exp. Route Total								--					0.06
		Exp. Point Total									--					7
	Exp. Medium Total										--					7
Medium Total											--					7
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-2
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0124)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Perfluorinated Compounds												
				Perfluorooctanesulfonic acid (PFOS)	1.10E-05	mg/L	(2)	--	--	--	--	3.30E-07	mg/kg-day	2.00E-06	mg/kg-day	0.2
				Cyanide												
				Cyanide	4.60E-03	mg/L	(2)	--	--	--	--	1.38E-04	mg/kg-day	6.00E-04	mg/kg-day	0.2
				Metals (Total)												
				Barium	4.80E-01	mg/L	(2)	--	--	--	--	1.44E-02	mg/kg-day	2.00E-01	mg/kg-day	0.07
				Cobalt	3.00E-02	mg/L	(2)	--	--	--	--	8.99E-04	mg/kg-day	3.00E-04	mg/kg-day	3
				Copper	2.50E-01	mg/L	(2)	--	--	--	--	7.49E-03	mg/kg-day	4.00E-02	mg/kg-day	0.2
				Manganese	1.90E-01	mg/L	(2)	--	--	--	--	5.69E-03	mg/kg-day	2.40E-02	mg/kg-day	0.2
			Exp. Route Total								--					4
			Dermal													
				Cyanide												
				Cyanide	4.60E-03	mg/L	(2)	--	--	--	--	1.09E-06	mg/kg-day	6.00E-04	mg/kg-day	0.002
				Metals (Total)												
				Barium	4.80E-01	mg/L	(2)	--	--	--	--	8.03E-05	mg/kg-day	1.40E-02	mg/kg-day	0.006
				Cobalt	3.00E-02	mg/L	(2)	--	--	--	--	2.01E-06	mg/kg-day	3.00E-04	mg/kg-day	0.007
				Copper	2.50E-01	mg/L	(2)	--	--	--	--	4.18E-05	mg/kg-day	4.00E-02	mg/kg-day	0.001
				Manganese	1.90E-01	mg/L	(2)	--	--	--	--	3.18E-05	mg/kg-day	9.60E-04	mg/kg-day	0.03
			Exp. Route Total								--					0.05
		Exp. Point Total									--					4
	Exp. Medium Total										--					4
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Cyanide												
				Cyanide	2.63E-04	µg/m³	(2)	--	--	--	--	3.46E-03	µg/m³	8.00E-01	µg/m³	0.004
			Exp. Route Total								--					0.004
		Exp. Point Total									--					0.004
	Exp. Medium Total										--					0.004
Medium Total											--					4
Notes:											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											--					4

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-3
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0124)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Perfluorinated Compounds												
				Perfluorooctanesulfonic acid (PFOS)	1.10E-05	mg/L	1.41E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cyanide												
				Cyanide	4.60E-03	mg/L	5.90E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Barium	4.80E-01	mg/L	6.16E-03	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cobalt	3.00E-02	mg/L	3.85E-04	mg/kg-day	--	--	--	(2)	--	--	--	--
				Copper	2.50E-01	mg/L	3.21E-03	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	1.90E-01	mg/L	2.44E-03	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
			Dermal													
				Cyanide												
				Cyanide	4.60E-03	mg/L	4.53E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Barium	4.80E-01	mg/L	3.29E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cobalt	3.00E-02	mg/L	8.22E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Copper	2.50E-01	mg/L	1.71E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	1.90E-01	mg/L	1.30E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
		Exp. Point Total									--					--
	Exp. Medium Total										--					--
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Cyanide												
				Cyanide	2.63E-04	µg/m³	9.89E-04	µg/m³	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
		Exp. Point Total									--					--
	Exp. Medium Total										--					--
Medium Total											--					--
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											--					--

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-4
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0155)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Cyanide												
				Cyanide	4.80E-03	mg/L	(2)	--	--	--	--	2.39E-04	mg/kg-day	6.00E-04	mg/kg-day	0.4
				Metals (Total)												
				Arsenic	3.80E-04	mg/L	(2)	--	--	--	--	1.89E-05	mg/kg-day	3.00E-04	mg/kg-day	0.06
				Barium	1.10E+00	mg/L	(2)	--	--	--	--	5.48E-02	mg/kg-day	2.00E-01	mg/kg-day	0.3
				Cadmium (Water)	3.30E-04	mg/L	(2)	--	--	--	--	1.65E-05	mg/kg-day	1.00E-04	mg/kg-day	0.2
				Cobalt	1.50E-02	mg/L	(2)	--	--	--	--	7.48E-04	mg/kg-day	3.00E-04	mg/kg-day	2
				Copper	1.40E-01	mg/L	(2)	--	--	--	--	6.98E-03	mg/kg-day	4.00E-02	mg/kg-day	0.2
				Manganese	1.20E-01	mg/L	(2)	--	--	--	--	5.98E-03	mg/kg-day	2.40E-02	mg/kg-day	0.2
			Exp. Route Total								--					4
			Dermal													
				Cyanide												
				Cyanide	4.80E-03	mg/L	(2)	--	--	--	--	1.63E-06	mg/kg-day	6.00E-04	mg/kg-day	0.003
				Metals (Total)												
				Arsenic	3.80E-04	mg/L	(2)	--	--	--	--	8.35E-08	mg/kg-day	3.00E-04	mg/kg-day	0.0003
				Barium	1.10E+00	mg/L	(2)	--	--	--	--	2.42E-04	mg/kg-day	1.40E-02	mg/kg-day	0.02
				Cadmium (Water)	3.30E-04	mg/L	(2)	--	--	--	--	7.25E-08	mg/kg-day	5.00E-06	mg/kg-day	0.01
				Cobalt	1.50E-02	mg/L	(2)	--	--	--	--	1.32E-06	mg/kg-day	3.00E-04	mg/kg-day	0.004
				Copper	1.40E-01	mg/L	(2)	--	--	--	--	3.08E-05	mg/kg-day	4.00E-02	mg/kg-day	0.0008
				Manganese	1.20E-01	mg/L	(2)	--	--	--	--	2.64E-05	mg/kg-day	9.60E-04	mg/kg-day	0.03
			Exp. Route Total								--					0.07
		Exp. Point Total									--					4
	Exp. Medium Total										--					4
Medium Total											--					4
Notes:											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-5
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0155)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Cyanide												
				Cyanide	4.80E-03	mg/L	(2)	--	--	--	--	1.44E-04	mg/kg-day	6.00E-04	mg/kg-day	0.2
				Metals (Total)												
				Arsenic	3.80E-04	mg/L	(2)	--	--	--	--	1.14E-05	mg/kg-day	3.00E-04	mg/kg-day	0.04
				Barium	1.10E+00	mg/L	(2)	--	--	--	--	3.30E-02	mg/kg-day	2.00E-01	mg/kg-day	0.2
				Cadmium (Water)	3.30E-04	mg/L	(2)	--	--	--	--	9.89E-06	mg/kg-day	1.00E-04	mg/kg-day	0.1
				Cobalt	1.50E-02	mg/L	(2)	--	--	--	--	4.49E-04	mg/kg-day	3.00E-04	mg/kg-day	1
				Copper	1.40E-01	mg/L	(2)	--	--	--	--	4.20E-03	mg/kg-day	4.00E-02	mg/kg-day	0.1
				Manganese	1.20E-01	mg/L	(2)	--	--	--	--	3.60E-03	mg/kg-day	2.40E-02	mg/kg-day	0.1
			Exp. Route Total								--					2
			Dermal													
				Cyanide												
				Cyanide	4.80E-03	mg/L	(2)	--	--	--	--	1.13E-06	mg/kg-day	6.00E-04	mg/kg-day	0.002
				Metals (Total)												
				Arsenic	3.80E-04	mg/L	(2)	--	--	--	--	6.36E-08	mg/kg-day	3.00E-04	mg/kg-day	0.0002
				Barium	1.10E+00	mg/L	(2)	--	--	--	--	1.84E-04	mg/kg-day	1.40E-02	mg/kg-day	0.01
				Cadmium (Water)	3.30E-04	mg/L	(2)	--	--	--	--	5.52E-08	mg/kg-day	5.00E-06	mg/kg-day	0.01
				Cobalt	1.50E-02	mg/L	(2)	--	--	--	--	1.00E-06	mg/kg-day	3.00E-04	mg/kg-day	0.003
				Copper	1.40E-01	mg/L	(2)	--	--	--	--	2.34E-05	mg/kg-day	4.00E-02	mg/kg-day	0.0006
				Manganese	1.20E-01	mg/L	(2)	--	--	--	--	2.01E-05	mg/kg-day	9.60E-04	mg/kg-day	0.02
			Exp. Route Total								--					0.05
		Exp. Point Total									--					2
	Exp. Medium Total										--					2
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Cyanide												
				Cyanide	2.74E-04	µg/m³	(2)	--	--	--	--	3.61E-03	µg/m³	8.00E-01	µg/m³	0.005
			Exp. Route Total								--					0.005
		Exp. Point Total									--					0.005
	Exp. Medium Total										--					0.005
Medium Total											--					2
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											--					2

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-6
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0155)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Cyanide												
				Cyanide	4.80E-03	mg/L	6.16E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Arsenic	3.80E-04	mg/L	4.88E-06	mg/kg-day	1.50E+00	1/(mg/kg-day)	7E-06	(2)	--	--	--	--
				Barium	1.10E+00	mg/L	1.41E-02	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cadmium (Water)	3.30E-04	mg/L	4.24E-06	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cobalt	1.50E-02	mg/L	1.93E-04	mg/kg-day	--	--	--	(2)	--	--	--	--
				Copper	1.40E-01	mg/L	1.80E-03	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	1.20E-01	mg/L	1.54E-03	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								7E-06					--
			Dermal													
				Cyanide												
				Cyanide	4.80E-03	mg/L	4.73E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Arsenic	3.80E-04	mg/L	2.60E-08	mg/kg-day	1.50E+00	1/(mg/kg-day)	4E-08	(2)	--	--	--	--
				Barium	1.10E+00	mg/L	7.54E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cadmium (Water)	3.30E-04	mg/L	2.26E-08	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cobalt	1.50E-02	mg/L	4.11E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Copper	1.40E-01	mg/L	9.60E-06	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	1.20E-01	mg/L	8.22E-06	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								4E-08					--
		Exp. Point Total									7E-06					--
	Exp. Medium Total										7E-06					--
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Cyanide												
				Cyanide	2.74E-04	µg/m³	1.03E-03	µg/m³	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
		Exp. Point Total									--					--
	Exp. Medium Total										--					--
Medium Total											7E-06					--
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											7E-06					--

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-7
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0170)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Volatile Organic Compounds (VOCs)												
				Chloroform	1.40E-03	mg/L	(2)	--	--	--	--	6.98E-05	mg/kg-day	1.00E-02	mg/kg-day	0.007
				Perfluorinated Compounds												
				Perfluorooctanoic acid (PFOA)	1.50E-05	mg/L	(2)	--	--	--	--	7.48E-07	mg/kg-day	3.00E-06	mg/kg-day	0.2
				Perfluorooctanesulfonic acid (PFOS)	2.60E-04	mg/L	(2)	--	--	--	--	1.30E-05	mg/kg-day	2.00E-06	mg/kg-day	6
				Metals (Total)												
				Chromium, Hexavalent	5.87E-03	mg/L	(2)	--	--	--	--	2.93E-04	mg/kg-day	3.00E-03	mg/kg-day	0.1
				Cobalt	6.50E-03	mg/L	(2)	--	--	--	--	3.24E-04	mg/kg-day	3.00E-04	mg/kg-day	1
				Nickel	5.30E-02	mg/L	(2)	--	--	--	--	2.64E-03	mg/kg-day	2.00E-02	mg/kg-day	0.1
			Exp. Route Total								--					8
			Dermal													
				Volatile Organic Compounds (VOCs)												
				Chloroform	1.40E-03	mg/L	(2)	--	--	--	--	5.53E-06	mg/kg-day	1.00E-02	mg/kg-day	0.0006
				Metals (Total)												
				Chromium, Hexavalent	5.87E-03	mg/L	(2)	--	--	--	--	2.58E-06	mg/kg-day	7.50E-05	mg/kg-day	0.03
				Cobalt	6.50E-03	mg/L	(2)	--	--	--	--	5.71E-07	mg/kg-day	3.00E-04	mg/kg-day	0.002
				Nickel	5.30E-02	mg/L	(2)	--	--	--	--	2.33E-06	mg/kg-day	8.00E-04	mg/kg-day	0.003
			Exp. Route Total								--					0.04
		Exp. Point Total									--					8
	Exp. Medium Total										--					8
	Indoor Air	Indoor Air (Vapor Intrusion)	Inhalation													
				Volatile Organic Compounds (VOCs)												
				Chloroform	1.76E-01	µg/m³	(2)	--	--	--	--	1.69E-01	µg/m³	9.77E+01	µg/m³	0.002
			Exp. Route Total								--					0.002
		Exp. Point Total									--					0.002
	Exp. Medium Total										--					0.002
Medium Total											--					8
											--					8

Total of Receptor Risks Across All Media

Total of Receptor Hazards Across All Media

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-8
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0170)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Volatile Organic Compounds (VOCs)												
				Chloroform	1.40E-03	mg/L	(2)	--	--	--	--	4.20E-05	mg/kg-day	1.00E-02	mg/kg-day	0.004
				Perfluorinated Compounds												
				Perfluorooctanoic acid (PFOA)	1.50E-05	mg/L	(2)	--	--	--	--	4.49E-07	mg/kg-day	3.00E-06	mg/kg-day	0.1
				Perfluorooctanesulfonic acid (PFOS)	2.60E-04	mg/L	(2)	--	--	--	--	7.79E-06	mg/kg-day	2.00E-06	mg/kg-day	4
				Metals (Total)												
				Chromium, Hexavalent	5.87E-03	mg/L	(2)	--	--	--	--	1.76E-04	mg/kg-day	3.00E-03	mg/kg-day	0.06
				Cobalt	6.50E-03	mg/L	(2)	--	--	--	--	1.95E-04	mg/kg-day	3.00E-04	mg/kg-day	0.6
				Nickel	5.30E-02	mg/L	(2)	--	--	--	--	1.59E-03	mg/kg-day	2.00E-02	mg/kg-day	0.08
			Exp. Route Total								--					5
			Dermal													
				Volatile Organic Compounds (VOCs)												
				Chloroform	1.40E-03	mg/L	(2)	--	--	--	--	3.67E-06	mg/kg-day	1.00E-02	mg/kg-day	0.0004
				Metals (Total)												
				Chromium, Hexavalent	5.87E-03	mg/L	(2)	--	--	--	--	1.96E-06	mg/kg-day	7.50E-05	mg/kg-day	0.03
				Cobalt	6.50E-03	mg/L	(2)	--	--	--	--	4.35E-07	mg/kg-day	3.00E-04	mg/kg-day	0.001
				Nickel	5.30E-02	mg/L	(2)	--	--	--	--	1.77E-06	mg/kg-day	8.00E-04	mg/kg-day	0.002
			Exp. Route Total								--					0.03
		Exp. Point Total									--					5
	Exp. Medium Total										--					5
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Volatile Organic Compounds (VOCs)												
				Chloroform	1.12E-04	µg/m³	(2)	--	--	--	--	1.48E-03	µg/m³	9.77E+01	µg/m³	0.00002
			Exp. Route Total								--					0.00002
		Exp. Point Total									--					0.00002
	Exp. Medium Total										--					0.00002
		Indoor Air (Vapor Intrusion)	Inhalation													
				Volatile Organic Compounds (VOCs)												
				Chloroform	1.76E-01	µg/m³	(2)	--	--	--	--	1.69E-01	µg/m³	9.77E+01	µg/m³	0.002
			Exp. Route Total								--					0.002
		Exp. Point Total									--					0.002
	Exp. Medium Total										--					0.002
Medium Total											--					5
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											--					5

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-9
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0170)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Volatile Organic Compounds (VOCs)												
				Chloroform	1.40E-03	mg/L	1.80E-05	mg/kg-day	3.10E-02	1/(mg/kg-day)	6E-07	(2)	--	--	--	--
				Perfluorinated Compounds												
				Perfluorooctanoic acid (PFOA)	1.50E-05	mg/L	1.93E-07	mg/kg-day	7.00E-02	1/(mg/kg-day)	1E-08	(2)	--	--	--	--
				Perfluorooctanesulfonic acid (PFOS)	2.60E-04	mg/L	3.34E-06	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Chromium, Hexavalent	5.87E-03	mg/L	2.34E-04	mg/kg-day	5.00E-01	1/(mg/kg-day)	1E-04	(2)	--	--	--	--
				Cobalt	6.50E-03	mg/L	8.34E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
				Nickel	5.30E-02	mg/L	6.80E-04	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								1E-04					--
			Dermal													
				Volatile Organic Compounds (VOCs)												
				Chloroform	1.40E-03	mg/L	1.55E-06	mg/kg-day	3.10E-02	1/(mg/kg-day)	5E-08	(2)	--	--	--	--
				Metals (Total)												
				Chromium, Hexavalent	5.87E-03	mg/L	2.52E-06	mg/kg-day	2.00E+01	1/(mg/kg-day)	5E-05	(2)	--	--	--	--
				Cobalt	6.50E-03	mg/L	1.78E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Nickel	5.30E-02	mg/L	7.27E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								5E-05					--
		Exp. Point Total									2E-04					--
	Exp. Medium Total										2E-04					--
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Volatile Organic Compounds (VOCs)												
				Chloroform	1.12E-04	µg/m³	4.22E-04	µg/m³	2.30E-05	m³/µg	1E-08	(2)	--	--	--	--
			Exp. Route Total								1E-08					--
		Exp. Point Total									1E-08					--
	Exp. Medium Total										1E-08					--
		Indoor Air (Vapor Intrusion)	Inhalation													
				Volatile Organic Compounds (VOCs)												
				Chloroform	1.76E-01	µg/m³	6.27E-02	µg/m³	2.30E-05	m³/µg	1E-06	(2)	--	--	--	--
			Exp. Route Total								1E-06					--
		Exp. Point Total									1E-06					--
	Exp. Medium Total										1E-06					--
Medium Total											2E-04					--
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											2E-04					--

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-10
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0173)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Perfluorinated Compounds												
				Perfluorooctanesulfonic acid (PFOS)	2.40E-05	mg/L	(2)	--	--	--	--	1.20E-06	mg/kg-day	2.00E-06	mg/kg-day	0.6
				Cyanide												
				Cyanide	9.50E-03	mg/L	(2)	--	--	--	--	4.74E-04	mg/kg-day	6.00E-04	mg/kg-day	0.8
				Metals (Total)												
				Barium	4.30E-01	mg/L	(2)	--	--	--	--	2.14E-02	mg/kg-day	2.00E-01	mg/kg-day	0.1
				Cobalt	2.20E-02	mg/L	(2)	--	--	--	--	1.10E-03	mg/kg-day	3.00E-04	mg/kg-day	4
				Manganese	2.20E-01	mg/L	(2)	--	--	--	--	1.10E-02	mg/kg-day	2.40E-02	mg/kg-day	0.5
			Exp. Route Total								--					6
			Dermal													
				Cyanide												
				Cyanide	9.50E-03	mg/L	(2)	--	--	--	--	3.22E-06	mg/kg-day	6.00E-04	mg/kg-day	0.005
				Metals (Total)												
				Barium	4.30E-01	mg/L	(2)	--	--	--	--	9.45E-05	mg/kg-day	1.40E-02	mg/kg-day	0.007
				Cobalt	2.20E-02	mg/L	(2)	--	--	--	--	1.93E-06	mg/kg-day	3.00E-04	mg/kg-day	0.006
				Manganese	2.20E-01	mg/L	(2)	--	--	--	--	4.83E-05	mg/kg-day	9.60E-04	mg/kg-day	0.05
			Exp. Route Total								--					0.07
		Exp. Point Total									--					6
	Exp. Medium Total										--					6
Medium Total											--					6
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											--					6

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-11
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0173)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Perfluorinated Compounds												
				Perfluorooctanesulfonic acid (PFOS)	2.40E-05	mg/L	(2)	--	--	--	--	7.19E-07	mg/kg-day	2.00E-06	mg/kg-day	0.4
				Cyanide												
				Cyanide	9.50E-03	mg/L	(2)	--	--	--	--	2.85E-04	mg/kg-day	6.00E-04	mg/kg-day	0.5
				Metals (Total)												
				Barium	4.30E-01	mg/L	(2)	--	--	--	--	1.29E-02	mg/kg-day	2.00E-01	mg/kg-day	0.06
				Cobalt	2.20E-02	mg/L	(2)	--	--	--	--	6.59E-04	mg/kg-day	3.00E-04	mg/kg-day	2
				Manganese	2.20E-01	mg/L	(2)	--	--	--	--	6.59E-03	mg/kg-day	2.40E-02	mg/kg-day	0.3
			Exp. Route Total								--					3
			Dermal													
				Cyanide												
				Cyanide	9.50E-03	mg/L	(2)	--	--	--	--	2.25E-06	mg/kg-day	6.00E-04	mg/kg-day	0.004
				Metals (Total)												
				Barium	4.30E-01	mg/L	(2)	--	--	--	--	7.19E-05	mg/kg-day	1.40E-02	mg/kg-day	0.005
				Cobalt	2.20E-02	mg/L	(2)	--	--	--	--	1.47E-06	mg/kg-day	3.00E-04	mg/kg-day	0.005
				Manganese	2.20E-01	mg/L	(2)	--	--	--	--	3.68E-05	mg/kg-day	9.60E-04	mg/kg-day	0.04
			Exp. Route Total								--					0.05
		Exp. Point Total									--					3
	Exp. Medium Total										--					3
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Cyanide												
				Cyanide	5.43E-04	µg/m³	(2)	--	--	--	--	7.15E-03	µg/m³	8.00E-01	µg/m³	0.009
			Exp. Route Total								--					0.009
		Exp. Point Total									--					0.009
	Exp. Medium Total										--					0.009
Medium Total											--					3
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											--					3

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-12
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0173)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Perfluorinated Compounds												
				Perfluorooctanesulfonic acid (PFOS)	2.40E-05	mg/L	3.08E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cyanide												
				Cyanide	9.50E-03	mg/L	1.22E-04	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Barium	4.30E-01	mg/L	5.52E-03	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cobalt	2.20E-02	mg/L	2.82E-04	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	2.20E-01	mg/L	2.82E-03	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
			Dermal													
				Cyanide												
				Cyanide	9.50E-03	mg/L	9.36E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Barium	4.30E-01	mg/L	2.95E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cobalt	2.20E-02	mg/L	6.03E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	2.20E-01	mg/L	1.51E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
		Exp. Point Total									--					--
	Exp. Medium Total										--					--
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Cyanide												
				Cyanide	5.43E-04	µg/m³	2.04E-03	µg/m³	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
		Exp. Point Total									--					--
	Exp. Medium Total										--					--
Medium Total											--					--
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											--					--

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-13
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0176)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Cyanide												
				Cyanide	9.00E-03	mg/L	(2)	--	--	--	--	4.49E-04	mg/kg-day	6.00E-04	mg/kg-day	0.7
				Metals (Total)												
				Barium	4.20E-01	mg/L	(2)	--	--	--	--	2.09E-02	mg/kg-day	2.00E-01	mg/kg-day	0.1
				Cadmium (Water)	2.00E-04	mg/L	(2)	--	--	--	--	9.97E-06	mg/kg-day	1.00E-04	mg/kg-day	0.1
				Cobalt	1.40E-02	mg/L	(2)	--	--	--	--	6.98E-04	mg/kg-day	3.00E-04	mg/kg-day	2
				Manganese	1.60E-01	mg/L	(2)	--	--	--	--	7.98E-03	mg/kg-day	2.40E-02	mg/kg-day	0.3
			Exp. Route Total								--					4
			Dermal													
				Cyanide												
				Cyanide	9.00E-03	mg/L	(2)	--	--	--	--	3.05E-06	mg/kg-day	6.00E-04	mg/kg-day	0.005
				Metals (Total)												
				Barium	4.20E-01	mg/L	(2)	--	--	--	--	9.23E-05	mg/kg-day	1.40E-02	mg/kg-day	0.007
				Cadmium (Water)	2.00E-04	mg/L	(2)	--	--	--	--	4.39E-08	mg/kg-day	5.00E-06	mg/kg-day	0.009
				Cobalt	1.40E-02	mg/L	(2)	--	--	--	--	1.23E-06	mg/kg-day	3.00E-04	mg/kg-day	0.004
				Manganese	1.60E-01	mg/L	(2)	--	--	--	--	3.52E-05	mg/kg-day	9.60E-04	mg/kg-day	0.04
			Exp. Route Total								--					0.06
		Exp. Point Total									--					4
	Exp. Medium Total										--					4
Medium Total											--					4
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-14
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0176)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Cyanide												
				Cyanide	9.00E-03	mg/L	(2)	--	--	--	--	2.70E-04	mg/kg-day	6.00E-04	mg/kg-day	0.4
				Metals (Total)												
				Barium	4.20E-01	mg/L	(2)	--	--	--	--	1.26E-02	mg/kg-day	2.00E-01	mg/kg-day	0.06
				Cadmium (Water)	2.00E-04	mg/L	(2)	--	--	--	--	5.99E-06	mg/kg-day	1.00E-04	mg/kg-day	0.06
				Cobalt	1.40E-02	mg/L	(2)	--	--	--	--	4.20E-04	mg/kg-day	3.00E-04	mg/kg-day	1
				Manganese	1.60E-01	mg/L	(2)	--	--	--	--	4.79E-03	mg/kg-day	2.40E-02	mg/kg-day	0.2
			Exp. Route Total								--					2
			Dermal													
				Cyanide												
				Cyanide	9.00E-03	mg/L	(2)	--	--	--	--	2.13E-06	mg/kg-day	6.00E-04	mg/kg-day	0.004
				Metals (Total)												
				Barium	4.20E-01	mg/L	(2)	--	--	--	--	7.02E-05	mg/kg-day	1.40E-02	mg/kg-day	0.005
				Cadmium (Water)	2.00E-04	mg/L	(2)	--	--	--	--	3.34E-08	mg/kg-day	5.00E-06	mg/kg-day	0.007
				Cobalt	1.40E-02	mg/L	(2)	--	--	--	--	9.37E-07	mg/kg-day	3.00E-04	mg/kg-day	0.003
				Manganese	1.60E-01	mg/L	(2)	--	--	--	--	2.68E-05	mg/kg-day	9.60E-04	mg/kg-day	0.03
			Exp. Route Total								--					0.05
		Exp. Point Total									--					2
	Exp. Medium Total										--					2
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Cyanide												
				Cyanide	5.14E-04	µg/m³	(2)	--	--	--	--	6.77E-03	µg/m³	8.00E-01	µg/m³	0.008
			Exp. Route Total								--					0.008
		Exp. Point Total									--					0.008
	Exp. Medium Total										--					0.008
Medium Total											--					2
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											--					2

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-15
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0176)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Cyanide												
				Cyanide	9.00E-03	mg/L	1.16E-04	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Barium	4.20E-01	mg/L	5.39E-03	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cadmium (Water)	2.00E-04	mg/L	2.57E-06	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cobalt	1.40E-02	mg/L	1.80E-04	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	1.60E-01	mg/L	2.05E-03	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
			Dermal													
				Cyanide												
				Cyanide	9.00E-03	mg/L	8.87E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Barium	4.20E-01	mg/L	2.88E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cadmium (Water)	2.00E-04	mg/L	1.37E-08	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cobalt	1.40E-02	mg/L	3.84E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	1.60E-01	mg/L	1.10E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
		Exp. Point Total									--					--
	Exp. Medium Total										--					--
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Cyanide												
				Cyanide	5.14E-04	µg/m³	1.94E-03	µg/m³	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
		Exp. Point Total									--					--
	Exp. Medium Total										--					--
Medium Total											--					--
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											--					--

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-16
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0182)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Perfluorinated Compounds												
				Perfluorooctanoic acid (PFOA)	1.30E-05	mg/L	(2)	--	--	--	--	6.48E-07	mg/kg-day	3.00E-06	mg/kg-day	0.2
				Perfluorooctanesulfonic acid (PFOS)	2.20E-04	mg/L	(2)	--	--	--	--	1.10E-05	mg/kg-day	2.00E-06	mg/kg-day	5
				Cyanide												
				Cyanide	3.60E-03	mg/L	(2)	--	--	--	--	1.80E-04	mg/kg-day	6.00E-04	mg/kg-day	0.3
				Metals (Total)												
				Cobalt	2.50E-02	mg/L	(2)	--	--	--	--	1.25E-03	mg/kg-day	3.00E-04	mg/kg-day	4
				Manganese	3.80E-01	mg/L	(2)	--	--	--	--	1.89E-02	mg/kg-day	2.40E-02	mg/kg-day	0.8
			Exp. Route Total								--					11
			Dermal													
				Cyanide												
				Cyanide	3.60E-03	mg/L	(2)	--	--	--	--	1.22E-06	mg/kg-day	6.00E-04	mg/kg-day	0.002
				Metals (Total)												
				Cobalt	2.50E-02	mg/L	(2)	--	--	--	--	2.20E-06	mg/kg-day	3.00E-04	mg/kg-day	0.007
				Manganese	3.80E-01	mg/L	(2)	--	--	--	--	8.35E-05	mg/kg-day	9.60E-04	mg/kg-day	0.09
			Exp. Route Total								--					0.1
		Exp. Point Total									--					11
	Exp. Medium Total										--					11
Medium Total											--					11
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-17
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0182)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Perfluorinated Compounds												
				Perfluorooctanoic acid (PFOA)	1.30E-05	mg/L	(2)	--	--	--	--	3.90E-07	mg/kg-day	3.00E-06	mg/kg-day	0.1
				Perfluorooctanesulfonic acid (PFOS)	2.20E-04	mg/L	(2)	--	--	--	--	6.59E-06	mg/kg-day	2.00E-06	mg/kg-day	3
				Cyanide												
				Cyanide	3.60E-03	mg/L	(2)	--	--	--	--	1.08E-04	mg/kg-day	6.00E-04	mg/kg-day	0.2
				Metals (Total)												
				Cobalt	2.50E-02	mg/L	(2)	--	--	--	--	7.49E-04	mg/kg-day	3.00E-04	mg/kg-day	2
				Manganese	3.80E-01	mg/L	(2)	--	--	--	--	1.14E-02	mg/kg-day	2.40E-02	mg/kg-day	0.5
			Exp. Route Total								--					7
			Dermal													
				Cyanide												
				Cyanide	3.60E-03	mg/L	(2)	--	--	--	--	8.51E-07	mg/kg-day	6.00E-04	mg/kg-day	0.001
				Metals (Total)												
				Cobalt	2.50E-02	mg/L	(2)	--	--	--	--	1.67E-06	mg/kg-day	3.00E-04	mg/kg-day	0.006
				Manganese	3.80E-01	mg/L	(2)	--	--	--	--	6.36E-05	mg/kg-day	9.60E-04	mg/kg-day	0.07
			Exp. Route Total								--					0.07
		Exp. Point Total									--					7
	Exp. Medium Total										--					7
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Cyanide												
				Cyanide	2.06E-04	µg/m³	(2)	--	--	--	--	2.71E-03	µg/m³	8.00E-01	µg/m³	0.003
			Exp. Route Total								--					0.003
		Exp. Point Total									--					0.003
	Exp. Medium Total										--					0.003
Medium Total											--					7
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											--					7

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-18
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0182)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Perfluorinated Compounds												
				Perfluorooctanoic acid (PFOA)	1.30E-05	mg/L	1.67E-07	mg/kg-day	7.00E-02	1/(mg/kg-day)	1E-08	(2)	--	--	--	--
				Perfluorooctanesulfonic acid (PFOS)	2.20E-04	mg/L	2.82E-06	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cyanide												
				Cyanide	3.60E-03	mg/L	4.62E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Cobalt	2.50E-02	mg/L	3.21E-04	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	3.80E-01	mg/L	4.88E-03	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								1E-08					--
			Dermal													
				Cyanide												
				Cyanide	3.60E-03	mg/L	3.55E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Cobalt	2.50E-02	mg/L	6.85E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	3.80E-01	mg/L	2.60E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
		Exp. Point Total									1E-08					--
	Exp. Medium Total										1E-08					--
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Cyanide												
				Cyanide	2.06E-04	µg/m³	7.74E-04	µg/m³	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
		Exp. Point Total									--					--
	Exp. Medium Total										--					--
Medium Total											1E-08					--
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											1E-08					--

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-19
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0197)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Volatile Organic Compounds (VOCs)												
				Chloroform	5.10E-04	mg/L	(2)	--	--	--	--	2.54E-05	mg/kg-day	1.00E-02	mg/kg-day	0.003
				Perfluorinated Compounds												
				Perfluorooctanoic acid (PFOA)	1.60E-05	mg/L	(2)	--	--	--	--	7.98E-07	mg/kg-day	3.00E-06	mg/kg-day	0.3
				Perfluorooctanesulfonic acid (PFOS)	1.50E-04	mg/L	(2)	--	--	--	--	7.48E-06	mg/kg-day	2.00E-06	mg/kg-day	4
				Cyanide												
				Cyanide	3.20E-03	mg/L	(2)	--	--	--	--	1.60E-04	mg/kg-day	6.00E-04	mg/kg-day	0.3
				Metals (Total)												
				Cadmium (Water)	3.30E-04	mg/L	(2)	--	--	--	--	1.65E-05	mg/kg-day	1.00E-04	mg/kg-day	0.2
				Cobalt	1.30E-02	mg/L	(2)	--	--	--	--	6.48E-04	mg/kg-day	3.00E-04	mg/kg-day	2
				Manganese	1.80E-01	mg/L	(2)	--	--	--	--	8.98E-03	mg/kg-day	2.40E-02	mg/kg-day	0.4
			Exp. Route Total								--					7
			Dermal													
				Volatile Organic Compounds (VOCs)												
				Chloroform	5.10E-04	mg/L	(2)	--	--	--	--	2.02E-06	mg/kg-day	1.00E-02	mg/kg-day	0.0002
				Cyanide												
				Cyanide	3.20E-03	mg/L	(2)	--	--	--	--	1.09E-06	mg/kg-day	6.00E-04	mg/kg-day	0.002
				Metals (Total)												
				Cadmium (Water)	3.30E-04	mg/L	(2)	--	--	--	--	7.25E-08	mg/kg-day	5.00E-06	mg/kg-day	0.01
				Cobalt	1.30E-02	mg/L	(2)	--	--	--	--	1.14E-06	mg/kg-day	3.00E-04	mg/kg-day	0.004
				Manganese	1.80E-01	mg/L	(2)	--	--	--	--	3.96E-05	mg/kg-day	9.60E-04	mg/kg-day	0.04
			Exp. Route Total								--					0.06
		Exp. Point Total									--					7
	Exp. Medium Total										--					7
Medium Total											--					7
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-20
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0197)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Volatile Organic Compounds (VOCs)												
				Chloroform	5.10E-04	mg/L	(2)	--	--	--	--	1.53E-05	mg/kg-day	1.00E-02	mg/kg-day	0.002
				Perfluorinated Compounds												
				Perfluorooctanoic acid (PFOA)	1.60E-05	mg/L	(2)	--	--	--	--	4.79E-07	mg/kg-day	3.00E-06	mg/kg-day	0.2
				Perfluorooctanesulfonic acid (PFOS)	1.50E-04	mg/L	(2)	--	--	--	--	4.49E-06	mg/kg-day	2.00E-06	mg/kg-day	2
				Cyanide												
				Cyanide	3.20E-03	mg/L	(2)	--	--	--	--	9.59E-05	mg/kg-day	6.00E-04	mg/kg-day	0.2
				Metals (Total)												
				Cadmium (Water)	3.30E-04	mg/L	(2)	--	--	--	--	9.89E-06	mg/kg-day	1.00E-04	mg/kg-day	0.1
				Cobalt	1.30E-02	mg/L	(2)	--	--	--	--	3.90E-04	mg/kg-day	3.00E-04	mg/kg-day	1
				Manganese	1.80E-01	mg/L	(2)	--	--	--	--	5.39E-03	mg/kg-day	2.40E-02	mg/kg-day	0.2
			Exp. Route Total								--					4
			Dermal													
				Volatile Organic Compounds (VOCs)												
				Chloroform	5.10E-04	mg/L	(2)	--	--	--	--	1.34E-06	mg/kg-day	1.00E-02	mg/kg-day	0.0001
				Cyanide												
				Cyanide	3.20E-03	mg/L	(2)	--	--	--	--	7.56E-07	mg/kg-day	6.00E-04	mg/kg-day	0.001
				Metals (Total)												
				Cadmium (Water)	3.30E-04	mg/L	(2)	--	--	--	--	5.52E-08	mg/kg-day	5.00E-06	mg/kg-day	0.01
				Cobalt	1.30E-02	mg/L	(2)	--	--	--	--	8.70E-07	mg/kg-day	3.00E-04	mg/kg-day	0.003
				Manganese	1.80E-01	mg/L	(2)	--	--	--	--	3.01E-05	mg/kg-day	9.60E-04	mg/kg-day	0.03
			Exp. Route Total								--					0.05
		Exp. Point Total									--					4
	Exp. Medium Total										--					4
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Volatile Organic Compounds (VOCs)												
				Chloroform	4.09E-05	µg/m³	(2)	--	--	--	--	5.38E-04	µg/m³	9.77E+01	µg/m³	0.000006
				Cyanide												
				Cyanide	1.83E-04	µg/m³	(2)	--	--	--	--	2.41E-03	µg/m³	8.00E-01	µg/m³	0.003
			Exp. Route Total								--					0.003
		Exp. Point Total									--					0.003
	Exp. Medium Total										--					0.003
Medium Total											--					4
										Total of Receptor Risks Across All Media	--				Total of Receptor Hazards Across All Media	4

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-21
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0197)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Volatile Organic Compounds (VOCs)												
				Chloroform	5.10E-04	mg/L	6.55E-06	mg/kg-day	3.10E-02	1/(mg/kg-day)	2E-07	(2)	--	--	--	--
				Perfluorinated Compounds												
				Perfluorooctanoic acid (PFOA)	1.60E-05	mg/L	2.05E-07	mg/kg-day	7.00E-02	1/(mg/kg-day)	1E-08	(2)	--	--	--	--
				Perfluorooctanesulfonic acid (PFOS)	1.50E-04	mg/L	1.93E-06	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cyanide												
				Cyanide	3.20E-03	mg/L	4.11E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Cadmium (Water)	3.30E-04	mg/L	4.24E-06	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cobalt	1.30E-02	mg/L	1.67E-04	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	1.80E-01	mg/L	2.31E-03	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								2E-07					--
			Dermal													
				Volatile Organic Compounds (VOCs)												
				Chloroform	5.10E-04	mg/L	5.64E-07	mg/kg-day	3.10E-02	1/(mg/kg-day)	2E-08	(2)	--	--	--	--
				Cyanide												
				Cyanide	3.20E-03	mg/L	3.15E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Cadmium (Water)	3.30E-04	mg/L	2.26E-08	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cobalt	1.30E-02	mg/L	3.56E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	1.80E-01	mg/L	1.23E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								2E-08					--
		Exp. Point Total									2E-07					--
	Exp. Medium Total										2E-07					--
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Volatile Organic Compounds (VOCs)												
				Chloroform	4.09E-05	µg/m³	1.54E-04	µg/m³	2.30E-05	m³/µg	4E-09	(2)	--	--	--	--
				Cyanide												
				Cyanide	1.83E-04	µg/m³	6.88E-04	µg/m³	--	--	--	(2)	--	--	--	--
			Exp. Route Total								4E-09					--
		Exp. Point Total									4E-09					--
	Exp. Medium Total										4E-09					--
Medium Total											2E-07					--
										Total of Receptor Risks Across All Media	2E-07				Total of Receptor Hazards Across All Media	--

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-22
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0212)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Volatile Organic Compounds (VOCs)												
				Chloroform	2.80E-04	mg/L	(2)	--	--	--	--	1.40E-05	mg/kg-day	1.00E-02	mg/kg-day	0.001
				Perfluorinated Compounds												
				Perfluorooctanoic acid (PFOA)	1.10E-05	mg/L	(2)	--	--	--	--	5.48E-07	mg/kg-day	3.00E-06	mg/kg-day	0.2
				Perfluorooctanesulfonic acid (PFOS)	5.70E-05	mg/L	(2)	--	--	--	--	2.84E-06	mg/kg-day	2.00E-06	mg/kg-day	1
				Metals (Total)												
				Cobalt	1.60E-03	mg/L	(2)	--	--	--	--	7.98E-05	mg/kg-day	3.00E-04	mg/kg-day	0.3
				Copper	2.90E-01	mg/L	(2)	--	--	--	--	1.45E-02	mg/kg-day	4.00E-02	mg/kg-day	0.4
			Exp. Route Total								--					2
			Dermal													
				Volatile Organic Compounds (VOCs)												
				Chloroform	2.80E-04	mg/L	(2)	--	--	--	--	1.11E-06	mg/kg-day	1.00E-02	mg/kg-day	0.0001
				Metals (Total)												
				Cobalt	1.60E-03	mg/L	(2)	--	--	--	--	1.41E-07	mg/kg-day	3.00E-04	mg/kg-day	0.0005
				Copper	2.90E-01	mg/L	(2)	--	--	--	--	6.37E-05	mg/kg-day	4.00E-02	mg/kg-day	0.002
			Exp. Route Total								--					0.002
		Exp. Point Total									--					2
	Exp. Medium Total										--					2
Medium Total											--					2
Notes:											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-23
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0212)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Volatile Organic Compounds (VOCs)												
				Chloroform	2.80E-04	mg/L	(2)	--	--	--	--	8.39E-06	mg/kg-day	1.00E-02	mg/kg-day	0.0008
				Perfluorinated Compounds												
				Perfluorooctanoic acid (PFOA)	1.10E-05	mg/L	(2)	--	--	--	--	3.30E-07	mg/kg-day	3.00E-06	mg/kg-day	0.1
				Perfluorooctanesulfonic acid (PFOS)	5.70E-05	mg/L	(2)	--	--	--	--	1.71E-06	mg/kg-day	2.00E-06	mg/kg-day	0.9
				Metals (Total)												
				Cobalt	1.60E-03	mg/L	(2)	--	--	--	--	4.79E-05	mg/kg-day	3.00E-04	mg/kg-day	0.2
				Copper	2.90E-01	mg/L	(2)	--	--	--	--	8.69E-03	mg/kg-day	4.00E-02	mg/kg-day	0.2
			Exp. Route Total								--					1
			Dermal													
				Volatile Organic Compounds (VOCs)												
				Chloroform	2.80E-04	mg/L	(2)	--	--	--	--	7.35E-07	mg/kg-day	1.00E-02	mg/kg-day	0.00007
				Metals (Total)												
				Cobalt	1.60E-03	mg/L	(2)	--	--	--	--	1.07E-07	mg/kg-day	3.00E-04	mg/kg-day	0.0004
				Copper	2.90E-01	mg/L	(2)	--	--	--	--	4.85E-05	mg/kg-day	4.00E-02	mg/kg-day	0.001
			Exp. Route Total								--					0.002
		Exp. Point Total									--					1
	Exp. Medium Total										--					1
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Volatile Organic Compounds (VOCs)												
				Chloroform	2.24E-05	µg/m³	(2)	--	--	--	--	2.95E-04	µg/m³	9.77E+01	µg/m³	0.000003
			Exp. Route Total								--					0.000003
		Exp. Point Total									--					0.000003
	Exp. Medium Total										--					0.000003
Medium Total											--					1
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											--					1

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-24
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0212)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Volatile Organic Compounds (VOCs)												
				Chloroform	2.80E-04	mg/L	3.59E-06	mg/kg-day	3.10E-02	1/(mg/kg-day)	1E-07	(2)	--	--	--	--
				Perfluorinated Compounds												
				Perfluorooctanoic acid (PFOA)	1.10E-05	mg/L	1.41E-07	mg/kg-day	7.00E-02	1/(mg/kg-day)	1E-08	(2)	--	--	--	--
				Perfluorooctanesulfonic acid (PFOS)	5.70E-05	mg/L	7.32E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Cobalt	1.60E-03	mg/L	2.05E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
				Copper	2.90E-01	mg/L	3.72E-03	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								1E-07					--
			Dermal													
				Volatile Organic Compounds (VOCs)												
				Chloroform	2.80E-04	mg/L	3.10E-07	mg/kg-day	3.10E-02	1/(mg/kg-day)	1E-08	(2)	--	--	--	--
				Metals (Total)												
				Cobalt	1.60E-03	mg/L	4.39E-08	mg/kg-day	--	--	--	(2)	--	--	--	--
				Copper	2.90E-01	mg/L	1.99E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								1E-08					--
		Exp. Point Total									1E-07					--
	Exp. Medium Total										1E-07					--
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Volatile Organic Compounds (VOCs)												
				Chloroform	2.24E-05	µg/m³	8.44E-05	µg/m³	2.30E-05	m³/µg	2E-09	(2)	--	--	--	--
			Exp. Route Total								2E-09					--
		Exp. Point Total									2E-09					--
	Exp. Medium Total										2E-09					--
Medium Total											1E-07					--
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											1E-07					--

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-25
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0275)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Perfluorinated Compounds												
				Perfluorooctanoic acid (PFOA)	7.40E-06	mg/L	(2)	--	--	--	--	3.69E-07	mg/kg-day	3.00E-06	mg/kg-day	0.1
				Perfluorooctanesulfonic acid (PFOS)	6.00E-05	mg/L	(2)	--	--	--	--	2.99E-06	mg/kg-day	2.00E-06	mg/kg-day	1
				Metals (Total)												
				Cadmium (Water)	2.00E-04	mg/L	(2)	--	--	--	--	9.97E-06	mg/kg-day	1.00E-04	mg/kg-day	0.1
				Cobalt	1.80E-03	mg/L	(2)	--	--	--	--	8.98E-05	mg/kg-day	3.00E-04	mg/kg-day	0.3
				Iron	2.90E+00	mg/L	(2)	--	--	--	--	1.45E-01	mg/kg-day	7.00E-01	mg/kg-day	0.2
				Manganese	5.60E-02	mg/L	(2)	--	--	--	--	2.79E-03	mg/kg-day	2.40E-02	mg/kg-day	0.1
			Exp. Route Total								--					2
			Dermal													
				Metals (Total)												
				Cadmium (Water)	2.00E-04	mg/L	(2)	--	--	--	--	4.39E-08	mg/kg-day	5.00E-06	mg/kg-day	0.009
				Cobalt	1.80E-03	mg/L	(2)	--	--	--	--	1.58E-07	mg/kg-day	3.00E-04	mg/kg-day	0.0005
				Iron	2.90E+00	mg/L	(2)	--	--	--	--	6.37E-04	mg/kg-day	7.00E-01	mg/kg-day	0.0009
				Manganese	5.60E-02	mg/L	(2)	--	--	--	--	1.23E-05	mg/kg-day	9.60E-04	mg/kg-day	0.01
			Exp. Route Total								--					0.02
		Exp. Point Total									--					2
	Exp. Medium Total										--					2
Medium Total											--					2
Notes:											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-26
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0275)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Perfluorinated Compounds												
				Perfluorooctanoic acid (PFOA)	7.40E-06	mg/L	(2)	--	--	--	--	2.22E-07	mg/kg-day	3.00E-06	mg/kg-day	0.07
				Perfluorooctanesulfonic acid (PFOS)	6.00E-05	mg/L	(2)	--	--	--	--	1.80E-06	mg/kg-day	2.00E-06	mg/kg-day	0.9
				Metals (Total)												
				Cadmium (Water)	2.00E-04	mg/L	(2)	--	--	--	--	5.99E-06	mg/kg-day	1.00E-04	mg/kg-day	0.06
				Cobalt	1.80E-03	mg/L	(2)	--	--	--	--	5.39E-05	mg/kg-day	3.00E-04	mg/kg-day	0.2
				Iron	2.90E+00	mg/L	(2)	--	--	--	--	8.69E-02	mg/kg-day	7.00E-01	mg/kg-day	0.1
				Manganese	5.60E-02	mg/L	(2)	--	--	--	--	1.68E-03	mg/kg-day	2.40E-02	mg/kg-day	0.07
			Exp. Route Total								--					1
			Dermal													
				Metals (Total)												
				Cadmium (Water)	2.00E-04	mg/L	(2)	--	--	--	--	3.34E-08	mg/kg-day	5.00E-06	mg/kg-day	0.007
				Cobalt	1.80E-03	mg/L	(2)	--	--	--	--	1.20E-07	mg/kg-day	3.00E-04	mg/kg-day	0.0004
				Iron	2.90E+00	mg/L	(2)	--	--	--	--	4.85E-04	mg/kg-day	7.00E-01	mg/kg-day	0.0007
				Manganese	5.60E-02	mg/L	(2)	--	--	--	--	9.37E-06	mg/kg-day	9.60E-04	mg/kg-day	0.01
			Exp. Route Total								--					0.02
		Exp. Point Total									--					1
	Exp. Medium Total										--					1
Medium Total											--					1
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-27
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0275)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Perfluorinated Compounds												
				Perfluorooctanoic acid (PFOA)	7.40E-06	mg/L	9.50E-08	mg/kg-day	7.00E-02	1/(mg/kg-day)	7E-09	(2)	--	--	--	--
				Perfluorooctanesulfonic acid (PFOS)	6.00E-05	mg/L	7.70E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Cadmium (Water)	2.00E-04	mg/L	2.57E-06	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cobalt	1.80E-03	mg/L	2.31E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
				Iron	2.90E+00	mg/L	3.72E-02	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	5.60E-02	mg/L	7.19E-04	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								7E-09					--
			Dermal													
				Metals (Total)												
				Cadmium (Water)	2.00E-04	mg/L	1.37E-08	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cobalt	1.80E-03	mg/L	4.93E-08	mg/kg-day	--	--	--	(2)	--	--	--	--
				Iron	2.90E+00	mg/L	1.99E-04	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	5.60E-02	mg/L	3.84E-06	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
		Exp. Point Total									7E-09					--
	Exp. Medium Total										7E-09					--
Medium Total											7E-09					--
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											7E-09					--

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-28
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0500)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Metals (Total)												
				Barium	6.90E-01	mg/L	(2)	--	--	--	--	3.44E-02	mg/kg-day	2.00E-01	mg/kg-day	0.2
				Beryllium	3.60E-03	mg/L	(2)	--	--	--	--	1.80E-04	mg/kg-day	2.00E-03	mg/kg-day	0.09
				Cadmium (Water)	4.40E-04	mg/L	(2)	--	--	--	--	2.19E-05	mg/kg-day	1.00E-04	mg/kg-day	0.2
				Cobalt	2.60E-02	mg/L	(2)	--	--	--	--	1.30E-03	mg/kg-day	3.00E-04	mg/kg-day	4
				Manganese	1.80E-01	mg/L	(2)	--	--	--	--	8.98E-03	mg/kg-day	2.40E-02	mg/kg-day	0.4
			Exp. Route Total								--					5
			Dermal													
				Metals (Total)												
				Barium	6.90E-01	mg/L	(2)	--	--	--	--	1.52E-04	mg/kg-day	1.40E-02	mg/kg-day	0.01
				Beryllium	3.60E-03	mg/L	(2)	--	--	--	--	7.91E-07	mg/kg-day	1.40E-05	mg/kg-day	0.06
				Cadmium (Water)	4.40E-04	mg/L	(2)	--	--	--	--	9.67E-08	mg/kg-day	5.00E-06	mg/kg-day	0.02
				Cobalt	2.60E-02	mg/L	(2)	--	--	--	--	2.29E-06	mg/kg-day	3.00E-04	mg/kg-day	0.008
				Manganese	1.80E-01	mg/L	(2)	--	--	--	--	3.96E-05	mg/kg-day	9.60E-04	mg/kg-day	0.04
			Exp. Route Total								--					0.1
		Exp. Point Total									--					5
	Exp. Medium Total										--					5
Medium Total											--					5
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-29
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0500)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Metals (Total)												
				Barium	6.90E-01	mg/L	(2)	--	--	--	--	2.07E-02	mg/kg-day	2.00E-01	mg/kg-day	0.1
				Beryllium	3.60E-03	mg/L	(2)	--	--	--	--	1.08E-04	mg/kg-day	2.00E-03	mg/kg-day	0.05
				Cadmium (Water)	4.40E-04	mg/L	(2)	--	--	--	--	1.32E-05	mg/kg-day	1.00E-04	mg/kg-day	0.1
				Cobalt	2.60E-02	mg/L	(2)	--	--	--	--	7.79E-04	mg/kg-day	3.00E-04	mg/kg-day	3
				Manganese	1.80E-01	mg/L	(2)	--	--	--	--	5.39E-03	mg/kg-day	2.40E-02	mg/kg-day	0.2
			Exp. Route Total								--					3
			Dermal													
				Metals (Total)												
				Barium	6.90E-01	mg/L	(2)	--	--	--	--	1.15E-04	mg/kg-day	1.40E-02	mg/kg-day	0.008
				Beryllium	3.60E-03	mg/L	(2)	--	--	--	--	6.02E-07	mg/kg-day	1.40E-05	mg/kg-day	0.04
				Cadmium (Water)	4.40E-04	mg/L	(2)	--	--	--	--	7.36E-08	mg/kg-day	5.00E-06	mg/kg-day	0.01
				Cobalt	2.60E-02	mg/L	(2)	--	--	--	--	1.74E-06	mg/kg-day	3.00E-04	mg/kg-day	0.006
				Manganese	1.80E-01	mg/L	(2)	--	--	--	--	3.01E-05	mg/kg-day	9.60E-04	mg/kg-day	0.03
			Exp. Route Total								--					0.1
		Exp. Point Total									--					3
	Exp. Medium Total										--					3
Medium Total											--					3
Notes:											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-30
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0500)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Metals (Total)												
				Barium	6.90E-01	mg/L	8.86E-03	mg/kg-day	--	--	--	(2)	--	--	--	--
				Beryllium	3.60E-03	mg/L	4.62E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cadmium (Water)	4.40E-04	mg/L	5.65E-06	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cobalt	2.60E-02	mg/L	3.34E-04	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	1.80E-01	mg/L	2.31E-03	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
			Dermal													
				Metals (Total)												
				Barium	6.90E-01	mg/L	4.73E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
				Beryllium	3.60E-03	mg/L	2.47E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cadmium (Water)	4.40E-04	mg/L	3.02E-08	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cobalt	2.60E-02	mg/L	7.13E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	1.80E-01	mg/L	1.23E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
		Exp. Point Total									--					--
	Exp. Medium Total										--					--
Medium Total											--					--
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											--					--

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-31
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0501)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Volatile Organic Compounds (VOCs)												
				Chloroform	9.60E-04	mg/L	(2)	--	--	--	--	4.79E-05	mg/kg-day	1.00E-02	mg/kg-day	0.005
				Perfluorinated Compounds												
				Perfluorooctanoic acid (PFOA)	1.70E-05	mg/L	(2)	--	--	--	--	8.48E-07	mg/kg-day	3.00E-06	mg/kg-day	0.3
				Perfluorooctanesulfonic acid (PFOS)	1.30E-04	mg/L	(2)	--	--	--	--	6.48E-06	mg/kg-day	2.00E-06	mg/kg-day	3
				Metals (Total)												
				Cobalt	1.60E-02	mg/L	(2)	--	--	--	--	7.98E-04	mg/kg-day	3.00E-04	mg/kg-day	3
				Manganese	2.60E-01	mg/L	(2)	--	--	--	--	1.30E-02	mg/kg-day	2.40E-02	mg/kg-day	0.5
			Exp. Route Total								--					7
			Dermal													
				Volatile Organic Compounds (VOCs)												
				Chloroform	9.60E-04	mg/L	(2)	--	--	--	--	3.79E-06	mg/kg-day	1.00E-02	mg/kg-day	0.0004
				Metals (Total)												
				Cobalt	1.60E-02	mg/L	(2)	--	--	--	--	1.41E-06	mg/kg-day	3.00E-04	mg/kg-day	0.005
				Manganese	2.60E-01	mg/L	(2)	--	--	--	--	5.71E-05	mg/kg-day	9.60E-04	mg/kg-day	0.06
			Exp. Route Total								--					0.06
		Exp. Point Total									--					7
	Exp. Medium Total										--					7
Medium Total											--					7
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-32
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0501)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Volatile Organic Compounds (VOCs)												
				Chloroform	9.60E-04	mg/L	(2)	--	--	--	--	2.88E-05	mg/kg-day	1.00E-02	mg/kg-day	0.003
				Perfluorinated Compounds												
				Perfluorooctanoic acid (PFOA)	1.70E-05	mg/L	(2)	--	--	--	--	5.09E-07	mg/kg-day	3.00E-06	mg/kg-day	0.2
				Perfluorooctanesulfonic acid (PFOS)	1.30E-04	mg/L	(2)	--	--	--	--	3.90E-06	mg/kg-day	2.00E-06	mg/kg-day	2
				Metals (Total)												
				Cobalt	1.60E-02	mg/L	(2)	--	--	--	--	4.79E-04	mg/kg-day	3.00E-04	mg/kg-day	2
				Manganese	2.60E-01	mg/L	(2)	--	--	--	--	7.79E-03	mg/kg-day	2.40E-02	mg/kg-day	0.3
			Exp. Route Total								--					4
			Dermal													
				Volatile Organic Compounds (VOCs)												
				Chloroform	9.60E-04	mg/L	(2)	--	--	--	--	2.52E-06	mg/kg-day	1.00E-02	mg/kg-day	0.0003
				Metals (Total)												
				Cobalt	1.60E-02	mg/L	(2)	--	--	--	--	1.07E-06	mg/kg-day	3.00E-04	mg/kg-day	0.004
				Manganese	2.60E-01	mg/L	(2)	--	--	--	--	4.35E-05	mg/kg-day	9.60E-04	mg/kg-day	0.05
			Exp. Route Total								--					0.05
		Exp. Point Total									--					4
	Exp. Medium Total										--					4
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Volatile Organic Compounds (VOCs)												
				Chloroform	7.69E-05	µg/m³	(2)	--	--	--	--	1.01E-03	µg/m³	9.77E+01	µg/m³	0.00001
			Exp. Route Total								--					0.00001
		Exp. Point Total									--					0.00001
	Exp. Medium Total										--					0.00001
Medium Total											--					4
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											--					4

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-33
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0501)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Volatile Organic Compounds (VOCs)												
				Chloroform	9.60E-04	mg/L	1.23E-05	mg/kg-day	3.10E-02	1/(mg/kg-day)	4E-07	(2)	--	--	--	--
				Perfluorinated Compounds												
				Perfluorooctanoic acid (PFOA)	1.70E-05	mg/L	2.18E-07	mg/kg-day	7.00E-02	1/(mg/kg-day)	2E-08	(2)	--	--	--	--
				Perfluorooctanesulfonic acid (PFOS)	1.30E-04	mg/L	1.67E-06	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Cobalt	1.60E-02	mg/L	2.05E-04	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	2.60E-01	mg/L	3.34E-03	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								4E-07					--
			Dermal													
				Volatile Organic Compounds (VOCs)												
				Chloroform	9.60E-04	mg/L	1.06E-06	mg/kg-day	3.10E-02	1/(mg/kg-day)	3E-08	(2)	--	--	--	--
				Metals (Total)												
				Cobalt	1.60E-02	mg/L	4.39E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	2.60E-01	mg/L	1.78E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								3E-08					--
		Exp. Point Total									4E-07					--
	Exp. Medium Total										4E-07					--
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Volatile Organic Compounds (VOCs)												
				Chloroform	7.69E-05	µg/m³	2.89E-04	µg/m³	2.30E-05	m³/µg	7E-09	(2)	--	--	--	--
			Exp. Route Total								7E-09					--
		Exp. Point Total									7E-09					--
	Exp. Medium Total										7E-09					--
Medium Total											4E-07					--
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media
											4E-07					--

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-34
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0510)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Cyanide												
				Cyanide	1.10E-02	mg/L	(2)	--	--	--	--	5.48E-04	mg/kg-day	6.00E-04	mg/kg-day	0.9
				Metals (Total)												
				Barium	1.30E+00	mg/L	(2)	--	--	--	--	6.48E-02	mg/kg-day	2.00E-01	mg/kg-day	0.3
				Cadmium (Water)	3.90E-04	mg/L	(2)	--	--	--	--	1.94E-05	mg/kg-day	1.00E-04	mg/kg-day	0.2
				Cobalt	2.00E-02	mg/L	(2)	--	--	--	--	9.97E-04	mg/kg-day	3.00E-04	mg/kg-day	3
				Copper	1.00E-01	mg/L	(2)	--	--	--	--	4.99E-03	mg/kg-day	4.00E-02	mg/kg-day	0.1
				Manganese	1.40E-01	mg/L	(2)	--	--	--	--	6.98E-03	mg/kg-day	2.40E-02	mg/kg-day	0.3
			Exp. Route Total								--					5
			Dermal													
				Cyanide												
				Cyanide	1.10E-02	mg/L	(2)	--	--	--	--	3.73E-06	mg/kg-day	6.00E-04	mg/kg-day	0.006
				Metals (Total)												
				Barium	1.30E+00	mg/L	(2)	--	--	--	--	2.86E-04	mg/kg-day	1.40E-02	mg/kg-day	0.02
				Cadmium (Water)	3.90E-04	mg/L	(2)	--	--	--	--	8.57E-08	mg/kg-day	5.00E-06	mg/kg-day	0.02
				Cobalt	2.00E-02	mg/L	(2)	--	--	--	--	1.76E-06	mg/kg-day	3.00E-04	mg/kg-day	0.006
				Copper	1.00E-01	mg/L	(2)	--	--	--	--	2.20E-05	mg/kg-day	4.00E-02	mg/kg-day	0.0005
				Manganese	1.40E-01	mg/L	(2)	--	--	--	--	3.08E-05	mg/kg-day	9.60E-04	mg/kg-day	0.03
			Exp. Route Total								--					0.08
		Exp. Point Total									--					5
	Exp. Medium Total										--					5
Medium Total											--					5
Notes:										Total of Receptor Risks Across All Media	--				Total of Receptor Hazards Across All Media	5

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-35
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0510)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Cyanide												
				Cyanide	1.10E-02	mg/L	(2)	--	--	--	--	3.30E-04	mg/kg-day	6.00E-04	mg/kg-day	0.5
				Metals (Total)												
				Barium	1.30E+00	mg/L	(2)	--	--	--	--	3.90E-02	mg/kg-day	2.00E-01	mg/kg-day	0.2
				Cadmium (Water)	3.90E-04	mg/L	(2)	--	--	--	--	1.17E-05	mg/kg-day	1.00E-04	mg/kg-day	0.1
				Cobalt	2.00E-02	mg/L	(2)	--	--	--	--	5.99E-04	mg/kg-day	3.00E-04	mg/kg-day	2
				Copper	1.00E-01	mg/L	(2)	--	--	--	--	3.00E-03	mg/kg-day	4.00E-02	mg/kg-day	0.07
				Manganese	1.40E-01	mg/L	(2)	--	--	--	--	4.20E-03	mg/kg-day	2.40E-02	mg/kg-day	0.2
			Exp. Route Total								--					3
			Dermal													
				Cyanide												
				Cyanide	1.10E-02	mg/L	(2)	--	--	--	--	2.60E-06	mg/kg-day	6.00E-04	mg/kg-day	0.004
				Metals (Total)												
				Barium	1.30E+00	mg/L	(2)	--	--	--	--	2.17E-04	mg/kg-day	1.40E-02	mg/kg-day	0.02
				Cadmium (Water)	3.90E-04	mg/L	(2)	--	--	--	--	6.52E-08	mg/kg-day	5.00E-06	mg/kg-day	0.01
				Cobalt	2.00E-02	mg/L	(2)	--	--	--	--	1.34E-06	mg/kg-day	3.00E-04	mg/kg-day	0.004
				Copper	1.00E-01	mg/L	(2)	--	--	--	--	1.67E-05	mg/kg-day	4.00E-02	mg/kg-day	0.0004
				Manganese	1.40E-01	mg/L	(2)	--	--	--	--	2.34E-05	mg/kg-day	9.60E-04	mg/kg-day	0.02
			Exp. Route Total								--					0.06
		Exp. Point Total									--					3
	Exp. Medium Total										--					3
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Cyanide												
				Cyanide	6.29E-04	µg/m³	(2)	--	--	--	--	8.28E-03	µg/m³	8.00E-01	µg/m³	0.01
			Exp. Route Total								--					0.01
		Exp. Point Total									--					0.01
	Exp. Medium Total										--					0.01
Medium Total											--					3
											Total of Receptor Risks Across All Media					3

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-36
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0510)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Cyanide												
				Cyanide	1.10E-02	mg/L	1.41E-04	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Barium	1.30E+00	mg/L	1.67E-02	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cadmium (Water)	3.90E-04	mg/L	5.01E-06	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cobalt	2.00E-02	mg/L	2.57E-04	mg/kg-day	--	--	--	(2)	--	--	--	--
				Copper	1.00E-01	mg/L	1.28E-03	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	1.40E-01	mg/L	1.80E-03	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
			Dermal													
				Cyanide												
				Cyanide	1.10E-02	mg/L	1.08E-06	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Barium	1.30E+00	mg/L	8.91E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cadmium (Water)	3.90E-04	mg/L	2.67E-08	mg/kg-day	--	--	--	(2)	--	--	--	--
				Cobalt	2.00E-02	mg/L	5.48E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Copper	1.00E-01	mg/L	6.85E-06	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	1.40E-01	mg/L	9.60E-06	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
		Exp. Point Total									--					--
	Exp. Medium Total										--					--
	Indoor Air	Shower/Bath (Vapors)	Inhalation													
				Cyanide												
				Cyanide	6.29E-04	µg/m³	2.37E-03	µg/m³	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
		Exp. Point Total									--					--
	Exp. Medium Total										--					--
Medium Total											--					--
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-37
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0527)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Perfluorinated Compounds												
				Perfluorooctanesulfonic acid (PFOS)	6.50E-05	mg/L	(2)	--	--	--	--	3.24E-06	mg/kg-day	2.00E-06	mg/kg-day	2
				Metals (Total)												
				Cobalt	4.40E-03	mg/L	(2)	--	--	--	--	2.19E-04	mg/kg-day	3.00E-04	mg/kg-day	0.7
				Manganese	5.60E-02	mg/L	(2)	--	--	--	--	2.79E-03	mg/kg-day	2.40E-02	mg/kg-day	0.1
			Exp. Route Total								--					2
			Dermal													
				Metals (Total)												
				Cobalt	4.40E-03	mg/L	(2)	--	--	--	--	3.87E-07	mg/kg-day	3.00E-04	mg/kg-day	0.001
				Manganese	5.60E-02	mg/L	(2)	--	--	--	--	1.23E-05	mg/kg-day	9.60E-04	mg/kg-day	0.01
			Exp. Route Total								--					0.01
		Exp. Point Total									--					2
	Exp. Medium Total										--					2
Medium Total											--					2
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-38
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0527)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Perfluorinated Compounds												
				Perfluorooctanesulfonic acid (PFOS)	6.50E-05	mg/L	(2)	--	--	--	--	1.95E-06	mg/kg-day	2.00E-06	mg/kg-day	1
				Metals (Total)												
				Cobalt	4.40E-03	mg/L	(2)	--	--	--	--	1.32E-04	mg/kg-day	3.00E-04	mg/kg-day	0.4
				Manganese	5.60E-02	mg/L	(2)	--	--	--	--	1.68E-03	mg/kg-day	2.40E-02	mg/kg-day	0.07
			Exp. Route Total								--					1
			Dermal													
				Metals (Total)												
				Cobalt	4.40E-03	mg/L	(2)	--	--	--	--	2.94E-07	mg/kg-day	3.00E-04	mg/kg-day	0.001
				Manganese	5.60E-02	mg/L	(2)	--	--	--	--	9.37E-06	mg/kg-day	9.60E-04	mg/kg-day	0.01
			Exp. Route Total								--					0.01
		Exp. Point Total									--					1
	Exp. Medium Total										--					1
Medium Total											--					1
											Total of Receptor Risks Across All Media					Total of Receptor Hazards Across All Media

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A7-39
Calculation of Chemical Cancer Risks and Non-Cancer Hazards
Reasonable Maximum Exposure (Well 0527)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk [1]	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient [1]
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater	Ingestion													
				Perfluorinated Compounds												
				Perfluorooctanesulfonic acid (PFOS)	6.50E-05	mg/L	8.34E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Metals (Total)												
				Cobalt	4.40E-03	mg/L	5.65E-05	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	5.60E-02	mg/L	7.19E-04	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
			Dermal													
				Metals (Total)												
				Cobalt	4.40E-03	mg/L	1.21E-07	mg/kg-day	--	--	--	(2)	--	--	--	--
				Manganese	5.60E-02	mg/L	3.84E-06	mg/kg-day	--	--	--	(2)	--	--	--	--
			Exp. Route Total								--					--
		Exp. Point Total									--					--
	Exp. Medium Total										--					--
Medium Total											--					--
										Total of Receptor Risks Across All Media	--				Total of Receptor Hazards Across All Media	--

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

(2) Cancer risk is only presented for the lifetime receptor, whereas non-cancer hazard is calculated separately for the child and adult receptor.

Table A9-1
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0124)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Perfluorinated Compounds									
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	DV	0.3	--	--	0.3
			Cyanide									
			Cyanide	--	--	--	--	RP	0.4	0.003	--	0.4
			Metals (Total)									
			Barium	--	--	--	--	NV	0.1	0.008	--	0.1
			Cobalt	--	--	--	--	EN	5	0.009	--	5
			Copper	--	--	--	--	GI	0.3	0.001	--	0.3
			Manganese	--	--	--	--	NV	0.4	0.04	--	0.4
			Chemical Total	--	--	--	--		6	0.06	--	7
		Exposure Point Total					--					7
	Exposure Medium Total						--					7
Medium Total							--					7
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	7

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Developmental (DV) HI across All Media =	0.3
Total Endocrine (EN) HI across All Media =	5
Total Gastrointestinal (GI) HI across All Media =	0.3
Total Nervous (NV) HI across All Media =	0.6
Total Reproductive (RP) HI across All Media =	0.4

Table A9-2
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0124)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk (1)				Non-Carcinogenic Hazard Quotient (1)				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Perfluorinated Compounds									
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	DV	0.2	--	--	0.2
			Cyanide									
			Cyanide	--	--	--	--	RP	0.2	0.002	--	0.2
			Metals (Total)									
			Barium	--	--	--	--	NV	0.07	0.006	--	0.08
			Cobalt	--	--	--	--	EN	3	0.007	--	3
			Copper	--	--	--	--	GI	0.2	0.001	--	0.2
			Manganese	--	--	--	--	NV	0.2	0.03	--	0.3
			Chemical Total	--	--	--	--		4	0.05	--	4
		Exposure Point Total					--					4
	Exposure Medium Total						--					4
	Indoor Air	Shower/Bath (Vapors)										
			Cyanide									
			Cyanide	--	--	--	--	EN	--	--	0.004	0.004
			Chemical Total	--	--	--	--		--	--	0.004	0.004
		Exposure Point Total					--					0.004
	Exposure Medium Total						--					0.004
Medium Total							--					4
						Receptor Risk Total	--				Receptor Hazard Index (HI)	4

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Developmental (DV) HI across All Media =	0.2
Total Endocrine (EN) HI across All Media =	3
Total Gastrointestinal (GI) HI across All Media =	0.2
Total Nervous (NV) HI across All Media =	0.3
Total Reproductive (RP) HI across All Media =	0.2

Table A9-3
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0124)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Perfluorinated Compounds									
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	--	--	--	--	--
			Cyanide									
			Cyanide	--	--	--	--	--	--	--	--	--
			Metals (Total)									
			Barium	--	--	--	--	--	--	--	--	--
			Cobalt	--	--	--	--	--	--	--	--	--
			Copper	--	--	--	--	--	--	--	--	--
			Manganese	--	--	--	--	--	--	--	--	--
			Chemical Total	--	--	--	--		--	--	--	--
		Exposure Point Total					--					--
	Exposure Medium Total						--					--
	Indoor Air	Shower/Bath (Vapors)										
			Cyanide									
			Cyanide	--	--	--	--	--	--	--	--	--
			Chemical Total	--	--	--	--		--	--	--	--
		Exposure Point Total					--					--
	Exposure Medium Total						--					--
Medium Total							--					--
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	--

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Table A9-4
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0155)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Cyanide									
			Cyanide	--	--	--	--	RP	0.4	0.003	--	0.4
			Metals (Total)									
			Arsenic	--	--	--	--	DM; HM	0.06	0.0003	--	0.06
			Barium	--	--	--	--	NV	0.3	0.02	--	0.3
			Cadmium (Water)	--	--	--	--	UR	0.2	0.01	--	0.2
			Cobalt	--	--	--	--	EN	2	0.004	--	2
			Copper	--	--	--	--	GI	0.2	0.0008	--	0.2
			Manganese	--	--	--	--	NV	0.2	0.03	--	0.3
			Chemical Total	--	--	--	--		4	0.07	--	4
		Exposure Point Total					--					4
	Exposure Medium Total						--					4
Medium Total							--					4
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	4

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Dermal (DM) HI across All Media =	0.06
Total Endocrine (EN) HI across All Media =	2
Total Gastrointestinal (GI) HI across All Media =	0.2
Total Hematological (HM) HI across All Media =	0.06
Total Nervous (NV) HI across All Media =	0.6
Total Reproductive (RP) HI across All Media =	0.4
Total Urinary (UR) HI across All Media =	0.2

Table A9-5
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0155)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Cyanide									
			Cyanide	--	--	--	--	RP	0.2	0.002	--	0.2
			Metals (Total)									
			Arsenic	--	--	--	--	DM; HM	0.04	0.0002	--	0.04
			Barium	--	--	--	--	NV	0.2	0.01	--	0.2
			Cadmium (Water)	--	--	--	--	UR	0.1	0.01	--	0.1
			Cobalt	--	--	--	--	EN	1	0.003	--	2
			Copper	--	--	--	--	GI	0.1	0.0006	--	0.1
			Manganese	--	--	--	--	NV	0.1	0.02	--	0.2
			Chemical Total	--	--	--	--		2	0.05	--	2
		Exposure Point Total					--					2
	Exposure Medium Total						--					2
	Indoor Air	Shower/Bath (Vapors)										
			Cyanide									
			Cyanide	--	--	--	--	EN	--	--	0.005	0.005
			Chemical Total	--	--	--	--		--	--	0.005	0.005
		Exposure Point Total					--					0.005
	Exposure Medium Total						--					0.005
Medium Total							--					2
						Receptor Risk Total	--				Receptor Hazard Index (HI)	2

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Dermal (DM) HI across All Media =	0.04
Total Endocrine (EN) HI across All Media =	2
Total Gastrointestinal (GI) HI across All Media =	0.1
Total Hematological (HM) HI across All Media =	0.04
Total Nervous (NV) HI across All Media =	0.3
Total Reproductive (RP) HI across All Media =	0.2
Total Urinary (UR) HI across All Media =	0.1

Table A9-6
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0155)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Cyanide									
			Cyanide	--	--	--	--	--	--	--	--	--
			Metals (Total)									
			Arsenic	7E-06	4E-08	--	7E-06	--	--	--	--	--
			Barium	--	--	--	--	--	--	--	--	--
			Cadmium (Water)	--	--	--	--	--	--	--	--	--
			Cobalt	--	--	--	--	--	--	--	--	--
			Copper	--	--	--	--	--	--	--	--	--
			Manganese	--	--	--	--	--	--	--	--	--
			Chemical Total	7E-06	4E-08	--	7E-06		--	--	--	--
		Exposure Point Total					7E-06					--
	Exposure Medium Total						7E-06					--
	Indoor Air	Shower/Bath (Vapors)										
			Cyanide									
			Cyanide	--	--	--	--	--	--	--	--	--
			Chemical Total	--	--	--	--		--	--	--	--
		Exposure Point Total					--					--
	Exposure Medium Total						--					--
Medium Total							7E-06					--
						Receptor Risk Total	7E-06				Receptor Hazard Index (HI)	--

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Table A9-7
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0170)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	--	--	HP	0.007	0.0006	--	0.008
			Perfluorinated Compounds									
			Perfluorooctanoic acid (PFOA)	--	--	--	--	DV	0.2	--	--	0.2
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	DV	6	--	--	6
			Metals (Total)									
			Chromium, Hexavalent	--	--	--	--	--	0.1	0.03	--	0.1
			Cobalt	--	--	--	--	EN	1	0.002	--	1
			Nickel	--	--	--	--	OT	0.1	0.003	--	0.1
			Chemical Total	--	--	--	--		8	0.04	--	8
		Exposure Point Total					--					8
	Exposure Medium Total						--					8
	Indoor Air	Indoor Air (Vapor Intrusion)										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	--	--	HP	--	--	0.002	0.002
			Chemical Total	--	--	--	--		--	--	0.002	0.002
		Exposure Point Total					--					0.002
	Exposure Medium Total						--					0.002
Medium Total							--					8
						Receptor Risk Total	--				Receptor Hazard Index (HI)	8

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Developmental (DV) HI across All Media =	7
Total Endocrine (EN) HI across All Media =	1
Total Hepatic (HP) HI across All Media =	0.009
Total Other (OT) HI across All Media =	0.1

Table A9-8
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0170)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk (1)				Non-Carcinogenic Hazard Quotient (1)				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	--	--	HP	0.004	0.0004	--	0.005
			Perfluorinated Compounds									
			Perfluorooctanoic acid (PFOA)	--	--	--	--	DV	0.1	--	--	0.1
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	DV	4	--	--	4
			Metals (Total)									
			Chromium, Hexavalent	--	--	--	--	--	0.06	0.03	--	0.08
			Cobalt	--	--	--	--	EN	0.6	0.001	--	0.7
			Nickel	--	--	--	--	OT	0.08	0.002	--	0.08
			Chemical Total	--	--	--	--		5	0.03	--	5
		Exposure Point Total					--					5
	Exposure Medium Total						--					5
	Indoor Air	Shower/Bath (Vapors)										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	--	--	HP	--	--	0.00002	0.00002
			Chemical Total	--	--	--	--		--	--	0.00002	0.00002
		Exposure Point Total					--					0.00002
	Exposure Medium Total						--					0.00002
		Indoor Air (Vapor Intrusion)										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	--	--	HP	--	--	0.002	0.002
			Chemical Total	--	--	--	--		--	--	0.002	0.002
		Exposure Point Total					--					0.002
	Exposure Medium Total						--					0.002
Medium Total							--					5
						Receptor Risk Total	--				Receptor Hazard Index (HI)	5

Notes:
(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Developmental (DV) HI across All Media =	4
Total Endocrine (EN) HI across All Media =	0.7
Total Hepatic (HP) HI across All Media =	0.006
Total Other (OT) HI across All Media =	0.08

Table A9-9
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0170)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Volatile Organic Compounds (VOCs)									
			Chloroform	6E-07	5E-08	--	6E-07	--	--	--	--	--
			Perfluorinated Compounds									
			Perfluorooctanoic acid (PFOA)	1E-08	--	--	1E-08	--	--	--	--	--
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	--	--	--	--	--
			Metals (Total)									
			Chromium, Hexavalent	1E-04	5E-05	--	2E-04	--	--	--	--	--
			Cobalt	--	--	--	--	--	--	--	--	--
			Nickel	--	--	--	--	--	--	--	--	--
			Chemical Total	1E-04	5E-05	--	2E-04		--	--	--	--
		Exposure Point Total					2E-04					--
	Exposure Medium Total						2E-04					--
	Indoor Air	Shower/Bath (Vapors)										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	1E-08	1E-08	--	--	--	--	--
			Chemical Total	--	--	1E-08	1E-08		--	--	--	--
		Exposure Point Total					1E-08					--
	Exposure Medium Total						1E-08					--
		Indoor Air (Vapor Intrusion)										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	1E-06	1E-06	--	--	--	--	--
			Chemical Total	--	--	1E-06	1E-06		--	--	--	--
		Exposure Point Total					1E-06					--
	Exposure Medium Total						1E-06					--
Medium Total							2E-04					--
						Receptor Risk Total	2E-04				Receptor Hazard Index (HI)	--

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Table A9-10
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0173)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Perfluorinated Compounds									
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	DV	0.6	--	--	0.6
			Cyanide									
			Cyanide	--	--	--	--	RP	0.8	0.005	--	0.8
			Metals (Total)									
			Barium	--	--	--	--	NV	0.1	0.007	--	0.1
			Cobalt	--	--	--	--	EN	4	0.006	--	4
			Manganese	--	--	--	--	NV	0.5	0.05	--	0.5
			Chemical Total	--	--	--	--		6	0.07	--	6
		Exposure Point Total					--					6
	Exposure Medium Total						--					6
Medium Total							--					6
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	6

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Developmental (DV) HI across All Media =	0.6
Total Endocrine (EN) HI across All Media =	4
Total Nervous (NV) HI across All Media =	0.6
Total Reproductive (RP) HI across All Media =	0.8

Table A9-11
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0173)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Perfluorinated Compounds									
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	DV	0.4	--	--	0.4
			Cyanide									
			Cyanide	--	--	--	--	RP	0.5	0.004	--	0.5
			Metals (Total)									
			Barium	--	--	--	--	NV	0.06	0.005	--	0.07
			Cobalt	--	--	--	--	EN	2	0.005	--	2
			Manganese	--	--	--	--	NV	0.3	0.04	--	0.3
			Chemical Total	--	--	--	--		3	0.05	--	3
		Exposure Point Total					--					3
	Exposure Medium Total						--					3
	Indoor Air	Shower/Bath (Vapors)										
			Cyanide									
			Cyanide	--	--	--	--	EN	--	--	0.009	0.009
			Chemical Total	--	--	--	--		--	--	0.009	0.009
		Exposure Point Total					--					0.009
	Exposure Medium Total						--					0.009
Medium Total							--					3
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	3

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Developmental (DV) HI across All Media =	0.4
Total Endocrine (EN) HI across All Media =	2
Total Nervous (NV) HI across All Media =	0.4
Total Reproductive (RP) HI across All Media =	0.5

Table A9-12
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0173)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Perfluorinated Compounds									
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	--	--	--	--	--
			Cyanide									
			Cyanide	--	--	--	--	--	--	--	--	--
			Metals (Total)									
			Barium	--	--	--	--	--	--	--	--	--
			Cobalt	--	--	--	--	--	--	--	--	--
			Manganese	--	--	--	--	--	--	--	--	--
			Chemical Total	--	--	--	--		--	--	--	--
		Exposure Point Total					--					--
	Exposure Medium Total						--					--
	Indoor Air	Shower/Bath (Vapors)										
			Cyanide									
			Cyanide	--	--	--	--	--	--	--	--	--
			Chemical Total	--	--	--	--		--	--	--	--
		Exposure Point Total					--					--
	Exposure Medium Total						--					--
Medium Total							--					--
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	--

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Table A9-13
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0176)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Cyanide									
			Cyanide	--	--	--	--	RP	0.7	0.005	--	0.8
			Metals (Total)									
			Barium	--	--	--	--	NV	0.1	0.007	--	0.1
			Cadmium (Water)	--	--	--	--	UR	0.1	0.009	--	0.1
			Cobalt	--	--	--	--	EN	2	0.004	--	2
			Manganese	--	--	--	--	NV	0.3	0.04	--	0.4
			Chemical Total	--	--	--	--		4	0.06	--	4
		Exposure Point Total					--					4
	Exposure Medium Total						--					4
Medium Total							--					4
						Receptor Risk Total	--				Receptor Hazard Index (HI)	4

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Endocrine (EN) HI across All Media =	2
Total Nervous (NV) HI across All Media =	0.5
Total Reproductive (RP) HI across All Media =	0.8
Total Urinary (UR) HI across All Media =	0.1

Table A9-14
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0176)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Cyanide									
			Cyanide	--	--	--	--	RP	0.4	0.004	--	0.5
			Metals (Total)									
			Barium	--	--	--	--	NV	0.06	0.005	--	0.07
			Cadmium (Water)	--	--	--	--	UR	0.06	0.007	--	0.07
			Cobalt	--	--	--	--	EN	1	0.003	--	1
			Manganese	--	--	--	--	NV	0.2	0.03	--	0.2
			Chemical Total	--	--	--	--		2	0.05	--	2
		Exposure Point Total					--					2
	Exposure Medium Total						--					2
	Indoor Air	Shower/Bath (Vapors)										
			Cyanide									
			Cyanide	--	--	--	--	EN	--	--	0.008	0.008
			Chemical Total	--	--	--	--		--	--	0.008	0.008
		Exposure Point Total					--					0.008
	Exposure Medium Total						--					0.008
Medium Total							--					2
						Receptor Risk Total	--				Receptor Hazard Index (HI)	2

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Endocrine (EN) HI across All Media =	1
Total Nervous (NV) HI across All Media =	0.3
Total Reproductive (RP) HI across All Media =	0.5
Total Urinary (UR) HI across All Media =	0.07

Table A9-15
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0176)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Cyanide									
			Cyanide	--	--	--	--	--	--	--	--	--
			Metals (Total)									
			Barium	--	--	--	--	--	--	--	--	--
			Cadmium (Water)	--	--	--	--	--	--	--	--	--
			Cobalt	--	--	--	--	--	--	--	--	--
			Manganese	--	--	--	--	--	--	--	--	--
			Chemical Total	--	--	--	--		--	--	--	--
		Exposure Point Total					--					--
	Exposure Medium Total						--					--
	Indoor Air	Shower/Bath (Vapors)										
			Cyanide									
			Cyanide	--	--	--	--	--	--	--	--	--
			Chemical Total	--	--	--	--		--	--	--	--
		Exposure Point Total					--					--
	Exposure Medium Total						--					--
Medium Total							--					--
						Receptor Risk Total	--				Receptor Hazard Index (HI)	--

Notes:
(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Table A9-16
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0182)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Perfluorinated Compounds									
			Perfluorooctanoic acid (PFOA)	--	--	--	--	DV	0.2	--	--	0.2
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	DV	5	--	--	5
			Cyanide									
			Cyanide	--	--	--	--	RP	0.3	0.002	--	0.3
			Metals (Total)									
			Cobalt	--	--	--	--	EN	4	0.007	--	4
			Manganese	--	--	--	--	NV	0.8	0.09	--	0.9
			Chemical Total	--	--	--	--		11	0.1	--	11
		Exposure Point Total					--					11
	Exposure Medium Total						--					11
Medium Total							--					11
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	11

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Developmental (DV) HI across All Media =	6
Total Endocrine (EN) HI across All Media =	4
Total Nervous (NV) HI across All Media =	0.9
Total Reproductive (RP) HI across All Media =	0.3

Table A9-17
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0182)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Perfluorinated Compounds									
			Perfluorooctanoic acid (PFOA)	--	--	--	--	DV	0.1	--	--	0.1
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	DV	3	--	--	3
			Cyanide									
			Cyanide	--	--	--	--	RP	0.2	0.001	--	0.2
			Metals (Total)									
			Cobalt	--	--	--	--	EN	2	0.006	--	3
			Manganese	--	--	--	--	NV	0.5	0.07	--	0.5
			Chemical Total	--	--	--	--		7	0.07	--	7
		Exposure Point Total					--					7
	Exposure Medium Total						--					7
	Indoor Air	Shower/Bath (Vapors)										
			Cyanide									
			Cyanide	--	--	--	--	EN	--	--	0.003	0.003
			Chemical Total	--	--	--	--		--	--	0.003	0.003
		Exposure Point Total					--					0.003
	Exposure Medium Total						--					0.003
Medium Total							--					7
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	7

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Developmental (DV) HI across All Media =	3
Total Endocrine (EN) HI across All Media =	3
Total Nervous (NV) HI across All Media =	0.5
Total Reproductive (RP) HI across All Media =	0.2

Table A9-18
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0182)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Perfluorinated Compounds									
			Perfluorooctanoic acid (PFOA)	1E-08	--	--	1E-08	--	--	--	--	--
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	--	--	--	--	--
			Cyanide									
			Cyanide	--	--	--	--	--	--	--	--	--
			Metals (Total)									
			Cobalt	--	--	--	--	--	--	--	--	--
			Manganese	--	--	--	--	--	--	--	--	--
			Chemical Total	1E-08	--	--	1E-08		--	--	--	--
		Exposure Point Total					1E-08					--
	Exposure Medium Total						1E-08					--
	Indoor Air	Shower/Bath (Vapors)										
			Cyanide									
			Cyanide	--	--	--	--	--	--	--	--	--
			Chemical Total	--	--	--	--		--	--	--	--
		Exposure Point Total					--					--
	Exposure Medium Total						--					--
Medium Total							1E-08					--
						Receptor Risk Total	1E-08				Receptor Hazard Index (HI)	--

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Table A9-19
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0197)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	--	--	HP	0.003	0.0002	--	0.003
			Perfluorinated Compounds									
			Perfluorooctanoic acid (PFOA)	--	--	--	--	DV	0.3	--	--	0.3
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	DV	4	--	--	4
			Cyanide									
			Cyanide	--	--	--	--	RP	0.3	0.002	--	0.3
			Metals (Total)									
			Cadmium (Water)	--	--	--	--	UR	0.2	0.01	--	0.2
			Cobalt	--	--	--	--	EN	2	0.004	--	2
			Manganese	--	--	--	--	NV	0.4	0.04	--	0.4
			Chemical Total	--	--	--	--		7	0.06	--	7
		Exposure Point Total					--					7
	Exposure Medium Total						--					7
Medium Total							--					7
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	7

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Developmental (DV) HI across All Media =	4
Total Endocrine (EN) HI across All Media =	2
Total Hepatic (HP) HI across All Media =	0.003
Total Nervous (NV) HI across All Media =	0.4
Total Reproductive (RP) HI across All Media =	0.3
Total Urinary (UR) HI across All Media =	0.2

Table A9-20
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0197)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk (1)				Non-Carcinogenic Hazard Quotient (1)				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	--	--	HP	0.002	0.0001	--	0.002
			Perfluorinated Compounds									
			Perfluorooctanoic acid (PFOA)	--	--	--	--	DV	0.2	--	--	0.2
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	DV	2	--	--	2
			Cyanide									
			Cyanide	--	--	--	--	RP	0.2	0.001	--	0.2
			Metals (Total)									
			Cadmium (Water)	--	--	--	--	UR	0.1	0.01	--	0.1
			Cobalt	--	--	--	--	EN	1	0.003	--	1
			Manganese	--	--	--	--	NV	0.2	0.03	--	0.3
			Chemical Total	--	--	--	--		4	0.05	--	4
		Exposure Point Total					--					4
	Exposure Medium Total						--					4
	Indoor Air	Shower/Bath (Vapors)										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	--	--	HP	--	--	0.000006	0.000006
			Cyanide									
			Cyanide	--	--	--	--	EN	--	--	0.003	0.003
			Chemical Total	--	--	--	--		--	--	0.003	0.003
		Exposure Point Total					--					0.003
	Exposure Medium Total						--					0.003
Medium Total							--					4
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	4

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Developmental (DV) HI across All Media =	2
Total Endocrine (EN) HI across All Media =	1
Total Hepatic (HP) HI across All Media =	0.002
Total Nervous (NV) HI across All Media =	0.3
Total Reproductive (RP) HI across All Media =	0.2
Total Urinary (UR) HI across All Media =	0.1

Table A9-21
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0197)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Volatile Organic Compounds (VOCs)									
			Chloroform	2E-07	2E-08	--	2E-07	--	--	--	--	--
			Perfluorinated Compounds									
			Perfluorooctanoic acid (PFOA)	1E-08	--	--	1E-08	--	--	--	--	--
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	--	--	--	--	--
			Cyanide									
			Cyanide	--	--	--	--	--	--	--	--	--
			Metals (Total)									
			Cadmium (Water)	--	--	--	--	--	--	--	--	--
			Cobalt	--	--	--	--	--	--	--	--	--
			Manganese	--	--	--	--	--	--	--	--	--
			Chemical Total	2E-07	2E-08	--	2E-07		--	--	--	--
		Exposure Point Total					2E-07					--
	Exposure Medium Total						2E-07					--
	Indoor Air	Shower/Bath (Vapors)										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	4E-09	4E-09	--	--	--	--	--
			Cyanide									
			Cyanide	--	--	--	--	--	--	--	--	--
			Chemical Total	--	--	4E-09	4E-09		--	--	--	--
		Exposure Point Total					4E-09					--
	Exposure Medium Total						4E-09					--
Medium Total							2E-07					--
						Receptor Risk Total	2E-07				Receptor Hazard Index (HI)	--

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Table A9-22
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0212)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	--	--	HP	0.001	0.0001	--	0.002
			Perfluorinated Compounds									
			Perfluorooctanoic acid (PFOA)	--	--	--	--	DV	0.2	--	--	0.2
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	DV	1	--	--	1
			Metals (Total)									
			Cobalt	--	--	--	--	EN	0.3	0.0005	--	0.3
			Copper	--	--	--	--	GI	0.4	0.002	--	0.4
			Chemical Total	--	--	--	--		2	0.002	--	2
		Exposure Point Total					--					2
	Exposure Medium Total						--					2
Medium Total							--					2
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	2

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Developmental (DV) HI across All Media =	2
Total Endocrine (EN) HI across All Media =	0.3
Total Gastrointestinal (GI) HI across All Media =	0.4
Total Hepatic (HP) HI across All Media =	0.002

Table A9-23
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0212)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	--	--	HP	0.0008	0.00007	--	0.0009
			Perfluorinated Compounds									
			Perfluorooctanoic acid (PFOA)	--	--	--	--	DV	0.1	--	--	0.1
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	DV	0.9	--	--	0.9
			Metals (Total)									
			Cobalt	--	--	--	--	EN	0.2	0.0004	--	0.2
			Copper	--	--	--	--	GI	0.2	0.001	--	0.2
			Chemical Total	--	--	--	--		1	0.002	--	1
		Exposure Point Total					--					1
	Exposure Medium Total						--					1
	Indoor Air	Shower/Bath (Vapors)										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	--	--	HP	--	--	0.000003	0.000003
			Chemical Total	--	--	--	--		--	--	0.000003	0.000003
		Exposure Point Total					--					0.000003
	Exposure Medium Total						--					0.000003
Medium Total							--					1
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	1

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Developmental (DV) HI across All Media =	1
Total Endocrine (EN) HI across All Media =	0.2
Total Gastrointestinal (GI) HI across All Media =	0.2
Total Hepatic (HP) HI across All Media =	0.0009

Table A9-24
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0212)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Volatile Organic Compounds (VOCs)									
			Chloroform	1E-07	1E-08	--	1E-07	--	--	--	--	--
			Perfluorinated Compounds									
			Perfluorooctanoic acid (PFOA)	1E-08	--	--	1E-08	--	--	--	--	--
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	--	--	--	--	--
			Metals (Total)									
			Cobalt	--	--	--	--	--	--	--	--	--
			Copper	--	--	--	--	--	--	--	--	--
			Chemical Total	1E-07	1E-08	--	1E-07		--	--	--	--
		Exposure Point Total					1E-07					--
	Exposure Medium Total						1E-07					--
	Indoor Air	Shower/Bath (Vapors)										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	2E-09	2E-09	--	--	--	--	--
			Chemical Total	--	--	2E-09	2E-09		--	--	--	--
		Exposure Point Total					2E-09					--
	Exposure Medium Total						2E-09					--
Medium Total							1E-07					--
Notes:						Receptor Risk Total	1E-07				Receptor Hazard Index (HI)	--

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Table A9-25
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0275)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Perfluorinated Compounds									
			Perfluorooctanoic acid (PFOA)	--	--	--	--	DV	0.1	--	--	0.1
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	DV	1	--	--	1
			Metals (Total)									
			Cadmium (Water)	--	--	--	--	UR	0.1	0.009	--	0.1
			Cobalt	--	--	--	--	EN	0.3	0.0005	--	0.3
			Iron	--	--	--	--	GI	0.2	0.0009	--	0.2
			Manganese	--	--	--	--	NV	0.1	0.01	--	0.1
			Chemical Total	--	--	--	--		2	0.02	--	2
		Exposure Point Total					--					2
	Exposure Medium Total						--					2
Medium Total							--					2
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	2

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Developmental (DV) HI across All Media =	2
Total Endocrine (EN) HI across All Media =	0.3
Total Gastrointestinal (GI) HI across All Media =	0.2
Total Nervous (NV) HI across All Media =	0.1
Total Urinary (UR) HI across All Media =	0.1

Table A9-26
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0275)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Perfluorinated Compounds									
			Perfluorooctanoic acid (PFOA)	--	--	--	--	DV	0.07	--	--	0.07
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	DV	0.9	--	--	0.9
			Metals (Total)									
			Cadmium (Water)	--	--	--	--	UR	0.06	0.007	--	0.07
			Cobalt	--	--	--	--	EN	0.2	0.0004	--	0.2
			Iron	--	--	--	--	GI	0.1	0.0007	--	0.1
			Manganese	--	--	--	--	NV	0.07	0.01	--	0.08
			Chemical Total	--	--	--	--		1	0.02	--	1
		Exposure Point Total					--					1
	Exposure Medium Total						--					1
Medium Total							--					1
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	1

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Developmental (DV) HI across All Media =	1
Total Endocrine (EN) HI across All Media =	0.2
Total Gastrointestinal (GI) HI across All Media =	0.1
Total Nervous (NV) HI across All Media =	0.08
Total Urinary (UR) HI across All Media =	0.07

Table A9-27
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0275)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Perfluorinated Compounds									
			Perfluorooctanoic acid (PFOA)	7E-09	--	--	7E-09	--	--	--	--	--
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	--	--	--	--	--
			Metals (Total)									
			Cadmium (Water)	--	--	--	--	--	--	--	--	--
			Cobalt	--	--	--	--	--	--	--	--	--
			Iron	--	--	--	--	--	--	--	--	--
			Manganese	--	--	--	--	--	--	--	--	--
			Chemical Total	7E-09	--	--	7E-09		--	--	--	--
		Exposure Point Total					7E-09					--
	Exposure Medium Total						7E-09					--
Medium Total							7E-09					--
Notes:						Receptor Risk Total	7E-09				Receptor Hazard Index (HI)	--

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Table A9-28
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0500)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Metals (Total)									
			Barium	--	--	--	--	NV	0.2	0.01	--	0.2
			Beryllium	--	--	--	--	GI	0.09	0.06	--	0.1
			Cadmium (Water)	--	--	--	--	UR	0.2	0.02	--	0.2
			Cobalt	--	--	--	--	EN	4	0.008	--	4
			Manganese	--	--	--	--	NV	0.4	0.04	--	0.4
			Chemical Total	--	--	--	--		5	0.1	--	5
		Exposure Point Total					--					5
	Exposure Medium Total						--					5
Medium Total							--					5
						Receptor Risk Total	--				Receptor Hazard Index (HI)	5

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Endocrine (EN) HI across All Media =	4
Total Gastrointestinal (GI) HI across All Media =	0.1
Total Nervous (NV) HI across All Media =	0.6
Total Urinary (UR) HI across All Media =	0.2

Table A9-29
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0500)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Metals (Total)									
			Barium	--	--	--	--	NV	0.1	0.008	--	0.1
			Beryllium	--	--	--	--	GI	0.05	0.04	--	0.1
			Cadmium (Water)	--	--	--	--	UR	0.1	0.01	--	0.1
			Cobalt	--	--	--	--	EN	3	0.006	--	3
			Manganese	--	--	--	--	NV	0.2	0.03	--	0.3
			Chemical Total	--	--	--	--		3	0.1	--	3
		Exposure Point Total					--					3
	Exposure Medium Total						--					3
Medium Total							--					3
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	3

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Endocrine (EN) HI across All Media =	3
Total Gastrointestinal (GI) HI across All Media =	0.1
Total Nervous (NV) HI across All Media =	0.4
Total Urinary (UR) HI across All Media =	0.1

Table A9-30
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0500)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Metals (Total)									
			Barium	--	--	--	--	--	--	--	--	--
			Beryllium	--	--	--	--	--	--	--	--	--
			Cadmium (Water)	--	--	--	--	--	--	--	--	--
			Cobalt	--	--	--	--	--	--	--	--	--
			Manganese	--	--	--	--	--	--	--	--	--
			Chemical Total	--	--	--	--		--	--	--	--
		Exposure Point Total					--					--
	Exposure Medium Total						--					--
Medium Total							--					--
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	--

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Table A9-31
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0501)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	--	--	HP	0.005	0.0004	--	0.005
			Perfluorinated Compounds									
			Perfluorooctanoic acid (PFOA)	--	--	--	--	DV	0.3	--	--	0.3
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	DV	3	--	--	3
			Metals (Total)									
			Cobalt	--	--	--	--	EN	3	0.005	--	3
			Manganese	--	--	--	--	NV	0.5	0.06	--	0.6
			Chemical Total	--	--	--	--		7	0.06	--	7
		Exposure Point Total					--					7
	Exposure Medium Total						--					7
Medium Total							--					7
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	7

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Developmental (DV) HI across All Media =	4
Total Endocrine (EN) HI across All Media =	3
Total Hepatic (HP) HI across All Media =	0.005
Total Nervous (NV) HI across All Media =	0.6

Table A9-32
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0501)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	--	--	HP	0.003	0.0003	--	0.003
			Perfluorinated Compounds									
			Perfluorooctanoic acid (PFOA)	--	--	--	--	DV	0.2	--	--	0.2
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	DV	2	--	--	2
			Metals (Total)									
			Cobalt	--	--	--	--	EN	2	0.004	--	2
			Manganese	--	--	--	--	NV	0.3	0.05	--	0.4
			Chemical Total	--	--	--	--		4	0.05	--	4
		Exposure Point Total					--					4
	Exposure Medium Total						--					4
	Indoor Air	Shower/Bath (Vapors)										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	--	--	HP	--	--	0.00001	0.00001
			Chemical Total	--	--	--	--		--	--	0.00001	0.00001
		Exposure Point Total					--					0.00001
	Exposure Medium Total						--					0.00001
Medium Total							--					4
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	4

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Developmental (DV) HI across All Media =	2
Total Endocrine (EN) HI across All Media =	2
Total Hepatic (HP) HI across All Media =	0.003
Total Nervous (NV) HI across All Media =	0.4

Table A9-33
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0501)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk (1)				Non-Carcinogenic Hazard Quotient (1)				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Volatile Organic Compounds (VOCs)									
			Chloroform	4E-07	3E-08	--	4E-07	--	--	--	--	--
			Perfluorinated Compounds									
			Perfluorooctanoic acid (PFOA)	2E-08	--	--	2E-08	--	--	--	--	--
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	--	--	--	--	--
			Metals (Total)									
			Cobalt	--	--	--	--	--	--	--	--	--
			Manganese	--	--	--	--	--	--	--	--	--
			Chemical Total	4E-07	3E-08	--	4E-07		--	--	--	--
		Exposure Point Total					4E-07					--
	Exposure Medium Total						4E-07					--
	Indoor Air	Shower/Bath (Vapors)										
			Volatile Organic Compounds (VOCs)									
			Chloroform	--	--	7E-09	7E-09	--	--	--	--	--
			Chemical Total	--	--	7E-09	7E-09		--	--	--	--
		Exposure Point Total					7E-09					--
	Exposure Medium Total						7E-09					--
Medium Total							4E-07					--
Notes:						Receptor Risk Total	4E-07				Receptor Hazard Index (HI)	--

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Table A9-34
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0510)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Cyanide									
			Cyanide	--	--	--	--	RP	0.9	0.006	--	0.9
			Metals (Total)									
			Barium	--	--	--	--	NV	0.3	0.02	--	0.3
			Cadmium (Water)	--	--	--	--	UR	0.2	0.02	--	0.2
			Cobalt	--	--	--	--	EN	3	0.006	--	3
			Copper	--	--	--	--	GI	0.1	0.0005	--	0.1
			Manganese	--	--	--	--	NV	0.3	0.03	--	0.3
			Chemical Total	--	--	--	--		5	0.08	--	5
		Exposure Point Total					--					5
	Exposure Medium Total						--					5
Medium Total							--					5
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	5

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Endocrine (EN) HI across All Media =	3
Total Gastrointestinal (GI) HI across All Media =	0.1
Total Nervous (NV) HI across All Media =	0.7
Total Reproductive (RP) HI across All Media =	0.9
Total Urinary (UR) HI across All Media =	0.2

Table A9-35
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0510)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Cyanide									
			Cyanide	--	--	--	--	RP	0.5	0.004	--	0.6
			Metals (Total)									
			Barium	--	--	--	--	NV	0.2	0.02	--	0.2
			Cadmium (Water)	--	--	--	--	UR	0.1	0.01	--	0.1
			Cobalt	--	--	--	--	EN	2	0.004	--	2
			Copper	--	--	--	--	GI	0.07	0.0004	--	0.08
			Manganese	--	--	--	--	NV	0.2	0.02	--	0.2
			Chemical Total	--	--	--	--		3	0.06	--	3
		Exposure Point Total					--					3
	Exposure Medium Total						--					3
	Indoor Air	Shower/Bath (Vapors)										
			Cyanide									
			Cyanide	--	--	--	--	EN	--	--	0.01	0.01
			Chemical Total	--	--	--	--		--	--	0.01	0.01
		Exposure Point Total					--					0.01
	Exposure Medium Total						--					0.01
Medium Total							--					3
						Receptor Risk Total	--				Receptor Hazard Index (HI)	3

Notes:

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Endocrine (EN) HI across All Media =	2
Total Gastrointestinal (GI) HI across All Media =	0.08
Total Nervous (NV) HI across All Media =	0.4
Total Reproductive (RP) HI across All Media =	0.6
Total Urinary (UR) HI across All Media =	0.1

Table A9-36
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0510)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Cyanide									
			Cyanide	--	--	--	--	--	--	--	--	--
			Metals (Total)									
			Barium	--	--	--	--	--	--	--	--	--
			Cadmium (Water)	--	--	--	--	--	--	--	--	--
			Cobalt	--	--	--	--	--	--	--	--	--
			Copper	--	--	--	--	--	--	--	--	--
			Manganese	--	--	--	--	--	--	--	--	--
			Chemical Total	--	--	--	--		--	--	--	--
		Exposure Point Total					--					--
	Exposure Medium Total						--					--
	Indoor Air	Shower/Bath (Vapors)										
			Cyanide									
			Cyanide	--	--	--	--	--	--	--	--	--
			Chemical Total	--	--	--	--		--	--	--	--
		Exposure Point Total					--					--
	Exposure Medium Total						--					--
Medium Total							--					--
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	--

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Table A9-37
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0527)
Current/Future On-Site Resident (Child) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Perfluorinated Compounds									
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	DV	2	--	--	2
			Metals (Total)									
			Cobalt	--	--	--	--	EN	0.7	0.001	--	0.7
			Manganese	--	--	--	--	NV	0.1	0.01	--	0.1
			Chemical Total	--	--	--	--		2	0.01	--	2
		Exposure Point Total					--					2
	Exposure Medium Total						--					2
Medium Total							--					2
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	2

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Developmental (DV) HI across All Media =	2
Total Endocrine (EN) HI across All Media =	0.7
Total Nervous (NV) HI across All Media =	0.1

Table A9-38
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0527)
Current/Future On-Site Resident (Adult) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Perfluorinated Compounds									
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	DV	1	--	--	1
			Metals (Total)									
			Cobalt	--	--	--	--	EN	0.4	0.001	--	0.4
			Manganese	--	--	--	--	NV	0.07	0.01	--	0.08
			Chemical Total	--	--	--	--		1	0.01	--	1
		Exposure Point Total					--					1
	Exposure Medium Total						--					1
Medium Total							--					1
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	1

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

Total Developmental (DV) HI across All Media =	1
Total Endocrine (EN) HI across All Media =	0.4
Total Nervous (NV) HI across All Media =	0.08

Table A9-39
Summary of Chemical Cancer Risks and Non-Cancer Hazards for COPCs
Reasonable Maximum Exposure (Well 0527)
Current/Future On-Site Resident (Lifetime) - Groundwater, Groundwater (Potable Use), Groundwater (Vapor Intrusion)
Human Health Risk Assessment
Blades Groundwater Superfund Site, Blades, Delaware

Scenario Timeframe:	Current/Future
Receptor Population:	On-Site Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Thresholds: Chemical-specific (1E-06) and Cumulative (1E-04)				Thresholds: Chemical-specific, Target Organ and Cumulative (HQ > 1)				
				Carcinogenic Risk [1]				Non-Carcinogenic Hazard Quotient [1]				
				Ingestion	Dermal	Inhalation	Exposure Routes Total	Primary Target Organs	Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Groundwater										
			Perfluorinated Compounds									
			Perfluorooctanesulfonic acid (PFOS)	--	--	--	--	--	--	--	--	--
			Metals (Total)									
			Cobalt	--	--	--	--	--	--	--	--	--
			Manganese	--	--	--	--	--	--	--	--	--
			Chemical Total	--	--	--	--		--	--	--	--
		Exposure Point Total					--					--
	Exposure Medium Total						--					--
Medium Total							--					--
Notes:						Receptor Risk Total	--				Receptor Hazard Index (HI)	--

(1) CR and HQs are rounded to one non-zero digit; cumulative totals may be slightly higher or lower depending on degree of rounding.

APPENDIX D

DETAILED COST ESTIMATE

Planning Cost Estimate Summary

Alternative: OU2-5: Alternate Water Supply – Waterline Connection

Site: Blades OU-2 (Residential)
Location: Blades, Delaware
Phase: FS
Date: February 2023

Description: This alternative involves connecting to the existing Town of Blades water distribution system and extending that system into the affected area. Monthly billing costs covered by end users following water line connection.

CAPITAL COSTS

Description	QTY	UNIT	UNIT COST	Total	Notes
Site Preparation and Management					
RA Contractor Work Plan	1	LS	$20,000	$20,000	Allowance
HASP	1	LS	$10,000	$10,000	Allowance
Equipment mobilization	1	LS	$20,000	$20,000	Allowance
				$50,000	
Additional Costs Associated with Existing POET/POUT Systems					
Carbon unit added for POETs	5	each	$1,350	$6,750	For existing number of residences; cost per unit from Active Chemical 8/12/22 estimate
Carbon unit added for POUTs	15	each	$50	$750	For existing number of units (15 total in 7 residences); cost per unit assumed
Oversight	29	HR	$75	$2,175	Assume 3 hrs per existing POET residence for carbon addition; assume 2 hrs per existing POUT residence for carbon addition
				$9,675	

General Assumptions			
Number of houses to connect	70	houses	
Test Pits at intersections	28	ea	2 per intersection assumed
6" Water Main	8,750	ft	Length of roadways in area of connection
Rock Removal	194	cy	Assumes 20% of route @ 3 ft deep
1" Supply from property line to house	7,000	ft	Assumes average of 100 ft/house
Sawcutting Bituminous Pavement	17,500	ft	2 cuts for total length of 6" water main
Removal of Bituminous Pavement	6,806	sy	Assumes 3.5 ft width of cut
Permanent Pavement Repair (Mill & Overlay)	23,333	sy	Assume 3" depth, 24' width for length of 6" water main
Driveway Repair/Replacement	486	sy	Assume 25% of houses * 250 sf/house
Pavement Markings	3,261	ft	Affected length of River Road
Turf Establishment	1,750	sy	Assume 100 sf/house+1 ft width along length of 6" water main
Hydrants	11	ea	Maximum spacing of 800 ft (estimate by dividing 6" water main length by 800 ft)

Water Line Construction and Existing System/Well Removal/Abandonment					
Erosion and Sediment Control Systems	1	LS	$20,000	$20,000	Allowance
Dust control and air monitoring	100	DAY	$1,000	$100,000	Estimated cost per day over assumed 5 months (20 days/mo)
Maintenance & Protection of Traffic	1,600	HR	$50	$80,000	Assumes 2 police for 100 8-hr days
Test Pits	28	EA	$500	$14,000	Unit Cost from RM 10/18/22 estimate
Connect to Blades Water Main and place under RR tracks	50	LF	$1,000	$50,000	Jacking under RR track; unit cost from RM 10/20/22 estimate
Rock Removal	194	CY	$75	$14,583	Unit Cost from RM 10/18/22 estimate
6" Ductile Iron Pipe (DIP) Water Main	8,750	FT	$175	$1,531,250	Unit Cost from RM 10/18/22 estimate
Wedge Blowoff	3	EA	$3,200	$9,600	Unit Cost from RM 10/20/22 estimate
6" gate valve and box	14	EA	$3,000	$42,000	Unit Cost from RM 10/20/22 estimate
1" Copper water service connection	70	EA	$550	$38,500	Unit Cost from RM 10/20/22 estimate
1" Supply from property line to house	7,000	FT	$33	$231,000	Unit Cost from RM 10/18/22 estimate
1" Water meter	70	EA	$300	$21,000	Unit Cost from RM 10/20/22 estimate
Dewatering	1	LS	$15,000	$15,000	Allowance
Sawcutting Bituminous Pavement	17,500	FT	$4	$70,000	Unit Cost from RM 10/18/22 estimate
Removal of Bituminous Pavement	6,806	SY	$12	$81,667	Unit Cost from RM 10/18/22 estimate
Temporary Pavement Repair	6,806	SY	$20	$136,111	Unit Cost from RM 10/20/22 estimate
Permanent Pavement Repair (Mill & Overlay)	23,333	SY	$25	$583,333	Unit Cost from RM 10/18/22 estimate
Driveway Repair/Replacement	486	SY	$25	$12,153	Unit Cost from RM 10/20/22 estimate
Pavement Markings	3,261	FT	$1.5	$4,892	Unit Cost from RM 10/18/22 estimate
Turf Establishment	1,750	SY	$18	$31,500	Unit Cost from RM 10/18/22 estimate
Hydrants, including appurtenances	11	EA	$12,400	$135,625	Unit Cost from RM 10/18/22 estimate
Disinfection of water main	1	LS	$15,000	$15,000	Unit Cost from Durham FS
Pressure and leakage tests	1	LS	$10,000	$10,000	Unit Cost from Durham FS
Water Line Construction Oversight	800	HR	$75	$60,000	Assume 5 mos (20 days/mo) for 8 hrs/day
Well Abandonment	70	each	$600	$42,000	Assume $12/ft; assume 50 ft/well ($600/well)
Well Abandonment Oversight	560	HR	$75	$42,000	Assume 8 hrs per property to abandon/restore
Remove existing POET/POUT systems	20	each	$500	$10,000	Assume up to 20 residences; includes oversight; cost from vendor discussion
				$3,401,214	

Post-Construction					
Remedial Action Completion Report	200	HR	$100	$20,000	Assumes 3 iterations for regulatory review/comment
				$20,000	
SUBTOTAL				$3,480,889	
Contingency	30%			$1,044,267	Typically just presumed scope (10%)+ bid(10%); however with current economic supply conditions add another 10%
SUBTOTAL				$4,525,155	
Project Management	6%			$271,509	Per USACE/USEPA Guide to Developing CEs during the FS
Remedial Design	10%			$452,516	Use maximum allowed for design services (10%)
Construction Management	8%			$362,012	Per USACE/USEPA Guide to Developing CEs during the FS
TOTAL CAPITAL COSTS (rounded to the nearest $1,000)				$5,611,000	

Planning Cost Estimate Summary

Alternative: OU2-5: Alternate Water Supply – Waterline Connection

O&M COSTS

Description			QTY	UNIT	UNIT COST	Total	Notes
Filter/Media Replacement/Maintenance (Annual)							
POET Filter replacement (2 times/yr)	$192	per event					Cost from bid analysis worksheet dated 4/29/22
POET Media replacement (every 3 years)	$224	per event (use 1/3 for annual cost)					Cost from bid analysis worksheet dated 4/29/22
POET carbon replacement (assume 1 time/yr)	$850	per event					Replacement frequency assumed; cost from Active Chemical 8/12/22 estimate
POUT Filter replacement (1 time/yr)	$41	per event					Cost from bid analysis worksheet dated 4/29/22
POUT carbon replacement (assume 1 time/yr)	$50	per event					Replacement frequency and cost assumed
POE Systems (Filter - 2 times per year; Media - every 3 years)			5	each	$1,309	$6,543	Unit Cost = 2* POE Filter Replacement+1/3*POE Media Replacement
POU Systems (Filter - 1 time per year)			15	each	$91	$1,365	
General Maintenance (assume 4 hrs per residence annually)			48	Hr	$75	$3,600	Responding to calls related to system issues (12 residences) for 3 years
SUBTOTAL						$11,508	
Contingency	10%					$1,151	
Project Management	10%					$1,151	
COST PER ANNUAL FILTER/MEDIA REPLACEMENT						$13,810	
Residential Monitoring: Labor & Materials							Annual monitoring assumed
Field work			80	HR	$75	$6,000	Assume 3 days+1 day of prep, 2 people, (8 total 10-hr days)
Brief memo summarizing maintenance and annual monitoring results			20	HR	$105	$2,100	Allowance
Letters to each resident			12	HR	$75	$900	Assume 1 hr per letter
Misc supplies, copying, etc.			1	LS	$1,000	$1,000	Allowance
Residential Monitoring: Analytical (first 2 years)							**First 2 years - all analytes**
PFAS			20	per sample	$282	$5,630	Recent avg. lab cost per sample
TAL Metals			20	per sample	$85	$1,700	Recent avg. lab cost per sample
Hexavalent Chromium			20	per sample	$85	$1,700	Recent avg. lab cost per sample
PAHs			20	per sample	$125	$2,500	Recent avg. lab cost per sample
VOCs			20	per sample	$62	$1,240	Recent avg. lab cost per sample
DO, ORP, pH, Cond., Temp.(field)			20	per sample	$10	$200	Recent avg. lab cost per sample
15% QA/QC			1	LS	$1,946	$1,946	Allowance of 15%
SUBTOTAL						$24,916	
Contingency	10%					$2,492	
Project Management	10%					$2,492	
COST PER RESIDENTIAL EVENT (first 2 years)						$29,899	
Residential Monitoring: Analytical (year 3)							**Year 3 - remove VOCs and PAHs**
PFAS			20	per sample	$282	$5,630	Recent avg. lab cost per sample
TAL Metals			20	per sample	$85	$1,700	Recent avg. lab cost per sample
Hexavalent Chromium			20	per sample	$85	$1,700	Recent avg. lab cost per sample
PAHs			0	per sample	$125	$0	Recent avg. lab cost per sample
VOCs			0	per sample	$62	$0	Recent avg. lab cost per sample
DO, ORP, pH, Cond., Temp.(field)			20	per sample	$10	$200	Recent avg. lab cost per sample
15% QA/QC			1	LS	$1,385	$1,385	Allowance of 15%
SUBTOTAL						$20,615	
Contingency	10%					$2,061	
Project Management	10%					$2,061	
COST PER RESIDENTIAL EVENT (year 3)						$24,737	
TOTAL O&M ANNUAL COSTS (rounded to the nearest $1,000) - First 2 Years						$44,000	Filter/Media Replacement and Resid. Monitoring (first 2 years)
TOTAL O&M ANNUAL COSTS (rounded to the nearest $1,000) - Year 3						$39,000	Filter/Media Replacement and Resid. Monitoring (Year 3)
TOTAL O&M ANNUAL COSTS (rounded to the nearest $1,000) - After Year 3						$0	

PERIODIC COSTS

Description	QTY	UNIT	UNIT COST	Total	Notes
Five Year Review (through year 30)	0	each	$20,000	$0	Will be included in post-RI remedial alternatives.
SUBTOTAL				$0	
TOTAL PERIODIC ANNUAL COSTS (rounded to the nearest $1,000)				$0	

PRESENT VALUE ANALYSIS

			Straight Cost			Present Value		
Cost Type	Year	Discount Factor at 0.50%	Capital Cost	O&M Costs	Periodic Costs	O&M	Periodic	Notes
Capital Cost	0	1	$5,611,000					Discount rate of 0.5% is based on the March 15, 2022 30-Year Real Interest Rate in Appendix C of the White House Office of Management and Budget (OMB) Circular A-94, Revised March 15, 2022
O&M Cost and Periodic Costs	1	0.9950		$44,000		$43,781	$0	O&M -POETS/POUTS Maintenance and Monitoring
	2	0.9901		$44,000		$43,563	$0	O&M -POETS/POUTS Maintenance and Monitoring
	3	0.9851		$39,000		$38,421	$0	O&M -POETS/POUTS Maintenance and Monitoring
	4	0.9802		$0		$0	$0	
	5	0.9754		$0	$0	$0	$0	
	6	0.9705		$0		$0	$0	
	7	0.9657		$0		$0	$0	
	8	0.9609		$0		$0	$0	
	9	0.9561		$0		$0	$0	

Planning Cost Estimate Summary

Alternative: OU2-5: Alternate Water Supply – Waterline Connection

10	0.9513	$0	$0	$0	$0
11	0.9466	$0		$0	$0
12	0.9419	$0		$0	$0
13	0.9372	$0		$0	$0
14	0.9326	$0		$0	$0
15	0.9279	$0	$0	$0	$0
16	0.9233	$0		$0	$0
17	0.9187	$0		$0	$0
18	0.9141	$0		$0	$0
19	0.9096	$0		$0	$0
20	0.9051	$0	$0	$0	$0
21	0.9006	$0		$0	$0
22	0.8961	$0		$0	$0
23	0.8916	$0		$0	$0
24	0.8872	$0		$0	$0
25	0.8828	$0	$0	$0	$0
26	0.8784	$0		$0	$0
27	0.8740	$0		$0	$0
28	0.8697	$0		$0	$0
29	0.8653	$0		$0	$0
30	0.8610	$0	$0	$0	$0
				$126,000	$0

Total Present Value of Alternative (rounded to the nearest $1,000) $5,737,000

APPENDIX E

DNREC CONCURRENCE LETTER

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL
DIVISION OF WASTE AND HAZARDOUS SUBSTANCES
RICHARDSON & ROBBINS BUILDING
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

DIRECTOR'S OFFICE

PHONE
(302) 739-9400

January 12, 2024

Mr. Paul Leonard, Director
US EPA Region III
4 Penn Center
1600 JFK Blvd.
Philadelphia, PA 19103-2029

RE: State of Delaware Concurrence for Blades Groundwater Operable Unit-2 (OU-2) (DE-1675) Record of Decision for Interim Action

Dear Mr. Leonard:

Thank you for the opportunity to review and comment on the United States Environmental Protection Agency's ("US EPA") selected remedy and Record of Decision for Interim Action for the Blades Groundwater Superfund OU-2 Site in Blades, Delaware. The State of Delaware hereby concurs with the proposed remedy of Connection of Residents to the Public Water Line for the Blades Groundwater Superfund Site Operable Unit 2.

Feel free to reach me at (302) 395-2600 if you have any questions or concerns about this concurrence.

Sincerely,

Timothy T. Ratsep
Director
Division of Waste & Hazardous Substances

TTR:QS:slw
TTR22000-RS.docx
DE-1675 II B9

cc: Qazi Salahuddin, Environmental Program Administrator, DNREC-WHS-Remediation Section
Amy Bryson, Program Manager II, DNREC-WHS-Remediation Section
Rick Galloway, Project Manager, DNREC-WHS-Remediation Section