RECORD OF DECISION

BAGHURST SUPERFUND SITE
UPPER SALFORD TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION III
PHILADELPHIA, PENNSYLVANIA
MAY 2022

BAGHURST DRIVE SUPERFUND SITE
UPPER SALFORD TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA
RECORD OF DECISION

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LIST OF ACRONYMS

AR	Administrative Record
ARARs	Applicable or Relevant and Appropriate Requirements
AUL	Activity and Use Limitations
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended
COC	Contaminant of Concern
COPC	Contaminant of Potential Concern
CSM	Conceptual Site Model
EPA	United States Environmental Protection Agency
FS	Feasibility Study
FYR	Five-Year Review
GWCS	Groundwater Cleanup Standard
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
ICs	Institutional Controls
ISCO	In Situ Chemical Oxidation
ISTR	In Situ Thermal Remediation
MCHD	Montgomery County Health Department
MCL	Maximum Contaminant Level
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
MW	Monitoring Well
NAAQS	National Ambient Air Quality Standards
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
PADEP	Pennsylvania Department of Environmental Protection
PCE	perchloroethylene
PRAP	Proposed Remedial Action Plan
PSG	Passive Soil Gas
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RG	Remediation Goal
RI	Remedial Investigation
ROD	Record of Decision
RSL	Regional Screening Levels
SLERA	Screening Level Ecological Risk Assessment
SVOC	Semi-Volatile Organic Compound
TCE	Trichloroethylene
TBC	To Be Considered
UECA	Pennsylvania Uniform Environmental Covenants Act
UU/UE	Unlimited Use/Unrestricted Exposure

µg/dL	Micrograms per Deciliter
µg/L	Micrograms per Liter
$\mu g/m^3$	Micrograms per Cubic Meter
VI	Vapor Intrusion
VOC	Volatile Organic Compound
1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethene
1,1,1-TCA	1,1,1-trichloroethane

I. DECLARATION

BAGHURST DRIVE SUPERFUND SITE
UPPER SALFORD TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

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BAGHURST DRIVE SUPERFUND SITE

DECLARATION

Site Name and Location

Baghurst Drive Superfund Site
Upper Salford Township, Montgomery County, Pennsylvania
CERCLIS ID Number PAN000306939

Statement of Basis and Purpose

This decision document presents the Selected Remedy for the Baghurst Drive Superfund Site (Site) located in Upper Salford Township, Montgomery County, Pennsylvania (see Figure 1). The Selected Remedy was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §§ 9601 et seq., and 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 choosing the Selected Remedy.

This decision document is based on the Administrative Record (AR) file 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/AR63703, at the U.S. Environmental Protection Agency Region (EPA) III Records Center in Philadelphia, Pennsylvania, and at the Indian Valley Public Library. The AR file index (Appendix A) identifies each document contained in the AR file upon which the selection of the remedy is based.

The Pennsylvania Department of Environmental Protection (PADEP) concurred with the Selected Remedy in a letter dated May 11, 2022, Appendix D.

Assessment of the Site

The Selected Remedy in this Record of Decision (ROD) is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Description of the Selected Remedy

The Selected Remedy in this ROD will address contaminated sub-surface soil and groundwater at the Site. The goal of the Selected Remedy is to prevent future potential human exposure to volatile organic compounds (VOCs) in the groundwater, soil, and soil gas and to prevent future release of VOCs to the environment from the impacted soil that would result in groundwater contamination in excess of the cleanup standards.

EPA, with assistance from its contractor, Tetra Tech, completed a Remedial Investigation (RI) in 2019. A Feasibility Study (FS) was completed in December 2020. The RI/FS identified unacceptable risk associated with exposure to contaminants of concern (COCs) in sub-surface soil and groundwater. The

Selected Remedy in this ROD addresses the threat from contaminated sub-surface soil and groundwater at the Site. The major components of the Selected Remedy are:

- In Situ Thermal Remediation (ISTR) to treat sub-surface soils and groundwater;

- In Situ Chemical Oxidation (ISCO) to treat groundwater hot-spot areas;

- Groundwater and vapor intrusion monitoring; and

- Institutional Controls (ICs) to prohibit the installation of new groundwater wells at the Site, to prevent disturbance of any component of the Remedial Action, and to require that new structures intended for human use or occupancy at the Site receive prior written approval from EPA, in consultation with PADEP, to ensure that any necessary vapor intrusion (VI) mitigation measures are included in this construction.

The estimated present worth cost of the Selected Remedial Action is $6,362,000.

Statutory Determinations

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

The Selected Remedy will meet the statutory preference for treatment as a principal element. This remedy utilizes permanent solutions to the maximum extent practicable by treating soil and groundwater that exceed established cleanup levels.

Because the Selected Remedy will result in hazardous substances remaining at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE) until performance standards are met, a policy review will be conducted every five years after initiation of the remedial action to ensure that the Selected Remedy is protective of human health and the environment pursuant to CERCLA Section 121(c) and 40 C.F.R. § 300.430(f)(4)(ii).

Data Certification Checklist

The following information is included in the Decision Summary of this ROD. Additional information can be found in the AR file for this remedial action.

ROD CERTIFICATION CHECKLIST	
Information	Location/Page Number
Chemicals of Concern	Section 5, pages 12-16; Section 7, page 17
Baseline risk	Section 7, page 16
Clean-up levels established for Chemicals of Concern	Section 7, page 17; Table 1, page 19
Current and reasonably anticipated future land use	Section 6, page 16

assumptions	
Potential future land and groundwater use that will be available at the Site as a result of the implementation of the Selected Remedy	Section 11, page 32
Estimated Selected Remedy cost	Section 9, page 26; Section 11, page 33
Key factors that led to selecting the remedy	Section 11, page 30

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Date: 2022.05.18 15:47:54 -05'00'

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

II. DECISION SUMMARY

BAGHURST DRIVE SUPERFUND SITE
UPPER SALFORD TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

RECORD OF DECISION

1.0 SITE NAME, LOCATION AND DESCRIPTION

The Baghurst Drive Superfund Site (Site) is located within the northwestern portion of Upper Salford Township, Montgomery County, Pennsylvania (Figure 1). The geographic coordinates of the Site are 40º17' 58.14" (40.299483) north latitude and 75º27' 18.48" (75.455133) west longitude, as measured at the intersection of Hendricks Road and Baghurst Drive. The Site includes real property located at 1926 Hendricks Road (the Farm property) and an adjacent parcel of real property located at 2110 Hendricks Road, just northwest of the Farm property (together referred to as the Hendricks Road properties), the Baghurst Drive residential community to the south of the Farm property (Figure 2), and the areal extent of a contaminated groundwater plume emanating from the Hendricks Road properties. The Farm property was formerly used for agricultural purposes and consists of nearly 52 acres adjacent to the Perkiomen Creek. The Farm property may also have been used for waste disposal by a former owner.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

In 1999, a newly installed residential well at one of the homes in the Baghurst Drive residential community was sampled per Montgomery County Health Department (MCHD) (now known as the Montgomery County Office of Public Health) requirements for obtaining a potable use permit. The analytical results included concentrations of 1,1,1-trichloroethane (1,1,1-TCA) greater than the maximum contaminant level (MCL) permitted for this contaminant under the Federal Safe Drinking Water Act. Based on this result, MCHD sampled several neighboring private wells between June and October 1999 and determined that most were also contaminated with multiple volatile organic compounds (VOCs) at levels that exceeded the applicable MCLs. Additional residential wells were subsequently sampled and found to be similarly contaminated. MCHD then requested assistance from the Pennsylvania Department of Environmental Protection (PADEP), which provided laboratory services to MCHD to increase the number of homes sampled in the area.

PADEP's Hazardous Sites Cleanup Program initiated further investigation at the Site in November 1999 due to the number of residential wells impacted by the groundwater contamination. The initial investigation focused on further identifying the residences affected by the groundwater contamination and providing those affected with an alternative potable water source. PADEP immediately began supplying 27 residences with bottled drinking water, and subsequently equipped the homes with carbon filtration systems. These residences included 17 individual drinking wells and one common well that collectively served 10 additional residences. PADEP began analyzing Site groundwater for 1,4-dioxane in 2004; it was subsequently detected in several of the contaminated residential wells. PADEP began delivery of bottled drinking water to residences affected by 1,4-dioxane because that compound is typically not completely captured by carbon filtration systems due to its high degree of solubility in water.

EPA released its Hazardous Ranking System report for the Site in May 2014. This report documented that the risk to human health and the environment created by the groundwater contamination was sufficiently high to make the Site eligible for inclusion on the National Priorities List (NPL) under Section 105 of CERCLA. The Site was added to the NPL in September 2014. In June 2014, EPA performed a removal site evaluation for the residential wells impacted by the groundwater plume, including the common well serving 10 residences. Sampling conducted for this evaluation detected 1,1,1-TCA at concentrations above its Superfund removal action level of 1,000 micrograms per liter (µg/L) in two wells. 1,4-dioxane was also detected in post-carbon (treated) water at multiple residences. This evaluation prompted EPA to initiate a time-critical removal action in 2014 that included ongoing operation and maintenance of the treatment systems installed by PADEP, ongoing provision of bottled water to the impacted residences, construction of an extension to a public water line, and installation of new lateral lines to the affected residences. In January 2022, EPA began construction of a waterline that will ultimately connect 27 homes to a local municipal water system operated by the Schwenksville Authority. Construction of the waterline is expected to be completed in late 2022.

PADEP conducted multiple Site investigations between 1999 and 2013. These investigations included sampling of multiple media, including groundwater, surface water, sediment, surface soil, and subsurface soil. In 2014, EPA directed its contractor, HydroGeoLogic, Inc. (HGL) to assemble the analytical data generated by these investigations and to construct a conceptual site model for the Site (HGL, 2014). The HGL report, which is included in the AR for this Selected Remedy, includes a detailed description of all Site activities conducted prior to the Site's inclusion on the NPL, including the installation of on-site and off-site monitoring wells and soil borings, the performance of several aquifer pumping tests, and preliminary groundwater modeling.

Since that time, EPA has evaluated remedial alternatives for the Site that would be protective of human health and the environment, comply with regulations, and address all stakeholder concerns. In May 2021, EPA completed a proposed remedial action plan (PRAP), identifying and soliciting public comment on EPA's Preferred Alternative, which is the Selected Remedy in this ROD.

3.0 COMMUNITY PARTICIPATION

The RI, FS, and other AR file documents relating to the Site, are available to the public. They are located in the AR file, which can be viewed at http://www.epa.gov/arweb. In addition, the detailed AR file can be examined at the following locations:

U.S. EPA Administrative Records Room
Administrative Records Coordinator
4 Penn Center
1600 JFK Boulevard
Philadelphia, PA 19103
Phone: (215) 814-3157
Hours: Monday-Friday 8:30a.m. to 4:30p.m.
By appointment

Indian Valley Public Library
100 East Church Road Avenue
Telford, Pennsylvania 18969
Phone: (215) 723-9109

General information on the Baghurst Drive Site can be found at EPA's website: https://semspub.epa.gov/src/collection/03/AR63703.

The notice of availability of these documents was published in *The Lansdale Reporter* on May 11, 2021.

From May 11, 2021, to June 11, 2021, EPA held a 30-day public comment period to accept public comments on the remedial alternatives presented in the PRAP and the other documents contained within the AR file for the Site. Due to public health concerns, an in-person public meeting was not held. EPA recorded a video presentation that was published in place of a public meeting to inform local officials, interested citizens and other stakeholders about EPA's proposed cleanup plan, the Superfund process, and to receive comments on the PRAP. During the public comment period, EPA accepted written comments and responded to the comments in the Responsiveness Summary section, which is included as Section III of this ROD. The prerecorded presentation is available at https://www.youtube.com/watch?v=BPnk9k9VXcM.

Cultural Investigation and National Historic Preservation Act Consultation

In 2021, EPA began consultation under the National Historic Preservation Act of 1966 (NHPA), 54 U.S.C. § 300101 *et seq*. In a letter dated August 4, 2021, NHPA concluded that the Selected Remedy as proposed in the ROD had no effect on historic properties on the Site.

Environmental Justice

An Environmental Justice (EJ) screen was conducted for the Site on March 30, 2022. The area around the Site is not considered to be an area of potential EJ concern. EPA has worked closely with the Municipality to keep the community informed during the planning and installation of the public waterline. EPA will continue to identify additional future outreach opportunities for the Site during the RA.

4.0 SCOPE AND ROLE OF THE RESPONSE ACTION

This ROD identifies the Selected Remedy to address sub-surface soil and groundwater contamination at the Site. The Selected Remedy, described herein, will prevent current and potential future exposure to contaminated groundwater, sub-surface soil, and soil vapor through a combination of treatment and institutional controls. It will have the capability to address contaminant mass that is in the groundwater, sub-surface soils, and bedrock matrix (the pore space of the rock). It will address principal threat waste through treatment to permanently reduce the toxicity, mobility, and volume of COCs, and therefore satisfies the statutory preference for treatment as a principal element of Superfund remedial actions. It will restore groundwater at the Site for maximum beneficial use.

The Remedial Action Objectives (RAOs) are described in additional detail in Section 8 of this ROD.

5.0 SITE CHARACTERISTICS

Surface Features

The topographic high spot on the Site is located on the northern end of the Farm property and generally slopes downward west (towards the Perkiomen Creek), east (towards Stream 1), and south (towards the Baghurst Drive residential community). The Farm property is zoned Rural Residential and is not currently being used for farming. The Farm property is bounded by private residences, wooded areas, and farmland.

Site Geology and Hydrogeology

The Site geology was established from drilling activities conducted as part of the RI. The Site-specific subsurface geology is consistent with regional geologic maps produced by the United States Geological Survey and the Pennsylvania Geological Survey.

The Site is immediately underlain by a thin soil layer that is typically less than 10-feet thick until the top of bedrock. The geologic formations beneath the Site are the Brunswick and Lockatong Formations (Figure 3). The bedrock layers underlying the Site dip or tilt to the southwest at rates ranging from 14° to 19°.

The thin layer of overburden soil is not saturated and serves primarily as a medium for the temporary storage of stormwater that infiltrates downward from the land surface. The water table (the top of the saturation zone below which the open spaces contain water) occurs within the underlying bedrock.

Rock formations can have both primary porosity (also called "matrix porosity") and secondary porosity. Primary porosity, the air-filled voids present when a rock forms, is a function of the rock's texture. Secondary porosity develops after the rock has formed by fracturing or physical breaks in the rock (e.g., joints, faults, and bedding planes). Groundwater flow in bedrock is largely controlled by this fracture network.

Groundwater flows laterally and vertically through the bedrock fractures, flowing higher elevations at the Hendricks Road properties towards the Perkiomen Creek and Stream 1, and to greater vertical depths underlying the surface water bodies.

Surface Hydrology

The direction of surface water flow is controlled by the slope of the ground surface. With exception of Stream 1 (bordering the eastern side of the Farm property), surface water on the Site is largely a result of precipitation from storm events. The Hendricks Road properties are divided by a subtle north-south ridge that bisects the Farm property. East of the ridge, the flow is toward the east and Stream 1. West of the ridge, the flow is toward the west and the Perkiomen Creek.

The Perkiomen Creek is a perennial stream (meaning water flows in it throughout the year) that flows to the south and is a major regional surface water body. The upper reach of Stream 1 is intermittent (meaning that it is sometimes dry), with flow only occurring following storm events and during the spring season. Stream 1 becomes perennial at a location adjacent to the Site. From there, it also flows to the south before joining another local stream, and eventually flowing into the Perkiomen Creek.

Nature and Extent of Contamination

Between 2015 and 2019, EPA, with assistance from its contractor, Tetra Tech, conducted a RI at the Site. The RI included a passive soil gas investigation, soil and bedrock sampling, groundwater sampling, surface water and sediment sampling, vapor intrusion sampling, and completion of a human health risk assessment (HHRA) and baseline ecological risk assessment.

<u>Passive Soil Gas Investigation</u>

Soil gas is gas that occurs in the dry air spaces between soil particles. EPA conducted a passive soil gas (PSG) investigation during the RI to aid in the identification of suspected contaminant hotspots at the Hendricks Road properties. In a PSG investigation, gas samplers are buried in the ground for a period of about two weeks to collect samples of the soil gas. The PSG investigation indicated that the dominant VOCs at the Site are 1,1,1-TCA; 1,1-dichloroethene (1,1-DCE); 1,1-dichloroethane (1,1-DCA); trichloroethylene (TCE); and perchloroethylene (PCE). Consistent with previous Site investigations conducted by PADEP, the principal Site VOC contaminant is 1,1,1-TCA, which was detected in the soil gas throughout all but the southwestern quadrant of the Farm property. The highest 1,1,1-TCA mass concentrations were focused in three hot-spot areas. Hot spots[1] were identified where VOC concentrations at specific locations are notably higher than the concentrations in the rest of the sample

[1] The RI identified three Hot Spot Areas: Hot Spot 1, Hot Spot 2, and Hot Spot 3. The FS renamed the Hot Spot Areas identified in the RI: Hot Spot 1 = Hot Spot Area B, Hot Spot 2 = Source Area, Hot Spot 3 = Hot Spot Area A. The FS also identified an additional Hot Spot at the southern end of the Farm Property, Hot Spot Area C. See Figure 9.

population. The largest hot spot (Hot Spot Area B) occurs along the entire eastern border of the Farm property adjacent and parallel to Stream 1. The Source Area is located along and within the tree line in the northwestern quadrant of the Farm property. Hot Spot Area A is much smaller and is located east of the tree line, near the Source Area.

The PSG investigation also indicated that the overall distribution pattern of 1,1-DCE is nearly identical to that for 1,1,1-TCA. 1,1-DCE forms through the abiotic (non-bacterial) dechlorination (breakdown) of 1,1,1-TCA, indicating that abiotic degradation is an important process at the Site. TCE, PCE, and 1,1-DCA are neither widespread nor abundant at the Site and are detected at low concentrations only within the 1,1,1-TCA Hot Spot locations. While 1,4-dioxane is present in groundwater, it was not identified during the PSG investigation, likely due to its higher solubility in groundwater (meaning it readily dissolves in groundwater).

<u>Soil</u>

During the RI, the condition of the soils located within the VOC Hot Spots was investigated through drilling 18 soil borings completely through the soils and to the top of bedrock within the Hot Spots (See Figure 4). Overall, the highest VOC concentrations were detected in the soil immediately overlying the top of bedrock.

For the soil investigation, the Source Area was divided into an eastern segment (located on the Farm property) and a western segment (located up to and across the property line of the Farm property and onto an adjacent property). In the eastern segment the maximum detected soil concentrations included TCE at 24 micrograms per kilogram (µg /kg), PCE at 3.3 µg/kg, 1,1- DCE at 11 µg/kg, 1,1-DCA at 0.9 µg/kg, and 1,1,1-TCA at 20 µg/kg. The SVOC, 1,4-dioxane, was also detected here at a concentration of 1.4 µg/kg at the soil/bedrock interface. The maximum concentrations of VOCs in the western segment of the Source Area included 1,1,1-TCA at 10,000 µg/kg; 1,1-DCE at 2,300 µg/kg; and TCE at 1,100 µg/kg. Again, all detections were from the soil collected just above the top of bedrock. 1,4-dioxane, was not detected in the western segment soil borings.

At Hot Spot Area A, the maximum VOC concentrations included 1,1,1-TCA at 630 µg/kg ; 1,1-DCE at 31 µg/kg, and 1,1-DCA at 0.85 J µg/kg. Soil contamination was less widespread in Hot Spot Area B where 1,1,1-TCA was detected at a maximum concentration of 37 µg/kg.

Sampling results demonstrate a correlation between the specific VOCs detected in the soil/bedrock interface and those detected through the PSG investigation. The VOC concentrations in the soil are low and are not indicative of contaminated source areas that are capable of creating a groundwater plume of the magnitude that occurs at this Site. In addition, the shallower soil at any location is typically not contaminated, and the highest VOC concentrations consistently occur at the soil/bedrock interface, suggesting that either the Hot Spots are not the areas where the chemicals were originally disposed of, or that over time the VOCs that were originally concentrated near the surface have dissolved into the infiltrating storm water or traveled downward as free product and accumulated near the top of bedrock, where the water encounters fewer pathways within which to travel.

An evaluation was done to determine whether metals detected in on-site soils were statistically significantly greater than background. The evaluation concluded that aluminum, chromium, thallium, and vanadium were within Site-specific background concentrations and were not Site-related. Therefore, these metals have not been included as COCs for the Site.

Bedrock

EPA conducted a bedrock matrix diffusion investigation to determine if VOC contamination may have diffused into the bedrock matrix (pore spaces within rock) in the shallow bedrock. To do this investigation, continuous cores of the bedrock were drilled, brought to the surface, crushed, and sampled for VOCs. The core locations included the VOC Hot Spots identified through the PSG investigation, areas in proximity to VOC Hot Spots identified in the shallow groundwater, and potential upstream source areas suggested by the analysis of the Site's groundwater flow patterns and directions (See Figure 5).

The bedrock core drilled within the Source Area revealed that this area is located at or very near the original source of contamination. 1,1,1-TCA was detected in the bedrock matrix at concentrations as high as 15,500 µg/kg. Based on the physical characteristics of the bedrock, this VOC level will produce an estimated water concentration as high as 65,000 micrograms per liter (µg/L), if the 1,1,1-TCA back-diffuses from the rock matrix into the groundwater. This estimated concentration is consistent with the highest concentrations that have been measured in the Site monitoring wells (See Figure 5), and strongly indicates that the Source Area is the primary source area for the Site contamination.

Dense non-aqueous phase liquid (DNAPL) is present at the Site and primarily composed of the COC 1,1,1-TCA. The "dense" refers to the fact that the chemical is denser than water and will sink when placed in water, and the concentration of the chemical is as high as it can physically reach. DNAPL acts as a continuing source of groundwater contamination as it contributes to dissolved-phase contamination. DNAPL has not been directly observed during the Site investigation, but the high detections near the Source Area (which are greater than 1% of the compound's effective solubility, or 13,340 µg/L) is an indication that DNAPL may actually be present in the immediate Source Area. This indication is significant because DNAPL is considered a principal threat waste that will continue to act as a source of contamination as long as it remains present.

At the other bedrock coring locations, the VOC concentrations within the shallowest bedrock matrix and groundwater are generally low and not indicative of major source areas. Importantly, the highest VOC concentrations at these locations are found deeper in the bedrock, below the water table, within fractures through which the groundwater is traveling. These VOC concentrations strongly indicate that, rather than being disposed of at these locations, the contaminants have traveled here from the Source Area as a dissolved phase chemical within the flowing groundwater plume.

Groundwater

The principal constituents of the groundwater plume are 1,1,1-TCA, 1,1-DCE, 1,1-DCA, TCE, and PCE, and 1,4-dioxane. Metals are present in groundwater at the Site. Their presence and concentrations do not exhibit a strong correlation with the VOCs and, unlike the VOCs, their distributions do not form a discernible plume.

The lateral extent of the groundwater plume was delineated by mapping the concentrations of selected Site contaminants in the shallow and deep groundwater as measured in the October 2017 sampling event. The VOC, 1,1,1-TCA, was selected for mapping because it is the most abundant and widespread Site contaminant, and the SVOC, 1,4-dioxane, was also selected because it extends furthest laterally in the aquifer. The groundwater plume map is included as Figure 6.

The plume map indicates that a plume of contaminated groundwater originates at the Hendricks Road properties and extends southward and downgradient into the neighboring residential community, for a lateral distance of approximately 3,000 feet. EPA installed a pair of shallow and deep "sentinel" wells at a location approximately 3,400 feet downgradient from the suspected Source Area. No Site chemicals were detected in these wells, so the downgradient or farthest extent of the groundwater plume has likely been defined.

As discussed above, the shallow groundwater within the eastern portion of the VOC plume flows to the east and discharges, or flows, into Stream 1. Stream 1 is the eastern boundary of the Site and the VOC plume. The western and southwestern portion of the VOC plume is hypothesized to discharge to Perkiomen Creek, as regional groundwater flow patterns indicate that the plume does not flow beneath the Creek.

Surface Water

Site-related VOCs were detected at multiple locations within Stream 1 (See Figure 7). The highest concentrations were detected at the locations where the VOC groundwater plume likely discharges into the stream, demonstrating a direct connection between the groundwater and the surface water in this area. No VOCs were detected upstream of this area, indicating that the northern segment of the stream is not impacted by the plume and reinforcing the conclusion that the groundwater plume is the source of the VOCs detected in the southern portion of the stream. The SVOC 1,4-dioxane was also detected at the locations containing the highest VOC concentrations, reinforcing the conclusion that the 1,4-dioxane is migrating in the groundwater plume with the VOCs. No VOCs were detected within Perkiomen Creek (Creek). Low concentrations of 1,4-dioxane were detected at three locations within the Creek, but two of these locations are upstream of the Site indicating these detections are not attributable to the Site and making the origin of the third detection uncertain.

The composition and concentrations of inorganics (metals) in surface water are very similar to those found in groundwater, suggesting that the discharge of area groundwater into surface water exerts a strong influence on the chemistry of the surface water. In addition, surface water concentrations detected at upstream sampling locations are similar to those detected in samples located downstream of the Site, indicating that these are naturally occurring metals and are not related to the disposal of Site wastes.

Sediment

1,1-DCA was detected at one sediment sampling location (See Figure 8) where the groundwater plume likely discharges within Stream 1. Methylene chloride was also detected at multiple locations within Stream 1 sediment at locations where other Site-related VOCs were detected in either surface water or at the groundwater/surface water interface. 1,4-dioxane was consistently detected in Stream 1 sediment both upstream and downstream of the Site. The upstream 1,4-dioxane detections occur several hundred feet upstream of the first detections of other Site COCs. Similar to the conclusions drawn for the surface water, it appears that, although 1,4-dioxane has been shown to be a chemical that was deposited at the Site, there appear to be additional source(s) of 1,4-dioxane in the area.

1,4-Dioxane was not detected in sediment samples collected from the Perkiomen Creek. However, multiple other SVOCs were detected in the Creek sediment. Although these SVOCs were also detected in Site soil (suggesting that their detections in sediment may be Site-related), many of the sediment detections occur upstream of the Site. Many of these SVOCs are a common by-product of human activity, such as burning fuels such as wood, coal, and gasoline.

Similarly, metals concentrations in sediment frequently exceeded project screening criteria, but the distribution of the metals in sediment does not suggest that their occurrence is related to or caused by the disposal of the Site-related wastes and does suggest that they are naturally occurring in the environment. Many of the elevated metals detections occur upstream of site-related detections of COCs.

Vapor Intrusion

Subslab vapor, indoor air, and outdoor (ambient) air samples were collected throughout the project area to determine the impact of the Site groundwater plume on the subslab vapor and air, and to identify and assess any individual residential risks created by this contaminant migration pathway. The source of the subslab vapor is the groundwater plume, where the VOCs migrate from groundwater into soil gas and become trapped below the structural slabs on their way into the atmosphere. VOC vapor has the potential to travel through cracks in the slabs and move into the living or breathing areas of the residences.

EPA delineated the vapor intrusion project area based on the defined extent of the groundwater plume, which included residences along Baghurst Drive and Hendricks Road. Two rounds of subslab vapor, indoor air, and outdoor air sampling were conducted to assess the potential impacts of the groundwater plume on the nearby residences located above its path. The subslab vapor samples measure the concentrations of the vapor that could potentially enter a residence. The indoor air samples measure the concentrations of vapors that may have entered a residence. The outdoor air sampling determines if any VOCs detected in the indoor air might be there because they are also present in the outdoor air rather than having migrated from beneath the building slab. In a number of indoor sample locations, 1,2-DCA, bromodichloromethane, chloroform, PCE, and TCE were present in indoor air at concentrations greater than the EPA's indoor air regional screening level. However, none of these compounds were detected in sub-slab vapor at concentrations greater than their sub-slab Vapor Intrusion Screening Level (VISLs), rendering the potential for significant vapor intrusion unlikely. Both rounds were conducted during the heating season (January and March 2016) to maximize the subslab and indoor air concentrations that may be present.

As discussed above, the groundwater contamination is present at depth in the fractured bedrock aquifer. The groundwater contaminant plume migrates from the Hendricks Road properties in the direction of the downgradient residential neighborhood. However, the contamination follows the fracture network and ultimately is present at depths extending 300 feet below ground surface in the residential area. Additionally, the groundwater contaminant plume is attenuated by the bedrock matrix, and processes such as dilution and dispersion of the groundwater plume. For these reasons, the homes in the residential neighborhood are not impacted by potential vapors emanating from the VOC plume.

Conceptual Site Model

A Conceptual Site Model (CSM) diagrams contaminant sources, contaminant release mechanisms and migration routes, exposure pathways, and potential human and ecological receptors. It documents what is known about human and environmental exposure under current and potential future Site conditions. The CSM was developed to identify if there are current, or potential future, complete human pathways. The following discussion identifies complete pathways for potential on-Site and off-Site receptors.

No source has been formally identified for on-site VOC contamination. Aerial photographs taken between 1958 and 1999 were analyzed, and earthen mounds, ground scars, probable trenches, a possible pit, a pond, and an area with distressed vegetation were identified in one or more photographs over that time that provide evidence related to the contamination source.

Because VOCs are present in the subsurface soil and bedrock, groundwater has also become contaminated. As the groundwater migrates through the Site, downgradient subsurface soil, groundwater, surface water, and sediment may also be impacted. Overburden consisting of silt with some weathered bedrock is generally thin in the area and reaches a thickness of approximately 20 feet near the barns west of the farmhouse. This cover may limit infiltration of stormwater into the subsurface during precipitation events. Surface water flow is generally toward Stream 1 and toward the Perkiomen Creek on the western side of the Site. Groundwater generally migrates in a southern direction toward the Baghurst Drive residential community.

Generally, VOCs released to soil are readily lost by volatilization or transported to groundwater by dissolution in infiltrating precipitation. Once in the groundwater, VOCs are transported with groundwater movement through advection and dispersion. The contaminants migrate at different rates because of contaminant-specific interactions with the geologic matrix that retard their movement and diffusion into the bedrock matrix. In addition, different zones of dominant chemical compounds may appear in the contaminant plume as COCs degrade into simpler chemical compounds. The chlorinated VOCs, in particular, are subject to anaerobic degradation commonly promoted in groundwater plumes by prevailing geochemical conditions. The degradation products may be more or less toxic than the parent compounds from which they derive. Eventually, chemicals at the leading edge of the contaminant plume will be converted to non-toxic chemicals. With continued degradation, the contaminant plume will ultimately dissipate, leaving no toxic chemicals in the groundwater. Induction of additives such as lactate can accelerate the rate of degradation.

6.0 CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

The Farm property is zoned Rural Residential and is bounded by a mixture of private residences, wooded areas, and farmland. The Farm property is not currently used for farming and is occupied by a resident living in the farmhouse. The Farm property is actively used for hunting by a local resident via an agreement with the property owner. The Baghurst Drive residential community to the south consists of approximately 27 residences. Residents in the area obtain drinking water from privately owned wells or from a community well, which serves 10 homes. As part of a Superfund-financed removal action under CERCLA § 104(a), EPA has been supplying property owners, whose wells have been impacted by Site COCs, with carbon-filtration treatment systems and bottled water since 2014.[2] The removal action will also include construction of an extension to a public waterline operated by the Schwenksville Authority and installation of new lateral lines to the affected residences. Construction of the waterline extension began in January 2022 and will be completed later in 2022.

7.0 SUMMARY OF SITE RISKS

Summary of Human Health Risk Assessment

A HHRA was prepared as part of the RI to evaluate the potential human health impacts that could result from exposure to soil, sediment, surface water, and groundwater. An HHRA involves assessing the toxicity, or degree of hazard, posed by hazardous substances related to a particular site, and describes the routes by which humans could come into contact with these substances.

[2] PADEP supplied these homeowners with treatment systems and bottled water from 1999-2014.

The HHRA for the Site identified an unacceptable human health risk associated with the contamination in the groundwater at the Site under current and future exposure scenarios. EPA has determined that the Selected Remedy identified in this ROD is necessary to protect public health and welfare and the environment from actual or threatened releases of hazardous substances, pollutants, and contaminants into the environment.

Exposure Assessment

In accordance with EPA Region 3 guidance, risk-based screening was performed to identify contaminants of potential concern (COPCs) in the groundwater, soil, and sediment that required further evaluation during the HHRA and to determine if they are COCs. Potential receptors for this Site under current land use are trespassers, recreational users, and on-Site residents. Potential receptors evaluated in the HHRA for future land use are construction workers, trespassers, recreational users, farmers, off-site residents, and on-site residents. EPA has set a target risk range of 1×10^{-4} to 1×10^{-6} for a lifetime excess carcinogenic risk. For non-carcinogenic contaminant risks, EPA sets a target of a Hazard Index (HI) of no greater than 1.0.

Identification of Contaminants of Concern

The NCP establishes a range of acceptable cancer risk for Superfund sites from one in ten thousand to one in one million additional cancer cases, expressed in scientific notation as 1×10^{-4} to 1×10^{-6}, over a lifetime exposure to site-related contaminants. A 1×10^{-4} carcinogenic risk means that one person in ten thousand would have an increased risk for cancer, while a 1×10^{-6} carcinogenic risk means that one person in one million would have an increased risk for cancer over a lifetime exposure to site-related COCs.

Additionally, chemicals that are ingested, inhaled, or absorbed through the skin may present non-cancer risks to different organs of the human body. The non-carcinogenic risks, or toxic effects, are expressed as a Hazard Quotient (HQ) calculated for the effect of each COPC on each target human organ; the cumulative risk is expressed as an HI. If an HI is less than 1.0, then exposure to site conditions is not expected to result in adverse effects during a lifetime or part of a lifetime. The NCP establishes an HI exceeding 1.0 as an unacceptable non-carcinogenic risk.

The COCs are determined by performing a site-specific risk analysis for each COPC and each pathway to indicate areas of current or potential future risk that exceed EPA's acceptable risk range of 1×10^{-4} to 1×10^{-6} for carcinogens or exceed an HI of 1.0 for non- carcinogens.

These risks and hazard levels indicate that there is significant potential risk to children and adults from direct exposure to contaminated groundwater. Based on the unacceptable human health risk, the Site-related COCs in groundwater include:

- 1,1,1-TCA
- 1,1,2-TCA
- 1,1-DCA
- 1,1-DCE
- 1,2-DCA
- 1,4-dioxane
- chloroform
- TCE

- vinyl chloride

Risk Characterization

Carcinogenic Risk:

Cumulative incremental lifetime cancer risks for future farmers (2 x 10^{-3}), future off-site residents (9 x 10^{-4}), and future on-site residents (1 x 10^{-4}) exceeded the acceptable level of 1 x 10^{-4}. The unacceptable risks are due to Site-related contamination in groundwater. No potentially unacceptable current or future human health risks associated with exposure to sediment or surface water were identified.

Noncarcinogenic risk:

EPA also evaluates the risks of effects other than cancer (noncarcinogenic effects) from chemical exposure. These noncarcinogenic risks are assessed using the HQ.

The HQ is calculated for each chemical, and the HQs are added for a total HI. Ultimately, only chemicals that affect the same target organs are added together and the goal is for the target organ HI to be 1.0 or less. The NCP establishes an HI exceeding 1.0 as an unacceptable non-carcinogenic risk.

Under the reasonable maximum exposure scenarios for current and future land use, the cumulative HIs for future child farmers (HI=10), future adult farmers (HI=27), future off-site child residents (HI=7), future off-site adult residents (HI=26), future on-site child residents (HI=10), and future on-site adult residents (HI=26) exceeded the acceptable level of 1. The unacceptable risks summarized above are due to Site-related contamination in groundwater. No potentially unacceptable current or future human health risks associated with exposure to sediment or surface water were identified. An unacceptable risk for exposure to manganese in soil was identified for a future on-Site construction worker, but this risk is attributable to background conditions and is not related to contaminant release at the Site.

Summary of Ecological Risk Assessment

An ecological risk assessment (ERA) was conducted to evaluate the potential for adverse ecological impacts from Site-related contamination and to determine the need for further investigation or remedial action. The ERA evaluated Site soil data, and surface water and sediment data from the Perkiomen Creek and Stream 1. The initial screening of the analytical data identified several chemicals as COPCs because they were detected at concentrations exceeding conservative screening levels, because they had ecological effects quotients greater than 1.0 in the conservative food chain model, or because they did not have screening levels.

The selected chemicals were further quantitatively evaluated to refine the list of COPCs and to better characterize risks to ecological receptors. Risks to terrestrial plants, soil invertebrates, sediment invertebrates, aquatic organisms, birds, or mammals were evaluated. No ecological risks were identified in the Screening-Level ERA.

8.0 REMEDIAL ACTION OBJECTIVES

The RAOs for the Site have been developed to address the COCs, media and exposure pathways listed in the previous section. These RAOs will be the basis for evaluation of remedial alternatives for the Site.

The RAOs describe both the exposure pathway to be addressed as well as the acceptable risk criteria that serve as the basis for the cleanup level. The RAOs developed for groundwater, sub-surface soil and groundwater are as follows:

- Remedial Action Objectives- Groundwater/sub-surface soils:
  - Prevent future human ingestion, inhalation, or dermal contact exposure with impacted soil and groundwater with COC concentrations that present unacceptable risk to human receptors;
  - Remove principal threat waste through treatment in the Source Area;
  - Restore the groundwater aquifer to its beneficial use by reducing COC concentrations to the groundwater remediation cleanup goals (Remediation Goals or RGs), as identified for each COC in Table 1, and by ensuring long-term protectiveness;
  - Prevent migration of the groundwater contaminant plume; and
  - Prevent any discharge (either from migration of the plume or treatment of the plume) from posing an unacceptable risk to ecological receptors in the surface water at or near the Site.

- Remedial Action Objectives - Soil Vapor:
  - Prevent future human inhalation exposure due to intrusion of soil vapor COC concentrations that would result in an unacceptable risk to human health.

When it has been determined that all Remediation Goals have been achieved, residual risks from exposure to Site contaminants must be re-evaluated to ensure long-term protectiveness has been achieved. The evaluation will be based on an assessment of the cumulative risk across all applicable exposure routes for all COCs remaining in groundwater following achievement of the remedial goals.

Table 1. Groundwater Remediation Goal

COC	Remediation Goal (RG) in µg/L	Basis
1,1,1-TCA	200	MCL
1,1,2-TCA	5	MCL
1,1-DCA	31	MSC
1,1-DCE	7	MCL
1,2-DCA	5	MCL
1,4-dioxane	6.4	MSC
chloroform	80	MCL
TCE	5	MCL
vinyl Chloride	2	MCL

MCL - Maximum contaminant level (Federal).
MSC - Medium-specific concentration for organic regulated substances in groundwater (Pennsylvania).

9.0 DESCRIPTION OF REMEDIAL ALTERNATIVES

The remedial alternatives, presented below in Table 2, were evaluated in consideration of the RAOs listed in the previous section. CERCLA and the NCP require that the alternative chosen to clean up a contaminated site meet several criteria. The alternative must protect human health and the environment and attain ARARs. Permanent solutions to contamination, which reduce the volume, toxicity, or mobility of the contaminants, should be developed wherever possible. Emphasis is also placed on treating the wastes at a site whenever possible, and on applying innovative technologies to clean up the contaminants.

Table 2. Remedial Alternatives Evaluated

Alternative	Description
1	No Action
2	Groundwater Extraction
3	In Situ Chemical Oxidation of Source Area
4	In Situ Thermal Remediation of Source Area
5	In Situ Chemical Oxidation of Hot Spot Areas
6	In Situ Thermal Remediation of Source Area, and In Situ Chemical Oxidation of Hot Spot Areas

Common Elements

Each of the remedial alternatives, with the exception of *Alternative 1: No Action*, include the following common components:

<u>Groundwater and Vapor Intrusion Monitoring</u>

Groundwater monitoring will be conducted until groundwater Remediation Goals are achieved. Groundwater samples will be collected and analyzed for 1,1,1-TCA, 1,4-dioxane, and other Site-related VOCs. Monitoring wells will be placed upgradient of the source and high-concentration areas, within the source and high-concentration areas, within the plume, and near the downgradient edge of the plume. Wells will be placed in the deep portions of the bedrock where relatively high concentrations of 1,1,1-TCA and 1,4-dioxane have been observed. A long-term monitoring plan will be prepared to identify the wells to be sampled and then analyzed. During implementation of the Remedial Action groundwater will be monitored to ensure that no discharges of the ISCO injectate occur.

Groundwater monitoring will also be used to ensure that vapor intrusion does not become an issue at the Site. As described in the *Nature and Extent of Contamination* section of this ROD, the results from the 2016 VI investigation showed that the groundwater plume was not at that time a source of subsurface vapor intrusion within the Baghurst Drive residential community. However, EPA will evaluate the need for additional VI sampling if new structures intended for human use or occupancy are proposed above or within 100 feet of the contaminated groundwater plume, or if groundwater monitoring shows COC concentrations near existing residential structures at the Site have increased by an order of magnitude, or 10 times, the current concentration for any COC.

<u>Institutional Controls</u>

ICs are non-engineered instruments, such as administrative and legal controls that help minimize the potential for exposure to contamination or protect the integrity of a response action. ICs typically are designed to limit land or resource use by providing information that modifies or guides people's behavior at a site. ICs for this Site will be instituted to: (i) prohibit the installation of new groundwater wells at the Site without the prior written approval of EPA, in consultation with PADEP, to minimize human exposure to unacceptable levels of contamination in groundwater; (ii) prohibit the disturbance of any component of the Remedial Action without the prior written approval of EPA, in consultation with DEP, to ensure the integrity of the remedial action; and (iii) require the prior written approval of EPA, in consultation with DEP, for the construction of any new structures intended for human use and occupancy at the Site to minimize human exposure to unacceptable levels of vapor intrusion. Consistent with EPA policy, the activity- and use-limitations (AULs) described above will be implemented by one or more of the following categories of ICs: (a) proprietary controls, such as environmental covenants under the Pennsylvania Uniform Environmental Covenants Act (PA UECA); (b) governmental controls, such as zoning, building codes, or state or local groundwater use regulations; (c) enforcement tools, such as administrative orders under CERCLA or Pennsylvania law; or (d) informational devices, such as deed notices in county property records, listing of properties affected by Site COCs in the Pennsylvania AUL Registry, advisories, such as publicly issued warnings by federal or state health agencies to owners of private wells at the Site about COCs in groundwater at levels posing a threat to human health, or outreach to the local community and other interested persons.

<u>Five-Year Reviews</u>

In accordance with CERCLA Section 121(c), 42 U.S.C. § 9621(c), a performance evaluation must be conducted at least every five years when a remedial action results in any hazardous substances, pollutants, or contaminants remaining on-Site. In addition, as a matter of policy, EPA will conduct a Five-Year Review (FYR) for any remedial action that, upon completion, will not leave hazardous substances, pollutants, or contaminants on-site above levels that allow for unlimited use and unrestricted exposure, but requires five years or more to complete.

For this Site, a FYR will be conducted every five years from the start of on-Site construction of the Remedial Action until the Remediation Goals have been met and a cumulative risk assessment concludes that the Remedy is protective and that unlimited use and unrestricted exposure are allowed. For the purpose of estimating costs only, a period of 30 years has been assumed. Therefore, EPA estimates that at least six FYRs will be performed for the Site within this 30-year period and will continue to be conducted after 30 years, as necessary, until Remediation Goals are achieved and a cumulative risk assessment concludes that the Selected Remedy is protective and that unlimited use and unrestricted exposure are allowed.

In addition to the common elements of the remedial alternatives discussed above, the following sections describe the additional components of each remedial alternative that EPA considered.

Description of Remedial Alternatives

The following remedial alternatives were developed and described in the FS. Total present worth costs were calculated for each alternative using an annual discount rate of 7%.

Alternative 1: No Action

Capital Cost:	*$0*
Total O&M Costs (30 Years Net Present Worth (NPW) Costs):	*$129,000*
Total Present Worth Cost:	*$129,000*

Under Alternative 1, no action would be taken at the Site. This “no action” alternative is included because the NCP requires that a “no action” alternative be retained as a baseline alternative to which the other alternatives may be compared. This alternative would not reduce human health risks to acceptable levels and would not achieve the RAOs. Because hazardous substances will be left in place at the Site, FYRs will be required. This alternative would not be protective of human health and will not be considered further.

Alternative 2: Groundwater Extraction and Treatment

Capital Cost:	*$4,180,000*
Total O&M Costs (30 Years NPW Costs):	*$8,388,000*
Total Present Worth Cost:	*$12,568,000*

Alternative 2 consists of the following major components: (1) groundwater extraction, (2) groundwater treatment, (3) direct discharge, (4) ICs, and (5) groundwater and VI monitoring.

Component 1: Groundwater Extraction

It is assumed that a network of one well for containment of the center of the plume and two downgradient extraction wells would be installed at the Site. The well network would be designed and operated to hydraulically contain the on-site shallow and intermediate groundwater zones.

Pre-design investigations, including a pump test(s) and sampling and analysis of groundwater, would be conducted to provide needed information regarding the underlying aquifer characteristics for the design of the extraction system. The pump test(s) would be used to define the hydraulic conductivity, transmissivity, and hydraulic gradient of the aquifer. The investigation would include at least one aquifer pump test, slug tests, groundwater elevation monitoring, and physical analysis of aquifer materials. Testing would be conducted in that area of the Site where the extraction wells would be located. Some additional wells may be required to conduct these tests. Data obtained during the design investigation would also be used to conduct fate-and-transport analysis for determination of the length of time treatment would be needed to achieve the RAOs.

To aid in the design of an effective groundwater treatment system, extracted groundwater, representative of that which would ultimately be pumped through the treatment system, would be collected during the pump test(s) and analyzed for design-related parameters, including the COCs and other organics, total dissolved solids (TDS), total suspended solids, pH, alkalinity, hardness, total organic carbon, chemical oxygen demand, and certain inorganics. The collected water would also be used for bench-scale treatability studies, if needed, as a preliminary step to the final design.

As a significant amount of groundwater may be pumped on a daily basis to contain the center of the plume, groundwater flow modeling would be necessary to determine the effects of the pumping on downgradient wells and properties. A determination of the need for flow modeling would be made following review of the pump test and aquifer characterization data collected during the pre-design phase. Data obtained during the pre-design investigation may also be used to conduct fate-and-transport analysis for determination of the length of time treatment would be needed to achieve the RAOs and RGs, along with performance monitoring.

Component 2: Groundwater Treatment System

The extracted groundwater would be treated at an on-Site plant. Based on the technology screening conducted during the FS, air stripping using tray towers and granular activated carbon (GAC) are proven and appropriate technologies for removal of the Site COCs from groundwater. Prior to treatment in either the air strippers or GAC units, the groundwater would be pumped through a filtration unit into an equalization tank in order to regulate flow. During the remedial design, additional field and bench-scale work would be conducted in order to determine the degree of filtration, pH adjustment, and metals removal that may be necessary to prevent fouling of the air strippers or GAC units and to meet effluent requirements.

After the air strippers or GAC units, an advanced oxidation process (AOP) would be used to remove the 1,4-dioxane. The system would be comprised of a continuous-flow hydrogen peroxide/ozone and ultraviolet (UV) system consisting of an oxygen or air source, an ozone generator or hydrogen peroxide feed system, a UV/oxidation reactor, and an ozone decomposer. HiPOx, a continuous, in-line, plug-flow AOP for water treatment utilizing hydrogen peroxide and ozone to efficiently create hydroxyl radicals that destroy organic compounds is a proven and preferred technology. The HiPOx AOP destroys contaminants with no waste residuals, while providing disinfection, eliminating other treatment steps prior to discharge to the Perkiomen Creek or Stream 1. The groundwater would be filtered to remove sediments and bulk solids prior to being treated by the HiPOx AOP.

Component 3: Discharge

Treated groundwater would be discharged to the Perkiomen Creek or to Stream 1. Sampling of treated water sampling would be required to satisfy the substantive requirements or standards that would otherwise be enforced under a National Pollution Discharge Elimination System (NPDES) permit in Pennsylvania.

Performance monitoring of the treatment system would consist of collecting monthly groundwater samples from the extraction well and final effluent of the treatment system and analyzing these samples for 1,4-dioxane, VOCs, pH, and TDS, and other analytes required by the permit.

Component 4: Institutional Controls

This component is identical to the ICs described in the *Common Components of Remedial Alternatives* section of this ROD.

Component 5: Groundwater and Vapor Intrusion Monitoring

This component is identical to the Groundwater and Vapor Intrusion Monitoring described in the *Common Components of Remedial Alternatives* section of this ROD.

Alternative 3: In Situ Chemical Oxidation (ISCO) of Source Area

Capital Cost:	*$539,000*
Total O&M Costs (30 Years NPW of Costs):	*$997,000*
Total Present Worth Cost:	*$1,536,000*

Alternative 3 consists of three major components: (1) ISCO injections (2) ICs, and (3) groundwater and VI monitoring.

Component 1: ISCO Injections

ISCO involves the introduction of a chemical oxidant into the subsurface for the purpose of transforming groundwater contaminants into less harmful chemical species. ISCO is typically performed by drilling injection wells and directly injecting chemical oxidants into the affected groundwater. The bench scale study would be performed that would determine the number of injection points to effectively distribute the oxidant in the targeted treatment zones. Based on existing information, at least three borings at depths of 30 feet below ground surface (bgs) would be needed in the Source Area. Approximately 700 pounds of sodium persulfate would be required. Three injection events would be performed for the Source Area (See Table 3). Additional ISCO injections would be required, as necessary to achieve RGs.

Table 3. ISCO of Source Area Details

Area	Number of Injection Wells	Injection Depth (feet bgs)	Total Persulfate Required (pounds)	Number of Events	Estimated COC Mass Removal (pounds)
Source Area	3	30	700	3	20

Component 2: Institutional Controls
This component is identical to the ICs described in the *Common Components of Remedial Alternatives* section of this ROD.

Component 3: Groundwater and Vapor Intrusion Monitoring
This component is identical to Groundwater and Vapor Intrusion Monitoring described in the *Common Components of Remedial Alternatives* section of this ROD.

Alternative 4: In Situ Thermal Remediation of Source Area

Capital Cost:	*$3,051,000*
Total O&M Costs (30 Years NPW of Costs):	*$1,104,000*
Total Present Worth Cost:	*$4,155,000*

Alternative 4 consists of three major components: (1) ISTR, (2) ICs, and (3) groundwater and VI monitoring.

Component 1: In Situ Thermal Remediation

For Alternative 4, the application of ISTR technology would heat the overburden soil, underlying bedrock, and groundwater to a temperature that would volatize the contaminants in the Source Area. Extraction wells would be used to collect contaminated groundwater, as well as steam, vapors and condensate generated by the heating process.

The heating elements would be installed using conventional drilling rigs and laid out in a pattern based on the geology of the soils and the distribution of groundwater and contaminants at the Site. For costing purposes, EPA has estimated that, at least five electrodes would be installed to deliver electric power at depths of 8 feet and 28 feet bgs and would be controlled to target treatment to specific subsurface zones based on the distribution of temperature, groundwater, and contaminants in the treatment zone during the heating process. Co-located vertical extraction wells would be used to maintain hydraulic control of groundwater and extract the vaporized contaminants and steam. The extracted vapors and liquids (condensate) would be collected and treated using a GAC system. Spent GAC units will be disposed of offsite in accordance with Section 121(d)(3) of CERCLA and Section 300.440 of the NCP.

The preferred ISTR technology is an effective method for the removal of VOCs from both unsaturated and saturated zones and is not significantly affected by soil permeability and heterogeneity. This technology has also been demonstrated to be an effective method for the removal of VOCs in the type of bedrock that is present at the Site.

Component 2: Institutional Controls

This component is identical to the ICs described in the *Common Components of Remedial Alternatives* section of this ROD.

Component 3: Groundwater and VI Monitoring
This component is identical to the Groundwater and Vapor Intrusion Monitoring described in the *Common Components of Remedial Alternatives* section of this ROD.

Alternative 5: ISCO in Hot Spot Areas

Capital Cost:	*$1,963,000*
Total O&M Costs (30 Years NPW of Costs):	*$997,000*
Total Present Worth Cost:	*$2,960,000*

Alternative 5 consists of these major components: (1) ISCO in Hot Spot Area A, (2) ISCO in Hot Spot Area B, (3) ISCO in Hot Spot Area C, (4) ICs, and (5) groundwater and VI monitoring.

Components 1 - 3: ISCO Injections in Hot Spot Areas

As discussed in the description for Alternative 3, ISCO involves the introduction of a chemical oxidant into the subsurface for the purpose of transforming groundwater or soil contaminants into less harmful chemical species. ISCO is typically performed by drilling injection wells and directly injecting chemical oxidants into the affected soil or groundwater. A bench-scale study would be performed to determine the number of injection points to effectively distribute the oxidant in the targeted treatment zones. Three Hot-Spot areas downgradient of the Source Area, as depicted in Figure 9, have been selected to perform ISCO injections if ISCO is selected as the remedy. The three separate ISCO Hot-Spot areas are shown on Figure 9. The following table shows the amount of sodium persulfate that would be required and the estimated mass removal for each area (See Table 4).

Table 4. ISCO of Hot Spot Areas Details

Component Number	Area	Number of Injection Wells	Injection Depth (feet bgs)	Total Persulfate Required (pounds)	Number of Events	Estimated COC Mass Removal (pounds)
1	A	8	55	1800	3	10
2	B	12	45	2800	2	200
3	C	13	35	520	1	15

Component 4: Institutional Controls

This component is identical to the ICs described in the *Common Components of Remedial Alternatives* section of this ROD.

Component 5: Groundwater and VI Monitoring
This component is identical to the Groundwater and Vapor Intrusion Monitoring described in the *Common Components of Remedial Alternatives* section of this ROD.

Alternative 6: ISTR in Source Area and ISCO in Hot Spot Areas

Capital Cost:	*$5,259,000*
Total O&M Costs (30 Years NPW of Costs):	*$1,103,000*
Total Present Worth Cost:	*$6,362,000*

Alternative 6 consists of these major components: (1) ISTR in the Source Area, (2) ISCO in Hot Spot Area A, (3) ISCO in Hot Spot Area B, (4) ISCO in Hot Spot Area C, (5) ICs, and (6) groundwater and VI monitoring. These components are depicted on Figure 9.

Component 1: ISTR in Source Area
This component would be identical to Component 1 of Alternative 4.

Component 2: ISCO Injection in Hot Spot Area A
This component would be identical to Component 1 of Alternative 5.

Component 3: ISCO Injection in Hot Spot Area B
This component would be identical to Component 2 of Alternative 5.

Component 4: ISCO Injection in Hot Spot Area C

This component would be identical to Component 3 of Alternative 5.

Component 5: Institutional Controls
This component would be identical to the ICs described in the *Common Components of Remedial Alternatives* section of this ROD.

Component 6: Groundwater and VI Monitoring

This component would be identical to the Groundwater and Vapor Intrusion Monitoring described in the *Common Components of Remedial Alternatives* section of this ROD.

10.0 COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

In this section, the remedial alternatives summarized above are compared to each other using the criteria set forth in the NCP at 40 C.F.R. § 300.430(e)(9)(iii). In the remedial decision-making process, EPA profiles the relative performance of each alternative against the evaluation criteria, noting how each compares to the other options under consideration. A detailed analysis of alternatives can be found in the FS, which is included in the AR file supporting selection of this Remedial Action.

These evaluation criteria relate directly to requirements of Section 121 of CERCLA, 42 U.S.C. § 9621, for determining the overall feasibility and acceptability of a remedial action. The nine criteria fall into three groups described as follows:

Threshold criteria must be satisfied in order for a remedial action to be eligible for selection. The first two criteria are threshold criteria: (1) overall protection of human health and the environment, and (2) compliance with ARARs. The selected remedial action must meet the first and the second criteria, unless an ARAR waiver is invoked in accordance with CERCLA § 121(d)(4).

Primary balancing criteria are used to weigh major tradeoffs between remedies. The next five criteria are the primary balancing criteria: (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume through treatment; (5) short-term effectiveness; (6) implementability; and (7) cost.

Modifying criteria are formally taken into account after public comment is received on the PRAP. The modifying criteria are the remaining two criteria: (8) State acceptance and (9) community acceptance.

The following discussion summarizes the evaluation of the remedial alternatives developed for the remedial action at the Site against the nine evaluation criteria.

Overall Protectiveness of Human Health and the Environment

Alternative 6 (ISTR in Source Area and ISCO in Hot Spot Areas) would be the most protective because the Source Area would be remediated by ISTR which directly removes the DNAPL diffused in the bedrock matrix, the downgradient Hot Spots would be treated with ISCO, and ICs would prevent potential human exposure to releases at the Site until RGs have been met and a cumulative risk assessment demonstrates that the Site is protective. Alternatives 3 (ISCO of Source Area) and 4 (ISTR of Source Area) would be the next most protective alternatives because contaminants in the Source Area would be treated. Alternative 5 (ISCO in Hot Spot Areas) would be protective, but slightly less protective than Alternatives 3 and 4, as some contaminants with concentrations greater than the RGs would still remain in the Source Area. Alternatives 3 and 4 offer similar protection since ingestion, inhalation, and dermal exposures to groundwater contaminants in excess of RGs would be reduced or eliminated.

The protectiveness of Alternative 2 (Groundwater Extraction and Treatment) would depend largely on the proper operation and maintenance of the extraction system to ensure effective removal of groundwater contaminants and ICs to prevent potential exposure to releases at the Site until all RGs have been met.

Alternative 1 would not be protective of human health since no actions would be taken to prevent exposure to COCs present in groundwater. No risk reduction is anticipated under the No Action Alternative. The No Action Alternative fails to meet the threshold criterion of protectiveness and will not be considered further.

Compliance with ARARs

This criterion addresses whether a remedial action would meet ARARs or whether there are grounds for invoking a waiver of an ARAR under CERCLA § 121(d)(4).

Under CERCLA § 121(d)(2)(A), ARARs are requirements, standards, criteria, or limitations under Federal environmental laws, or more stringent State requirements, standards, criteria, or limitations that are promulgated under State environmental or facility-siting laws. Section 121(d) of CERCLA and NCP § 300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites attain ARARs, unless an ARAR is waived in accordance with CERCLA § 9621(d)(4) and NCP § 300.430(f)(1)(ii)(C).

Under the NCP, “Applicable” requirements are substantive 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 substantive 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.

In addition to ARARs, EPA and a State may, as appropriate, identify other advisories, criteria, or guidance to be considered for a particular release. The "to be considered" (TBC) category consists of advisories, criteria, or guidance that were developed by EPA, other federal agencies, or States that may be useful in developing CERCLA remedies. TBCs are non-promulgated advisories or guidance issued by Federal or State governments that are not legally binding and do not have the status of potential ARARs. 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 or situations at a site.

Alternatives 6 will eventually attain chemical-specific ARARs, such as the MCLs for most COCs and the MSCs for 1,4-dioxane and 1,1-DCA. Alternatives 2 through 6 will meet all location- and action-specific ARARs.

A complete description of Federal and State ARARs that have been identified for the Selected Remedy, as well as the legal citation and the relation of each ARAR to the Selected Remedy, are provided in Table 5.

Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence addresses expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. Alternative 6 (ISTR in Source Area and ISCO in Hot Spot Areas) would provide the highest long-term effectiveness and permanence since the source area would be remediated along with the downgradient Hot Spots. Furthermore Alternative 6 utilizes ISTR, which is the only remedy that can target and remove the mass contamination diffused in the bedrock matrix. Alternatives 3 (ISCO of Source Area) and 4 (ISTR of Source Area) would provide similar levels of effectiveness by treating the Source Area but not the hot spots. Alternative 5 (ISCO in Hot Spot Areas) may provide slightly less long-term effectiveness than Alternatives 3 and 4 because it would not treat the Source Area. Alternative 2 (Groundwater Extraction and Treatment) would provide the lowest long-term effectiveness because it does not address the Source Area or Hot Spots.

Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment

Alternatives 4 and 6 would effectively and permanently remove groundwater contamination through treatment of principal threat wastes, and the treatment would permanently remove the contaminants.

Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup levels are achieved.

Alternatives 2 through 6 would reduce human health risks in the short term because groundwater use restrictions would be implemented. There would be slight risk to the surrounding community due to the increase in vehicular traffic during construction and operation of the Selected Remedy.

Implementability

Alternative 2 can be readily implemented as air stripper and GAC systems are readily available. However, there are few contractors that provide AOP, which would be needed to remove 1,4-dioxane.

For Alternatives 3, 5 and 6, ISCO is a readily available technology that could easily be implemented at the Site. However, distribution of the oxidizer in the bedrock is uncertain, which affects the injection well spacing and frequency of injection. For Alternatives 4 and 6, a specialized vendor is required to install an ISTR system.

Coordination with PADEP would be required under all Alternatives for monitoring and the FYR process.

The long-term monitoring can be readily achieved. Implementation of ICs will require coordination with and the cooperation of property owners at the Site, DEP, and local government.

For all Alternatives, EPA technical personnel are available to perform the FYRs.

Cost

Estimated costs associated with implementation of the remedial alternatives are presented in Appendix B. Alternative 3 has the lowest estimated cost ($1,536,000) because the Source Area is relatively small and would not require a large amount of injections. Alternative 2 has the highest estimated cost ($12,568,000) because of the installation of the treatment system, costs associated with removing 1,4-dioxane, and long-term O&M.

Alternative 6 has the second highest cost ($6,362,000), but it is still roughly half the cost of Alternative 2. The costs for the remaining 2 alternatives are as follows: Alternative 4 - $4,155,000, and Alternative 5 - $2,960,000.

State/Support Agency Acceptance

EPA and PADEP have consulted during the RI, FS, and the preparation of the PRAP and ROD. PADEP concurred with the Selected Remedy (Alternative 6) in a letter dated May 11, 2022.

Community Acceptance

EPA held a 30-day public comment period from May 11, 2021, through June 11, 2021, to accept public comments on the remedial alternatives presented in the PRAP and on the other documents contained in the AR file compiled in support of the Selected Remedy. Due to public health concerns, an in-person public meeting was not held. EPA recorded a video presentation that was published in place of a public meeting to inform local officials, interested citizens and other stakeholders about EPA's proposed cleanup plan, the Superfund process, and to receive comments on the Proposed Plan. During the public comment period, EPA accepted written comments and responded to the comments in the Responsiveness Summary, which is included as Part III of this ROD.

Principal Threat Wastes

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable. See 40 C.F.R. § 300.430(a)(1)(iii)(A). The principal threat concept is applied to the characterization of source materials at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to, for example, groundwater. Principal threat wastes are those source materials considered to be highly toxic or highly mobile and that would present a significant risk to human health or the environment should exposure occur.

Based on the concentrations of 1,1,1-TCA in groundwater, DNAPL is likely present at the Site in residual or free-flowing form. DNAPL is considered a principal threat waste because it acts as a reservoir for continued groundwater contamination. Treatment of principal threat waste to the maximum extent practicable has therefore been selected by EPA in this ROD to address a major source of groundwater contamination.

11.0 SELECTED REMEDY

Following review and consideration of the information in the AR file supporting selection of this remedial action, the requirements of CERCLA and the NCP, public comments, and State acceptance, EPA has selected **Alternative 6: In-Situ Thermal Remediation in Source Area and In-Situ Chemical Oxidation in Hot Spot Areas** (Figure 9).

Summary of the Rationale for the Selected Remedy

The Selected Remedy at the Site is: **Alternative 6: In-Situ Thermal Remediation in Source Area and In-Situ Chemical Oxidation in Hot Spot Areas, groundwater and vapor intrusion monitoring, and ICs.** EPA has selected Alternative 6 because it is protective, will comply with ARARs, is considered more effective in the long-term, is more permanent, and provides greater reduction of toxicity, mobility, and volume of contamination.

Alternative 6 is considered the most effective in the long-term and the most permanent because it will remove the contamination from the Site by treating it on-Site. ISTR is the only remedy that can effectively treat DNAPL found in the bedrock matrix. By removing the contamination from the Site, Alternative 6 will prevent the contamination from migrating to groundwater at levels that would present an unacceptable risk to the public and will eliminate the probability of an accidental release in the future. Alternative 2 would leave sub-surface soil and bedrock contamination in place and requires operation and maintenance of the groundwater treatment system and would be the most expensive of the alternative remedies considered. Alternatives 3, 4, and 5 would only treat specific areas of contamination in sub-surface soil and bedrock and not sitewide contamination, leading to continued groundwater contamination. Alternative 6 is not the most expensive remedial alternative, and it ensures permanent protectiveness.

Alternative 6 was selected because it will protect human health and the environment by treating contaminated sub-surface soil and bedrock and will comply with ARARs.

Description of Selected Remedy and Performance Standards

Based on the comparative analysis of the alternatives under the nine criteria, EPA's Selected Remedy for the Site is Alternative 6. The total present worth cost of the Selected Remedy is $6,362,000. The major components of the Selected Remedy are:

Component 1: In Situ Thermal Remediation in Source Area

The application of ISTR technology will heat the overburden soil, underlying bedrock, and groundwater to a temperature that will volatilize the contaminants in the Source Area. Separate vapor extraction wells will be used for the extraction of the steam and contaminant-laden vapors generated by the overburden soil heating process.

The heating elements will be installed using conventional drilling rigs and laid out in a pattern based on the geology of the soils and the distribution of groundwater and contaminants at the Site. EPA expects that five electrodes will be used to deliver electric power at depths of 8 feet and 28 feet bgs and will be controlled to target treatment of specific subsurface zones based on the distribution of temperature, groundwater, and contaminants in the treatment zone during the heating process. Co-located vertical extraction wells will be used to extract the vaporized contaminants and steam and to maintain pneumatic and hydraulic control. The extracted vapors and liquids (condensate) will be treated using a GAC system. The spent GAC units will be disposed of offsite in accordance with Section 121(d)(3) of CERCLA and Section 300.440 of the NCP.

Prior to implementation of ISTR, additional characterization of the Source Area will be conducted. This characterization will be completed as part of the Remedial Design. In addition, existing wells (for example, monitoring wells) in the areas of the Site that will be impacted by ISTR will be abandoned using PA Department of Conservation and Natural Resources (DCNR) Water-Well Abandonment Guidelines.

Monitoring of the ISTR system will be performed before, during, and after the thermal treatment heating period. Temperature and pressure monitoring wells will be installed within the target treatment area to track subsurface heating, pneumatic, and hydraulic control. During operation of the system, temperature, groundwater quality, vapor emissions, and condensate/discharge will be monitored for optimized control of the treatment process.

In addition, groundwater monitoring in and near the overburden treatment zone will be performed to evaluate the progress and extent of the ISTR treatment. One baseline monitoring event will be conducted prior to implementation of the ISTR treatment process, and groundwater samples will be collected every 2 weeks during the ISTR heating program.

Specific performance criteria for the ISTR will be developed during the Remedial Design Phase. Achieving target temperature throughout the thermal treatment area will be the first criterion in evaluating the performance of the thermal system. EPA expects that when target temperatures are achieved, mass recovery rates will decline and COC concentrations in groundwater will decrease. When EPA determines that ISTR in the Source Area has reduced COC concentrations to or below RGs, heating of the Source Area by ISTR will be terminated. Mass recovery in the vapor phase and in groundwater will continue for further reduction of COC concentrations in groundwater.

Component 2: ISCO Injections in Hot Spot Areas

ISCO involves the introduction of a chemical oxidant into the subsurface for the purpose of transforming groundwater contaminants into less harmful chemical species. ISCO is typically performed by drilling injection wells and directly injecting chemical oxidants into the affected groundwater. A bench scale study will be performed to determine the number of injection points to effectively distribute the oxidant in the targeted treatment zones. Three Hot Spot areas downgradient of the Source Area have already been selected to perform ISCO injections. These three separate ISCO Hot Spot areas are shown on Figure 9 Table 3 shows the amount of persulfate required and estimated mass removal for each area. These numbers are based on current data and will be modified during the remedial design phase if it is determined that such modifications are required to meet RGs.

Prior to the ISCO injections taking place, a robust monitoring plan will be developed to ensure that no discharges of the injectate or contaminants occur to ground surface, surface water or sediments as a result of the ISCO injections.

Component 3: Groundwater and Vapor Intrusion Monitoring

Groundwater monitoring will be conducted to assess the effectiveness of the Selected Remedy. Groundwater samples will be collected and analyzed for Site-related COCs. Wells will be selected upgradient of the source and high-concentration areas, within the source and high-concentration areas of the Site, within the plume, and near the downgradient edge of the plume. Wells will be selected from the deep portions of the bedrock where relatively high concentrations of 1,1,1-TCA and 1,4-dioxane have been observed. A long-term monitoring plan will be prepared to identify the wells to be sampled and the analyses to be performed. EPA will also evaluate through monitoring the effectiveness of source control on the contaminated groundwater plume. If RGs are not met, additional treatment measures will be evaluated and implemented. During implementation of the Remedial Action groundwater will be monitored to ensure that no discharges of the ISCO injectate occur.

Groundwater monitoring will also be used to determine whether additional VI monitoring is necessary at the Site. As described in the *Nature and Extent of Contamination* section of this ROD, EPA previously evaluated the results from the 2016 vapor intrusion investigation and determined that subsurface vapor intrusion of VOCs from the groundwater plume is not impacting the residential community at the Site. EPA will, however, conduct VI evaluation if there is new structures intended for human occupancy and use above or within 100 feet of the contaminated groundwater plume, or if COC concentrations near existing structures increase by an order of magnitude.

Component 4: Institutional Controls

The ICs will consist of the following requirements:

EPA, in consultation with DEP, will work with the property owners at the Site, and, as necessary, with local government to implement institutional controls, such as proprietary controls (e.g., environmental covenants), governmental controls (e.g., zoning ordinances or building codes), enforcement instruments (e.g., Federal or State administrative orders), or informational devices (e.g., deed notices, the PA AUL Registry, community outreach, or advisories), to ensure implementation of the following AULs which will limit human exposure to hazardous substances at the Site and activities that interfere with the integrity of the remedial action:

- A prohibition on the installation of any new groundwater wells until RGs and protectiveness have been achieved, unless EPA, in consultation with DEP, gives prior written approval for such installation;

- A prohibition on all activities that interfere with any component of the remedial action, unless EPA, in consultation with DEP, gives prior written approval for such activity; and

- A requirement that EPA, in consultation with DEP, give prior written approval for new structures intended for human occupancy and use to prevent exposure to COCs via vapor intrusion.

Summary of the Estimated Selected Remedy Costs

The estimated present worth cost of the Selected Remedy is $6,362,000. The information in the cost summary table (Appendix A, Table 4) is based on the best available information regarding the anticipated scope of the Selected Remedy. Changes in the cost elements may occur as a result of new information and data collected during the engineering design of the Selected Remedial Action.

12.0 STATUTORY DETERMINATIONS

Under CERCLA, a selected remedy must protect human health and the environment, comply with ARARs that are not waived, be cost-effective and use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Additionally, CERCLA includes a preference for remedial actions that use, as their principal element, treatment to significantly and permanently reduce the volume, toxicity, or mobility of hazardous substances, pollutants, and contaminants. The following sections discuss how the Selected Remedy meets these statutory requirements.

Protection of Human Health and the Environment

The Selected Remedy is protective of human health and the environment. In-situ treatment of soil and groundwater by ISTR and ISCO will eliminate risks associated with contaminated groundwater and prevent further migration of COCs to groundwater. Confirmation sampling will be used to verify that the Selected Remedy is effective in attaining the RAOs. ICs will prevent future potential exposure to contaminants by prohibiting interference with the remedial action and by restricting new groundwater use or new residential construction without prior written approval by EPA, in consultation with PADEP.

Compliance with Applicable or Relevant and Appropriate Requirements

The Selected Remedy will attain the Federal and State ARARs described in Table 5 as required by CERCLA and the NCP. The Selected Remedy will eventually attain chemical-specific ARARs, including the MCLs for seven COCs and the MSCs for 1,4-dioxane and 1,1-DCA. The Selected Remedy will also meet all location- and action-specific ARARs that have been identified in Table 5.

Cost Effectiveness

Section 300.430(f)(1)(ii)(D) of the NCP requires EPA to evaluate cost-effectiveness by comparing 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 (collectively referred to as "overall effectiveness"). The NCP further states that overall effectiveness is then compared to cost to ensure that the remedial action is cost effective, and that a remedial action is cost effective if its costs are proportional to its overall effectiveness.

EPA concludes, following an evaluation of these criteria, that the Selected Remedy is cost-effective in providing overall protection in proportion to cost and meets all other requirements of CERCLA. The estimated present worth cost for the Selected Remedy is $6,362,000.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The Selected Remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. In-situ treatment of contaminated soil and groundwater will permanently eliminate the threats to human health and the environment from those media. For the Selected Remedy, risk reduction and protectiveness will be achieved in a cost-effective manner, using proven technologies.

Preference for Treatment as a Principal Element

The Selected Remedy employs treatment as a principal element because it is cost-effective, and there will be a reduction in toxicity, mobility, and volume of contamination by removing the contamination permanently from the Site.

Five-Year Review Requirements

In accordance with CERCLA Section 121(c), 42 U.S.C. § 9621(c), a performance evaluation must be conducted at least every five years when a remedial action results in any hazardous substances, pollutants, or contaminants remaining on-Site. In addition, as a matter of policy, EPA will conduct a FYR for any remedial action that, upon completion, will not leave hazardous substances, pollutants, or contaminants on-site above levels that allow for unlimited use and unrestricted exposure, but requires five years or more to complete.

For this Site, a FYR will be conducted every five years from the start of on-Site construction of the Remedial Action until the Remediation Goals have been met and a cumulative risk assessment concludes that the Remedy is protective and that unlimited use and unrestricted exposure are allowed.

13.0 DOCUMENTATION OF SIGNIFICANT CHANGES

The PRAP for the Site, the recorded video presentation, along with the AR file, were released for public comment on May 11, 2021. The PRAP identified Alternative 6 (in-situ treatment and ICs) as the Preferred Alternative at the Site. EPA reviewed all comments received during the public comment period. EPA has determined that no significant charges to the Preferred Alternative, as originally identified in the PRAP, are necessary or appropriate and have chosen it as the Selected Remedy in this ROD. However, EPA has made three changes to Table 5 (ARARs and TBCs) in response to a requested correction from PADEP and as a result of the Agency's determination that certain State well-abandonment regulations or related guidance should be included as action-specific ARARs for this remedial action.

III. RESPONSIVENESS SUMMARY

BAGHURST DRIVE SUPERFUND SITE
UPPER SALFORD TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

RECORD OF DECISION

BAGHURST DRIVE SUPERFUND SITE
UPPER SALFORD TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

RESPONSIVENESS SUMMARY

This Section of the ROD summarizes the significant comments and concerns received from the public and PADEP during the 30-day public comment period on EPA's proposed remedial action for the Site and provides EPA's responses to those comments and concerns. After careful consideration of the public's comments and concerns received during the public meeting for the Site, as well as PADEP's suggestions concerning ARARs, EPA has determined that no significant changes to the proposed remedial action, as originally identified in the PRAP, are necessary or appropriate. EPA has selected Preferred Alternative 6 as the Remedy to address soil, bedrock, and groundwater contamination at the Site.

A. The Public Comment Period

In accordance with Section 117(a) of CERCLA,[3] EPA issued a public notice on May 11, 2021, in *The Lansdale Reporter*, a major local newspaper of general circulation in the community near the Site. The public notice contained a list of the components of EPA's preferred alternatives, information relevant to the duration of the public comment period, the weblink to a prerecorded presentation about the PRAP, and a weblink to the PRAP and the AR file for public review. EPA also provided notice to the public that the AR file could be viewed in person at the following locations:

EPA Administrative Records Room,
Indian Valley Public Library
100 East Church Road Avenue
Telford, Pennsylvania 18969
Phone: 215-723-9109

Attention: Administrative Records Coordinator
4 Penn Center
1600 JFK Boulevard
Philadelphia, PA 19103
(215) 814-3157
Hours: Monday through Friday, 8:30 am to
4:30 pm; by appointment only.

The 30-day comment period began on May 11, 2021, and ran through June 11, 2021. In addition, on May 11, 2021, EPA sent a Fact Sheet summarizing EPA's preferred alternatives to residences at and near the Site.

Due to public health concerns related to the COVID-19 pandemic, an in-person public meeting was not held. As a substitute for the public meeting, EPA published, on the internet, a recorded video presentation containing information EPA would have shared at the public meeting had the

[3] 42 U.S.C. § 9617(a); *see also* 40 C.F.R. § 300.430(f)(3).

meeting been held in person. In the presentation, the public was informed that comments could be directly emailed to EPA's Remedial Project Manager (RPM) or Community Involvement Coordinator (CIC) or a message could be left on a dedicated voicemail box that was set up by EPA.

B. Comments Received from the Public and DEP

Some of the questions raised by members of the public during the comment period concerned information on the status of the drinking water line that EPA will be installing at the Site as part of a Superfund removal action under Section 104(a) of CERCLA.[4]

As discussed above, EPA has been conducting a Superfund-financed removal action at the Site to protect the public health and welfare. The removal action has included installation and maintenance of carbon-filtration-treatment systems on private and community wells serving 27 households in Upper Salford Township that have been impacted by releases at the Site. In addition, EPA currently provides bottled drinking water to these households. In January 2022, EPA began construction of a waterline that will ultimately connect the 27 homes to a local municipal water system operated by the Schwenksville Authority. Following completion of the waterline, EPA intends to donate the waterline to the Schwenksville Authority, which will assume responsibility for the waterline's long-term operation and maintenance.

Members of the public have asked for a list of the properties that will be connected to the public waterline and for a map of the waterline itself. As explained in greater detail below, EPA will not release a list of the specific properties that will be connected to the public waterline because of privacy concerns. Upon completion of the waterline's construction, EPA will make available as-built map(s) or schematics of the public portions of the waterline, but only to the extent that EPA determines that the release of this information would not be a clearly unwarranted invasion of an individual's privacy. For additional information about EPA's removal action, interested persons are encouraged to contact EPA's CIC for this Site.

In addition to the public's questions about the waterline, EPA received several comments from PADEP about State ARARs identified in the PRAP. EPA will make changes to certain descriptions of State ARARs in response to PADEP's suggestions. However, for the legal reasons discussed below, EPA has not agreed to include the regulations promulgated under Pennsylvania's Uniform Environmental Covenants Act (PA UECA) as an ARAR for this remedial action.

C. EPA Responses to Comments From Public and PADEP

1. Comment 1: Can EPA supply a list of properties that will be connected to public water which EPA Removal Program is constructing in the area?

EPA Response: As a matter of law and policy, EPA will not publish the list of private properties that will be connected to the public waterline.

[4] 42 U.S.C. § 9604(a).

When releasing information to the public, EPA intends to be transparent about its actions in a manner that is consistent with the Freedom of Information Act (FOIA)[5], the Privacy Act[6], and other federal law. The FOIA exempts certain information from release to the public, including, for instance, "personnel and medical files and similar files the disclosure of which would constitute a clearly unwarranted invasion of personal privacy . . ."[7] Federal courts have interpreted the release of private citizens' addresses in certain circumstances to be a clearly unwarranted invasion of personal privacy.[8] In this case, the residents whose wells have been contaminated by hazardous substances through no fault of their own have not relinquished their privacy interests in their home addresses simply because the government has determined that, for public health reasons, their private wells must be abandoned and that their homes must now be hooked up to a public waterline. Accordingly, EPA will not supply to the general public a list of the private properties that will be connected to the waterline during the removal action at the Site.

EPA also believes the Privacy Act applies to the information requested by the commenter who submitted Comment 1. Under the Privacy Act, EPA may not disclose any information about an individual that is maintained in an EPA system of records, containing the individual's name or other identifying particular, unless in response to a written request by, or with the prior written consent of, the individual to whom the record pertains.[9] In this case, EPA has determined that the home addresses of private citizens living at the Site may be among the *identifying particulars* whose release is prohibited under the Privacy Act without the prior written consent of the individual. As such, EPA will not release the list of private properties that will be connected to the waterline during the removal action at the Site.

2. Comment 2: Can a map of the waterline be provided?

EPA Response: Subject to the privacy-related legal prohibitions described immediately above, EPA will provide an as-built map or other schematic of the public portions of the waterline once construction has been completed. For the reasons stated above, EPA will not provide to the general public a map or other schematic showing the locations of lateral waterlines installed on private properties at the Site.

[*Note: The following four comments were submitted by PADEP in a letter dated June 10, 2021, from Bonnie McClennen, PADEP Environmental Group Manger, Environmental Cleanup and Brownfields, to Andrew Hanieko, EPA Remedial Project Manager.*]

3. Comment 3: PADEP submitted the following comment – "Pages 17 and 18 of the PRAP state that "the activity and use-restrictions described above will be implemented by one or more of the following categories of ICs: (a) proprietary controls, such as

[5] 5 U.S.C. § 552.
[6] 5 U.S.C. § 552a.
[7] 5 U.S.C. § 552(b)(6).
[8] *See, e.g., Sheet Metal Workers Int'l Ass'n, Local No. 19 v. VA*, 135 F.3d 891, 903-05 (3d Cir. 1998), and cases cited therein.
[9] 5 U.S.C. § 552a(b).

environmental covenants under the Pennsylvania Uniform Environmental Covenants Act;……; or (d) informational devices, such as deed notices in county property records, listing of properties affected by Site COCs in the Pennsylvania Activity and Use (AUL) Registry." Institutional Controls (ICs) that implement Activity and Use Limitations (AULs) which constitute a critical remedial component of environmental response projects, including CERCLA remedies, that satisfy Pennsylvania remediation standards are required to be in the form of Environmental Covenants (ECs), pursuant the Section 6517(a)(1) of the Pennsylvania Uniform Environmental Covenants Act (UECA), 27 Pa.C.S. § 6517(a)(1)."

EPA Response: This Comment and Comment 4 (immediately below) have been part of an ongoing dialogue between EPA and PADEP. EPA's prior written communications with PADEP about ARARs are included in the Administrative Record for the Site's remedial action.

EPA intends to use environmental covenants as institutional controls implementing AULs at the Site when appropriate. When AULs are implemented with an environmental covenant, EPA will follow the requirements promulgated under the PA UECA at 25 Pa. Code Chapter 253.

Generally, EPA's implementation of AULs at the Site will be informed by Agency guidance, *Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites* (OSWER 9355.0-89; EPA-540-R-09-001; Dec. 2012) (the "PIME Guidance"), which EPA has identified as a TBC (i.e., guidance or directive to be considered) for this remedial action. The PIME Guidance identifies four types of institutional controls – (i) proprietary controls (e.g., environmental covenants, restrictive covenants), (ii) governmental controls (e.g., zoning), (iii) enforcement tools (e.g., state or federal administrative orders, and (iv) informational devices (e.g., health advisories, public notices). While EPA prefers to use environmental covenants to implement AULs at Superfund sites, the Agency recognizes that other forms of institutional controls may be necessary at some sites.

EPA respectfully disagrees with PADEP that, on its face, the PA UECA requires AULs to be implemented by environmental covenants in every instance. For one, as discussed in more detail below, the regulations promulgated under the PA UECA allow for the waiver by PADEP of an environmental covenant.[10] In addition, the PA UECA itself provides that other instruments may be used in Pennsylvania to implement AULs.[11] In any event, as stated above, EPA prefers to use environmental covenants for implementation of AULs at Superfund sites in Pennsylvania (and other states) and intends to follow this preference as appropriate at this Site.

4. Comment 4: PADEP submitted the following comment – "After DEP identified the Pennsylvania UECA as an ARAR, in its April 21st, 2021 letter EPA declined to list it as an ARAR stating that 'the PA UECA is not a requirement of general applicability because it may either be waived, ...' We presume that this comment is alluding to the

[10] *See* 25 Pa. Code § 253.4 (Requirements for and waiver of environmental covenants).
[11] *See* 27 Pa.C.S. § 6505(d)(2) ("Nothing in this chapter shall be construed to restrict, affect or impair the rights of any person to enter into or record a restrictive covenant, institution[al] control, easement, servitude or other restriction on the use of property permitted by law that does not satisfy the requirements of this chapter . . .")

first phrase of Section 6517(a)(1) of UECA.[12] That language, however, does not refer to waivers of environmental covenants. Rather, that language refers to remediation requirements that DEP may potentially waive under Section 902(b) of Act 2 akin to the authority EPA maintains under Section 121(d)(4) of CERCLA. There is nothing about that authority which impacts UECA as an ARAR."

EPA Response: EPA has carefully considered all of PADEP's proposed ARARs for the remedial action, and we believe this was reflected in our prior correspondence on ARARs and in our two earlier meetings on this matter. EPA's decisions on ARARs are legal and technical determinations. In this case, EPA has determined that the requirements promulgated under the PA UECA at 25 Pa. Code Chapter 253 do not meet the legal definition of an ARAR under CERCLA, the NCP, and case law. However, as discussed above, EPA intends to comply with these requirements to the extent EPA determines that an environmental covenant should be used to implement AULs on real property at the Site.

EPA must attain any ARARs that are selected for the remedial action at the Site. Under CERCLA § 121(d)(2)(A),[13] ARARs are requirements, standards, criteria, or limitations under federal environmental laws, or more stringent State requirements, standards, criteria, or limitations that are promulgated under State environmental or facility-siting laws. The NCP defines *promulgated*, as used in connection with an ARAR, to mean a standard that is of general applicability and is legally enforceable.[14] This definition of *promulgated*, along with several other provisions of the NCP, were challenged by the State of Ohio, the Commonwealth of Pennsylvania, and several other states in a case called *State of Ohio v. U.S. EPA*,[15] in which the court upheld the NCP's definition of *promulgated* and stated, "Under the NCP definition, a standard must be generally applicable on its face, and if so, the standard is a potential ARAR."[16]

In this case, the standards promulgated under the PA UECA at 25 Pa. Code § 253.4 are not generally applicable on their face and therefore do not meet the legal definition of an ARAR. For one, 25 Pa. Code § 253.4 is a subchapter of the PA UECA regulations entitled, "Requirements for and waiver of environmental covenants," providing that environmental covenants may be waived in certain circumstances by PADEP – "Unless waived by the Department, activity and use limitations used to demonstrate or maintain attainment of a remediation standard under the Land Recycling Act or the Storage Tank Act must be in the form of an environmental covenant . . . ." If a requirement can be waived, it is not one of general applicability on its face and, therefore, does not meet the legal definition of an ARAR under CERCLA and the NCP. In addition, 25 Pa. Code § 253.4(a) provides that "an environmental covenant may be used with other types of environmental response projects," besides cleanups under the Land Recycling Act or the Storage Tank Act. The predicate "may be used" means that the requirement for an

[12] Note: EPA's April 21, 2021 letter, which is included in the AR, expressly cites 25 Pa. Code § 253.4 in footnote 2, not Section 6517(a)(1) of the PA UECA.
[13] 42 U.S.C. § 9621(d)(2)(A).
[14] *See* 40 C.F.R. § 300.400(g); *see also* 42 U.S.C. § 9621(d)(2)(C)(iii)(I) ("Any State standard, requirement, criteria, or limitation . . . shall apply where each of the following conditions is met: . . . The State standard, requirement, criteria, or limitation is of general applicability and was adopted by formal means.")
[15] 997 F.2d 1520 (D.C. Cir. 1993)
[16] 997 F.2d at 1528.

environmental covenant under 25 Pa. Code § 253.4(a) is discretionary and not of general applicability. If a standard is discretionary at other response sites in Pennsylvania, it cannot be deemed a requirement at a CERCLA site.[17]

Upon further consideration of this matter, EPA respectfully disagrees that the standards promulgated under the PA UECA are of general applicability. As such, they do not meet the legal definition of an ARAR under CERCLA and the NCP and have not been identified as ARARs for this remedial action.

5. Comment 5: PADEP also submitted the following comment – "In addition, in cases where property owners refuse to execute an EC, at EPA's request, DEP may issue an Administrative Order either requiring the owner to record an EC or, pursuant to Section 512(a) of HSCA, to implement such restrictions directly as it has already done for Ambler Asbestos and plans to do for Clearview Landfill. For these occasions, EPA should add to its ARAR table: Section 512(b) of the HSCA, P.L. 756, No. 108 of October 1988; 35 P.S. § 6020.512."

EPA Response: As stated in our response to Comment 3 above, EPA agrees that implementation of AULs can take more than one form. The PRAP identifies EPA's 2012 PIME Guidance as a TBC for the remedial action. Under the PIME Guidance, AULs can be implemented by proprietary controls (e.g., environmental covenants), governmental controls (e.g., zoning), enforcement tools (e.g., administrative orders), or informational controls (e.g., fish advisories). EPA has not identified Section 512(b) of HSCA as an ARAR because EPA does not intend to implement all AULs with administrative orders. CERCLA requires attainment of all ARARs selected in the ROD, unless EPA modifies it with an Explanation of Significant Differences or a ROD Amendment. For EPA not to identify Section 512(b) as an ARAR does not diminish PADEP's authorities under this law. For its part, EPA reserves its rights to issue administrative orders under Section 106(a) of CERCLA[18] to enforce AULs, as we have done at the AIW Frank/Mid-County Mustang Superfund Site in Chester County, Pennsylvania.

6. Comment 6: PADEP submitted the following additional comment – "DEP also reasserts its concerns regarding language related to modifications to AULs in the PRAP '. . . unless EPA, in consultation with DEP, gives prior written approval . . .' DEP presumes that EPA plans to utilize this language in the Record of Decision and in future ECs. The language proposed in the PRAP diminishes DEP's enforcement authority, should it disagree with future modifications to AULs. As a signatory to the EC or issuing authority for a HSCA Section 512 Order, DEP must maintain the ability to provide its concurrence with modifications to AULs."

EPA Response: EPA is sensitive to PADEP's position on this issue, but does not share PADEP's belief that use of the *in-consultation* language would somehow diminish PADEP's enforcement authority under Pennsylvania law.

[17] 53 Fed. Reg. 51394-01, 51438 (Dec. 21, 1988) ("For a State requirement to be a potential ARAR it must be applicable to all remedial situations described in the requirement, not just CERCLA sites.")
[18] 42 U.S.C. 9606(a).

As an initial matter, EPA's use of the *in-consultation* formulation in the PRAP is consistent with the respective roles EPA and PADEP play as *lead agency* and *support agency* under federal law. The NCP provides that "the lead agency will consult with the support agency . . . throughout the response process."[19] EPA intends to engage in such consultation with PADEP throughout the remedial action at this Site, including during the implementation of institutional controls. To that end, EPA has previously agreed to co-sign with PADEP environmental covenants recorded for the implementation of AULs at Fund-financed sites on the NPL in Pennsylvania and intends to do this for environmental covenants that may be obtained at the Site.

Under the PA UECA, all signatories to an environmental covenant must agree to and sign any proposed modifications to, or termination of, the environmental covenant before such modification or termination can take effect.[20] Accordingly, EPA does not agree that use of the *in-consultation* language in the ROD or in any environmental covenant implementing AULs selected in the ROD would diminish PADEP's legal rights or enforcement authorities as a co-signatory on an environmental covenant. These rights and authorities are expressly secured under the PA UECA.

In addition, as PADEP notes in Comment 5 above, it maintains its enforcement authorities under Section 512(b) of HSCA at federal Superfund sites.

EPA also notes that PADEP's enforcement authorities are protected under the federal Superfund law. Section 114(a) of CERCLA[21] expressly provides that no provision in CERCLA preempts PADEP's own enforcement authorities under PA law to impose additional liability or requirements with respect to the release of hazardous substances within the Commonwealth. *See also Manor Care, Inc. v. Yaskin*, 950 F. 2d 122, 125-6 (3d Cir. 1991) (Holding that the clear language of CERCLA § 114(a) demonstrates that Congress did not intend CERCLA to occupy completely the field of environmental regulation or to preempt states from enacting or enforcing their own laws to supplement federal measures to clean up hazardous wastes). Thus, under CERCLA, PADEP's enforcement authority under PA law would not be diminished by inclusion of the *in-consultation* language in EPA's ROD.

Finally, EPA has previously demonstrated its intention to coordinate with PADEP on enforcement of AULs. When the current owner of a Superfund site in Southeast Pennsylvania did not comply with AULs under a recorded environmental covenant signed by both EPA and PADEP, our two agencies worked together and agreed that the best response would be for EPA to enforce the AULs under CERCLA by issuing an administrative settlement and order on consent (ASAOC) under CERCLA §§ 104(a) and 122(a). PADEP played a vital, consultative role throughout that enforcement action and in the oversight of the subsequent response action under the ASAOC. PADEP's enforcement authority was not diminished in that case, and PADEP is not foreclosed from seeking its own legal remedies under the PA UECA or other State or Federal law.

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[19] 40 C.F.R. § 300.4. *See also* 40 C.F.R Part 300, Subpart F (State Involvement in Hazardous Substance Response).
[20] See 27 Pa.C.S. § 6510(a)
[21] 42 U.S.C. § 9614(a).

7. Comment 7: PADEP also submitted a comment concerning an inaccuracy in the description of a State ARAR – 25 Pa. Code § 139.l4(a)(2) – listed in the Final ARARs Table.

EPA Response: EPA has corrected this particular inaccuracy in the Final ARARs Table (Table 5) for the ROD and will continue to coordinate with PADEP on issues concerning ARARs.

IV. TABLES

BAGHURST DRIVE SUPERFUND SITE
UPPER SALFORD TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

RECORD OF DECISION

Chemical-Specific ARARs and TBCs

Requirement	Citation	Status	Description	Relation to Remedy
Maximum Contaminant Levels (MCLs) under the Safe Drinking Water Act of 1974, as amended, 42 U.S.C. §§ 300f et seq. (SDWA)	40 C.F.R. § 141.61	Relevant and Appropriate	MCLs promulgated under the SDWA for certain organic chemicals are enforceable standards for public drinking water supply systems having at least 15 service connections or being used by at least 25 persons.	Groundwater at the Site is a potential underground source of drinking water. MCLs will be the cleanup standards for groundwater remediation of the following contaminants of concern (COCs)– 1,1,1-TCA, 1,1,2-TCA, 1,1-DCE, 1,2-DCA, chloroform, TCE, and vinyl chloride.
Pennsylvania Statewide Health Standards promulgated under the Land Recycling and Environmental Remediation Standards Act of May 19, 1995, P.L. 4, No. 2, 35 P.S. §§ 6026.101 et seq. (Act 2)	25 Pa. Code §§ 250.304, 250.305, 250.309(a), 250.309(c), and 25 Pa. Code Chapter 250, Appendix A, Tables 1 and 3.	Relevant and Appropriate	Statewide Health Standards are Medium-Specific Concentrations (MSCs) of regulated substances associated with groundwater, soil, and surface water used for most voluntary and mandatory cleanups conducted in Pennsylvania (PA).	The State MSCs for 1,1-DCA and 1,4-dioxane will be the cleanup standards for these two COCs in groundwater.
Pennsylvania Water Quality Standards issued under Sections 5(b)(1) and 402 of the Clean Streams Law, Act of June 22, 1937, P.L. 1987, as amended, 35 P.S. §§ 691.5(b)(1) and 691.402 (Clean Streams Law)	25 Pa. Code §§ 93.6; 93.7; 93.8a(a)-(e); 93.8c, including Table 5 (Water Quality Criteria for Toxic Substances); and 93.9f.	Relevant and Appropriate	These water quality standards are based on the protected, designated uses of surface waters in Pennsylvania (PA). The Water Quality Criteria listed in 25 Pa. Code § 93.8c, Table 5, are the criteria for toxic substances used in the development of effluent limitations in National Pollution Discharge Elimination System (NPDES) permits in PA and for other purposes.	Any discharge of treated groundwater to surface water in Stream 1 or the Perkiomen Creek during the remedial action will abide by the Water Quality Criteria in Table 5 and will not impair the designated uses of surface waters at the Site.

Requirement	Citation	Status	Description	Relation to Remedy
	EPA Vapor Intrusion Screening Level Calculator https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-level-calculator	TBC[1]	The COCs are volatile organic compounds (VOCs) that have the potential to migrate from groundwater into the air and can become trapped below the slabs of residential buildings at the Site as the vapors make their way into the atmosphere. VOC vapors have the potential to travel through cracks in the slabs and move into the living or breathing areas of residential structures. The Vapor Intrusion Screening Level (VISL) calculator identifies chemicals that are considered to be sufficiently volatile and toxic to warrant an investigation of the soil gas intrusion pathway when they are present as subsurface contaminants.	The VISL calculator will be used to evaluate the need for vapor-intrusion mitigation measures in any new construction for human occupation at the Site. If the VISL calculator determines that releases or potential releases of VOCs in sub-slab or indoor air pose an unacceptable risk to human health, EPA will require VI-mitigation measures to be implemented in any new construction for human occupation.

[1] 40 C.F.R. § 300.400(g)(3) provides that EPA and the state may, as appropriate, identify other advisories, criteria, or guidance to be considered for a particular release(s). This to-be-considered category (TBC) includes advisories, criteria, or guidance issued by EPA, other federal agencies, or the state.

Location-Specific ARARs and TBCs

Requirement	Citation	Status	Description	Relation to Remedy
Delaware River Basin Commission (DRBC), promulgated regulations	18 C.F.R. §§ 401.3, 430.7, 430.9, and 430.23(b)	Applicable	These DRBC regulations require federal agencies to consult with the DRBC on projects affecting water resources of the Delaware River Basin. They also establish the *Southeastern Pennsylvania Groundwater Protected Area* and groundwater withdrawal limits for this *Protected Area*; and they provide calculation procedures for groundwater withdrawal limits.	The Site lies within the DRBC-designated *Southeastern Pennsylvania Groundwater Protected Area*. EPA has conferred with the DRBC about the remedial action, as required by these regulations. To the extent a significant amount of groundwater will be withdrawn at the Site during the remedial action, the withdrawal limits established in the regulations will apply.
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, and the Federal Advisory Council on Historic Preservation must be given a reasonable opportunity to comment on the undertaking. The regulations at 36 C.F.R. Part 800 describe the actions a Federal agency must take to meet its statutory responsibilities under the NHPA, including consultation with the Pennsylvania State Historic Preservation Office (SHPO) and the Federal Advisory Council on Historic Preservation to determine if the Federal undertaking will affect cultural or historic sites on or eligible for the National Register of Historic Places.	The remedial action meets the definition of an "undertaking" under 36 C.F.R. § 800.16(y). Accordingly, EPA will comply with Section 106 of the NHPA and the regulations implementing it. EPA will consult with the Federal Advisory Council and SHPO prior to the remedial action.

Requirement	Citation	Status	Description	Relation to Remedy
Migratory Bird Treaty Act of 1918, as amended (MBTA), regulations promulgated thereunder	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 Service (FWS). The species protected as migratory birds under the MBTA are listed at 50 C.F.R. § 10.13.	Appropriate actions will be taken during the remedial action to ensure that no migratory birds listed at 50 C.F.R. § 10.13 or their nests are adversely affected by the remedial action.
Dam Safety and Waterway Management regulations promulgated under the Clean Streams Law and the Dam Safety and Encroachments Act, Act of Nov. 26, 1978, P.L. 1375, No. 325, 32 P.S. §§ 693.1 et seq., as amended	25 Pa. Code Chapter 105, including 25 Pa. Code §§ 105.17, 105.161, 105.165, 105.166, and 105.311-.315	Applicable	These regulations (i) provide for comprehensive regulation and supervision, and (ii) assure proper planning, design, construction, maintenance, and monitoring, of water obstructions and encroachments in PA.	Discharges of treated groundwater to Stream 1 or the Perkiomen Creek during the remedial action will comply with substantive requirements of these regulations, but no permit will be obtained. EPA will also meet the substantive requirements of an environmental assessment under 25 Pa. Code § 105.15 during the remedial design, if it is determined that any wetlands on-Site will be impacted by the remedial action.
Floodplain Management regulations promulgated under the Clean Streams Law and the Dam Safety Act	25 Pa. Code Chapter 106, including 25 Pa. Code §§ 106.31-.33, 106.41(a), 106.45. 106.46, 106.51, 106.52(a)-(b), 106.53, and 106.63	Applicable	These regulations encourage planning and development in floodplains that are consistent with sound land-use practices.	Any construction activities in an on-Site floodplain during the remedial action will meet the substantive requirements of these regulations, but no permit will be obtained.

Action-Specific ARARs and TBCs

Requirement	Citation	Status	Description	Relation to Remedy
Section 7 of the Endangered Species Act of 1973, as amended (ESA), and regulations promulgated under it.	16 U.S.C. § 1536 and 50 CFR §§ 402.01-402.17	Applicable	The ESA requires consultation between the U.S. Department of Interior and other federal agencies to ensure that that any action authorized, funded, or carried out by these agencies (a/k/a "agency action") 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.	The bog turtle (*Clemmys muhlenbergii*) is a threatened species, whose habitat potentially includes areas of Montgomery County, Pennsylvania, near the Site. EPA will coordinate with FWS to ensure the remedial action does not jeopardize the continued existence of the bog turtle or any other endangered or threatened species or result in the destruction or adverse modification of habitat of these species.
Fish and Wildlife Coordination Act of 1934, as amended (FWCA)	16 U.S.C. § 662	Applicable	The FWCA requires action to protect fish and wildlife from actions modifying streams or lakes. The FWCA requires coordination with the FWS, Department of the Interior, and state agencies to conserve wildlife resources and to prevent loss and damage to these resources.	Discharges of treated groundwater from the Site will potentially modify Stream 1 and the Perkiomen Creek and affect fish and wildlife resources. EPA will coordinate with other federal and state agencies to prevent loss or damage of these resources during the remedial action.
Federal regulations for the Underground Injection Control (UIC) Program promulgated under the SDWA	40 CFR §§ 144.12(a), 144.82, 146.6, 146.8, 146.10(c)	Applicable	These regulations set forth requirements for the UIC program promulgated under Part C of the SDWA.	The remedial action includes in-situ chemical oxidation (ISCO), which will involve substrate injections into an underground source of drinking water (USDW). The remedial action will meet these requirements to protect the USDW.

Requirement	Citation	Status	Description	Relation to Remedy
Standards for Contaminant Emissions, promulgated under the Air Pollution Control Act, Act of Jan. 8, (1960) 1959, P.L. 2119, No. 787, as amended, 35 P.S. §§ 4001 et seq. (ACPA)	25 Pa. Code §§ 123.1(a) and (c), 123.2, and 123.31	Applicable	These regulations prohibit fugitive emissions, fugitive particulate matter emissions, visible emission, and emissions of malodorous air contaminants.	Emissions occurring during construction of the remedial action and operation of the in-situ thermal remediation (ISTR) component of the remedy will be addressed in accordance with these requirements, but no permit will be obtained.
National Emissions Standards for Hazardous Air Pollutants: Site Remediation, promulgated under Section 112 of the Clean Air Act of 1970, as amended (CAA), 42 U.S.C. § 7412[2]	40 C.F.R. Part 63, Subpart GGGGG - - §§ 63.7884-.7887; 63.7890(a)-(b); 63.7891(b); 63.7893(b); 63.7910(a)-(b); 63.7912-.7913; 63.7920; 63.7922; 63.7923(a); 63.7935(a), (g), (h)(1)-(2), (i), (j); 63.7937(b)(1), (c)(1); 63.7938(b), (c)(1)-(3), (d); 63.7941(c), (d), (f), (k); 63.7943(a)-(c); 63.7944 (a)-(c); 63.7945(a); and 63.7946-.7947.	Relevant and appropriate	This subpart establishes national emissions limitations and Maximum Achievable Control Technology (MACT) standards for hazardous air pollutants (HAPs) emitted from site remediation activities. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emissions limitations and work practice standards.	The COCs identified at the Site are designated HAPs. Any vapor emissions during the remedial action will be controlled and monitored in accordance with the substantive provisions of these regulations. No permit will be obtained.
Requirement promulgated under Section 5 of the ACPA, 35 P.S. § 4005	25 Pa. Code § 139.14(a)(2)	Applicable	This requirement establishes sampling requirements for VOC emissions.	Air emissions during the remedial action will be subject to this testing requirement, but no permit approval will be obtained.
National Ambient Air Quality Standards (NAAQS), promulgated under Sections 108 and 109 of the CAA, 42 U.S.C. §§ 7408-09	40 CFR Part 50 - §§ 50.5, 50.8, 50.11, and 50.17	Applicable	These NAAQs regulate six criteria air pollutants.	Three of the criteria pollutants – carbon monoxide, nitrogen dioxide, and sulfur dioxide – may be generated in small amounts during the implementation of ISTR.

[2] Adopted by Pennsylvania at 25 Pa. Code § 127.35.

Requirement	Citation	Status	Description	Relation to Remedy
Effluent limitations and other standards promulgated under the Clean Water Act of 1972, as amended (CWA), 33 U.S.C. §§ 1251 et seq.	40 C.F.R. Part 122, §§ 122.44(a), (d), (e), and (i)	Relevant and appropriate	These substantive requirements of NPDES permits include technology-based standards, water quality standards, technology-based controls for toxic pollutants, and monitoring requirements.	Any discharge of treated groundwater at or from the Site to surface water in Stream 1 or the Perkiomen Creek during the remedial action will meet these requirements and standards, but no permit will be obtained.
Regulations promulgated under the Clean Streams Law concerning pH of wastewater, oil-bearing wastewaters, and heated wastewater discharges.	25 Pa. Code §§ 95.2(1)(i), 95.2(2), and 96.6	Relevant and appropriate	These industrial waste discharge requirements apply to pH, oil-sheen control, and thermal discharges.	Discharges of treated groundwater to Stream 1 or the Perkiomen Creek during the remedial action will meet these requirements.
Guidelines for continuous monitoring of pH promulgated under the CWA.	40 C.F.R. § 401.17(a) and (c)	Applicable	This regulation establishes guidelines for continuous monitoring of pH in wastewater.	Discharges of treated groundwater to Stream 1 or the Perkiomen Creek during the remedial action will comply with this continuous monitoring requirement.
Guidelines establishing test procedures for the analysis of pollutants, promulgated under the CWA	40 C.F.R. Part 136, §§ 136.1(a)(2), (b), and (c); 136.3, Table IC (List of Approved Test Procedures for Non-Pesticide Organic Compounds) and Table II (Required Containers, Preservation Techniques, and Holding Times); 136.7; and Appendix A, Methods for Organic Chemical Analysis for Municipal and Industrial Wastewater	Relevant and appropriate	These guidelines establish the procedures and analytical methods required for testing for parameters of Site COCs in discharges to surface water.	These test procedure and analytical methods will be used to monitor the discharge of treated groundwater to surface water at the Site.
Erosion and Sediment Control regulations, promulgated under the Clean Streams Law	25 Pa. Code §§ 102.2; 102.4(b)(1)-(5); 102.8(b)-(f) and (n); 102.11(a) and (b); 102.22	Applicable	These regulations require persons conducting earth disturbance activities to develop, implement, and maintain best management plans (BMPs) to minimize the potential for accelerated erosion and sedimentation and to manage post construction stormwater.	An erosion and sediment control plan will be developed and implemented to minimize erosion and sedimentation to Stream 1 or the other local stream during the construction of the remedial action.

Requirement	Citation	Status	Description	Relation to Remedy
Stormwater regulations promulgated under the Clean Water Act of 1972, as amended (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 and after construction activities, an estimate of the runoff coefficient of the site, and the name(s) of the receiving water(s).	Best management practices to control COCs in stormwater during and after the remedial action will be implemented at the Site. EPA will maintain other Site-related information identified in this regulation to report to appropriate PA and federal officials.
PA regulations concerning residual waste management, promulgated under the Solid Waste Management Act, Act 97 of July 7, 1980, P.L. 380, No. 97, 35 P.S. §§ 6018.101 et seq. (SWMA)	25 Pa. Code §§ 287.2(a) and (c); 287.54(a)(1)-(2), (c), and (d); 287.55; 287.56; 299.111; 299.112(a)-(c); 299.113(c); 299.114(a) and (b); 299.115(a)(1)-(2) and (b); 299.116; 299.121(a), (b), (d), and (e); 299.131(a)-(d); 299.159; and 299.161(a) and (b)	Applicable	These regulations set forth the requirements for persons who generate, manage, or handle residual waste.	During the remedial action, sampling for residual waste will be conducted to ensure proper classification and on-site handling for soil cuttings, development water, or purge water from well installation and residuals from groundwater treatment.
PA standards applicable to generators of hazardous waste, promulgated under the SWMA	25 Pa. Code §§ 262a.11, 262a.14(a), 262a.16, 262a.21, 262a.43	Applicable	These regulations set forth substantive standards for persons who generate a hazardous waste, as defined by 40 C.F.R. § 261.3.	Any generation of a hazardous waste, as defined by 40 C.F.R. § 261.3, during the remedial action will comply with these standards.
Federal standards applicable to generators of hazardous waste promulgated under the Solid Waste Disposal Act. as amended by the Resource Conservation and Recovery Act of 1976, as amended (RCRA), 42 U.S.C. §§ 6901 et seq.	40 C.F.R. § 262	Applicable	These regulations establish standards for *generators of hazardous waste*, as defined by 40 C.F.R. § 260.10.	Any generation of a hazardous waste, as defined by 40 C.F.R. § 261.3, during the remedial action will comply with the substantive parts of these standards.

Requirement	Citation	Status	Description	Relation to Remedy
Regulations promulgated under the Water Well Drillers License Act, 32 P.S. § 645.12	17 Pa. Code § 47.8	Applicable	Requires at least 10-days prior notice to the Department of Conservation & Natural Resources (DCNR) before a well is sealed or closed.	EPA will coordinate with DEP and DCNR on the abandonment of any wells at the Site during the remedial action.
Guidance for Evaluating Completion of Groundwater Restoration Remedial Action	EPA Office of Solid Waste and Emergency, Response (OSWER) Directive 9355.0-129 (11/25/13)	TBC	This guidance presents EPA's recommendations for evaluating Superfund groundwater remedy performance and making decisions to help facilitate achievement of Remedial Action Objectives (RAOs) and associated cleanup levels.	This guidance will be used to evaluate remedy performance and achievement of RAOs.
EPA Groundwater Remedy Completion Strategy	EPA OSWER Directive 9200.2-144 (05/12/14)	TBC	This guidance presents EPA's recommendations for evaluating Superfund groundwater remedy performance and making decisions to help facilitate achievement of RAOs and associated cleanup levels.	This guidance will be used to evaluate remedy performance and achievement of RAOs.
Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air	EPA OSWER Publication 9200.2-154 (June 2015); and Errata.	TBC	This guidance is intended for use at any site being evaluated by EPA under CERCLA where vapor intrusion may be of potential concern. It is intended for use in both residential and non-residential settings.	This guidance will be used to evaluate the need for vapor-intrusion mitigation measures in any new construction of structures for human occupancy or use at the Site.

Requirement	Citation	Status	Description	Relation to Remedy
Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites	OSWER Guidance 9355.0-89, EPA-540-R-09-001 (Dec. 2012)	TBC	This guidance provides information and recommendations for planning, implementing, maintaining, and enforcing ICs at Superfund sites.	This guidance will inform the planning and implementation of any ICs required during the remedial action.
Water-Well Abandonment Guidelines (previously published as Chapter 7 in the DEP publication, *Ground Water Monitoring Guidance Manual*)	Available at http://elibrary.dcnr.pa.gov/GetDocument?docId=1751964&DocName=WtrWellAbandonGuidelines.pdf	TBC	Private water wells that are no longer being used should be sealed to prevent migration of contaminants and eliminate the safety hazard of an open hole. In PA, the property owner is responsible for effectively filling and sealing all abandoned water wells according to these water-well abandonment guidelines.	EPA will follow these guidelines during the abandonment and sealing of any wells during the remedial action.

V. FIGURES

BAGHURST DRIVE SUPERFUND SITE
UPPER SALFORD TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

RECORD OF DECISION

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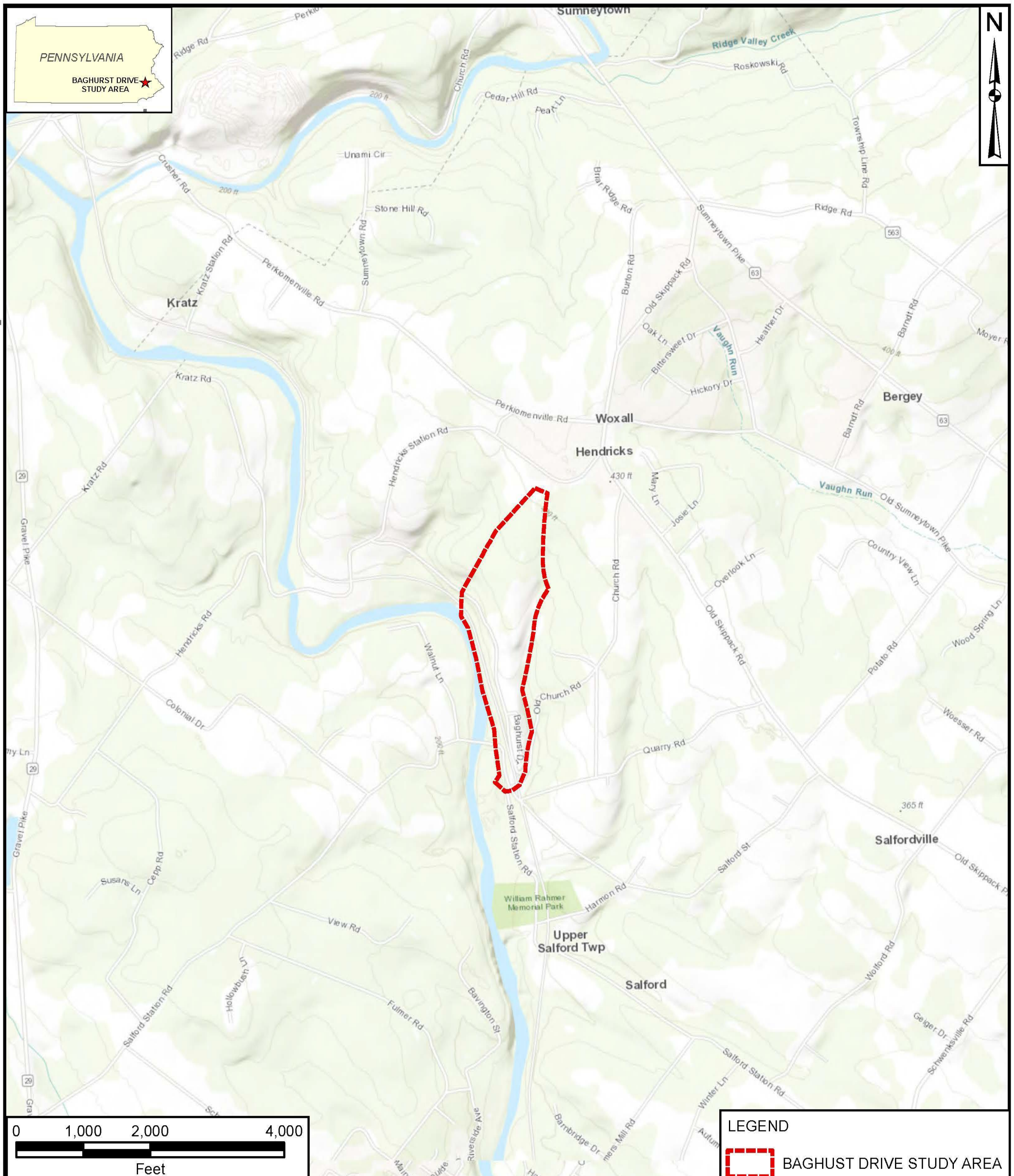

EPA United States Environmental Protection Agency

SITE LOCATION MAP
BAGHURST DRIVE SITE
UPPER SALFORD TOWNSHIP, PENNSYLVANIA

SCALE	PER SCALE BAR
FILE	SITE LOCATION MAP
REV	0
DATE	08/12/19
FIGURE NUMBER	FIGURE 1

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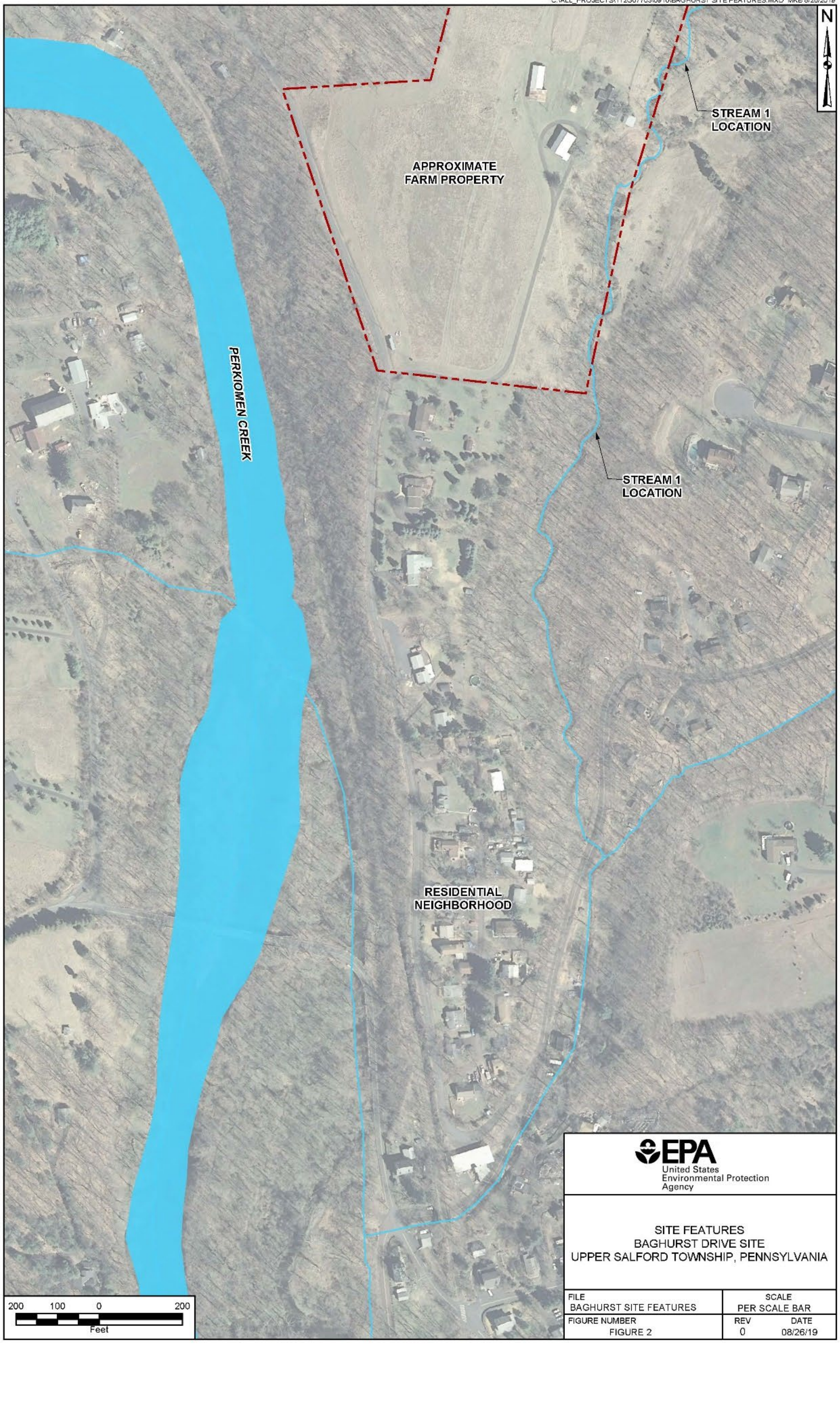

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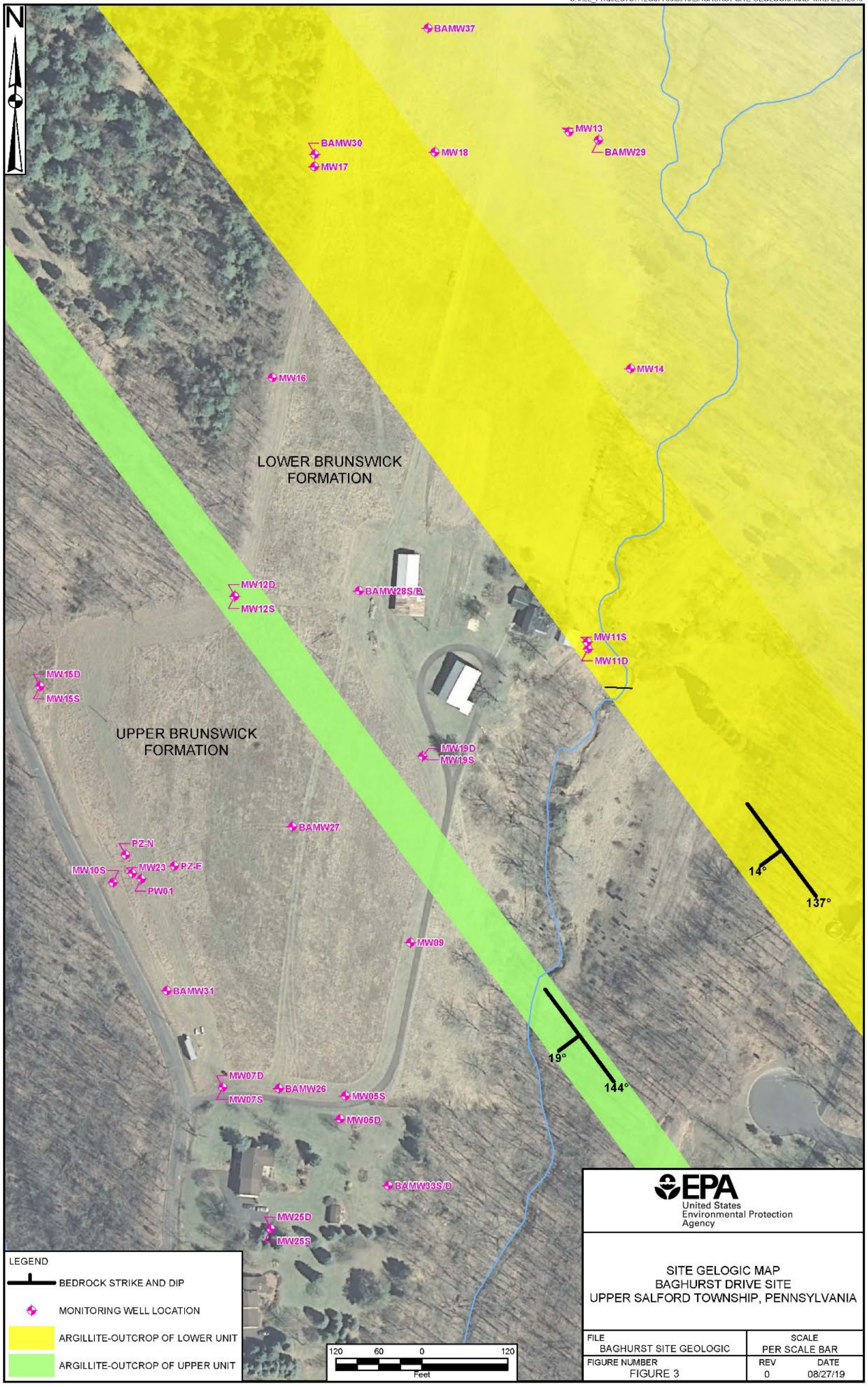
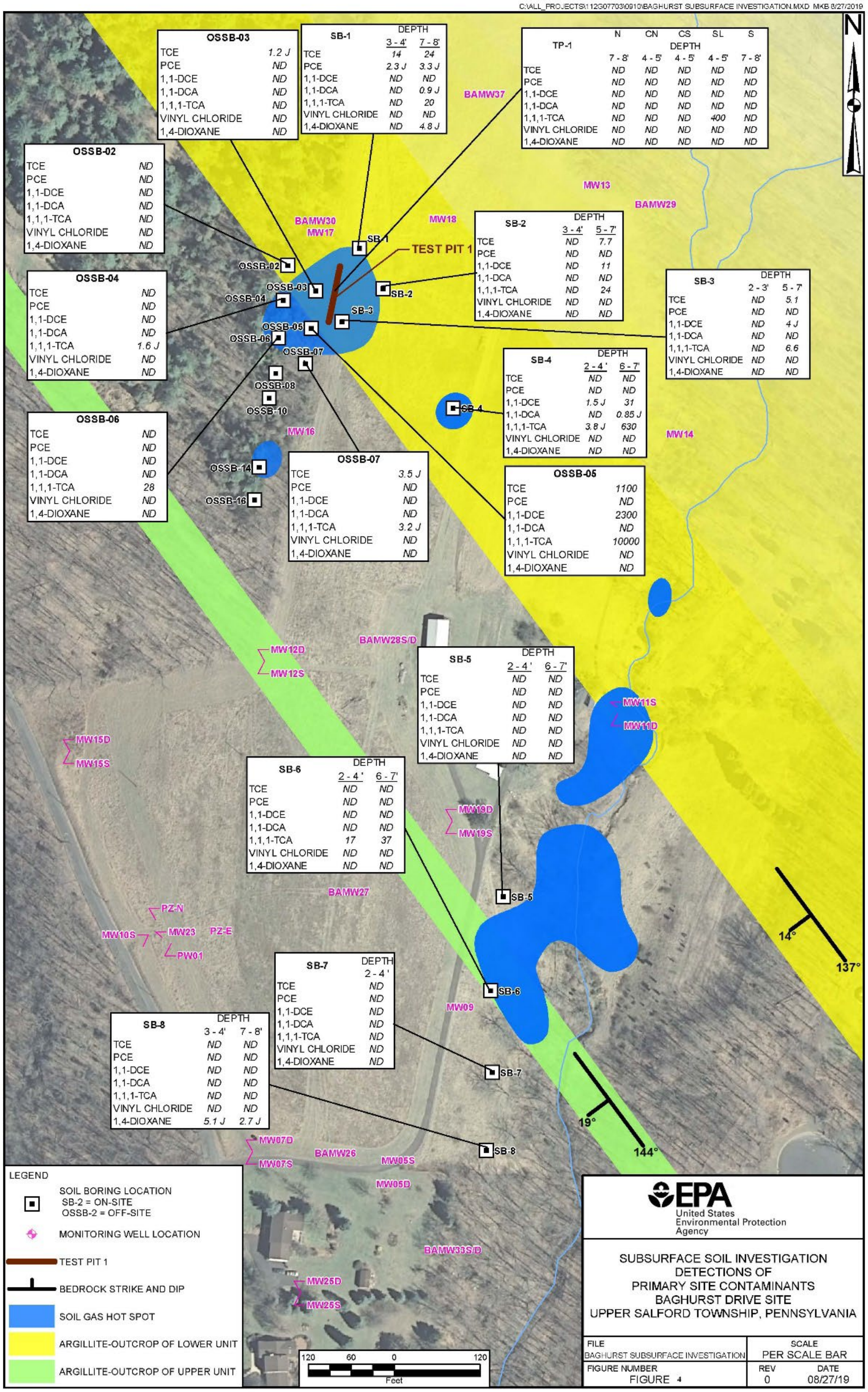


EPA United States Environmental Protection Agency

SITE GELOGIC MAP
BAGHURST DRIVE SITE
UPPER SALFORD TOWNSHIP, PENNSYLVANIA

FILE	SCALE	
BAGHURST SITE GEOLOGIC	PER SCALE BAR	
FIGURE NUMBER	REV	DATE
FIGURE 3	0	08/27/19



OSSB-03	
TCE	1.2 J
PCE	ND
1,1-DCE	ND
1,1-DCA	ND
1,1,1-TCA	ND
VINYL CHLORIDE	ND
1,4-DIOXANE	ND

SB-1	DEPTH 3 - 4'	7 - 8'
TCE	14	24
PCE	2.3 J	3.3 J
1,1-DCE	ND	ND
1,1-DCA	ND	0.9 J
1,1,1-TCA	ND	20
VINYL CHLORIDE	ND	ND
1,4-DIOXANE	ND	4.8 J

TP-1	N	CN	CS	SL	S
DEPTH	7 - 8'	4 - 5'	4 - 5'	4 - 5'	7 - 8'
TCE	ND	ND	ND	ND	ND
PCE	ND	ND	ND	ND	ND
1,1-DCE	ND	ND	ND	ND	ND
1,1-DCA	ND	ND	ND	ND	ND
1,1,1-TCA	ND	ND	ND	400	ND
VINYL CHLORIDE	ND	ND	ND	ND	ND
1,4-DIOXANE	ND	ND	ND	ND	ND

OSSB-02	
TCE	ND
PCE	ND
1,1-DCE	ND
1,1-DCA	ND
1,1,1-TCA	ND
VINYL CHLORIDE	ND
1,4-DIOXANE	ND

SB-2	DEPTH 3 - 4'	5 - 7'
TCE	ND	7.7
PCE	ND	ND
1,1-DCE	ND	11
1,1-DCA	ND	ND
1,1,1-TCA	ND	24
VINYL CHLORIDE	ND	ND
1,4-DIOXANE	ND	ND

SB-3	DEPTH 2 - 3'	5 - 7'
TCE	ND	5.1
PCE	ND	ND
1,1-DCE	ND	4 J
1,1-DCA	ND	ND
1,1,1-TCA	ND	6.6
VINYL CHLORIDE	ND	ND
1,4-DIOXANE	ND	ND

OSSB-04	
TCE	ND
PCE	ND
1,1-DCE	ND
1,1-DCA	ND
1,1,1-TCA	1.6 J
VINYL CHLORIDE	ND
1,4-DIOXANE	ND

SB-4	DEPTH 2 - 4'	6 - 7'
TCE	ND	ND
PCE	ND	ND
1,1-DCE	1.5 J	31
1,1-DCA	ND	0.85 J
1,1,1-TCA	3.8 J	630
VINYL CHLORIDE	ND	ND
1,4-DIOXANE	ND	ND

OSSB-06	
TCE	ND
PCE	ND
1,1-DCE	ND
1,1-DCA	ND
1,1,1-TCA	28
VINYL CHLORIDE	ND
1,4-DIOXANE	ND

OSSB-07	
TCE	3.5 J
PCE	ND
1,1-DCE	ND
1,1-DCA	ND
1,1,1-TCA	3.2 J
VINYL CHLORIDE	ND
1,4-DIOXANE	ND

OSSB-05	
TCE	1100
PCE	ND
1,1-DCE	2300
1,1-DCA	ND
1,1,1-TCA	10000
VINYL CHLORIDE	ND
1,4-DIOXANE	ND

SB-5	DEPTH 2 - 4'	6 - 7'
TCE	ND	ND
PCE	ND	ND
1,1-DCE	ND	ND
1,1-DCA	ND	ND
1,1,1-TCA	ND	ND
VINYL CHLORIDE	ND	ND
1,4-DIOXANE	ND	ND

SB-6	DEPTH 2 - 4'	6 - 7'
TCE	ND	ND
PCE	ND	ND
1,1-DCE	ND	ND
1,1-DCA	ND	ND
1,1,1-TCA	17	37
VINYL CHLORIDE	ND	ND
1,4-DIOXANE	ND	ND

SB-7	DEPTH 2 - 4'
TCE	ND
PCE	ND
1,1-DCE	ND
1,1-DCA	ND
1,1,1-TCA	ND
VINYL CHLORIDE	ND
1,4-DIOXANE	ND

SB-8	DEPTH 3 - 4'	7 - 8'
TCE	ND	ND
PCE	ND	ND
1,1-DCE	ND	ND
1,1-DCA	ND	ND
1,1,1-TCA	ND	ND
VINYL CHLORIDE	ND	ND
1,4-DIOXANE	5.1 J	2.7 J

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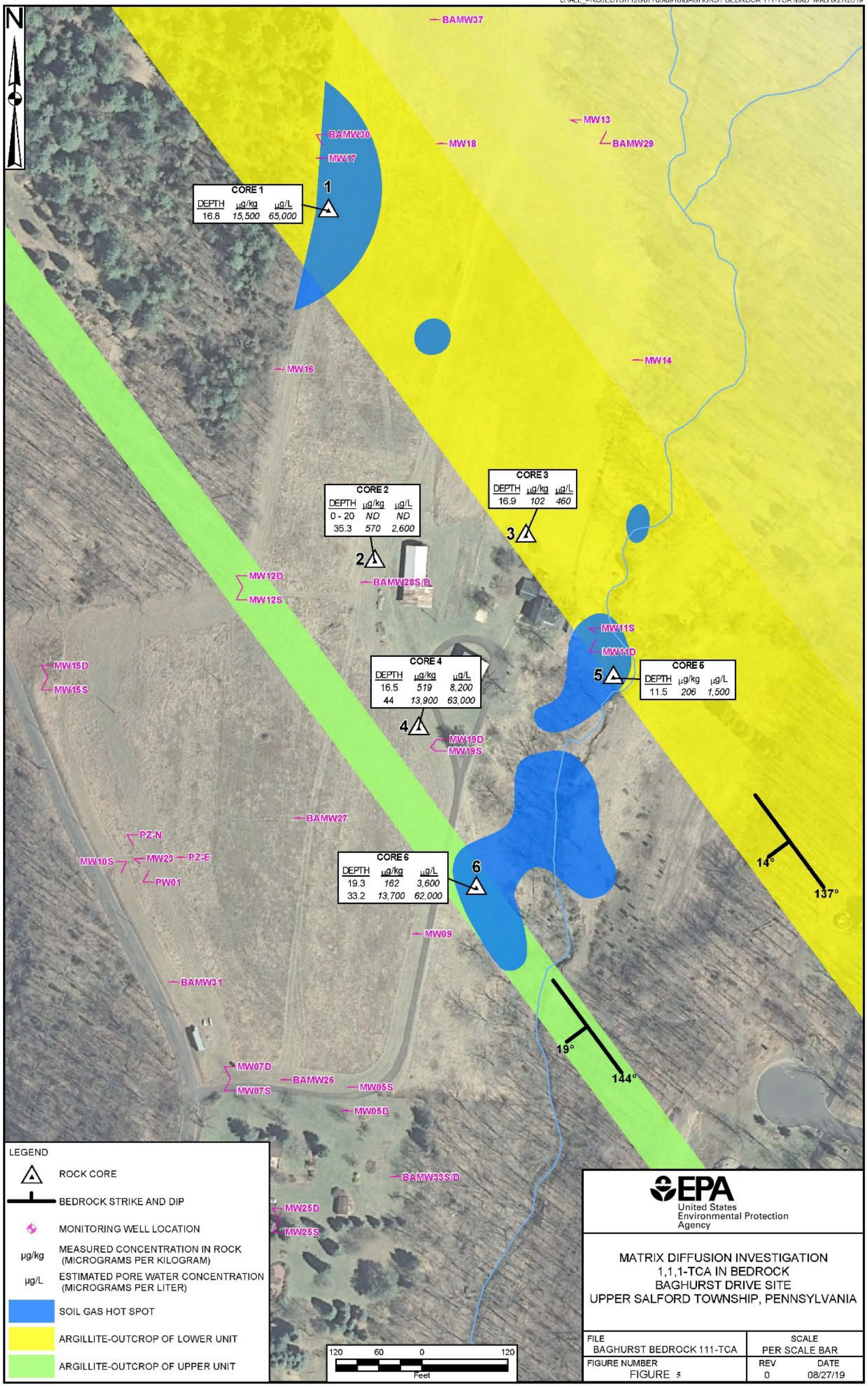

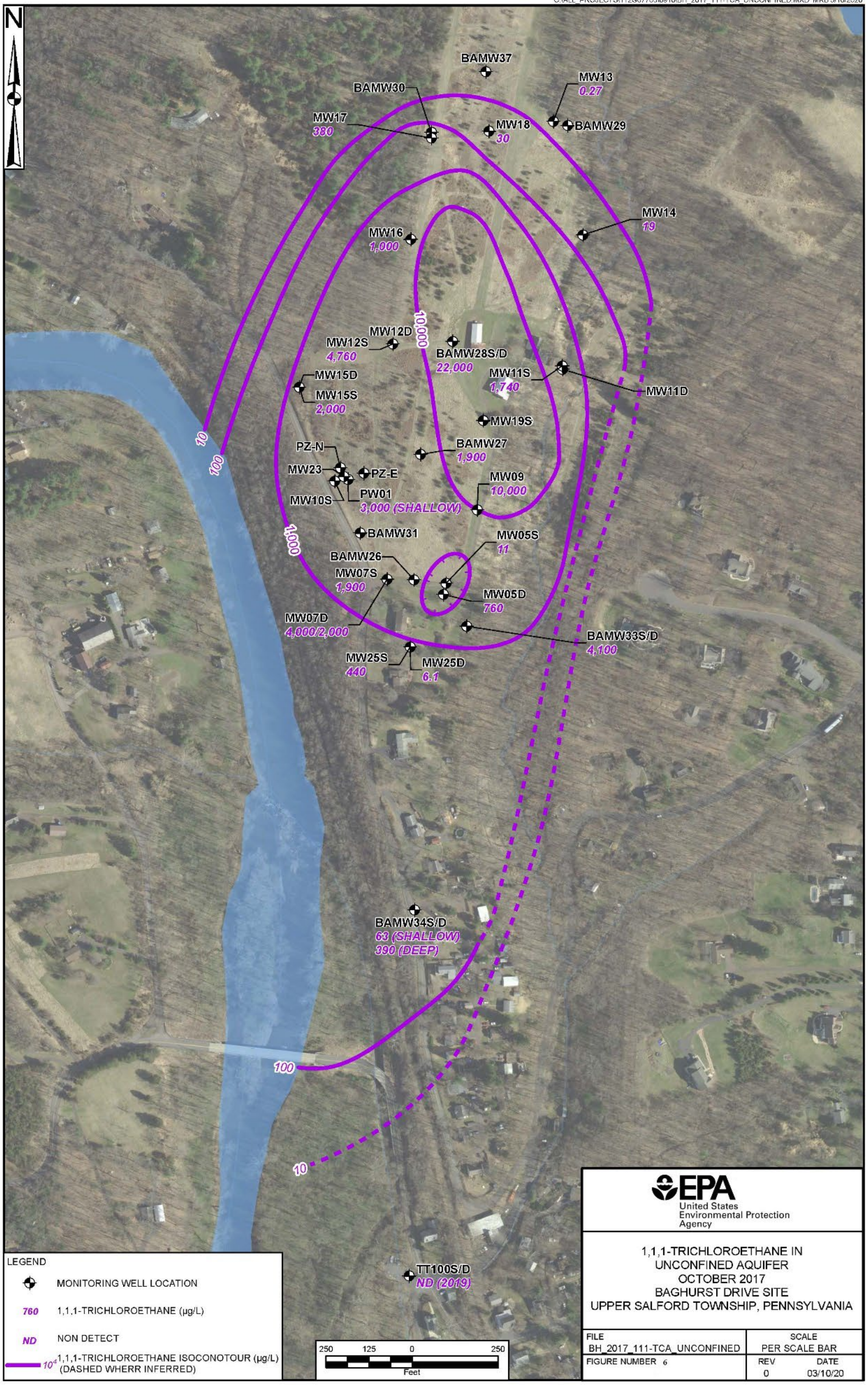
N
BAMW37
MW13
0.27
BAMW30
MW17
380
MW18
30
BAMW29
MW14
19
MW16
1,000
10,000
MW12D
MW12S
4,760
BAMW28S/D
22,000
MW11S
1,740
MW11D
MW15D
MW15S
2,000
MW19S
10
100
PZ-N
BAMW27
1,900
MW23
PZ-E
MW09
10,000
PW01
MW10S
3,000 (SHALLOW)
1,000
BAMW31
MW05S
11
BAMW26
MW07S
1,900
MW05D
760
MW07D
4,000/2,000
BAMW33S/D
4,100
MW25S
440
MW25D
6.1
BAMW34S/D
63 (SHALLOW)
390 (DEEP)
100
10
TT100S/D
ND (2019)
LEGEND
MONITORING WELL LOCATION
760 1,1,1-TRICHLOROETHANE (µg/L)
ND NON DETECT
10 1,1,1-TRICHLOROETHANE ISOCONOTOUR (µg/L) (DASHED WHERR INFERRED)
250 125 0 250
Feet
EPA
United States Environmental Protection Agency
1,1,1-TRICHLOROETHANE IN UNCONFINED AQUIFER
OCTOBER 2017
BAGHURST DRIVE SITE
UPPER SALFORD TOWNSHIP, PENNSYLVANIA
FILE
BH_2017_111-TCA_UNCONFINED
SCALE
PER SCALE BAR
FIGURE NUMBER 6
REV
0
DATE
03/10/20

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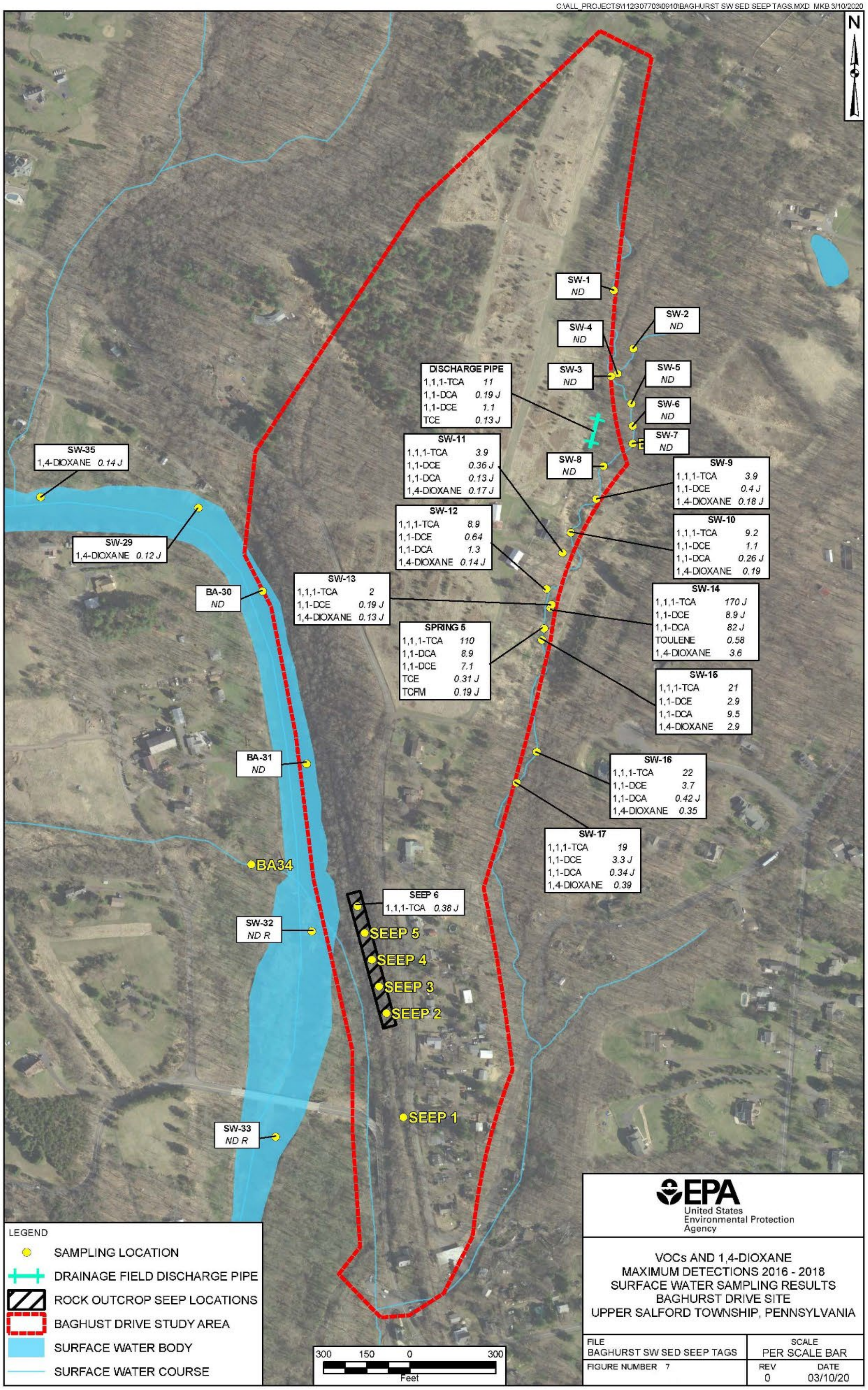

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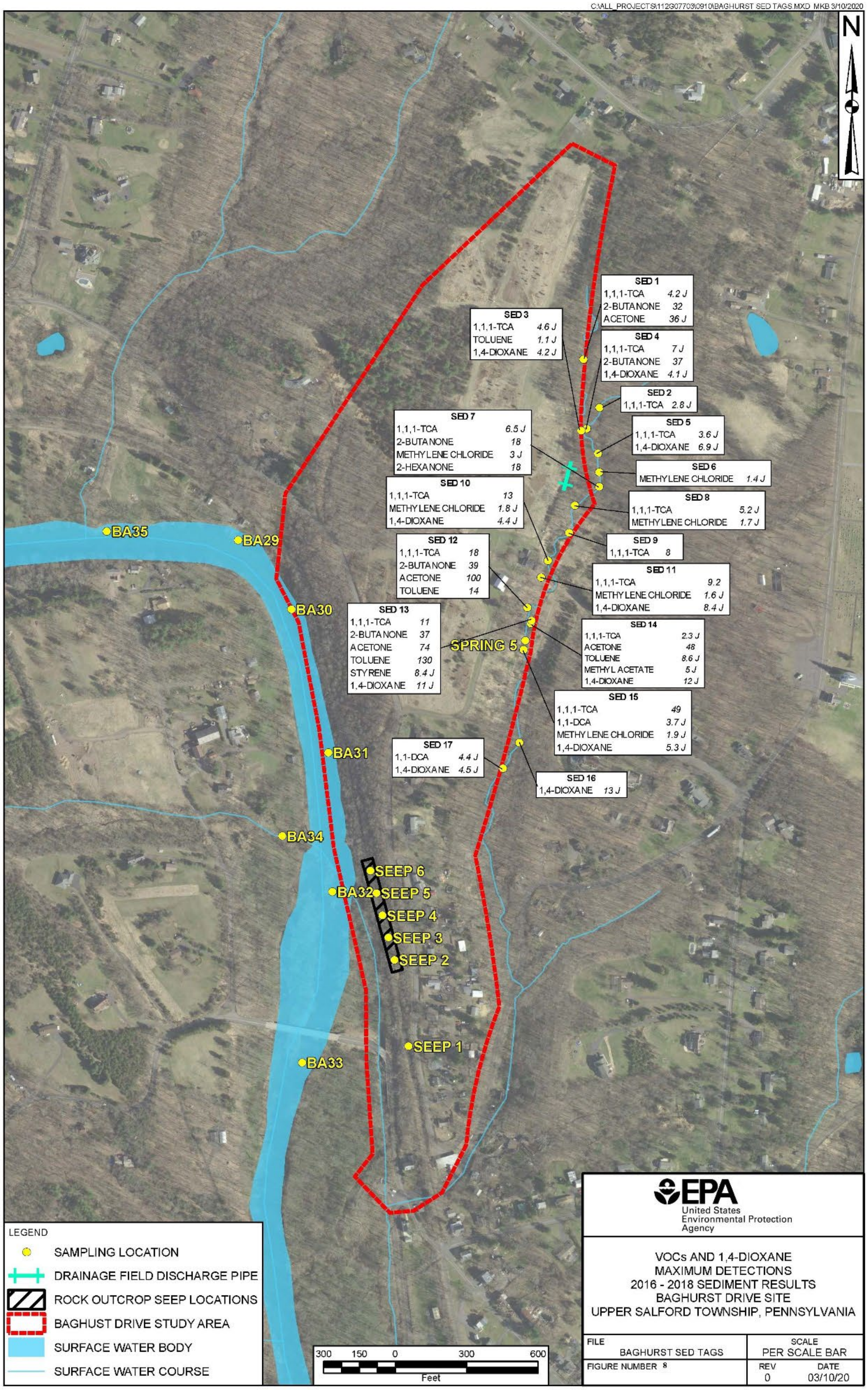

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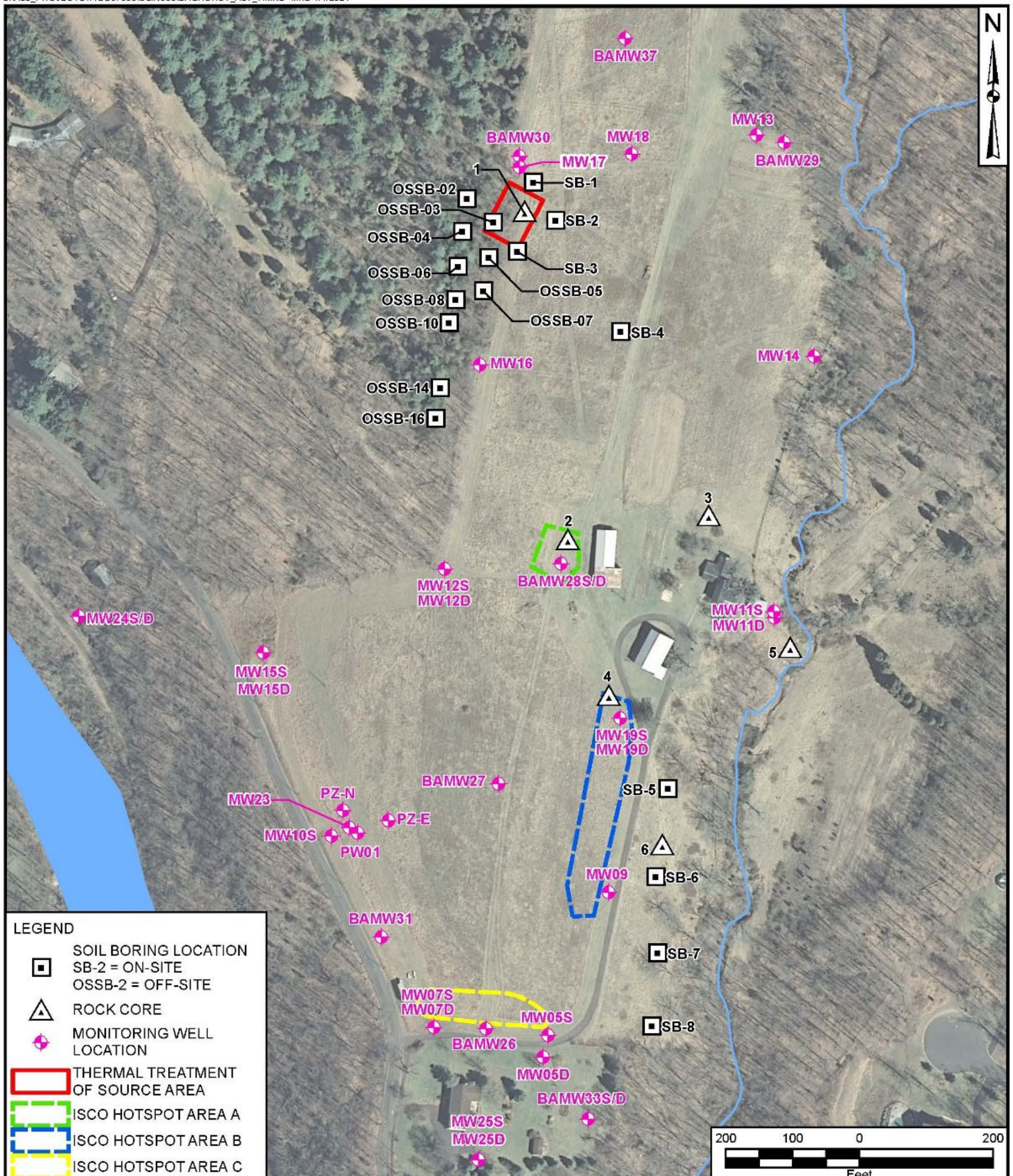

EPA
United States Environmental Protection Agency

ALTERNATIVE 6
THERMAL TREATMENT OF SOURCE AREA
AND IN SITU CHEMICAL OXIDATION OF HOT SPOT AREAS
BAGHURST DRIVE SITE
UPPER SALFORD TOWNSHIP, PENNSYLVANIA

SCALE	
PER SCALE BAR	
FILE	
baghurst_alt_7	
REV	DATE
0	01/04/21
FIGURE NUMBER	
9	

APPENDIX A

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION III

1650 Arch Street

Philadelphia, Pennsylvania 19103

BAGHURST DRIVE

REMEDIAL ADMINISTRATIVE RECORD FILE

INDEX OF DOCUMENTS

AVAILABLE 5/11/2021, UPDATED //2022

https://semspub.epa.gov/src/collection/03/AR66839

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.

The documents in the Baghurst Drive Removal Administrative Record File dated 9/16/2019 are herein incorporated by reference.

DOC ID	DOC DATE	TITLE	PAGE COUNT	ADDRESSEE NAME	AUTHOR NAME
2316107	04/03/2017	DATA VALIDATION REPORT - DAS # R35028 (RELATED DOCUMENTS ATTACHED)	12	GEIGER,WILL (EPA)|MCDONALD,BRANDON (EPA)	(ICF INTERNATIONAL)|MCDONALD,BRANDON (EPA)
2316114	04/03/2017	VALIDATED DATA - DAS # R35028	7	(EPA)	(ICF INTERNATIONAL)
2316108	04/21/2017	REVIEW OF VALIDATED DATA FOR INDOOR AIR	4	GEIGER,WILL (EPA)	FLORES-BROWN,PATRICIA,I (EPA)
2309599	10/21/2019	PADEP COMMENTS ON DRAFT REMEDIAL INVESTIGATION REPORT	2	GEIGER,WILL (EPA)	ARMSTRONG,DUSTIN,A (PA DEPT OF ENVIRONMENTAL PROTECTION)
2309595	04/01/2020	PADEP COMMENTS ON DRAFT FEASIBILITY STUDY	5	GEIGER,WILL (EPA)	ARMSTRONG,DUSTIN,A (PA DEPT OF ENVIRONMENTAL PROTECTION)
2316100	04/02/2020	EMAIL REGARDING PADEP ARARS REVIEW	6	ARMSTRONG,DUSTIN,A (PA DEPT OF ENVIRONMENTAL PROTECTION)|GEIGER,WILL (EPA)	ARMSTRONG,DUSTIN,A (PA DEPT OF ENVIRONMENTAL PROTECTION)|GEIGER,WILL (EPA)
2309598	04/29/2020	EMAIL REGARDING PRELIMINARY REMEDIATION GOALS (PRGS) FOR METALS	5	GEIGER,WILL (EPA)|GELHAUS,MARTIN (EPA)|KILMARTIN,KEVIN,C (TETRA TECH)	GEIGER,WILL (EPA)|GELHAUS,MARTIN (EPA)|KILMARTIN,KEVIN,C (TETRA TECH)
2316112	05/01/2020	REDACTED REMEDIAL INVESTIGATION REPORT	5126		(TETRA TECH INC)
2316111	12/01/2020	REDACTED FEASIBILITY STUDY	343		(TETRA TECH INC)
2316115	03/12/2021	TRANSMITTAL OF DRAFT PROPOSED REMEDIAL ACTION PLAN (PRAP)	1	ARMSTRONG,DUSTIN,A (PA DEPT OF ENVIRONMENTAL PROTECTION)	HANEIKO,ANDREW (EPA)
2309597	04/19/2021	MEMO TO FILE REGARDING DECISION NOT TO EVALUATE MONITORED NATURAL ATTENUATION (MNA) OF GROUNDWATER AS REMEDIAL ALTERNATIVE	1		HANEIKO,ANDREW (EPA)
2316103	04/20/2021	EMAIL REGARDING EPA RESPONSE TO PADEP IDENTIFICATION OF ADDITIONAL POTENTIAL ARARS	17	THOMAS,GINA (PA DEPT OF ENVIRONMENTAL PROTECTION)	HASSON,ROBERT (EPA)
2316106	04/21/2021	EMAIL REGARDING CITATIONS CONCERNING GENERAL APPLICABILITY CRITERION OF ARARS	3	HARTZELL,ANDERSON,L (PA DEPT OF ENVIRONMENTAL PROTECTION)	HASSON,ROBERT (EPA)
2316101	04/26/2021	EMAIL REGARDING REVISIONS TO PROPOSED REMEDIAL ACTION PLAN (PRAP) INSTITUTIONAL CONTROL LANGUAGE (PROPOSED REVISIONS ATTACHED)	9	HANEIKO,ANDREW (EPA)	MCCLENNEN,BONNIE (PA DEPT OF ENVIRONMENTAL PROTECTION)
2316113	04/29/2021	EMAIL REGARDING FEEDBACK ON ARARS (RELATED DOCUMENTS ATTACHED)	15	HANEIKO,ANDREW (EPA)	ARMSTRONG,DUSTIN,A (PA DEPT OF ENVIRONMENTAL PROTECTION)
2316105	05/05/2021	EPA REPSONSE TO PADEP CONCERNS REGARDING PROPOSED REMEDIAL ACTION PLAN (PRAP) INSTITUTIONAL CONTROL LANGUAGE	2	PATEL,RAGESH (PA DEPT OF ENVIRONMENTAL PROTECTION)	ROOT,CHARLIE (EPA)
2316104	05/07/2021	EPA SUPPLEMENTAL RESPONSE TO PADEP IDENTIFICATION OF ADDITIONAL POTENTIAL ARARS (TRANSMITTAL EMAIL ATTACHED)	14	THOMAS,GINA (PA DEPT OF ENVIRONMENTAL PROTECTION)	HASSON,ROBERT (EPA)

DOC ID	DOC DATE	TITLE	PAGE COUNT	ADDRESSEE NAME	AUTHOR NAME	
2316110	05/11/2021	FACT SHEET: EPA ANNOUNCES PROPOSED CLEANUP PLAN	4		(EPA)	
2316109	05/11/2021	PUBLIC NOTICE: PROPOSED CLEANUP PLAN AVAILABLE FOR PUBLIC COMMENT	1		(EPA)	
2316102	05/11/2021	PROPOSED REMEDIAL ACTION PLAN (PRAP)	62		(EPA)	
2316119	05/11/2021	VIDEO: PROPOSED REMEDIAL ACTION PLAN (PRAP) VIRTUAL PUBLIC MEETING PRESENTATION (WITH CAPTIONS)	1		(EPA)	*
2327402	05/11/2021	VIRTUAL PUBLIC MEETING PRESENTATION TRANSCRIPT	10		(EPA)	
2327403	05/20/2021	REDACTED PUBLIC COMMENT ON PROPOSED REMEDIAL ACTION PLAN (PRAP)	1		(RESIDENT)	
2327400	06/10/2021	PADEP COMMENTS ON PROPOSED REMEDIAL ACTION PLAN (PRAP)	2	HANEIKO,ANDREW (EPA)	MCCLENNEN,BONNIE (PA DEPT OF ENVIRONMENTAL PROTECTION)	
2327405	08/04/2021	PA STATE HISTORIC PRESERVATION OFFICE ENVIRONMENTAL REVIEW SUMMARY LETTER	2	OKORN,BARBARA (EPA)	MACDONALD,ANDREA (PA STATE HISTORIC PRESERVATION OFFICE)	

* The virtual public meeting presentation can also be viewed online at:
https://www.youtube.com/watch?v=BPnk9k9VXcM

APPENDIX B – Cost Estimates for Remedial Alternatives

BAGHURST DRIVE SUPERFUND SITE 2/26/2020
Upper Salford Township
Montgomery County, PA
Alternative G1 - No Action
Capital Cost

			Unit Cost				Extended Cost				
Item	Quantity	Unit	Subcontract	Material	Labor	Equipment	Subcontract	Material	Labor	Equipment	Subtotal
1 PROJECT PLANNING & DOCUMENTS											
1.1 Prepare Documents & Plans	0	hr			$42.00		$0	$0	$0	$0	$0
Subtotal							$0	$0	$0	$0	$0
Overhead on Labor Cost @ 30%									$0		$0
G & A on Labor, Material, Equipment, & Subs Cost @ 10%							$0	$0	$0	$0	$0
Tax on Materials and Equipment Cost @ 7%								$0		$0	$0
Total Direct Cost							$0	$0	$0	$0	$0
Indirects on Total Direct Cost @ 25%											$0
Profit on Total Direct Cost @ 10%											$0
Subtotal											$0
Health & Safety Monitoring @ 0%											$0
Total Field Cost											$0
Engineering on Total Field Cost @ 15%											$0
Contingency on Total Field Cost @ 20%											$0
TOTAL CAPITAL COST											**$0**

BAGHURST DRIVE SUPERFUND SITE
Upper Salford Township
Montgomery County, PA
Alternative G1 - No Action
Operating Cost

2/26/2020

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
None											
Subtotal							$0	$0	$0	$0	$0
Overhead on Labor Cost @ 30%									$0		$0
G & A on Labor, Material, Equipment, & Subs Cost @ 10%							$0	$0	$0	$0	$0
Tax on Materials and Equipment Cost @ 7%								$0		$0	$0
Total Direct Cost							$0	$0	$0	$0	$0
Indirects on Total Direct Cost @ 25%											$0
Profit on Total Direct Cost @ 10%											$0
Subtotal											$0
Health & Safety Monitoring @ 0%											$0
Total Field Cost											$0
Engineering on Total Field Cost @ 15%											$0
Contingency on Total Field Cost @ 20%											$0
TOTAL CAPITAL COST											**$0**

BAGHURST DRIVE SUPERFUND SITE
Upper Salford Township
Montgomery County, PA
Alternative G1 - No Action
Annual Cost

2/26/2020

Item	Item Cost years 1 - 30	Item Cost every 5 years	Notes
Five Year Site Review		$25,000	
Subtotal	$0	$25,000	
Contingency @ 10%	$0	$2,500	
TOTAL	**$0**	**$27,500**	

BAGHURST DRIVE SUPERFUND SITE 2/26/2020
Montgomery County, PA
Upper Salford Township
Alternative G1 - No Action
Present Worth Analysis

Year	Capital Cost	Operation & Maintenance Cost	Annual Cost	Total Year Cost	Annual Discount Rate 1.5%	Present Worth
0	$0			$0	1.000	$0
1		$0	$0	$0	0.985	$0
2		$0	$0	$0	0.971	$0
3		$0	$0	$0	0.956	$0
4		$0	$0	$0	0.942	$0
5		$0	$27,500	$27,500	0.928	$25,527
6		$0	$0	$0	0.915	$0
7		$0	$0	$0	0.901	$0
8		$0	$0	$0	0.888	$0
9		$0	$0	$0	0.875	$0
10		$0	$27,500	$27,500	0.862	$23,696
11		$0	$0	$0	0.849	$0
12		$0	$0	$0	0.836	$0
13		$0	$0	$0	0.824	$0
14		$0	$0	$0	0.812	$0
15		$0	$27,500	$27,500	0.800	$21,996
16		$0	$0	$0	0.788	$0
17		$0	$0	$0	0.776	$0
18		$0	$0	$0	0.765	$0
19		$0	$0	$0	0.754	$0
20		$0	$27,500	$27,500	0.742	$20,418
21		$0	$0	$0	0.731	$0
22		$0	$0	$0	0.721	$0
23		$0	$0	$0	0.710	$0
24		$0	$0	$0	0.700	$0
25		$0	$27,500	$27,500	0.689	$18,953
26		$0	$0	$0	0.679	$0
27		$0	$0	$0	0.669	$0
28		$0	$0	$0	0.659	$0
29		$0	$0	$0	0.649	$0
30		$0	$27,500	$27,500	0.640	$17,593
					TOTAL PRESENT WORTH	**$128,183**

BAGHURST DRIVE SUPERFUND SITE
Upper Salford Township
Montgomery County, PA
Alternatives G2 - ICs and MNA

3/3/2020

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
1 PROJECT PLANNING & DOCUMENTS											
1.1 Prepare LTM Plan	200	hr			$42.00		$0	$0	$8,400	$0	$8,400
1.2 Prepare ICs	250	hr			$42.00		$0	$0	$10,500	$0	$10,500
2 START-UP/ BASELINE SAMPLING											
2.1 Analysis: CVOCs and 1,4 dioxane	6	sample	$3,420.00				$20,520	$0	$0	$0	$20,520
2.2 Equipment (sampling equipment/instruments, veh	2	days				$500.00	$0	$0	$0	$1,000	$1,000
2.3 Sampling labor (1 technician)	2	days			$274.80		$0	$0	$550	$0	$550
Subtotal							$20,520	$0	$19,450	$1,000	$40,970
Overhead on Labor Cost @	30%								$5,835		$5,835
G & A on Labor, Material, Equipment, & Subs Cost @	10%						$2,052	$0	$1,945	$100	$4,097
Tax on Materials and Equipment Cost @	7%							$0		$70	$70
Total Direct Cost							$22,572	$0	$27,229	$1,170	$50,971
Indirects on Total Direct Cost @	25%										$12,743
Profit on Total Direct Cost @	10%										$5,097
Subtotal											$68,811
Health & Safety Monitoring @	0%										$0
Total Field Cost											$68,811
Engineering on Total Field Cost @	15%										$10,321.72
Contingency on Total Field Cost @	20%										$13,762
TOTAL CAPITAL COST											**$92,895**

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternatives G2 - ICs and MNA
Annual Cost

Item	Item Cost year 1-5	Item Cost years 6-10	Item Cost years 11-30	Item Cost every 5 years	Notes
Site Inspection: Visit	$2,500	$2,500	$2,500		One-day visit and report to verify ICs
Groundwater	$13,625	$13,625	$13,625		Labor and supplies to collect samples annually.
Analysis:	$3,420	$3,420	$3,420		Analyze 18 samples for CVOCs and 1,4 Dioxane
Five Year Site Review				$25,000	
Subtotal	$19,545	$19,545	$19,545	$25,000	
Contingency @ 10%	$1,955	$1,955	$1,955	$2,500	
TOTAL	**$21,500**	**$21,500**	**$21,500**	**$27,500**	

BAGHURST DRIVE SUPERFUND SITE
Montgomery County, PA
Upper Salford Township
Alternatives G2 - ICs and MNA
Present Worth Analysis

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate 1.5%	Present Worth
0	$92,895		$92,895	1.000	$92,895
1		$21,500	$21,500	0.985	$21,182
2		$21,500	$21,500	0.971	$20,869
3		$21,500	$21,500	0.956	$20,560
4		$21,500	$21,500	0.942	$20,256
5		$49,000	$49,000	0.928	$45,484
6		$21,500	$21,500	0.915	$19,662
7		$21,500	$21,500	0.901	$19,372
8		$21,500	$21,500	0.888	$19,085
9		$21,500	$21,500	0.875	$18,803
10		$49,000	$49,000	0.862	$42,221
11		$21,500	$21,500	0.849	$18,252
12		$21,500	$21,500	0.836	$17,982
13		$21,500	$21,500	0.824	$17,716
14		$21,500	$21,500	0.812	$17,454
15		$49,000	$49,000	0.800	$39,192
16		$21,500	$21,500	0.788	$16,942
17		$21,500	$21,500	0.776	$16,692
18		$21,500	$21,500	0.765	$16,445
19		$21,500	$21,500	0.754	$16,202
20		$49,000	$49,000	0.742	$36,381
21		$21,500	$21,500	0.731	$15,727
22		$21,500	$21,500	0.721	$15,494
23		$21,500	$21,500	0.710	$15,265
24		$21,500	$21,500	0.700	$15,040
25		$49,000	$49,000	0.689	$33,771
26		$21,500	$21,500	0.679	$14,599
27		$21,500	$21,500	0.669	$14,383
28		$21,500	$21,500	0.659	$14,170
29		$21,500	$21,500	0.649	$13,961
30		$49,000	$49,000	0.640	$31,348
				TOTAL PRESENT WORTH	**$737,407**

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G3 - Groundwater Extraction
Capital Cost

Item	Quantity	Unit	Unit Cost				Extended Cost				
			Subcontract	Material	Labor	Equipment	Subcontract	Material	Labor	Equipment	Subtotal
1 PROJECT PLANNING & DOCUMENTS											
1.1 Implementation Work Plan	100	hr			$42.00		$0	$0	$4,200	$0	$4,200
1.2 Prepare LTM Plans	200	hr			$42.00		$0	$0	$8,400	$0	$8,400
1.3 Permitting (NPDES and E&SC)	300	hr			$42.00		$0	$0	$12,600	$0	$12,600
1.4 Prepare ICs	250	hr			$42.00		$0	$0	$10,500	$0	$10,500
1.5 Easement For Discharge	1	ls			$15,000.00		$0	$0	$15,000	$0	$15,000
2 MOBILIZATION/DEMOBILIZATION, SITE PREP											
2.1 Site Support Facilities (trailers, phone, electric, etc.	1	ls		$1,000.00		$3,500.00	$0	$1,000	$0	$3,500	$4,500
2.2 Equipment Mobilization/Demobilization	5	ea			$780.00	$424.00	$0	$0	$3,900	$2,120	$6,020
2.2 Grading for Access Road	1,250	sy			$0.72	$0.74	$0	$0	$900	$925	$1,825
2.3 Gravel Access Road, 12" thick	1,250	sy		$11.90	$0.51	$0.73	$0	$14,875	$638	$913	$16,425
2.4 Clear and Grub, Cut & Chip Trees	0.5	ac			$1,900.00	$1,425.00	$0	$0	$950	$713	$1,663
2.5 Fence, Chain Link, 8' high	1,200	lf	$44.50				$53,400	$0	$0	$0	$53,400
2.6 Gate, Chain Link, 20' wide	2	ea.	$2,800.00				$5,600	$0	$0	$0	$5,600
3 FIELD SUPPORT											
3.1 Office Trailer	6	mo				$450.00	$0	$0	$0	$2,700	$2,700
3.2 Field Office Equipment, Utilities, & Support	6	mo		$456.00			$0	$2,736	$0	$0	$2,736
3.3 Storage Trailer	6	mo				$110.00	$0	$0	$0	$660	$660
3.4 Survey Support	5	day	$1,275.00				$6,375	$0	$0	$0	$6,375
3.5 Site Superintendent	150	day		$111.00	$435.00		$0	$16,650	$65,250	$0	$81,900
3.6 Site Health & Safety and QA/QC	25	day		$111.00	$370.00		$0	$2,775	$9,250	$0	$12,025
4 DECONTAMINATION											
4.1 Equipment Decon Pad	1	ls		$5,800.00	$6,650.00	$700.00	$0	$5,800	$6,650	$700	$13,150
4.2 Decontamination Services	2	mo		$375.00	$1,200.00	$900.00	$0	$750	$2,400	$1,800	$4,950
4.3 Decon Water	2,000	gal	$0.20				$400	$0	$0	$0	$400
4.4 Decon Water Storage Tank, 6,000 gallon	2	mo				$635.00	$0	$0	$0	$1,270	$1,270
4.5 Clean Water Storage Tank, 4,000 gallon	2	mo				$570.00	$0	$0	$0	$1,140	$1,140
5 GROUNDWATER EXTRACTION WELLS											
5.1 Driller Mobilization\Demobilization	1	ls	$6,000.00				$6,000	$0	$0	$0	$6,000
5.2 Drilling Plume Extraction Wells (5- 6" wells)	240	ft			$12.35	$24.00	$0	$0	$2,964	$5,760	$8,724
5.3 6" Diameter Slotted PVC Well Casing	60	ft		$16.70	$7.90	$21.50	$0	$1,002	$474	$1,290	$2,766
5.4 6" Diameter PVC Well Casing	240	ft		$8.50	$7.65	$21.00	$0	$2,040	$1,836	$5,040	$8,916
5.5 Well Development @ 3 hours/well	9	hr		$243.00	$124.00	$380.00	$0	$2,187	$1,116	$3,420	$6,723
5.6 Well Vault	3	each		$1,800.00	$650.00	$250.00	$0	$5,400	$1,950	$750	$8,100
5.7 Sampling/Analysis of Drill Cuttings	2	ea	$1,200.00		$100.00		$2,400	$0	$200	$0	$2,600
5.8 T&D of Drill Cuttings	25	ton	$620.00				$15,500	$0	$0	$0	$15,500
5.9 Sampling/Analysis of Waste Water	1	ea	$1,000.00				$1,000	$0	$0	$0	$1,000
5.10 Borehole logging and reporting	4	week			$1,870.40		$0	$0	$7,482	$0	$7,482
5.11 Pump testing	72	hr	$81.00	$124.00	$380.00		$5,832	$8,928	$27,360	$0	$42,120
5.12 Extraction well pump, 1/3 hp submersible	3	ea		$450.00	$257.00		$0	$1,350	$771	$0	$2,121
5.13 Pump Suspension	237	lf		$1.72	$1.25	$0.50	$0	$408	$296	$119	$822

			Unit Cost				Extended Cost				
Item	Quantity	Unit	Subcontract	Material	Labor	Equipment	Subcontract	Material	Labor	Equipment	Subtotal
5.14 Well pump Power Cable	3500	lf		$7.50	$1.15		$0	$26,250	$4,025	$0	$30,275
5.15 3/4" Reifnorced Flexible downhole Piping	237	lf		$2.15	$1.00	$0.00	$0	$510	$237	$0	$747
5.16 Well Level Transducer and Cable	3	ea		$664.00	$100.00	$80.00	$0	$1,992	$300	$240	$2,532
5.17 Valves, Fitting and Sampling Port	1	ls	$6,000.00				$6,000	$0	$0	$0	$6,000
6 TREATMENT PLANT AND EQUIPIMENT											
6.1 Treatment Building, 70' by 56' by 16'	3,920	sf	$40.50				$158,760	$0	$0	$0	$158,760
6.2 Treatment Building Slab, 70' by 56' by 6"	75	cy	$621.00				$46,575	$0	$0	$0	$46,575
6.3 Treatment Building Foudation, 70' by 56'	56	cy	$621.00				$34,776	$0	$0	$0	$34,776
6.4 Truck Door	1	ea	$4,050.00				$4,050	$0	$0	$0	$4,050
6.5 Equalization Tank, 2,800 gal HDPE	1	ea		$2,500.00	$325.00		$0	$2,500	$325	$0	$2,825
6.6 Feed Pump, 40 gpm, 2 hp	1	ea		$860.00	$348.00		$0	$860	$348	$0	$1,208
6.7 HIPOX Unit with Ozone Generator	1	ea		$310,000.00	$3,024.00	$704.00	$0	$310,000	$3,024	$704	$313,728
6.8 PSA Oxygen Generator	1	ea		$25,000.00	$4,536.00	$1,056.00	$0	$25,000	$4,536	$1,056	$30,592
6.9 Peroxide Tank, 50 gal	1	ea		$420.00	$89.00		$0	$420	$89	$0	$509
6.10 Peroxide Feed Pump	1	ea		$1,100.00	$45.00		$0	$1,100	$45	$0	$1,145
6.11 Sodium Hydroxide Tank, 30 gal	1	ea		$300.00	$89.00		$0	$300	$89	$0	$389
6.12 Sodium Hydroxide Feed Pump	1	ea		$1,100.00	$89.00		$0	$1,100	$89	$0	$1,189
6.13 Static Mixer, 12 element, Sch 80 2-inch PVC	1	ea		$450.00	$45.00		$0	$450	$45	$0	$495
6.14 Greensand Filters with Zeolite Filter System	1	ea		$100,000.00	$7,560.00	$1,760.00	$0	$100,000	$7,560	$1,760	$109,320
6.15 Sodium Hypochlorite Tank, 50 gal	1	ea		$420.00	$89.00		$0	$420	$89	$0	$509
6.16 Sodium Hypochlorite Feed Pump	1	ea		$1,100.00	$45.00		$0	$1,100	$45	$0	$1,145
6.17 Backwash Storage Tank, 12,000 gal HDPE	1	ea		$28,000.00	$510.00		$0	$28,000	$510	$0	$28,510
6.18 Backwash Pump, 424 gpm, 10 hp	1	ea		$1,430.00	$615.00		$0	$1,430	$615	$0	$2,045
6.19 Dirty Backwash Tank, 9,000 gal HDPE	1	ea		$18,000.00	$480.00		$0	$18,000	$480	$0	$18,480
6.20 Solids Settling Tank, 9,000 gal HDPE	1	ea		$18,000.00	$480.00		$0	$18,000	$480	$0	$18,480
6.21 Filter Press (plate & frame) 1 cf	1	ea		$16,000.00	$3,024.00	$704.00	$0	$16,000	$3,024	$704	$19,728
6.22 Filter Press Feed Pump, 10 gpm	1	ea		$450.00	$90.00		$0	$450	$90	$0	$540
6.23 Air Compressor	1	ea		$2,000.00	$260.00		$0	$2,000	$260	$0	$2,260
6.24 Misc. Solids Dewatering Piping and Valves	1	ls		$5,000.00	$5,040.00		$0	$5,000	$5,040	$0	$10,040
6.25 Dirty Backwash Pump, 10 gpm, 1/3 hp	1	ea		$340.00	$300.00		$0	$340	$300	$0	$640
6.26 Sump Pump, 10 gpm, 1/3 hp	1	ea		$340.00	$300.00		$0	$340	$300	$0	$640
6.27 PVC Sch 80 pipe, 2.5" dia.	1,000	lf		$9.30	$17.10		$0	$9,300	$17,100	$0	$26,400
6.28 PVC Sch 80 ball valves, 2.5"	50	ea		$195.00	$34.50		$0	$9,750	$1,725	$0	$11,475
6.29 PVC Elbows & Tees, 2.5"	120	ea		$33.00	$44.50		$0	$3,960	$5,340	$0	$9,300
6.30 PVC Sch 80 pipe, 2.5" dia. (underground)	2,500	lf		$5.49	$7.35		$0	$13,725	$18,375	$0	$32,100
6.31 PVC Sch 80 pipe, 4" dia. (underground)	2,500	lf		$19.18	$8.32		$0	$47,950	$20,800	$0	$68,750
6.32 Pipeline Excavation/Bedding/Backfill	2,500	lf		$3.70	$5.10	$2.05	$0	$9,250	$12,750	$5,125	$27,125
6.33 Extraction Well pump, 40 gpm, 3 hp	5	ea		$25,000.00	$800.00	$500.00	$0	$125,000	$4,000	$2,500	$131,500
6.34 Misc Piping Appurtenances	2	ls		$45,000.00	$5,340.00		$0	$90,000	$10,680	$0	$100,680
6.35 Electric Service	1	ls	$30,000.00				$30,000	$0	$0	$0	$30,000
6.36 GAC Unit	2	ea		$12,000.00			$0	$24,000	$0	$0	$24,000
6.37 Instruments and Controls	1			$175,000.00			$0	$175,000	$0	$0	$175,000

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G3 - Groundwater Extraction
Capital Cost

			Unit Cost				Extended Cost				
Item	Quantity	Unit	Subcontract	Material	Labor	Equipment	Subcontract	Material	Labor	Equipment	Subtotal
6.38 Electrical System	1			$110,000.00			$0	$110,000	$0	$0	$110,000
6.39 System Start-Up and Testing	15	day		$100.00	$504.00	$5.00	$0	$1,500	$7,560	$75	$9,135
7 **SITE RESTORATION**											
7.1 Area Seeding	100	msf	$56.60				$5,660	$0	$0	$0	$5,660
7.2 Crushed Stone	625	sy		$6.80	$0.57	$0.83	$0	$4,250	$356	$519	$5,125
8 **POST CONSTRUCTION COST**											
8.1 Contractor Completion Report	300	hr			$42.00		$0	$0	$12,600	$0	$12,600
8.2 Remedial Action Closeout Report	250	hr			$42.00		$0	$0	$10,500	$0	$10,500
9 **START-UP/ BASELINE SAMPLING**											
9.1 Analysis: CVOCs and 1,4 dioxane	1	event	$3,420.00				$3,420	$0	$0	$0	$3,420
9.2 Equipment (sampling equipment/instruments, vehic	3	days				$500.00	$0	$0	$0	$1,500	$1,500
9.3 Sampling labor (1 technician)	3	days			$274.80		$0	$0	$824	$0	$824
Subtotal							$385,748	$1,251,147	$339,642	$47,001	$2,023,538
Overhead on Labor Cost @ 30%									$101,893		$101,893
G & A on Labor, Material, Equipment, & Subs Cost @ 10%							$38,575	$125,115	$33,964	$4,700	$202,354
Tax on Materials and Equipment Cost @ 7%								$87,580		$3,290	$90,870
Total Direct Cost							$424,323	$1,463,842	$475,499	$54,991	$2,418,655
Indirects on Total Direct Cost @ 25%											$604,664
Profit on Total Direct Cost @ 10%											$241,866
Total Cost											$3,265,185
Engineering on Total Field Cost @ 8%											$261,215
Contingency on Total Field Cost @ 20%											$653,037
TOTAL CAPITAL COST											**$4,179,436**

BAGHURST DRIVE SUPERFUND SITE
Upper Salford Township
Montgomery County, PA
Alternative G3 - Groundwater Extraction
O & M Costs

3/3/2020

	Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
1	**OPERATING COST**											
1.1	Plant Labor, 40 hours per week	2,080	hr			$27.00		$0	$0	$56,160	$0	$56,160
1.2	Electric, per year	85,000	kw-hr		$0.17			$0	$14,450	$0	$0	$14,450
1.3	Brine Disposal	650,000	gal	$0.08				$52,000	$0	$0	$0	$52,000
1.4	Solids Disposal	2,500	lb	$0.12				$300	$0	$0	$0	$300
1.5	Sodium Hypochlorite	600	lb		$9.00			$0	$5,400	$0	$0	$5,400
1.6	Sodium Hydroxide	1	ls		$900.00			$0	$900	$0	$0	$900
1.7	Hydrogen Peroxide Solution	1,000	gal		$4.00			$0	$4,000	$0	$0	$4,000
1.8	GAC Replacement Service (semi-annual)	2	ea	$1,000.00				$2,000	$0	$0	$0	
1.9	GAC Replacement Units	1	ea		$4,000.00			$0	$8	$0	$0	$8
1.10	Filter (semi-annual)	2	ea		$4.00			$0	$8	$0	$0	
1.11	UV Electricity	1	ls	$10.00				$10	$0	$0	$0	
1.11	Equipment Maintenance, 5% Equipment Cost	1	ls		$30,153.78			$0	$30,154	$0	$0	$30,154
2	**SAMPLING**											
2.1	Effluent and Influent Sampling, 2 locations monthly	24	ea	$190.00				$4,560	$0	$0	$0	$4,560
	Subtotal							$58,870	$54,920	$56,160	$0	$169,950
	Overhead on Labor Cost @	30%								$16,848		$16,848
	G & A on Labor, Material, Equipment, & Subs Cost @	10%						$5,887	$5,492	$5,616	$0	$16,995
	Tax on Materials and Equipment Cost @	7%							$3,844		$0	$3,844
	Total Direct Cost							$64,757	$64,256	$78,624	$0	$207,637
	Indirects on Total Direct Cost @	25%										$51,909
	Profit on Total Direct Cost @	10%										$20,764
	Total Cost											$280,310
	Contingency on Total Field Costs @	0%										$0
	Engineering on Total Field Cost @	10%										$28,031
	TOTAL CAPITAL COST											**$308,341**

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G3 - Groundwater Extraction
Annual Cost

Item	Item Cost year 1-5	Item Cost years 6-10	Item Cost years 11-30	Item Cost every 5 years	Notes
Site Inspection: Visit	$2,500	$2,500	$2,500		One-day visit and report to verify ICs
Groundwater Sampling	$54,500	$27,250	$13,625		Labor and supplies to collect samples from 16 wells & 2 QC samples, quarterly years 1-5, semiannual years 6-10, and annually years 11-30.
Analysis:	$13,680	$6,840	$3,420		Analyze 18 samples for CVOCs and 1,4 Dioxane
Five Year Site Review				$25,000	
Subtotal	$70,680	$36,590	$19,545	$25,000	
Contingency @ 10%	$7,068	$3,659	$1,955	$2,500	
TOTAL	**$77,748**	**$40,249**	**$21,500**	**$27,500**	

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G3 - Groundwater Extraction
Present Worth Analysis

Year	Capital Cost	Operation & Maintenance Cost	Annual Cost	Total Year Cost	Annual Discount Rate 1.5%	Present Worth
0	$4,179,436			$4,179,436	1.000	$4,179,436
1		$308,341	$77,748	$386,089	0.985	$380,383
2		$308,341	$77,748	$386,089	0.971	$374,762
3		$308,341	$77,748	$386,089	0.956	$369,224
4		$308,341	$77,748	$386,089	0.942	$363,767
5		$308,341	$105,248	$413,589	0.928	$383,918
6		$308,341	$40,249	$348,590	0.915	$318,800
7		$308,341	$40,249	$348,590	0.901	$314,089
8		$308,341	$40,249	$348,590	0.888	$309,447
9		$308,341	$40,249	$348,590	0.875	$304,874
10		$308,341	$67,749	$376,090	0.862	$324,065
11		$308,341	$21,500	$329,841	0.849	$280,013
12		$308,341	$21,500	$329,841	0.836	$275,875
13		$308,341	$21,500	$329,841	0.824	$271,798
14		$308,341	$21,500	$329,841	0.812	$267,781
15		$308,341	$49,000	$357,341	0.800	$285,819
16		$308,341	$21,500	$329,841	0.788	$259,925
17		$308,341	$21,500	$329,841	0.776	$256,083
18		$308,341	$21,500	$329,841	0.765	$252,299
19		$308,341	$21,500	$329,841	0.754	$248,570
20		$308,341	$49,000	$357,341	0.742	$265,315
21		$308,341	$21,500	$329,841	0.731	$241,278
22		$308,341	$21,500	$329,841	0.721	$237,712
23		$308,341	$21,500	$329,841	0.710	$234,199
24		$308,341	$21,500	$329,841	0.700	$230,738
25		$308,341	$49,000	$357,341	0.689	$246,281
26		$308,341	$21,500	$329,841	0.679	$223,969
27		$308,341	$21,500	$329,841	0.669	$220,659
28		$308,341	$21,500	$329,841	0.659	$217,398
29		$308,341	$21,500	$329,841	0.649	$214,185
30		$308,341	$27,500	$335,841	0.640	$214,859
					TOTAL PRESENT WORTH	**$12,567,521**

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G4 - ISCO in Source Area
Capital Cost

Item	Quantity	Unit	Unit Cost				Extended Cost				
			Subcontract	Material	Labor	Equipment	Subcontract	Material	Labor	Equipment	Subtotal
1 PROJECT PLANNING & DOCUMENTS											
1.1 Implementation Work Plan	100	hr			$42.00		$0	$0	$4,200	$0	$4,200
1.2 Prepare Remedial Action Plan & Permitting	300	hr			$42.00		$0	$0	$12,600	$0	$12,600
1.3 Prepare LTM Plan	200	hr			$42.00		$0	$0	$8,400	$0	$8,400
1.4 Prepare ICs	250	hr			$42.00		$0	$0	$10,500	$0	$10,500
2 MOBILIZATION/DEMOBILIZATION											
2.1 Mobilization/Demobilization	1	ea	$5,000.00		$5,000.00		$5,000	$0	$5,000	$0	$10,000
2.2 Clear and Grub, Cut & Chip Trees	1	ac			$1,900.00	$1,425.00	$0	$0	$1,900	$1,425	$3,325
3 FIELD SUPPORT											
3.1 Site Support Facilities (trailers, chemical toilet, etc.	1	mo		$220.00	$370.00		$0	$220	$370	$0	$590
3.2 Construction Survey Support	2	day	$1,125.00				$2,250	$0	$0	$0	$2,250
3.3 Site Superintendent	20	day			$375.00		$0	$0	$7,500	$0	$7,500
3.4 Site Health & Safety and QA/QC	20	day			$355.00		$0	$0	$7,100	$0	$7,100
4 DECONTAMINATION											
4.1 Equipment Decon Pad	1	ls		$5,800.00	$6,650.00	$700.00	$0	$5,800	$6,650	$700	$13,150
4.2 Decontamination Services	1	mo		$375.00	$1,200.00	$900.00	$0	$375	$1,200	$900	$2,475
4.3 Decon Water	1,000	gal	$0.20				$200	$0	$0	$0	$200
4.4 Decon Water Storage Tank, 6,000 gallon	1	mo				$635.00	$0	$0	$0	$635	$635
4.5 Clean Water Storage Tank, 4,000 gallon	1	mo				$570.00	$0	$0	$0	$570	$570
4.6 Disposal of Decon Waste (liquid & solid)	1	mo	$950.00				$950	$0	$0	$0	$950
5 ISCO TREATMENT											
5.1 Bed Rock Drilling	150	ft	$75.00				$11,250	$0	$0	$0	$11,250
5.2 ISCO Chemical	3	event		$2,000.00			$0	$6,000	$0	$0	$6,000
5.3 Chemical Injection	3	event	$21,000.00				$63,000	$0	$0	$0	$63,000
6 START-UP/ BASELINE SAMPLING											
6.1 Analysis: CVOCs and 1,4 dioxane	6	sample	$3,420.00				$20,520	$0	$0	$0	$20,520
6.2 Equipment (sampling equipment/instruments, vehi	2	days				$500.00	$0	$0	$0	$1,000	$1,000
6.3 Sampling labor (1 technician)	2	days			$274.80		$0	$0	$550	$0	$550
7 Post-Injection Sampling											
7.1 Post-Injection Sampling Labor	80	hr			$37.50		$0	$0	$3,000	$0	$3,000
7.2 Post-Injection Sampling ODC	9	ea		$500.00			$0	$4,500	$0	$0	$4,500
7.3 Post-Injection Analysis	9	ea	$600.00				$5,400	$0	$0	$0	$5,400
7.4 Post-Injection Report	200	hr			$42.00		$0	$0	$8,400	$0	$8,400
7.5 Equipment (sampling equipment/instruments, vehi	2	days				$500.00	$0	$0	$0	$1,000	$1,000
7.6 Sampling labor (1 technician)	2	days			$274.80		$0	$0	$550	$0	$550
8 MONITORING WELLS											
8.1 Monitoring Wells, 1" dia. (3 new wells at various de	90	lft	$55.00				$4,950	$0	$0	$0	$4,950
8.2 Monitoring Wells Head Completion	3	ea	$250.00				$750	$0	$0	$0	$750
8.3 IDW Disposal (well installation)	9	drum	$135.00				$1,215	$0	$0	$0	$1,215

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G4 - ISCO in Source Area
Capital Cost

	Item	Quantity	Unit	Unit Cost: Subcontract	Unit Cost: Material	Unit Cost: Labor	Unit Cost: Equipment	Extended Cost: Subcontract	Extended Cost: Material	Extended Cost: Labor	Extended Cost: Equipment	Subtotal
9	**POST CONSTRUCTION COST**											
9.1	Contractor Completion Report	300	hr			$42.00		$0	$0	$12,600	$0	$12,600
9.2	Remedial Action Closeout Report	250	hr			$42.00		$0	$0	$10,500	$0	$10,500
	Subtotal							$115,485	$16,895	$101,019	$6,230	$239,629
	Overhead on Labor Cost @	30%								$30,306		$30,306
	G & A on Labor, Material, Equipment, & Subs Cost @	10%						$11,549	$1,690	$10,102	$623	$23,963
	Tax on Materials and Equipment Cost @	7%							$1,183		$436	$1,619
	Total Direct Cost							$127,034	$19,767	$141,427	$7,289	$295,517
	Indirects on Total Direct Cost @	25%										$73,879
	Profit on Total Direct Cost @	10%										$29,552
	Total Cost											$398,947
	Engineering on Total Field Cost @	15%										$59,842
	Contingency on Total Field Cost @	20%										$79,789
	TOTAL CAPITAL COST											**$538,579**

BAGHURST DRIVE SUPERFUND SITE
Upper Salford Township
Montgomery County, PA
Alternative G4 - ISCO in Source Area
Annual Cost

3/3/2020

Item	Item Cost year 1-5	Item Cost years 6-10	Item Cost years 11-30	Item Cost every 5 years	Notes
Site Inspection: Visit	$2,500	$2,500	$2,500		One-day visit and report to verify ICs
Groundwater Sampling	$54,500	$27,250	$13,625		Labor and supplies to collect samples from 16 wells & 2 QC samples, quarterly years 1-5, semiannual years 6-10, and annually years 11-30.
Analysis:	$13,680	$6,840	$3,420		Analyze 18 samples for CVOCs and 1,4 Dioxane
Five Year Site Review				$25,000	
Subtotal	$70,680	$36,590	$19,545	$25,000	
Contingency @ 10%	$7,068	$3,659	$1,955	$2,500	
TOTAL	**$77,748**	**$40,249**	**$21,500**	**$27,500**	

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Montgomery County, PA
Upper Salford Township
Alternative G4 - ISCO in Source Area
Present Worth Analysis

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate 1.5%	Present Worth
0	$538,579		$538,579	1.000	$538,579
1		$77,748	$77,748	0.985	$76,599
2		$77,748	$77,748	0.971	$75,467
3		$77,748	$77,748	0.956	$74,352
4		$77,748	$77,748	0.942	$73,253
5		$105,248	$105,248	0.928	$97,698
6		$40,249	$40,249	0.915	$36,809
7		$40,249	$40,249	0.901	$36,265
8		$40,249	$40,249	0.888	$35,729
9		$40,249	$40,249	0.875	$35,201
10		$67,749	$67,749	0.862	$58,377
11		$21,500	$21,500	0.849	$18,252
12		$21,500	$21,500	0.836	$17,982
13		$21,500	$21,500	0.824	$17,716
14		$21,500	$21,500	0.812	$17,454
15		$49,000	$49,000	0.800	$39,192
16		$21,500	$21,500	0.788	$16,942
17		$21,500	$21,500	0.776	$16,692
18		$21,500	$21,500	0.765	$16,445
19		$21,500	$21,500	0.754	$16,202
20		$49,000	$49,000	0.742	$36,381
21		$21,500	$21,500	0.731	$15,727
22		$21,500	$21,500	0.721	$15,494
23		$21,500	$21,500	0.710	$15,265
24		$21,500	$21,500	0.700	$15,040
25		$49,000	$49,000	0.689	$33,771
26		$21,500	$21,500	0.679	$14,599
27		$21,500	$21,500	0.669	$14,383
28		$21,500	$21,500	0.659	$14,170
29		$21,500	$21,500	0.649	$13,961
30		$49,000	$49,000	0.640	$31,348
				TOTAL PRESENT WORTH	**$1,535,347**

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G5 - TCH in Source Area
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
1 PROJECT PLANNING & DOCUMENTS											
1.1 Implementation Work Plan	100	hr			$42.00		$0	$0	$4,200	$0	$4,200
1.2 Prepare Remedial Action Plan & Permitting	300	hr			$42.00		$0	$0	$12,600	$0	$12,600
1.3 Prepare LTM Plan	200	hr			$42.00		$0	$0	$8,400	$0	$8,400
1.4 Prepare ICs	250	hr			$42.00		$0	$0	$10,500	$0	$10,500
2 MOBILIZATION/DEMOBILIZATION, FIELD SUPPORT											
2.1 Mobilization/Demobilization	1	ea	$5,000.00		$5,000.00		$5,000	$0	$5,000	$0	$10,000
2.2 Grading for Access Road	1,250	sy			$0.72	$0.74	$0	$0	$900	$925	$1,825
2.3 Gravel Access Road, 12" thick	1,250	sy		$11.90	$0.51	$0.73	$0	$14,875	$638	$913	$16,425
2.4 Clear and Grub, Cut & Chip Trees	0.5	ac			$1,900.00	$1,425.00	$0	$0	$950	$713	$1,663
3 FIELD SUPPORT											
3.1 Site Support Facilities (trailers, chemical toilet, etc.)	1	mo		$220.00	$370.00		$0	$220	$370	$0	$590
3.2 Construction Survey Support	2	day	$1,125.00				$2,250	$0	$0	$0	$2,250
3.3 Site Superintendent	20	day			$375.00		$0	$0	$7,500	$0	$7,500
3.4 Site Health & Safety and QA/QC	20	day			$355.00		$0	$0	$7,100	$0	$7,100
4 DECONTAMINATION											
4.1 Equipment Decon Pad	1	ls		$5,800.00	$6,650.00	$700.00	$0	$5,800	$6,650	$700	$13,150
4.2 Decontamination Services	2	mo		$375.00	$1,200.00	$900.00	$0	$750	$2,400	$1,800	$4,950
4.3 Decon Water	2,000	gal	$0.20				$400	$0	$0	$0	$400
4.4 Decon Water Storage Tank, 6,000 gallon	2	mo				$635.00	$0	$0	$0	$1,270	$1,270
4.5 Clean Water Storage Tank, 4,000 gallon	2	mo				$570.00	$0	$0	$0	$1,140	$1,140
5 TCH INSTALLATION AND OPERATION											
5.1 Design and Procurement (Vendor Estimate)	1	ea			$110,000.00		$0	$0	$110,000	$0	$110,000
5.2 Construction, Operation and Disposal (Vendor Estim	1	ea	$950,000.00				$950,000	$0	$0	$0	$950,000
5.3 Generator Rental	1	ea				$75,000.00	$0	$0	$0	$75,000	$75,000
5.4 Diesel Fuel	1	ea		$125,000.00			$0	$125,000	$0	$0	$125,000
5.5 Site Supervisor	20	day			$375.00		$0	$0	$7,500	$0	$7,500
6 Post-Injection Sampling											
6.1 Post-Injection Sampling Labor	80	hr			$37.50		$0	$0	$3,000	$0	$3,000
6.2 Post-Injection Sampling ODC	9	ea		$500.00			$0	$4,500	$0	$0	$4,500
6.3 Post-Injection Analysis	9	ea	$600.00				$5,400	$0	$0	$0	$5,400
6.4 Post-Injection Report	200	hr			$42.00		$0	$0	$8,400	$0	$8,400
6.5 Equipment (sampling equipment/instruments, vehicle	2	days				$500.00	$0	$0	$0	$1,000	$1,000
6.6 Sampling labor (1 technician)	2	days			$274.80		$0	$0	$550	$0	$550
7 POST CONSTRUCTION COST											
7.1 Contractor Completion Report	300	hr			$42.00		$0	$0	$12,600	$0	$12,600
7.2 Remedial Action Closeout Report	250	hr			$42.00		$0	$0	$10,500	$0	$10,500
8 MONITORING WELLS											
8.1 Monitoring Wells, 1" dia. (3 new wells at various dept	90	lft	$55.00				$4,950	$0	$0	$0	$4,950
8.2 Monitoring Wells Head Completion	3	ea	$250.00				$750	$0	$0	$0	$750
8.3 IDW Disposal (well installation)	9	drum	$135.00				$1,215	$0	$0	$0	$1,215
9 START-UP/ BASELINE SAMPLING											

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G5 - TCH in Source Area
Capital Cost

			Unit Cost				Extended Cost				
Item	Quantity	Unit	Subcontract	Material	Labor	Equipment	Subcontract	Material	Labor	Equipment	Subtotal
9.1 Analysis: CVOCs and 1,4 dioxane	6	sample	$3,420.00				$20,520	$0	$0	$0	$20,520
9.2 Equipment (sampling equipment/instruments, vehicle	2	days				$500.00	$0	$0	$0	$1,000	$1,000
9.3 Sampling labor (1 technician)	2	days			$274.80		$0	$0	$550	$0	$550
Subtotal							$990,485	$151,145	$220,307	$84,460	$1,446,397
Overhead on Labor Cost @ 30%									$66,092		$66,092
G & A on Labor, Material, Equipment, & Subs Cost @ 10%							$99,049	$15,115	$22,031	$8,446	$144,640
Tax on Materials and Equipment Cost @ 7%								$10,580		$5,912	$16,492
Total Direct Cost							$1,089,534	$176,840	$308,429	$98,818	$1,673,621
Indirects on Total Direct Cost @ 25%											$418,405
Profit on Total Direct Cost @ 10%											$167,362
Total Cost											$2,259,388
Engineering on Total Field Cost @ 15%											$338,908
Contingency on Total Field Cost @ 20%											$451,878
TOTAL CAPITAL COST											**$3,050,174**

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G5 - TCH in Source Area
O&M

	Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
1	**PERFORMANCE MONITORING (3 events)**											
1.1	Analysis: CVOCs and 1,4 dioxane	6	sample	$3,420.00				$20,520	$0	$0	$0	$20,520
1.2	Equipment (sampling equipment/instruments, vehicle	2	days				$500.00	$0	$0	$0	$1,000	$1,000
1.3	Sampling labor (1 technician)	2	days			$274.80		$0	$0	$550	$0	$550
1.4	Project Management	100	hr			$42.00		$0	$0	$4,200	$0	$4,200
2	**AMBIENT AIR MONITORING (assume labor from Site Technician costed)**											
2.1	Summa Canister TO-15 Analysis 3 locs, Week 1, daily, 24-hr TAT)	21	ea.	$350.00				$7,350	$0	$0	$0	$7,350
2.2	Summa Canister TO-15 Analysis (3 locs, Week 2 to 4, weekly, 24-hr TAT)	9	ea.	$350.00				$3,150	$0	$0	$0	$3,150
2.3	Summa Canister TO-15 Analysis (3 locs, Month 1 to 4, monthly, 28-d TAT)	9	ea.	$175.00				$1,575	$0	$0	$0	$1,575
3	**TCH Operating Costs**											
3.1	Site Engineer	45	day			$375.00		$0	$0	$16,875	$0	$16,875
4	**REPORTING**											
4.1	Completion Report	100	hr			$42.00		$0	$0	$4,200	$0	$4,200
	Subtotal							$32,595	$0	$25,825	$1,000	$59,420
	Overhead on Labor Cost @ 30%									$7,747		$7,747
	G & A on Labor, Material, Equipment, & Subs Cost @ 10%							$3,260	$0	$2,582	$100	$5,942
	Tax on Materials and Equipment Cost @ 7%								$0		$70	$70
	Total Direct Cost							$35,855	$0	$36,154	$1,170	$73,179
	Indirects on Total Direct Cost @ 25%											$18,295
	Profit on Total Direct Cost @ 10%											$7,318
	Total Cost											$98,792
	Contingency on Total Field Costs @ 0%											$0
	Engineering on Total Field Cost @ 10%											$9,879
	TOTAL CAPITAL COST											**$108,671**

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G5 - TCH in Source Area
Annual Cost

Item	Item Cost year 1-5	Item Cost years 6-10	Item Cost years 11-30	Item Cost every 5 years	Notes
Site Inspection: Visit	$2,500	$2,500	$2,500		One-day visit and report to verify ICs
Groundwater Sampling	$54,500	$27,250	$13,625		Labor and supplies to collect samples from 16 wells & 2 QC samples, quarterly years 1-5, semiannual years 6-10, and annually years 11-30.
Analysis:	$13,680	$6,840	$3,420		Analyze 18 samples for CVOCs and 1,4 Dioxane
Five Year Site Review				$25,000	
Subtotal	$70,680	$36,590	$19,545	$25,000	
Contingency @ 10%	$7,068	$3,659	$1,955	$2,500	
TOTAL	**$77,748**	**$40,249**	**$21,500**	**$27,500**	

BAGHURST DRIVE SUPERFUND SITE
Upper Salford Township
Montgomery County, PA
Alternative G5 - TCH in Source Area
Present Worth Analysis

Year	Capital Cost	Operation & Maintenance Cost	Annual Cost	Total Year Cost	Annual Discount Rate 1.5%	Present Worth
0	$3,050,174			$3,050,174	1.000	$3,050,174
1		$108,671	$77,748	$186,419	0.985	$183,664
2			$77,748	$77,748	0.971	$75,467
3			$77,748	$77,748	0.956	$74,352
4			$77,748	$77,748	0.942	$73,253
5			$105,248	$105,248	0.928	$97,698
6			$40,249	$40,249	0.915	$36,809
7			$40,249	$40,249	0.901	$36,265
8			$40,249	$40,249	0.888	$35,729
9			$40,249	$40,249	0.875	$35,201
10			$67,749	$67,749	0.862	$58,377
11			$21,500	$21,500	0.849	$18,252
12			$21,500	$21,500	0.836	$17,982
13			$21,500	$21,500	0.824	$17,716
14			$21,500	$21,500	0.812	$17,454
15			$49,000	$49,000	0.800	$39,192
16			$21,500	$21,500	0.788	$16,942
17			$21,500	$21,500	0.776	$16,692
18			$21,500	$21,500	0.765	$16,445
19			$21,500	$21,500	0.754	$16,202
20			$49,000	$49,000	0.742	$36,381
21			$21,500	$21,500	0.731	$15,727
22			$21,500	$21,500	0.721	$15,494
23			$21,500	$21,500	0.710	$15,265
24			$21,500	$21,500	0.700	$15,040
25			$49,000	$49,000	0.689	$33,771
26			$21,500	$21,500	0.679	$14,599
27			$21,500	$21,500	0.669	$14,383
28			$21,500	$21,500	0.659	$14,170
29			$21,500	$21,500	0.649	$13,961
30			$49,000	$49,000	0.640	$31,348
					TOTAL PRESENT WORTH	**$4,154,006**

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G6 - ISCO in Hot Spot Areas
Capital Cost

HS A ISCO			Unit Cost				Extended Cost				
Item	Quantity	Unit	Subcontract	Material	Labor	Equipment	Subcontract	Material	Labor	Equipment	Subtotal
1 PROJECT PLANNING & DOCUMENTS											
1.1 Implementation Work Plan	100	hr			$42.00		$0	$0	$4,200	$0	$4,200
1.2 Prepare Remedial Action Plan & Permitting	300	hr			$42.00		$0	$0	$12,600	$0	$12,600
1.3 Prepare LTM Plan	200	hr			$42.00		$0	$0	$8,400	$0	$8,400
1.4 Prepare ICs	250	hr			$42.00		$0	$0	$10,500	$0	$10,500
2 MOBILIZATION/DEMOBILIZATION											
2.1 Mobilization/Demobilization	1	ea	$5,000.00		$5,000.00		$5,000	$0	$5,000	$0	$10,000
2.2 Clear and Grub, Cut & Chip Trees	1	ac			$1,900.00	$1,425.00	$0	$0	$1,900	$1,425	$3,325
2.3 Grading for Access Road	1,250	sy			$0.72	$0.74	$0	$0	$900	$925	$1,825
2.4 Gravel Access Road, 12" thick	1,250	sy		$11.90	$0.51	$0.73	$0	$14,875	$638	$913	$16,425
2.5 Clear and Grub, Cut & Chip Trees	0.5	ac			$1,900.00	$1,425.00	$0	$0	$950	$713	$1,663
2.6 Fence, Chain Link, 8' high	1,200	lf	$44.50				$53,400	$0	$0	$0	$53,400
2.7 Gate, Chain Link, 20' wide	2	ea.	$2,800.00				$5,600	$0	$0	$0	$5,600
3 FIELD SUPPORT											
3.1 Site Support Facilities (trailers, chemical toilet, etc.	1	mo		$220.00	$370.00		$0	$220	$370	$0	$590
3.2 Construction Survey Support	2	day	$1,125.00				$2,250	$0	$0	$0	$2,250
3.3 Site Superintendent	20	day			$375.00		$0	$0	$7,500	$0	$7,500
3.4 Site Health & Safety and QA/QC	20	day			$355.00		$0	$0	$7,100	$0	$7,100
4 DECONTAMINATION											
4.1 Equipment Decon Pad	1	ls		$5,800.00	$6,650.00	$700.00	$0	$5,800	$6,650	$700	$13,150
4.2 Decontamination Services	1	mo		$375.00	$1,200.00	$900.00	$0	$375	$1,200	$900	$2,475
4.3 Decon Water	1,000	gal	$0.20				$200	$0	$0	$0	$200
4.4 Decon Water Storage Tank, 6,000 gallon	1	mo				$635.00	$0	$0	$0	$635	$635
4.5 Clean Water Storage Tank, 4,000 gallon	1	mo				$570.00	$0	$0	$0	$570	$570
4.6 Disposal of Decon Waste (liquid & solid)	1	mo	$950.00				$950	$0	$0	$0	$950
5 ISCO TREATMENT											
5.1 Bed Rock Drilling	540	ft	$75.00				$40,500	$0	$0	$0	$40,500
5.2 ISCO Chemical	3	event		$15,000.00			$0	$45,000	$0	$0	$45,000
5.3 Chemical Injection	3	event	$41,000.00				$123,000	$0	$0	$0	$123,000
6 Post-Injection Sampling											
6.1 Post-Injection Sampling Labor	80	hr			$37.50		$0	$0	$3,000	$0	$3,000
6.2 Post-Injection Sampling ODC	9	ea		$500.00			$0	$4,500	$0	$0	$4,500
6.3 Post-Injection Analysis	9	ea	$600.00				$5,400	$0	$0	$0	$5,400
6.4 Post-Injection Report	200	hr			$42.00		$0	$0	$8,400	$0	$8,400
6.5 Equipment (sampling equipment/instruments, vehi	2	days				$500.00	$0	$0	$0	$1,000	$1,000
6.6 Sampling labor (1 technician)	2	days			$274.80		$0	$0	$550	$0	$550
7 START-UP/ BASELINE SAMPLING											
7.1 Analysis: CVOCs and 1,4 dioxane	6	sample	$3,420.00				$20,520	$0	$0	$0	$20,520
7.2 Equipment (sampling equipment/instruments, vehi	2	days				$500.00	$0	$0	$0	$1,000	$1,000

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G6 - ISCO in Hot Spot Areas
Capital Cost

HS A ISCO Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
7.3 Sampling labor (1 technician)	2	days			$274.80		$0	$0	$550	$0	$550
8 MONITORING WELLS											
8.1 Monitoring Wells, 1" dia. (3 new wells at various de	90	lft	$55.00				$4,950	$0	$0	$0	$4,950
8.2 Monitoring Wells Head Completion	3	ea	$250.00				$750	$0	$0	$0	$750
8.3 IDW Disposal (well installation)	9	drum	$135.00				$1,215	$0	$0	$0	$1,215
9 POST CONSTRUCTION COST											
9.1 Contractor Completion Report	300	hr			$42.00		$0	$0	$12,600	$0	$12,600
9.2 Remedial Action Closeout Report	250	hr			$42.00		$0	$0	$10,500	$0	$10,500
Subtotal							$263,735	$70,770	$103,507	$8,780	$446,792
Overhead on Labor Cost @ 30%									$31,052		$31,052
G & A on Labor, Material, Equipment, & Subs Cost @ 10%							$26,374	$7,077	$10,351	$878	$44,679
Tax on Materials and Equipment Cost @ 7%								$4,954		$615	$5,569
Total Direct Cost							$290,109	$82,801	$144,909	$10,273	$528,091
Indirects on Total Direct Cost @ 25%											$132,023
Profit on Total Direct Cost @ 10%											$52,809
Total Cost											$712,923
Engineering on Total Field Cost @ 15%											$106,939
Contingency on Total Field Cost @ 20%											$142,585
TOTAL CAPITAL COST											**$962,447**

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G6 - ISCO in Hot Spot Areas
Capital Cost

HS B ISCO			Unit Cost				Extended Cost				
Item	Quantity	Unit	Subcontract	Material	Labor	Equipment	Subcontract	Material	Labor	Equipment	Subtotal
1 MOBILIZATION/DEMOBILIZATION											
1.1 Mobilization/Demobilization	1	ea	$5,000.00		$5,000.00		$5,000	$0	$5,000	$0	$10,000
1.2 Clear and Grub, Cut & Chip Trees	1	ac			$1,900.00	$1,425.00	$0	$0	$1,900	$1,425	$3,325
2 FIELD SUPPORT											
2.1 Site Support Facilities (trailers, chemical toilet, etc.	1	mo		$220.00	$370.00		$0	$220	$370	$0	$590
2.2 Construction Survey Support	2	day	$1,125.00				$2,250	$0	$0	$0	$2,250
2.3 Site Superintendent	20	day			$375.00		$0	$0	$7,500	$0	$7,500
2.4 Site Health & Safety and QA/QC	20	day			$355.00		$0	$0	$7,100	$0	$7,100
3 DECONTAMINATION											
3.1 Equipment Decon Pad	1	ls		$5,800.00	$6,650.00	$700.00	$0	$5,800	$6,650	$700	$13,150
3.2 Decontamination Services	1	mo		$375.00	$1,200.00	$900.00	$0	$375	$1,200	$900	$2,475
3.3 Decon Water	1,000	gal	$0.20				$200	$0	$0	$0	$200
3.4 Decon Water Storage Tank, 6,000 gallon	1	mo				$635.00	$0	$0	$0	$635	$635
3.5 Clean Water Storage Tank, 4,000 gallon	1	mo				$570.00	$0	$0	$0	$570	$570
3.6 Disposal of Decon Waste (liquid & solid)	1	mo	$950.00				$950	$0	$0	$0	$950
4 ISCO TREATMENT											
4.1 Bed Rock Drilling	440	ft	$75.00				$33,000	$0	$0	$0	$33,000
4.2 ISCO Chemical	2	event		$72,000.00			$0	$144,000	$0	$0	$144,000
4.3 Chemical Injection	2	event	$56,000.00				$112,000	$0	$0	$0	$112,000
5 Post-Injection Sampling											
5.1 Post-Injection Sampling Labor	80	hr			$37.50		$0	$0	$3,000	$0	$3,000
5.2 Post-Injection Sampling ODC	2	ea		$500.00			$0	$1,000	$0	$0	$1,000
5.3 Post-Injection Analysis	2	ea	$600.00				$1,200	$0	$0	$0	$1,200
5.4 Post-Injection Report	200	hr			$42.00		$0	$0	$8,400	$0	$8,400
5.5 Equipment (sampling equipment/instruments, vehi	2	days				$500.00	$0	$0	$0	$1,000	$1,000
5.6 Sampling labor (1 technician)	2	days			$274.80		$0	$0	$550	$0	$550
Subtotal							$154,600	$151,395	$41,670	$5,230	$352,895
Overhead on Labor Cost @	30%								$12,501		$12,501
G & A on Labor, Material, Equipment, & Subs Cost @	10%						$15,460	$15,140	$4,167	$523	$35,289
Tax on Materials and Equipment Cost @	7%							$10,598		$366	$10,964
Total Direct Cost							$170,060	$177,132	$58,337	$6,119	$411,649

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G6 - ISCO in Hot Spot Areas
Capital Cost

HS B ISCO Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
Indirects on Total Direct Cost @	25%										$102,912
Profit on Total Direct Cost @	10%										$41,165
Total Cost											$555,726
Engineering on Total Field Cost @	15%										$83,359
Contingency on Total Field Cost @	20%										$111,145
TOTAL CAPITAL COST											**$750,230**

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G6 - ISCO in Hot Spot Areas
Capital Cost

HS C ISCO			Unit Cost				Extended Cost				
Item	Quantity	Unit	Subcontract	Material	Labor	Equipment	Subcontract	Material	Labor	Equipment	Subtotal
1 MOBILIZATION/DEMOBILIZATION											
1.1 Mobilization/Demobilization	1	ea	$5,000.00		$5,000.00		$5,000	$0	$5,000	$0	$10,000
1.2 Clear and Grub, Cut & Chip Trees	1	ac			$1,900.00	$1,425.00	$0	$0	$1,900	$1,425	$3,325
2 FIELD SUPPORT											
2.1 Site Support Facilities (trailers, chemical toilet, etc.	1	mo		$220.00	$370.00		$0	$220	$370	$0	$590
2.2 Construction Survey Support	2	day	$1,125.00				$2,250	$0	$0	$0	$2,250
2.3 Site Superintendent	20	day			$375.00		$0	$0	$7,500	$0	$7,500
2.4 Site Health & Safety and QA/QC	20	day			$355.00		$0	$0	$7,100	$0	$7,100
3 DECONTAMINATION											
3.1 Equipment Decon Pad	1	ls		$5,800.00	$6,650.00	$700.00	$0	$5,800	$6,650	$700	$13,150
3.2 Decontamination Services	1	mo		$375.00	$1,200.00	$900.00	$0	$375	$1,200	$900	$2,475
3.3 Decon Water	1,000	gal	$0.20				$200	$0	$0	$0	$200
3.4 Decon Water Storage Tank, 6,000 gallon	1	mo				$635.00	$0	$0	$0	$635	$635
3.5 Clean Water Storage Tank, 4,000 gallon	1	mo				$570.00	$0	$0	$0	$570	$570
3.6 Disposal of Decon Waste (liquid & solid)	1	mo	$950.00				$950	$0	$0	$0	$950
4 ISCO TREATMENT											
4.1 Bed Rock Drilling	105	ft	$75.00				$7,875	$0	$0	$0	$7,875
4.2 ISCO Chemical	1	event		$13,000.00			$0	$13,000	$0	$0	$13,000
4.3 Chemical Injection	1	event	$19,000.00				$19,000	$0	$0	$0	$19,000
5 Post-Injection Sampling											
5.1 Post-Injection Sampling Labor	80	hr			$37.50		$0	$0	$3,000	$0	$3,000
5.2 Post-Injection Sampling ODC	9	ea		$500.00			$0	$4,500	$0	$0	$4,500
5.3 Post-Injection Analysis	9	ea	$600.00				$5,400	$0	$0	$0	$5,400
5.4 Post-Injection Report	200	hr			$42.00		$0	$0	$8,400	$0	$8,400
5.5 Equipment (sampling equipment/instruments, vehi	2	days				$500.00	$0	$0	$0	$1,000	$1,000
5.6 Sampling labor (1 technician)	2	days			$274.80		$0	$0	$550	$0	$550
Subtotal							$40,675	$23,895	$41,670	$5,230	$111,470
Overhead on Labor Cost @	30%								$12,501		$12,501
G & A on Labor, Material, Equipment, & Subs Cost @	10%						$4,068	$2,390	$4,167	$523	$11,147
Tax on Materials and Equipment Cost @	7%							$1,673		$366	$2,039
Total Direct Cost							$44,743	$27,957	$58,337	$6,119	$137,156

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G6 - ISCO in Hot Spot Areas
Capital Cost

HS C ISCO Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
Indirects on Total Direct Cost @	25%										$34,289
Profit on Total Direct Cost @	10%										$13,716
Total Cost											$185,161
Engineering on Total Field Cost @	15%										$27,774
Contingency on Total Field Cost @	20%										$37,032
TOTAL CAPITAL COST											**$249,967**

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G6 - ISCO in Hot Spot Areas
Annual Cost

Item	Item Cost year 1-5	Item Cost years 6-10	Item Cost years 11-30	Item Cost every 5 years	Notes
Site Inspection: Visit	$2,500	$2,500	$2,500		One-day visit and report to verify ICs
Groundwater Sampling	$54,500	$27,250	$13,625		Labor and supplies to collect samples from 16 wells & 2 QC samples, quarterly years 1-5, semiannual years 6-10, and annually years 11-30.
Analysis:	$13,680	$6,840	$3,420		Analyze 18 samples for CVOCs and 1,4 Dioxane
Five Year Site Review				$25,000	
Subtotal	$70,680	$36,590	$19,545	$25,000	
Contingency @ 10%	$7,068	$3,659	$1,955	$2,500	
TOTAL	**$77,748**	**$40,249**	**$21,500**	**$27,500**	

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G6 - ISCO in Hot Spot Areas
Present Worth Analysis

Year	Capital Cost	Operation & Maintenance Cost	Annual Cost	Total Year Cost	Annual Discount Rate 1.5%	Present Worth
0	$962,447					
0	$750,230					
0	$249,967			$1,962,643	1.000	$1,962,643
1		$0	$77,748	$77,748	0.985	$76,599
2			$77,748	$77,748	0.971	$75,467
3			$77,748	$77,748	0.956	$74,352
4			$77,748	$77,748	0.942	$73,253
5			$105,248	$105,248	0.928	$97,698
6			$40,249	$40,249	0.915	$36,809
7			$40,249	$40,249	0.901	$36,265
8			$40,249	$40,249	0.888	$35,729
9			$40,249	$40,249	0.875	$35,201
10			$67,749	$67,749	0.862	$58,377
11			$21,500	$21,500	0.849	$18,252
12			$21,500	$21,500	0.836	$17,982
13			$21,500	$21,500	0.824	$17,716
14			$21,500	$21,500	0.812	$17,454
15			$49,000	$49,000	0.800	$39,192
16			$21,500	$21,500	0.788	$16,942
17			$21,500	$21,500	0.776	$16,692
18			$21,500	$21,500	0.765	$16,445
19			$21,500	$21,500	0.754	$16,202
20			$49,000	$49,000	0.742	$36,381
21			$21,500	$21,500	0.731	$15,727
22			$21,500	$21,500	0.721	$15,494
23			$21,500	$21,500	0.710	$15,265
24			$21,500	$21,500	0.700	$15,040
25			$49,000	$49,000	0.689	$33,771
26			$21,500	$21,500	0.679	$14,599
27			$21,500	$21,500	0.669	$14,383
28			$21,500	$21,500	0.659	$14,170
29			$21,500	$21,500	0.649	$13,961
30			$49,000	$49,000	0.640	$31,348

BAGHURST DRIVE SUPERFUND SITE
Upper Salford Township
Montgomery County, PA
Alternative G6 - ISCO in Hot Spot Areas
Present Worth Analysis

3/3/2020

Year	Capital Cost	Operation & Maintenance Cost	Annual Cost	Total Year Cost	Annual Discount Rate 1.5%	Present Worth

TOTAL PRESENT WORTH **$2,959,411**

BAGHURST DRIVE SUPERFUND SITE
Upper Salford Township
Montgomery County, PA
Alternative G7 - TCH in Source Area and ISCO in Hot Spot Areas
Capital Cost

TCH in Source Area			Unit Cost				Extended Cost				
Item	Quantity	Unit	Subcontract	Material	Labor	Equipment	Subcontract	Material	Labor	Equipment	Subtotal
1 PROJECT PLANNING & DOCUMENTS											
1.1 Implementation Work Plan	100	hr			$42.00		$0	$0	$4,200	$0	$4,200
1.2 Prepare Remedial Action Plan & Permitting	300	hr			$42.00		$0	$0	$12,600	$0	$12,600
1.3 Prepare LTM Plan	200	hr			$42.00		$0	$0	$8,400	$0	$8,400
1.4 Prepare ICs	250	hr			$42.00		$0	$0	$10,500	$0	$10,500
2 MOBILIZATION/DEMOBILIZATION, FIELD SUPPORT											
2.1 Mobilization/Demobilization	1	ea	$5,000.00		$5,000.00		$5,000	$0	$5,000	$0	$10,000
2.2 Grading for Access Road	1,250	sy			$0.72	$0.74	$0	$0	$900	$925	$1,825
2.3 Gravel Access Road, 12" thick	1,250	sy		$11.90	$0.51	$0.73	$0	$14,875	$638	$913	$16,425
2.4 Clear and Grub, Cut & Chip Trees	0.5	ac			$1,900.00	$1,425.00	$0	$0	$950	$713	$1,663
3 FIELD SUPPORT											
3.1 Site Support Facilities (trailers, chemical toilet, etc.)	1	mo		$220.00	$370.00		$0	$220	$370	$0	$590
3.2 Construction Survey Support	2	day	$1,125.00				$2,250	$0	$0	$0	$2,250
3.3 Site Superintendent	20	day			$375.00		$0	$0	$7,500	$0	$7,500
3.4 Site Health & Safety and QA/QC	20	day			$355.00		$0	$0	$7,100	$0	$7,100
4 DECONTAMINATION											
4.1 Equipment Decon Pad	1	ls		$5,800.00	$6,650.00	$700.00	$0	$5,800	$6,650	$700	$13,150
4.2 Decontamination Services	2	mo		$375.00	$1,200.00	$900.00	$0	$750	$2,400	$1,800	$4,950
4.3 Decon Water	2,000	gal	$0.20				$400	$0	$0	$0	$400
4.4 Decon Water Storage Tank, 6,000 gallon	2	mo				$635.00	$0	$0	$0	$1,270	$1,270
4.5 Clean Water Storage Tank, 4,000 gallon	2	mo				$570.00	$0	$0	$0	$1,140	$1,140
5 TCH INSTALLATION AND OPERATION											
5.1 Design and Procurement (Vendor Estimate)	1	ea			$110,000.00		$0	$0	$110,000	$0	$110,000
5.2 Construction, Operation and Disposal (Vendor Estim	1	ea	$950,000.00				$950,000	$0	$0	$0	$950,000
5.3 Generator Rental	1	ea				$75,000.00	$0	$0	$0	$75,000	$75,000
5.4 Diesel Fuel	1	ea		$125,000.00			$0	$125,000	$0	$0	$125,000
5.5 Site Supervisor	20	day			$375.00		$0	$0	$7,500	$0	$7,500
5 ISCO TREATMENT											
5.1 Bed Rock Drilling	540	ft	$75.00				$40,500	$0	$0	$0	$40,500
5.2 ISCO Chemical	3	event		$15,000.00			$0	$45,000	$0	$0	$45,000
5.3 Chemical Injection	3	event	$41,000.00				$123,000	$0	$0	$0	$123,000
6 Post-Injection Sampling											
6.1 Post-Injection Sampling Labor	80	hr			$37.50		$0	$0	$3,000	$0	$3,000
6.2 Post-Injection Sampling ODC	9	ea		$500.00			$0	$4,500	$0	$0	$4,500
6.3 Post-Injection Analysis	9	ea	$600.00				$5,400	$0	$0	$0	$5,400
6.4 Post-Injection Report	200	hr			$42.00		$0	$0	$8,400	$0	$8,400
6.5 Equipment (sampling equipment/instruments, vehicle	2	days				$500.00	$0	$0	$0	$1,000	$1,000
6.6 Sampling labor (1 technician)	2	days			$274.80		$0	$0	$550	$0	$550
7 POST CONSTRUCTION COST											
7.1 Contractor Completion Report	300	hr			$42.00		$0	$0	$12,600	$0	$12,600
7.2 Remedial Action Closeout Report	250	hr			$42.00		$0	$0	$10,500	$0	$10,500

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G7 - TCH in Source Area and ISCO in Hot Spot Areas
Capital Cost

TCH in Source Area			Unit Cost				Extended Cost				
Item	Quantity	Unit	Subcontract	Material	Labor	Equipment	Subcontract	Material	Labor	Equipment	Subtotal
8 MONITORING WELLS											
8.1 Monitoring Wells, 1" dia. (3 new wells at various dept	90	lft	$55.00				$4,950	$0	$0	$0	$4,950
8.2 Monitoring Wells Head Completion	3	ea	$250.00				$750	$0	$0	$0	$750
8.3 IDW Disposal (well installation)	9	drum	$135.00				$1,215	$0	$0	$0	$1,215
9 START-UP/ BASELINE SAMPLING											
9.1 Analysis: CVOCs and 1,4 dioxane	6	sample	$3,420.00				$20,520	$0	$0	$0	$20,520
9.2 Equipment (sampling equipment/instruments, vehicle	2	days				$500.00	$0	$0	$0	$1,000	$1,000
9.3 Sampling labor (1 technician)	2	days			$274.80		$0	$0	$550	$0	$550
Subtotal							$1,153,985	$196,145	$220,307	$84,460	$1,654,897
Overhead on Labor Cost @ 30%									$66,092		$66,092
G & A on Labor, Material, Equipment, & Subs Cost @ 10%							$115,399	$19,615	$22,031	$8,446	$165,490
Tax on Materials and Equipment Cost @ 7%								$13,730		$5,912	$19,642
Total Direct Cost							$1,269,384	$229,490	$308,429	$98,818	$1,906,121
Indirects on Total Direct Cost @ 25%											$476,530
Profit on Total Direct Cost @ 10%											$190,612
Total Cost											$2,573,263
Engineering on Total Field Cost @ 15%											$385,989
Contingency on Total Field Cost @ 20%											$514,653
TOTAL CAPITAL COST											**$3,473,905**

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G7 - TCH in Source Area and ISCO in Hot Spot Areas
O&M Cost -TCH

	TCH in Source Area			Unit Cost				Extended Cost				
	Item	Quantity	Unit	Subcontract	Material	Labor	Equipment	Subcontract	Material	Labor	Equipment	Subtotal
1	**PERFORMANCE MONITORING (3 events)**											
1.1	Analysis: CVOCs and 1,4 dioxane	6	sample	$3,420.00				$20,520	$0	$0	$0	$20,520
1.2	Equipment (sampling equipment/instruments, vehicle	2	days				$500.00	$0	$0	$0	$1,000	$1,000
1.3	Sampling labor (1 technician)	2	days			$274.80		$0	$0	$550	$0	$550
1.4	Project Management	100	hr			$42.00		$0	$0	$4,200	$0	$4,200
2	**AMBIENT AIR MONITORING (assume labor from Site Technician costed)**											
2.1	Summa Canister TO-15 Analysis 3 locs, Week 1, daily, 24-hr TAT)	21	ea.	$350.00				$7,350	$0	$0	$0	$7,350
2.2	Summa Canister TO-15 Analysis (3 locs, Week 2 to 4, weekly, 24-hr TAT)	9	ea.	$350.00				$3,150	$0	$0	$0	$3,150
2.3	Summa Canister TO-15 Analysis (3 locs, Month 1 to 4, monthly, 28-d TAT)	9	ea.	$175.00				$1,575	$0	$0	$0	$1,575
3	**TCH Operating Costs**											
3.1	Site Engineer	45	day			$375.00		$0	$0	$16,875	$0	$16,875
4	**REPORTING**											
4.1	Completion Report	100	hr			$42.00		$0	$0	$4,200	$0	$4,200
	Subtotal							$32,595	$0	$25,825	$1,000	$59,420
	Overhead on Labor Cost @ 30%									$7,747		$7,747
	G & A on Labor, Material, Equipment, & Subs Cost @ 10%							$3,260	$0	$2,582	$100	$5,942
	Tax on Materials and Equipment Cost @ 7%								$0		$70	$70
	Total Direct Cost							$35,855	$0	$36,154	$1,170	$73,179
	Indirects on Total Direct Cost @ 25%											$18,295
	Profit on Total Direct Cost @ 10%											$7,318
	Total Cost											$98,792
	Contingency on Total Field Costs @ 0%											$0
	Engineering on Total Field Cost @ 10%											$9,879
	TOTAL CAPITAL COST											**$108,671**

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G7 - TCH in Source Area and ISCO in Hot Spot Areas
Capital Cost

HS A ISCO			Unit Cost				Extended Cost				
Item	Quantity	Unit	Subcontract	Material	Labor	Equipment	Subcontract	Material	Labor	Equipment	Subtotal
1 MOBILIZATION/DEMOBILIZATION											
1.1 Mobilization/Demobilization	1	ea	$5,000.00		$5,000.00		$5,000	$0	$5,000	$0	$10,000
1.2 Clear and Grub, Cut & Chip Trees	1	ac			$1,900.00	$1,425.00	$0	$0	$1,900	$1,425	$3,325
2 FIELD SUPPORT											
2.1 Site Support Facilities (trailers, chemical toilet, etc.	1	mo		$220.00	$370.00		$0	$220	$370	$0	$590
2.2 Construction Survey Support	2	day	$1,125.00				$2,250	$0	$0	$0	$2,250
2.3 Site Superintendent	20	day			$375.00		$0	$0	$7,500	$0	$7,500
2.4 Site Health & Safety and QA/QC	20	day			$355.00		$0	$0	$7,100	$0	$7,100
3 DECONTAMINATION											
3.1 Equipment Decon Pad	1	ls		$5,800.00	$6,650.00	$700.00	$0	$5,800	$6,650	$700	$13,150
3.2 Decontamination Services	1	mo		$375.00	$1,200.00	$900.00	$0	$375	$1,200	$900	$2,475
3.3 Decon Water	1,000	gal	$0.20				$200	$0	$0	$0	$200
3.4 Decon Water Storage Tank, 6,000 gallon	1	mo				$635.00	$0	$0	$0	$635	$635
3.5 Clean Water Storage Tank, 4,000 gallon	1	mo				$570.00	$0	$0	$0	$570	$570
3.6 Disposal of Decon Waste (liquid & solid)	1	mo	$950.00				$950	$0	$0	$0	$950
4 ISCO TREATMENT											
4.1 Bed Rock Drilling	540	ft	$75.00				$40,500	$0	$0	$0	$40,500
4.2 ISCO Chemical	3	event		$45,000.00			$0	$135,000	$0	$0	$135,000
4.3 Chemical Injection	3	event	$41,000.00				$123,000	$0	$0	$0	$123,000
5 Post-Injection Sampling											
5.1 Post-Injection Sampling Labor	80	hr			$37.50		$0	$0	$3,000	$0	$3,000
5.2 Post-Injection Sampling ODC	9	ea		$500.00			$0	$4,500	$0	$0	$4,500
5.3 Post-Injection Analysis	9	ea	$600.00				$5,400	$0	$0	$0	$5,400
5.4 Post-Injection Report	200	hr			$42.00		$0	$0	$8,400	$0	$8,400
5.5 Equipment (sampling equipment/instruments, vehi	2	days				$500.00	$0	$0	$0	$1,000	$1,000
5.6 Sampling labor (1 technician)	2	days			$274.80		$0	$0	$550	$0	$550
Subtotal							$177,300	$145,895	$41,670	$5,230	$370,095
Overhead on Labor Cost @	30%								$12,501		$12,501
G & A on Labor, Material, Equipment, & Subs Cost @	10%						$17,730	$14,590	$4,167	$523	$37,009
Tax on Materials and Equipment Cost @	7%							$10,213		$366	$10,579
Total Direct Cost							$195,030	$170,697	$58,337	$6,119	$430,184

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G7 - TCH in Source Area and ISCO in Hot Spot Areas
Capital Cost

HS A ISCO Item	Quantity	Unit	Unit Cost Subcontract	Material	Labor	Equipment	Extended Cost Subcontract	Material	Labor	Equipment	Subtotal
Indirects on Total Direct Cost @	25%										$107,546
Profit on Total Direct Cost @	10%										$43,018
Total Cost											$580,748
Engineering on Total Field Cost @	15%										$87,112
Contingency on Total Field Cost @	20%										$116,150
TOTAL CAPITAL COST											**$784,010**

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G7 - TCH in Source Area and ISCO in Hot Spot Areas
Capital Cost

HS B ISCO			Unit Cost				Extended Cost				
Item	Quantity	Unit	Subcontract	Material	Labor	Equipment	Subcontract	Material	Labor	Equipment	Subtotal
1 MOBILIZATION/DEMOBILIZATION											
1.1 Mobilization/Demobilization	1	ea	$5,000.00		$5,000.00		$5,000	$0	$5,000	$0	$10,000
1.2 Clear and Grub, Cut & Chip Trees	1	ac			$1,900.00	$1,425.00	$0	$0	$1,900	$1,425	$3,325
2 FIELD SUPPORT											
2.1 Site Support Facilities (trailers, chemical toilet, etc.	1	mo		$220.00	$370.00		$0	$220	$370	$0	$590
2.2 Construction Survey Support	2	day	$1,125.00				$2,250	$0	$0	$0	$2,250
2.3 Site Superintendent	20	day			$375.00		$0	$0	$7,500	$0	$7,500
2.4 Site Health & Safety and QA/QC	20	day			$355.00		$0	$0	$7,100	$0	$7,100
3 DECONTAMINATION											
3.1 Equipment Decon Pad	1	ls		$5,800.00	$6,650.00	$700.00	$0	$5,800	$6,650	$700	$13,150
3.2 Decontamination Services	1	mo		$375.00	$1,200.00	$900.00	$0	$375	$1,200	$900	$2,475
3.3 Decon Water	1,000	gal	$0.20				$200	$0	$0	$0	$200
3.4 Decon Water Storage Tank, 6,000 gallon	1	mo				$635.00	$0	$0	$0	$635	$635
3.5 Clean Water Storage Tank, 4,000 gallon	1	mo				$570.00	$0	$0	$0	$570	$570
3.6 Disposal of Decon Waste (liquid & solid)	1	mo	$950.00				$950	$0	$0	$0	$950
4 ISCO TREATMENT											
4.1 Bed Rock Drilling	440	ft	$75.00				$33,000	$0	$0	$0	$33,000
4.2 ISCO Chemical	2	event		$72,000.00			$0	$144,000	$0	$0	$144,000
4.3 Chemical Injection	2	event	$56,000.00				$112,000	$0	$0	$0	$112,000
5 Post-Injection Sampling											
5.1 Post-Injection Sampling Labor	80	hr			$37.50		$0	$0	$3,000	$0	$3,000
5.2 Post-Injection Sampling ODC	2	ea		$500.00			$0	$1,000	$0	$0	$1,000
5.3 Post-Injection Analysis	2	ea	$600.00				$1,200	$0	$0	$0	$1,200
5.4 Post-Injection Report	200	hr			$42.00		$0	$0	$8,400	$0	$8,400
5.5 Equipment (sampling equipment/instruments, vehi	2	days				$500.00	$0	$0	$0	$1,000	$1,000
5.6 Sampling labor (1 technician)	2	days			$274.80		$0	$0	$550	$0	$550
Subtotal							$154,600	$151,395	$41,670	$5,230	$352,895
Overhead on Labor Cost @	30%								$12,501		$12,501
G & A on Labor, Material, Equipment, & Subs Cost @	10%						$15,460	$15,140	$4,167	$523	$35,289
Tax on Materials and Equipment Cost @	7%							$10,598		$366	$10,964
Total Direct Cost							$170,060	$177,132	$58,337	$6,119	$411,649

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G7 - TCH in Source Area and ISCO in Hot Spot Areas
Capital Cost

HS B ISCO Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
Indirects on Total Direct Cost @	25%										$102,912
Profit on Total Direct Cost @	10%										$41,165
Total Cost											$555,726
Engineering on Total Field Cost @	15%										$83,359
Contingency on Total Field Cost @	20%										$111,145
TOTAL CAPITAL COST											**$750,230**

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G7 - TCH in Source Area and ISCO in Hot Spot Areas
Capital Cost

HS C ISCO			Unit Cost				Extended Cost				
Item	Quantity	Unit	Subcontract	Material	Labor	Equipment	Subcontract	Material	Labor	Equipment	Subtotal
1 MOBILIZATION/DEMOBILIZATION											
1.1 Mobilization/Demobilization	1	ea	$5,000.00		$5,000.00		$5,000	$0	$5,000	$0	$10,000
1.2 Clear and Grub, Cut & Chip Trees	1	ac			$1,900.00	$1,425.00	$0	$0	$1,900	$1,425	$3,325
2 FIELD SUPPORT											
2.1 Site Support Facilities (trailers, chemical toilet, etc.	1	mo		$220.00	$370.00		$0	$220	$370	$0	$590
2.2 Construction Survey Support	2	day	$1,125.00				$2,250	$0	$0	$0	$2,250
2.3 Site Superintendent	20	day			$375.00		$0	$0	$7,500	$0	$7,500
2.4 Site Health & Safety and QA/QC	20	day			$355.00		$0	$0	$7,100	$0	$7,100
3 DECONTAMINATION											
3.1 Equipment Decon Pad	1	ls		$5,800.00	$6,650.00	$700.00	$0	$5,800	$6,650	$700	$13,150
3.2 Decontamination Services	1	mo		$375.00	$1,200.00	$900.00	$0	$375	$1,200	$900	$2,475
3.3 Decon Water	1,000	gal	$0.20				$200	$0	$0	$0	$200
3.4 Decon Water Storage Tank, 6,000 gallon	1	mo				$635.00	$0	$0	$0	$635	$635
3.5 Clean Water Storage Tank, 4,000 gallon	1	mo				$570.00	$0	$0	$0	$570	$570
3.6 Disposal of Decon Waste (liquid & solid)	1	mo	$950.00				$950	$0	$0	$0	$950
4 ISCO TREATMENT											
4.1 Bed Rock Drilling	105	ft	$75.00				$7,875	$0	$0	$0	$7,875
4.2 ISCO Chemical	1	event		$13,000.00			$0	$13,000	$0	$0	$13,000
4.3 Chemical Injection	1	event	$19,000.00				$19,000	$0	$0	$0	$19,000
5 Post-Injection Sampling											
5.1 Post-Injection Sampling Labor	80	hr			$37.50		$0	$0	$3,000	$0	$3,000
5.2 Post-Injection Sampling ODC	9	ea		$500.00			$0	$4,500	$0	$0	$4,500
5.3 Post-Injection Analysis	9	ea	$600.00				$5,400	$0	$0	$0	$5,400
5.4 Post-Injection Report	200	hr			$42.00		$0	$0	$8,400	$0	$8,400
5.5 Equipment (sampling equipment/instruments, vehi	2	days				$500.00	$0	$0	$0	$1,000	$1,000
5.6 Sampling labor (1 technician)	2	days			$274.80		$0	$0	$550	$0	$550
Subtotal							$40,675	$23,895	$41,670	$5,230	$111,470
Overhead on Labor Cost @	30%								$12,501		$12,501
G & A on Labor, Material, Equipment, & Subs Cost @	10%						$4,068	$2,390	$4,167	$523	$11,147
Tax on Materials and Equipment Cost @	7%							$1,673		$366	$2,039
Total Direct Cost							$44,743	$27,957	$58,337	$6,119	$137,156

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G7 - TCH in Source Area and ISCO in Hot Spot Areas
Capital Cost

HS C ISCO Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
Indirects on Total Direct Cost @	25%										$34,289
Profit on Total Direct Cost @	10%										$13,716
Total Cost											$185,161
Engineering on Total Field Cost @	15%										$27,774
Contingency on Total Field Cost @	20%										$37,032
TOTAL CAPITAL COST											**$249,967**

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G7 - TCH in Source Area and ISCO in Hot Spot Areas
Annual Cost

Item	Item Cost year 1-5	Item Cost years 6-10	Item Cost years 11-30	Item Cost every 5 years	Notes
Site Inspection: Visit	$2,500	$2,500	$2,500		One-day visit and report to verify ICs
Groundwater Sampling	$54,500	$27,250	$13,625		Labor and supplies to collect samples from 16 wells & 2 QC samples, quarterly years 1-5, semiannual years 6-10, and annually years 11-30.
Analysis:	$13,680	$6,840	$3,420		Analyze 18 samples for CVOCs and 1,4 Dioxane
Five Year Site Review				$25,000	
Subtotal	$70,680	$36,590	$19,545	$25,000	
Contingency @ 10%	$7,068	$3,659	$1,955	$2,500	
TOTAL	**$77,748**	**$40,249**	**$21,500**	**$27,500**	

BAGHURST DRIVE SUPERFUND SITE 3/3/2020
Upper Salford Township
Montgomery County, PA
Alternative G7 - TCH in Source Area and ISCO in Hot Spot Areas
Present Worth Analysis

Year	Capital Cost	Operation & Maintenance Cost	Annual Cost	Total Year Cost	Annual Discount Rate 1.5%	Present Worth
	$3,473,905					
0	$784,010					
0	$750,230					
0	$249,967			$5,258,112	1.000	$5,258,112
1		$108,671	$77,748	$186,419	0.985	$183,664
2			$77,748	$77,748	0.971	$75,467
3			$77,748	$77,748	0.956	$74,352
4			$77,748	$77,748	0.942	$73,253
5			$105,248	$105,248	0.928	$97,698
6			$40,249	$40,249	0.915	$36,809
7			$40,249	$40,249	0.901	$36,265
8			$40,249	$40,249	0.888	$35,729
9			$40,249	$40,249	0.875	$35,201
10			$67,749	$67,749	0.862	$58,377
11			$21,500	$21,500	0.849	$18,252
12			$21,500	$21,500	0.836	$17,982
13			$21,500	$21,500	0.824	$17,716
14			$21,500	$21,500	0.812	$17,454
15			$49,000	$49,000	0.800	$39,192
16			$21,500	$21,500	0.788	$16,942
17			$21,500	$21,500	0.776	$16,692
18			$21,500	$21,500	0.765	$16,445
19			$21,500	$21,500	0.754	$16,202
20			$49,000	$49,000	0.742	$36,381
21			$21,500	$21,500	0.731	$15,727
22			$21,500	$21,500	0.721	$15,494
23			$21,500	$21,500	0.710	$15,265
24			$21,500	$21,500	0.700	$15,040
25			$49,000	$49,000	0.689	$33,771
26			$21,500	$21,500	0.679	$14,599
27			$21,500	$21,500	0.669	$14,383
28			$21,500	$21,500	0.659	$14,170
29			$21,500	$21,500	0.649	$13,961
30			$49,000	$49,000	0.640	$31,348
					TOTAL PRESENT WORTH	**$6,361,944**

APPENDIX C - Risk Assessments Calculation Tables

LIST OF TABLES
RAGS PART D TABLE 4
VALUES USED FOR DAILY INTAKE CALCULATIONS

TABLE 4.1.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - ADOLESCENT TRESPASSERS - SOILS
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Trespassers	Adolescent	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	100	mg/day	USEPA, 2017	
				RBA	Relative Bioavailability	Chemical Specific	unitless	(1)	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	USEPA, 1989	
				EF	Exposure Frequency	26	days/year	(2)	
				ED	Exposure Duration	10	years	(3)	
				BW	Body Weight	44	kg	USEPA, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 1989	
Dermal	Trespassers	Adolescent	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	3,750	cm2	(4)	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	26	days/year	(2)	
				ED	Exposure Duration	10	years	(3)	
				BW	Body Weight	44	kg	USEPA, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 1989	

Notes:

For chemicals that act via the mutagenic mode of action the intake will be multiplied by the appropriate age-dependent adjustment factor in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

1 - A value of 0.6 will be used for arsenic (USEPA, 2012) and 1 for all other chemicals.

2 - Professional judgment. Assume one day a week in warm weather months for RME and one day every other week for CTE.

3 - Older child from age 6 to 16.

4 - Assumes face, forearms, hands, and are exposed (USEPA, 2011).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Tables 7-2 and 7-12.

USEPA, 2012: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil and Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil Documents. OSWER Directive 9200.1-113.

USEPA, 2017: Update of Chapter 5 for the Exposure Factors Handbook EPA/600R-17/384F, Table 5-1.

TABLE 4.2.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - ADOLESCENT TRESPASSERS - SOILS TO AIR
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Trespassers	Adolescent	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	4	hours/day	(1)	$\frac{\text{CA x ET x EF x ED}}{\text{AT x 24 hours/day}}$
				EF	Exposure Frequency	26	days/year	(2)	
				ED	Exposure Duration	10	years	(3)	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 1989	
				PEF	Particulate Emission Factor	3.24E+09	m3/kg	USEPA, 2019	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	$PEF = Q/C_{wind} \times \frac{3600\ sec/hr}{0.036 \times (1-V) \times (U_m/U_t)^3 \times F(x)}$
				Q/C	Inverse of mean concentration at center of source	87.36898	g/m2-s per kg/m3	USEPA, 2019	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2019	
				Um	Mean annual wind speed	4.29	m/sec	USEPA, 2019	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2019	
				F(x)	Function dependent of Um/Ut	0.09918	unitless	USEPA, 2019	

Notes:

For chemicals that act via the mutagenic mode of action the intake will be multiplied by the appropriate age-dependent adjustment factor in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

1 - Professional judgment.

2 - Professional judgment. Assume one day a week in warm weather months for RME and one day every other week for CTE.

3 - Older child from age 6 to 16.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2019: USEPA Regional Screening Level Calculator at http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. Values are for Philadelphia, PA.

TABLE 4.3.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - ADOLESCENT TRESPASSERS - SURFACE WATER

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Trespassers	Adolescent	Baghurst Drive Site	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
				CR	Contact Rate	0.071	L/hour	USEPA, 2011	
				CF	Conversion factor	0.001	mg/ug	- -	
				ET	Exposure Time	4	hours/event	(1)	CW x CF x CR x ET x EF x ED
				EF	Exposure Frequency	26	events/year	(1)	BW x AT
				ED	Exposure Duration	10	years	(2)	
				BW	Body Weight	44	kg	USEPA, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 1989	
Dermal	Trespassers	Adolescent	Baghurst Drive Site	DAevent	Absorbed dose per event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Water	Max or 95% UCL	mg/kg	USEPA, 2002	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	DAevent x EV x EF x ED x SA
				CF	Conversion factor	0.001	L/cm^3	- -	BW x AT
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				tevent	Duration of event	4	hr/event	(1)	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	3,750	cm2	(3)	DAevent= 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/π]
				EV	Event Frequency	1	events/day	(1)	
				EF	Exposure Frequency	26	days/year	(1)	For organics if tevent > t*
				ED	Exposure Duration	10	years	(2)	DAevent =FA x Kp x Cw x CF x [tevent/(1+B) +
				BW	Body Weight	44	kg	USEPA, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 1989	

Notes:

For chemicals that act via the mutagenic mode of action the intake will be multiplied by the appropriate age-dependent adjustment factor in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

1 - Professional judgment. Assume one day a week in warm weather months for RME and one day every other week for CTE.

2 - Older child from age 6 to 16.

3 - Assumes face, forearms, hands, and lower legs are exposed (USEPA, 2011).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Tables 3-5 and 8-3.

TABLE 4.4.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - ADOLESCENT TRESPASSERS - SEDIMENT

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Trespassers	Adolescent	Baghurst Drive Site	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	100	mg/day	USEPA, 2017	
				RBA	Relative Bioavailability	Chemical Specific	unitless	USEPA, 1989	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	(2)	
				EF	Exposure Frequency	26	days/year	(2)	
				ED	Exposure Duration	10	years	(3)	
				BW	Body Weight	44	kg	USEPA, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 1989	
Dermal	Trespassers	Adolescent	Baghurst Drive Site	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	3,750	cm2	(4)	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	26	days/year	(2)	
				ED	Exposure Duration	10	years	(3)	
				BW	Body Weight	44	kg	USEPA, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 1989	

Notes:

For chemicals that act via the mutagenic mode of action the intake will be multiplied by the appropriate age-dependent adjustment factor in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

1 - A value of 0.6 will be used for arsenic (USEPA, 2012) and 1 for all other chemicals.

2 - Professional judgment. Assume one day a week in warm weather months for RME and one day every other week for CTE.

3 - Older child from age 6 to 16.

4 - Assumes face, forearms, hands, and lower legs are exposed (USEPA, 2011).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Table 8-3.

USEPA, 2012: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil and Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil Documents. OSWER Directive 9200.1-113.

USEPA, 2017: Update of Chapter 5 for the Exposure Factors Handbook EPA/600R-17/384F, Table 5-1.

TABLE 4.5.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - CHILD RECREATIONAL USERS - SOILS

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational User	Child	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	200	mg/day	USEPA, 2014	
				RBA	Relative Bioavailability	Chemical Specific	unitless	(1)	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	--	
				EF	Exposure Frequency	52	days/year	(2)	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(3), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(3), USEPA, 2005, 2014	
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014	
Dermal	Recreational User	Child	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	2,373	cm2	USEPA, 2014	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2014	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	52	days/year	(2)	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(3), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(3), USEPA, 2005, 2014	
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014	

Notes:

1 - A value of 0.6 will be used for arsenic (USEPA, 2012) and 1 for all other chemicals.

2 - Assume two days a week in warm weather months for RME and one days a week for CTE.

3 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, children recreational users will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2012: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil and Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil Documents. OSWER Directive 9200.1-113.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.6.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - CHILD RECREATIONAL USERS - SOILS TO AIR

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Recreational User	Child	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	4	hours/day	(1)	$\frac{CA \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$
				EF	Exposure Frequency	52	days/year	(2)	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(3), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(3), USEPA, 2005, 2014	CA = (1/PEF + 1/VF) x Cs
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014	
				PEF	Particulate Emission Factor	3.23E+09	m3/kg	USEPA, 2019	$PEF = Q/C_{wind} \times \frac{3600 \ sec/hr}{0.036 \times (1 - V) \times (U_m/U_t)^3 \times F(x)}$
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	87.36898	g/m2-s per kg/m3	USEPA, 2019	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2019	
				Um	Mean annual wind speed	4.29	m/sec	USEPA, 2019	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2019	
				F(x)	Function dependent of Um/Ut	0.09918	unitless	USEPA, 2019	

Notes:

1 - Professional judgment.

2 - Assume two days a week in warm weather months for RME and one days a week for CTE.

3 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, children recreational users will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

USEPA, 2019: USEPA Regional Screening Level Calculator at http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. Values are for Philadelphia, PA.

TABLE 4.7 RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - CHILD RECREATIONAL USERS - SURFACE WATER
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational User	Child	Baghurst Drive Site	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
				CR	Contact Rate	0.12	L/hr	USEPA, 2011	
				CF	Conversion factor	0.001	mg/ug	- -	
				ET	Exposure Time	4	hours/event	(1)	CW x CF x CR x ET x EF x ED
				EF	Exposure Frequency	52	events/year	(1)	BW x AT
				ED1	Exposure Duration (Age 0 - 2)	2	years	(2), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(2), USEPA, 2005, 2014	
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014	
Dermal	Recreational User	Child	Baghurst Drive Site	DAevent	Absorbed dose per event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Water	Max or 95% UCL	mg/kg	USEPA, 2002	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	DAevent x EV x EF x ED x SA
				CF	Conversion factor	0.001	L/cm^3	- -	BW x AT
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				tevent	Duration of event	4	hr/event	(1)	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	2,373	cm2	USEPA, 2014	DAevent= 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/π]
				EV	Event Frequency	1	events/day	(1)	
				EF	Exposure Frequency	52	days/year	(1)	For organics if tevent > t*
				ED1	Exposure Duration (Age 0 - 2)	2	years	(2), USEPA, 2005, 2014	DAevent =FA x Kp x Cw x CF x [tevent/(1+B) +
				ED2	Exposure Duration (Age 2 - 6)	4	years	(2), USEPA, 2005, 2014	2 x τ +(1 + 3B + 3B^2)/(1+B^2)
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014	

Notes:

1 - Assume two days a week in warm weather months for RME and one days a week for CTE.

2 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, children recreational users will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.
USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Table 3-5.
USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.8.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - CHILD RECREATIONAL USERS - SEDIMENT

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational User	Child	Baghurst Drive Site	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	200	mg/day	USEPA, 2014	
				RBA	Relative Bioavailability	Chemical Specific	unitless	(1)	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	(2)	
				EF	Exposure Frequency	52	days/year	(2)	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(3), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(3), USEPA, 2005, 2014	
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014	
Dermal	Recreational User	Child	Baghurst Drive Site	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	2,373	cm2	USEPA, 2014	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	52	days/year	(2)	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(3), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(3), USEPA, 2005, 2014	
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014	

Notes:

1 - A value of 0.6 will be used for arsenic (USEPA, 2012) and 1 for all other chemicals.

2 - Professional judgment. Assume two days a week in warm weather months for RME and one day a week for CTE.

3 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, children recreational users will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2012: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil and Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil Documents. OSWER Directive 9200.1-113.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.9.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - ADULT RECREATIONAL USERS - SOILS

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational User	Adult	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	100	mg/day	USEPA, 2014	
				RBA	Relative Bioavailability	Chemical Specific	unitless	(1)	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	--	
				EF	Exposure Frequency	52	days/year	(2)	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(3), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(3), USEPA, 2005, 2014	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014	
Dermal	Recreational User	Adult	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	6,032	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.07	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	52	days/year	(2)	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(3), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(3), USEPA, 2005, 2014	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014	

Notes:

1 - A value of 0.6 will be used for arsenic and 1 for all other chemicals.

2 - Assumes two days a week in warm weather months for RME and one days a week for CTE.

3 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adult recreational users will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.10.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - ADULT RECREATIONAL USERS - SOILS TO AIR
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Recreational User	Adult	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	4	hours/day	(1)	$\frac{\text{CA x ET x EF x ED}}{\text{AT x 24 hours/day}}$
				EF	Exposure Frequency	52	days/year	(1)	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(2), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(2), USEPA, 2005, 2014	CA = (1/PEF + 1/VF) x Cs
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014	$PEF = Q/C_{wind} \times \frac{3600\ sec/hr}{0.036 \times (1-V) \times (U_m/U_t)^3 \times F(x)}$
				PEF	Particulate Emission Factor	3.23E+09	m3/kg	USEPA, 2019	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	87.36898	g/m2-s per kg/m3	USEPA, 2019	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2019	
				Um	Mean annual wind speed	4.29	m/sec	USEPA, 2019	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2019	
				F(x)	Function dependent of Um/Ut	0.09918	unitless	USEPA, 2019	

Notes:

1 - Assumes two days a week in warm weather months for RME and one days a week for CTE.

2 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adult recreational users will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.
USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.
USEPA, 2019: USEPA Regional Screening Level Calculator at http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. Values are for Philadelphia, PA.

TABLE 4.11.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - ADULT RECREATIONAL USERS - SURFACE WATER
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational User	Adult	Baghurst Drive Site	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
				CR	Contact Rate	0.071	L/hour	USEPA, 2011	
				CF	Conversion factor	0.001	mg/ug	- -	
				ET	Exposure Time	4	hours/event	(1)	$\frac{CW \times CF \times CR \times ET \times EF \times ED}{BW \times AT}$
				EF	Exposure Frequency	52	events/year	(1)	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(2), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(2), USEPA, 2005, 2014	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014	
Dermal	Recreational User	Adult	Baghurst Drive Site	DAevent	Absorbed dose per event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Water	Max or 95% UCL	mg/kg	USEPA, 2002	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	$\frac{DAevent \times EV \times EF \times ED \times SA}{BW \times AT}$
				CF	Conversion factor	0.001	L/cm^3	- -	
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp $\times$ CW $\times$ CF $\times$ tevent
				tevent	Duration of event	4	hr/event	(1)	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	6,032	cm2	USEPA, 2014	DAevent= $2 \times FA \times Kp \times Cw \times CF \times sqrt[(6 \times \tau \times tevent)/\pi]$
				EV	Event Frequency	1	events/day	(1)	
				EF	Exposure Frequency	52	days/year	(1)	For organics if tevent > t*
				ED1	Exposure Duration (Age 6 - 16)	10	years	(2), USEPA, 2005, 2014	DAevent $= FA \times Kp \times Cw \times CF \times [tevent/(1+B) +$
				ED2	Exposure Duration (Age 16 - 26)	10	years	(2), USEPA, 2005, 2014	$2 \times \tau + (1 + 3B + 3B^2)/(1+B^2)$
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014	

Notes:
1 - Professional judgment. Assume two days a week in warm weather months for RME and one day a week for CTE.
2 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adult recreational users will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Table 3-5.
USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.12.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - ADULT RECREATIONAL USERS - SEDIMENT
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational User	Adult	Baghurst Drive Site	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	100	mg/day	USEPA, 2014	
				RBA	Relative Bioavailability	Chemical Specific	unitless	(1)	$\frac{Cs \times RBA \times IRS \times CF3 \times FI \times EF \times ED}{BW \times AT}$
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				FI	Fraction Ingested	1	unitless	--	
				EF	Exposure Frequency	52	days/year	(2)	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(3), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(3), USEPA, 2005, 2014	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014	
Dermal	Recreational User	Adult	Baghurst Drive Site	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	6,032	cm2	USEPA, 2014	$\frac{CS \times CF3 \times SA \times SSAF \times DABS \times EV \times EF \times ED}{BW \times AT}$
				SSAF	Soil to Skin Adherence Factor	0.07	mg/cm2/event	USEPA, 2004	
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	52	days/year	(2)	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(3), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(3), USEPA, 2005, 2014	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014	

Notes:

1 - A value of 0.6 will be used for arsenic (USEPA, 2012) and 1 for all other chemicals.

2 - Professional judgment. Assume two days a week in warm weather months for RME and one day a week for CTE.

3 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adult recreational users will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2012: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil and Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil Documents. OSWER Directive 9200.1-113.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.13.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - CONSTRUCTION WORKERS- SOILS
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Construction Workers	Adult	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	330	mg/day	USEPA, 2002b	
				RBA	Relative Bioavailability	Chemical Specific	unitless	(1)	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	USEPA, 2002b	
				EF	Exposure Frequency	250	days/year	(2)	
				ED	Exposure Duration	1	years	(2)	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 2014	
Dermal	Construction Workers	Adult	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	3,527	cm2	USEPA, 2014	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.3	mg/cm2/event	USEPA, 2002b	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	250	days/year	(2)	
				ED	Exposure Duration	1	years	(2)	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 2014	

Notes:
1 - A value of 0.6 will be used for arsenic and 1 for all other chemicals.
2 - Professional judgment.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.
USEPA, 2002a Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.
USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
USEPA, 2012: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil and Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil Documents. OSWER Directive 9200.1-113.
USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.14 RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - CONSTRUCTION WORKERS - SOILS TO AIR
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Construction Workers	Adult	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	8	hours/day	(1)	$\frac{CA \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$
				EF	Exposure Frequency	250	days/year	(1)	
				ED	Exposure Duration	1	years	(1)	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 2014	
				PEF	Particulate Emission Factor	1.40E+06	m3/kg	USEPA, 2002a	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	14.31	g/m2-s per kg/m3	USEPA, 2002a	

Notes:

1 - Professional judgment.

Sources:

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.15.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - FARMERS - CHILD - SOILS
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Farmer	Child	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	200	mg/day	USEPA, 2014	
				RBA	Relative Bioavailability	Chemical Specific	unitless	USEPA, 1989	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	USEPA, 2014	
				EF	Exposure Frequency	350	days/year	USEPA, 2014	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 2005, 2014	
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014	
Dermal	Farmer	Child	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	2,373	cm2	USEPA, 2014	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2014	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2014	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 2005, 2014	
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014	

Notes:

1 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.
USEPA, 2002:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.16.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - FARMER - CHILD - SOILS TO AIR
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Farmer	Child	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	24	hours/day	USEPA, 2014	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				EF	Exposure Frequency	350	days/year	USEPA, 2014	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 2005, 2014	CA = (1/PEF + 1/VF) x Cs
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014	
				PEF	Particulate Emission Factor	3.23E+09	m3/kg	USEPA, 2019	$PEF = Q/C_{wind} \times \frac{3600\ sec/hr}{0.036 \times (1-V) \times (U_m/U_t)^3 \times F(x)}$
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	87.36898	g/m2-s per kg/m3	USEPA, 2019	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2019	
				Um	Mean annual wind speed	4.29	m/sec	USEPA, 2019	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2019	
				F(x)	Function dependent of Um/Ut	0.09918	unitless	USEPA, 2019	

Notes:

1 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.
USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.
USEPA, 2019: USEPA Regional Screening Level Calculator at http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. Values are for Philadelphia, PA.

TABLE 4.17.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - FARMER - CHILD - GROUNDWATER

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Farmer	Child	Baghurst Drive Site	CGW	Chemical Concentration in Groundwater	Max or 95% UCL	mg/kg	USEPA, 2014a	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	0.78	L/day	USEPA, 2014b	CGW x CF x IR-GW x EF x ED
				EF	Exposure Frequency	350	days/year	USEPA, 2014b	BW x AT
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 2005, 2014b	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 2005, 2014b	
				BW	Body Weight	15	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014b	
Dermal	Farmer	Child	Baghurst Drive Site	DAevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	mg/kg	USEPA, 2014a	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	DAevent x EV x EF x ED x SA
				CF	Conversion factor	0.001	L/cm^3	- -	BW x AT
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				tevent	Duration of event	0.54	hr/event	USEPA, 2014b	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	6,365	cm2	USEPA, 2014b	DAevent= 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/π]
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2014b	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 2005, 2014b	DAevent =FA x Kp x Cw x CF x [tevent/(1+B) +
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 2005, 2014b	2 x τ +(1 + 3B + 3B^2)/(1+B^2)
				BW	Body Weight	15	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014b	

Notes:

1 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

USEPA, 2014b: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.18.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - ADULT FARMER - SOIL

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Farmer	Adult	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	330	mg/day	(1)	
				RBA	Relative Bioavailability	Chemical Specific	unitless	(2)	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	USEPA, 2014	
				EF	Exposure Frequency	350	days/year	USEPA, 2014	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(3), USEPA, 2005, 2014)	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(3), USEPA, 2005, 2014)	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 2014	
Dermal	Farmer	Adult	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	3,527	cm2	USEPA, 2014	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.3	mg/cm2/event	(1)	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2014	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(3), USEPA, 2005, 2014)	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(3), USEPA, 2005, 2014)	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 2014	

Notes:

1 - Professional judgment. Assume incidental rate and soil adherence factor for a farmer is similar to that of a construction worker.

2 - A value of 0.6 will be used for arsenic (USEPA, 2012) and 1 for all other chemicals.

3 - Chemicals that act via the mutagenic mode of action will be evaluated in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 2002:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.19.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - ADULT FARMER - SOIL TO AIR
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Farmer	Adult	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	24	hours/day	USEPA, 2014	$\frac{CA \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$
				EF	Exposure Frequency	350	days/year	USEPA, 2014	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 2005, 2014)	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(1), USEPA, 2005, 2014)	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 2014	
				PEF	Particulate Emission Factor	3.23E+09	m3/kg	USEPA, 2019	$PEF = Q/C_{wind} \times \frac{3600\ sec/hr}{0.036 \times (1-V) \times (U_m/U_t)^3 \times F(x)}$
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	87.36898	g/m2-s per kg/m3	USEPA, 2019	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2019	
				Um	Mean annual wind speed	4.29	m/sec	USEPA, 2019	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2019	
				F(x)	Function dependent of Um/Ut	0.09918	unitless	USEPA, 2019	

Notes:

1 - Chemicals that act via the mutagenic mode of action will be evaluated in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

USEPA, 2019: USEPA Regional Screening Level Calculator at http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. Values are for Philadelphia, PA.

TABLE 4.20.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - ADULT FARMER - GROUNDWATER - POTABLE USE

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Farmer	Adult	Baghurst Drive Site	CGW	Chemical Concentration in Groundwater	95% UCL or Max	ug/L	USEPA, 2014a	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	2.5	L/day	USEPA, 2014b	CGW x CF x IR-GW x EF x ED
				EF	Exposure Frequency	350	days/year	USEPA, 2014b	BW x AT
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 2005, 2014)	
				ED2	Exposure Duration (Age 16 - 40)	10	years	(1), USEPA, 2005, 2014)	
				BW	Body Weight	80	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014b	
Dermal	Farmer	Adult	Baghurst Drive Site	DAevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2002	DAevent x EV x EF x ED x SA
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	BW x AT
				CF	Conversion factor	0.001	L/cm^3	- -	
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	For inorganics
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	
				tevent	Duration of event	0.71	hr/event	USEPA, 2014b	For organics if tevent <= t*
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	DAevent= 2 x FA x Kp x Cw x CF x sqrt[(6 x t x tevent)/p]
				SA	Skin Surface Available for Contact	19,652	cm2	USEPA, 2014b	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2014b	For organics if tevent > t*
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 2005, 2014)	DAevent =FA x Kp x Cw x CF x [tevent/(1+B) +
				ED2	Exposure Duration (Age 16 - 40)	10	years	(1), USEPA, 2005, 2014)	2 x τ +(1 + 3B + 3B^2)/(1+B^2)
				BW	Body Weight	80	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014b	

Notes:

1 - Chemicals that act via the mutagenic mode of action will be evaluated in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

USEPA, 2014b: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.21.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - ADULT FARMER - INHALATION OF VOLATILES FROM GROUNDWATER
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Farmer	Adult	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 1991	Exposure Concentration (mg/m^3) =
				GW	Chemical concentration in water.	95% UCL or Max	ug/L	USEPA, 2014a	
				CF	Conversion Factor	0.001	mg/ug	--	CA x ET x EF x ED
				ET	Exposure Time	24	hours/day	USEPA, 2014b	AT x 24 hours/day
				EF	Exposure Frequency	350	days/year	USEPA, 2014b	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 2005, 2014b)	CA = CW x CF x VF
				ED2	Exposure Duration (Age 16 - 40)	10	years	(1), USEPA, 2005, 2014b)	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014b	
				VF	Volatilization Factor	0.5	L/m3	USEPA, 1991	

Notes:
1 - Chemicals that act via the mutagenic mode of action will be evaluated in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).
USEPA, 1991: Human Health Evaluation Manual, Part B: Development of Risk-based Preliminary Remediation Goals. OSWER Directive 9285.7-01B.
USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42
USEPA, 2014b: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.22 RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - ADULT FARMER - GROUNDWATER USED FOR IRRIGATION

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Farmer	Adult	Baghurst Drive Site	CGW	Chemical Concentration in Groundwater	95% UCL or Max	ug/L	USEPA, 2014a	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	0.05	L/day	(1)	CGW x CF x IR-GW x EF x ED
				EF	Exposure Frequency	60	days/year	(1)	BW x AT
				ED1	Exposure Duration (Age 6 - 16)	10	years	(2), USEPA, 2005, 2014)	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(2), USEPA, 2005, 2011)	
				BW	Body Weight	80	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014b	
Dermal	Farmer	Adult	Baghurst Drive Site	DAevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2002	DAevent x EV x EF x ED x SA
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	BW x AT
				CF	Conversion factor	0.001	L/cm^3	- -	
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	For inorganics
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	
				tevent	Duration of event	2	hr/event	(1)	For organics if tevent <= t*
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	DAevent= 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/π]
				SA	Skin Surface Available for Contact	3,527	cm2	USEPA, 2014	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	60	days/year	(1)	For organics if tevent > t*
				ED1	Exposure Duration (Age 6 - 16)	10	years	(2), USEPA, 2005, 2014)	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(2), USEPA, 2005, 2014)	DAevent =FA x Kp x Cw x CF x [tevent/(1+B) +
				BW	Body Weight	80	kg	USEPA, 2014b	2 x τ +(1 + 3B + $3B^2$)/(1+B^2)
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014b	

Notes:

1 - Professional judgment. Assumes exposed for three days a week, 20 weeks a year (May through September) for two hours a day.

2 - Chemicals that act via the mutagenic mode of action will be evaluated in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

USEPA, 2014b: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.23.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - ADULT FARMER - INHALATION OF VOLATILES FROM GROUNDWATER USED FOR IRRIGATION

LOWER DARBY CREEK AREA, PENNSYLVANIA

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 Equation/ Model Name
Inhalation	Farmer	Adult	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	UF, 2009	Exposure Concentration (mg/m^3) =
				CW	Chemical concentration in water	Max or 95% UCL	ug/L	USEPA, 2014a	
				CF	Conversion Factor	0.001	mg/ug	--	CA x ET x EF x ED
				ET	Exposure Time	2	hours/day	(1)	AT x 24 hours/day
				EF	Exposure Frequency	60	days/year	(1)	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(2), USEPA, 2005, 2014b)	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(2), USEPA, 2005, 2014b)	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014b	

Notes:

1 - Professional judgment. Assumes exposed for three days a week, 20 weeks a year (May through September) for two hours a day.

2 - Chemicals that act via the mutagenic mode of action will be evaluated in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

USEPA, 2014b: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

UF, 2009. Letter from Stephen Roberts, Ph.D to Ligia Mora-Applegate, Methodology for the Development of Irrigation Water Risk-Based Criteria. January 14

TABLE 4.24.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - CHILD RESIDENTS - SOILS
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Child	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	200	mg/day	USEPA, 2014	
				RBA	Relative Bioavailability	Chemical Specific	unitless	(1)	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	USEPA, 2014	
				EF	Exposure Frequency	350	days/year	USEPA, 2014	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(2), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(2), USEPA, 2005, 2014	
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014	
Dermal	Resident	Child	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	2,373	cm2	USEPA, 2014	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.2	mg/cm2/event	USEPA, 2014	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2014	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(2), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(2), USEPA, 2005, 2014	
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014	

Notes:

1 - A value of 0.6 will be used for arsenic (USEPA, 2012) and 1 for all other chemicals.

2 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.
USEPA, 2002:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
USEPA, 2012: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil and Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil Documents. OSWER Directive 9200.1-113.
USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.25.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - CHILD RESIDENTS SOILS TO AIR
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Child	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	24	hours/day	USEPA, 2014	$\frac{\text{CA x ET x EF x ED}}{\text{AT x 24 hours/day}}$
				EF	Exposure Frequency	350	days/year	USEPA, 2014	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 2005, 2014	CA = (1/PEF + 1/VF) x Cs
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014	$PEF = Q/C_{wind} \times \frac{3600\ sec/hr}{0.036 \times (1-V) \times (U_m/U_t)^3 \times F(x)}$
				PEF	Particulate Emission Factor	3.23E+09	m3/kg	USEPA, 2019	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	87.36898	g/m2-s per kg/m3	USEPA, 2019	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2019	
				Um	Mean annual wind speed	4.29	m/sec	USEPA, 2019	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2019	
				F(x)	Function dependent of Um/Ut	0.09918	unitless	USEPA, 2019	

Notes:

1 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

USEPA, 2019: USEPA Regional Screening Level Calculator at http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. Values are for Philadelphia, PA.

TABLE 4.26.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - CHILD RESIDENTS - GROUNDWATER

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Residents	Child	Baghurst Drive Site	CGW	Chemical Concentration in Groundwater	Max or 95% UCL	mg/kg	USEPA, 2014a	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	0.78	L/day	USEPA, 2014b	CGW x CF x IR-GW x EF x ED
				EF	Exposure Frequency	350	days/year	USEPA, 2014b	BW x AT
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 2005, 2014b	
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 2005, 2014b	
				BW	Body Weight	15	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014b	
Dermal	Residents	Child	Baghurst Drive Site	DAevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2014a	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	DAevent x EV x EF x ED x SA
				CF	Conversion factor	0.001	L/cm^3	- -	BW x AT
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				tevent	Duration of event	0.54	hr/event	USEPA, 2014b	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	6,365	cm2	USEPA, 2014b	DAevent= 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/π]
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2014b	
				ED1	Exposure Duration (Age 0 - 2)	2	years	(1), USEPA, 2005, 2014b	DAevent =FA x Kp x Cw x CF x [tevent/(1+B) +
				ED2	Exposure Duration (Age 2 - 6)	4	years	(1), USEPA, 2005, 2014b	2 x τ +(1 + 3B + $3B^2$)/(1+B^2)
				BW	Body Weight	15	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 2014b	

Notes:

1 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

USEPA, 2014b: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.27.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - ADULT RESIDENTS - SOILS

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Adult	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	100	mg/day	USEPA, 2014	
				RBA	Relative Bioavailability	Chemical Specific	unitless	(1)	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	USEPA, 1989	
				EF	Exposure Frequency	350	days/year	USEPA, 2014	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(2), USEPA, 2005, 2014)	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(2), USEPA, 2005, 2014)	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014	
Dermal	Resident	Adult	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	6,032	cm2	USEPA, 2014	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.07	mg/cm2/event	USEPA, 2014	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2014	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(2), USEPA, 2005, 2014)	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(2), USEPA, 2005, 2014)	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014	

Notes:

1 - A value of 0.6 will be used for arsenic (USEPA, 2012) and 1 for all other chemicals.

2 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adults will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 2002:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2012: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil and Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil Documents. OSWER Directive 9200.1-113.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.28.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - ADULT RESIDENTS - SOILS TO AIR
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Adult	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	24	hours/day	USEPA, 2014	$\frac{CA \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$
				EF	Exposure Frequency	350	days/year	USEPA, 2014	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 2005, 2014)	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(1), USEPA, 2005, 2014)	CA = (1/PEF + 1/VF) x Cs
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014	$PEF = Q/C_{wind} \times \frac{3600\ sec/hr}{0.036 \times (1-V) \times (U_m/U_t)^3 \times F(x)}$
				PEF	Particulate Emission Factor	3.23E+09	m3/kg	USEPA, 2019	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	87.36898	g/m2-s per kg/m3	USEPA, 2019	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2019	
				Um	Mean annual wind speed	4.29	m/sec	USEPA, 2019	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2019	
				F(x)	Function dependent of Um/Ut	0.09918	unitless	USEPA, 2019	

Notes:

1 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adults will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

USEPA, 2019: USEPA Regional Screening Level Calculator at http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. Values are for Philadelphia, PA.

TABLE 4.29.RME
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE - ADULT RESIDENTS - GROUNDWATER
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Residents	Adult	Baghurst Drive Site	CGW	Chemical Concentration in Groundwater	95% UCL or Max	ug/L	USEPA, 2014a	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	2.5	L/day	USEPA, 2014b	CGW x CF x IR-GW x EF x ED
				EF	Exposure Frequency	350	days/year	USEPA, 2014b	BW x AT
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 2005, 2014b)	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(1), USEPA, 2005, 2014b)	
				BW	Body Weight	80	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014b	
Dermal	Residents	Adult	Baghurst Drive Site	DAevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2002	DAevent x EV x EF x ED x SA
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	BW x AT
				CF	Conversion factor	0.001	L/cm^3	- -	
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	For inorganics
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	
				tevent	Duration of event	0.71	hr/event	USEPA, 2014b	For organics if tevent <= t*
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	DAevent= 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/π]
				SA	Skin Surface Available for Contact	19,652	cm2	USEPA, 2014b	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2014b	For organics if tevent > t*
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 2005, 2014b)	DAevent =FA x Kp x Cw x CF x [tevent/(1+B) +
				ED2	Exposure Duration (Age 16 - 26)	10	years	(1), USEPA, 2005, 2014b)	2 x τ +(1 + 3B + 3B^2)/(1+B^2)
				BW	Body Weight	80	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014b	

Notes:

1 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adults will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

USEPA, 2014b: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.30.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE - ADULT RESIDENTS - INHALATION OF VOLATILES FROM GROUNDWATER

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

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 Equation/ Model Name
Inhalation	Residents	Adult	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 1991	Exposure Concentration (mg/m^3) =
				GW	Chemical concentration in water.	95% UCL or Max	ug/L	USEPA, 2014a	
				CF	Conversion Factor	0.001	mg/ug	--	$\frac{CA \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$
				ET	Exposure Time	24	hours/day	USEPA, 2014b	
				EF	Exposure Frequency	350	days/year	USEPA, 2014b	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 2005, 2014b)	CA = CW x CF x VF
				ED2	Exposure Duration (Age 16 - 26)	10	years	(1), USEPA, 2005, 2014b)	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014b	
				VF	Volatilization Factor	0.5	L/m3	USEPA, 1991	

Notes:

1 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adults will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

USEPA, 1991: Human Health Evaluation Manual, Part B: Development of Risk-based Preliminary Remediation Goals. OSWER Directive 9285.7-01B.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

USEPA, 2014b: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.1.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - ADOLESCENT TRESPASSERS - SOILS
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Trespassers	Adolescent	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	50	mg/day	USEPA, 2017	
				RBA	Relative Bioavailability	Chemical Specific	unitless	(1)	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	USEPA, 1989	
				EF	Exposure Frequency	13	days/year	(2)	
				ED	Exposure Duration	10	years	(3)	
				BW	Body Weight	44	kg	USEPA, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 1989	
Dermal	Trespassers	Adolescent	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	3,750	cm2	(4)	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.04	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	13	days/year	(2)	
				ED	Exposure Duration	10	years	(3)	
				BW	Body Weight	44	kg	USEPA, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 1989	

Notes:
1 - A value of 0.6 will be used for arsenic (USEPA, 2012) and 1 for all other chemicals.
2 - Professional judgment. Assume one day a week in warm weather months for RME and one day every other week for CTE.
3 - Older child from age 6 to 16.
4 - Assumes face, forearms, hands, and are exposed (USEPA, 2011).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.
USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Tables 7-2 and 7-12.
USEPA, 2012: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil and Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil Documents. OSWER Directive 9200.1-113.
USEPA, 2017: Update of Chapter 5 for the Exposure Factors Handbook EPA/600R-17/384F, Table 5-1.

TABLE 4.2.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - ADOLESCENT TRESPASSERS - SOILS TO AIR
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Trespassers	Adolescent	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	2	hours/day	(1)	$\frac{CA \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$
				EF	Exposure Frequency	13	days/year	(2)	
				ED	Exposure Duration	10	years	(3)	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 1989	
				PEF	Particulate Emission Factor	3.23E+09	m3/kg	USEPA, 2019	$PEF = Q/C_{wind} \times \frac{3600\ sec/hr}{0.036 \times (1-V) \times (U_m/U_t)^3 \times F(x)}$
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	87.36898	g/m2-s per kg/m3	USEPA, 2019	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2019	
				Um	Mean annual wind speed	4.29	m/sec	USEPA, 2019	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2019	
				F(x)	Function dependent of Um/Ut	0.09918	unitless	USEPA, 2019	

Notes:
For chemicals that act via the mutagenic mode of action the intake will be multiplied by the appropriate age-dependent adjustment factor in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).
1 - Professional judgment.
2 - Professional judgment. Assume one day a week in warm weather months for RME and one day every other week for CTE.
2 - Older child from age 6 to 16.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.
USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.
USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2019: USEPA Regional Screening Level Calculator at http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. Values are for Philadelphia, PA.

TABLE 4.3.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - ADOLESCENT TRESPASSERS - SURFACE WATER
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Trespassers	Adolescent	Baghurst Drive Site	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
				CR	Contact Rate	0.021	L/hour	USEPA, 2011	
				CF	Conversion factor	0.001	mg/ug	- -	
				ET	Exposure Time	2	hours/event	(1)	CW x CF x CR x ET x EF x ED
				EF	Exposure Frequency	13	events/year	(1)	BW x AT
				ED	Exposure Duration	10	years	(2)	
				BW	Body Weight	44	kg	USEPA, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 1989	
Dermal	Trespassers	Adolescent	Baghurst Drive Site	DAevent	Absorbed dose per event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Water	Max or 95% UCL	mg/kg	USEPA, 2002a	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	DAevent x EV x EF x ED x SA
				CF	Conversion factor	0.001	L/cm^3	- -	BW x AT
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				tevent	Duration of event	2	hr/event	(1)	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	3,750	cm2	(3)	DAevent= 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/π]
				EV	Event Frequency	1	events/day	(1)	
				EF	Exposure Frequency	13	days/year	(1)	For organics if tevent > t*
				ED	Exposure Duration	10	years	(2)	DAevent =FA x Kp x Cw x CF x [tevent/(1+B) +
				BW	Body Weight	44	kg	USEPA, 2011	2 x τ +(1 + 3B + 3B^2)/(1+B^2)
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 1989	

Notes:
For chemicals that act via the mutagenic mode of action the intake will be multiplied by the appropriate age-dependent adjustment factor in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).
1 - Professional judgment. Assume one day a week in warm weather months for RME and one day every other week for CTE.
2 - Older child from age 6 to 16.
3 - Assumes face, forearms, hands, and are exposed (USEPA, 2011).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.
USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Tables 3-5 and 8-3.

TABLE 4.4.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - ADOLESCENT TRESPASSERS - SEDIMENT
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Trespassers	Adolescent	Baghurst Drive Site	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	50	mg/day	USEPA, 2017	
				RBA	Relative Bioavailability	Chemical Specific	unitless	USEPA, 1989	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	(2)	
				EF	Exposure Frequency	13	days/year	(2)	
				ED	Exposure Duration	10	years	(3)	
				BW	Body Weight	44	kg	USEPA, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 1989	
Dermal	Trespassers	Adolescent	Baghurst Drive Site	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	3,750	cm2	(4)	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.04	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	13	days/year	(2)	
				ED	Exposure Duration	10	years	(3)	
				BW	Body Weight	44	kg	USEPA, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 1989	

Notes:
For chemicals that act via the mutagenic mode of action the intake will be multiplied by the appropriate age-dependent adjustment factor in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).
1 - A value of 0.6 will be used for arsenic (USEPA, 2012) and 1 for all other chemicals.
2 - Professional judgment. Assume one day a week in warm weather months for RME and one day every other week for CTE.
3 - Older child from age 6 to 16.
4 - Assumes face, forearms, hands, and are exposed (USEPA, 2011).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.
USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.
USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Table 8-3.
USEPA, 2012: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil and Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil Documents. OSWER Directive 9200.1-113.
USEPA, 2017: Update of Chapter 5 for the Exposure Factors Handbook EPA/600R-17/384F, Table 5-1.

TABLE 4.5.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - CHILD RECREATIONAL USERS - SOILS
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational User	Child	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	80	mg/day	USEPA, 2017	
				RBA	Relative Bioavailability	Chemical Specific	unitless	(1)	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	(2)	
				EF	Exposure Frequency	26	days/year	(3)	
				ED1	Exposure Duration (Age 0 - 2)	1	years	(4), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 2 - 6)	1	years	(4), USEPA, 2005, 2011	
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 2014	
Dermal	Recreational User	Child	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	2,373	cm2	USEPA, 2014	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.04	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	26	days/year	(3)	
				ED1	Exposure Duration (Age 0 - 2)	1	years	(4), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 2 - 6)	1	years	(4), USEPA, 2005, 2011	
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 2014	

Notes:
1 - A value of 0.6 will be used for arsenic (USEPA, 2012) and 1 for all other chemicals.
2 - The child recreational user is assumed to be at the site only a portion of the day.
3 - Assume two days a week in warm weather months for RME and one days a week for CTE.
4 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, children recreational users will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).
Sources:
USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.
USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Table 16-108.
USEPA, 2012: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil and Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil Documents. OSWER Directive 9200.1-113.
USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.
USEPA, 2017: Update for Chapter 5 of the Exposure Factors Handbook. EPA/600/R-17/384F.

TABLE 4.6.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - CHILD RECREATIONAL USERS - SOILS TO AIR
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Recreational User	Child	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	2	hours/day	(1)	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				EF	Exposure Frequency	26	days/year	(2)	
				ED1	Exposure Duration (Age 0 - 2)	1	years	(3), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 2 - 6)	1	years	(3), USEPA, 2005, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 1989	
				PEF	Particulate Emission Factor	3.23E+09	m3/kg	USEPA 2018	$PEF = Q/C_{wind} \times \frac{3600\ sec/hr}{0.036 \times (1-V) \times (U_m/U_t)^3 \times F(x)}$
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	87.36898	g/m2-s per kg/m3	USEPA, 2019	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2019	
				Um	Mean annual wind speed	4.29	m/sec	USEPA, 2019	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2019	
				F(x)	Function dependent of Um/Ut	0.09918	unitless	USEPA, 2019	

Notes:

1 - Professional judgment.

2 - Assume two days a week in warm weather months for RME and one days a week for CTE.

3 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, children recreational users will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Table 16-108.

USEPA, 2019: USEPA Regional Screening Level Calculator at http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. Values are for Philadelphia, PA.

TABLE 4.7.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - CHILD RECREATIONAL USERS - SURFACE WATER

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational User	Child	Baghurst Drive Site	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
				CR	Contact Rate	0.049	L/hr	USEPA, 2011	
				CF	Conversion factor	0.001	mg/ug	- -	
				ET	Exposure Time	2	hours/event	(1)	CW x CF x CR x ET x EF x ED
				EF	Exposure Frequency	26	events/year	(2)	BW x AT
				ED1	Exposure Duration (Age 0 - 2)	1	years	(3), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 2 - 6)	1	years	(3), USEPA, 2005, 2011	
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 2014	
Dermal	Recreational User	Child	Baghurst Drive Site	DAevent	Absorbed dose per event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Water	Max or 95% UCL	mg/kg	USEPA, 2002a	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	DAevent x EV x EF x ED x SA
				CF	Conversion factor	0.001	L/cm^3	- -	BW x AT
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				tevent	Duration of event	2	hr/event	(1)	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	2,373	cm2	USEPA, 2014	DAevent= 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/π]
				EV	Event Frequency	1	events/day	(1)	
				EF	Exposure Frequency	26	days/year	(2)	For organics if tevent > t*
				ED1	Exposure Duration (Age 0 - 2)	1	years	(3), USEPA, 2005, 2011	DAevent =FA x Kp x Cw x CF x [tevent/(1+B) +
				ED2	Exposure Duration (Age 2 - 6)	1	years	(3), USEPA, 2005, 2011	2 x τ +(1 + 3B + $3B^2$)/(1+B^2)
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 2014	

Notes:

1 - Professional judgment.

2 - Assume two days a week in warm weather months for RME and one days a week for CTE.

3 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, children recreational users will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Tables 3-5 and 16-108.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.8.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - CHILD RECREATIONAL USERS - SEDIMENT
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational User	Child	Baghurst Drive Site	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	80	mg/day	USEPA, 2017	
				RBA	Relative Bioavailability	Chemical Specific	unitless	(1)	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	--	
				EF	Exposure Frequency	26	days/year	(2)	
				ED1	Exposure Duration (Age 0 - 2)	1	years	(3), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 2 - 6)	1	years	(3), USEPA, 2005, 2011	
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 2014	
Dermal	Recreational User	Child	Baghurst Drive Site	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	2,373	cm2	USEPA, 2014	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.04	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	26	days/year	(1)	
				ED1	Exposure Duration (Age 0 - 2)	1	years	(3), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 2 - 6)	1	years	(3), USEPA, 2005, 2011	
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 2014	

Notes:
1 - A value of 0.6 will be used for arsenic (USEPA, 2012) and 1 for all other chemicals.
2 - Professional judgment. Assume two days a week in warm weather months for RME and one day a week for CTE.
3 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, children recreational users will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:
USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.
USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Table 16-108.
USEPA, 2012: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil and Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil Documents. OSWER Directive 9200.1-113.
USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.
USEPA, 2017: Update for Chapter 5 of the Exposure Factors Handbook. EPA/600/R-17/384F.

TABLE 4.9.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - ADULT RECREATIONAL USERS - SOILS

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational User	Adult	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	30	mg/day	USEPA, 2017	
				RBA	Relative Bioavailability	Chemical Specific	unitless	(1)	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	--	
				EF	Exposure Frequency	26	days/year	(2)	
				ED1	Exposure Duration (Age 6 - 16)	2	years	(3), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 16 - 26)	5	years	(3), USEPA, 2005, 2011	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 2014	
Dermal	Recreational User	Adult	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	6,032	cm2	USEPA, 2014	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.01	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	26	days/year	(2)	
				ED1	Exposure Duration (Age 6 - 16)	2	years	(3), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 16 - 26)	5	years	(3), USEPA, 2005, 2011	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 2014	

Notes:

1 - A value of 0.6 will be used for arsenic (USEPA, 2012) and 1 for all other chemicals.

2 - Assumes two days a week in warm weather months for RME and one days a week for CTE.

3 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adult recreational users will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Table 16-108.

USEPA, 2012: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil and Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil Documents. OSWER Directive 9200.1-113.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

USEPA, 2017: Update for Chapter 5 of the Exposure Factors Handbook. EPA/600/R-17/384F.

TABLE 4.10.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - ADULT RECREATIONAL USERS - SOILS TO AIR

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Recreational User	Adult	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	2	hours/day	(1)	$\frac{CA \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$
				EF	Exposure Frequency	26	days/year	(1)	
				ED1	Exposure Duration (Age 6 - 16)	2	years	(2), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 16 - 26)	5	years	(2), USEPA, 2005, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1989	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 1989	
				PEF	Particulate Emission Factor	3.23E+09	m3/kg	USEPA, 2019	$PEF = Q/C_{wind} \times \frac{3600\ sec/hr}{0.036 \times (1-V) \times (U_m/U_t)^3 \times F(x)}$
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	87.36898	g/m2-s per kg/m3	USEPA, 2019	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2019	
				Um	Mean annual wind speed	4.29	m/sec	USEPA, 2019	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2019	
				F(x)	Function dependent of Um/Ut	0.09918	unitless	USEPA, 2019	

Notes:

1 - Assumes two days a week in warm weather months for RME and one days a week for CTE.

2 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adult recreational users will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. USEPA/540/1-86/060.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Table 16-108.

USEPA, 2019: USEPA Regional Screening Level Calculator at http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. Values are for Philadelphia, PA.

TABLE 4.11.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - ADULT RECREATIONAL USERS - SURFACE WATER
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational User	Adult	Baghurst Drive Site	CW	Chemical Concentration in Water	Max or 95% UCL	ug/L	USEPA, 2002	Chronic Daily Intake (CDI) (mg/kg/day) =
				CR	Contact Rate	0.021	L/hour	USEPA, 2011	
				CF	Conversion factor	0.001	mg/ug	- -	
				ET	Exposure Time	2	hours/event	(1)	CW x CF x CR x ET x EF x ED
				EF	Exposure Frequency	26	events/year	(1)	BW x AT
				ED1	Exposure Duration (Age 6 - 16)	2	years	(2), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 16 - 26)	5	years	(2), USEPA, 2005, 2011	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 2014	
Dermal	Recreational User	Adult	Baghurst Drive Site	DAevent	Absorbed dose per event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Water	Max or 95% UCL	mg/kg	USEPA, 2002a	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	DAevent x EV x EF x ED x SA
				CF	Conversion factor	0.001	L/cm^3	- -	BW x AT
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				tevent	Duration of event	2	hr/event	(1)	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	6,032	cm2	USEPA, 2014	DAevent= 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/π]
				EV	Event Frequency	1	events/day	(1)	
				EF	Exposure Frequency	26	days/year	(1)	For organics if tevent > t*
				ED1	Exposure Duration (Age 6 - 16)	2	years	(2), USEPA, 2005, 2011	DAevent =FA x Kp x Cw x CF x [tevent/(1+B) +
				ED2	Exposure Duration (Age 16 - 26)	5	years	(2), USEPA, 2005, 2011	
				BW	Body Weight	80	kg	USEPA, 2014	2 x τ +(1 + 3B + $3B^2$)/(1+B^2)
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 2014	

Notes:
1 - Professional judgment. Assume two days a week in warm weather months for RME and one day a week for CTE.
2 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adult recreational users will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.
USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Tables 3-5 and 16-108.
USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.12.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - ADULT RECREATIONAL USERS - SEDIMENT
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Recreational User	Adult	Baghurst Drive Site	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	30	mg/day	USEPA, 2017	
				RBA	Relative Bioavailability	Chemical Specific	unitless	(1)	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	--	
				EF	Exposure Frequency	26	days/year	(2)	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(3), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(3), USEPA, 2005, 2011	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014	
Dermal	Recreational User	Adult	Baghurst Drive Site	CS	Chemical concentration in sediment	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	6,032	cm2	USEPA, 2014	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.07	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	26	days/year	(2)	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(3), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(3), USEPA, 2005, 2011	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014	

Notes:
1 - A value of 0.6 will be used for arsenic (USEPA, 2012) and 1 for all other chemicals.
2 - Professional judgment. Assume two days a week in warm weather months for RME and one day a week for CTE.
3 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adult recreational users will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:
USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.
USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F.
USEPA, 2012: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil and Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil Documents. OSWER Directive 9200.1-113.
USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.
USEPA, 2017: Update for Chapter 5 of the Exposure Factors Handbook. EPA/600/R-17/384F.

TABLE 4.13.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - CONSTRUCTION WORKERS - SOILS
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Construction Workers	Adult	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	165	mg/day	(1)	
				RBA	Relative Bioavailability	Chemical Specific	unitless	(2)	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	USEPA, 2002b	
				EF	Exposure Frequency	125	days/year	(1)	
				ED	Exposure Duration	1	years	(1)	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 2014	
Dermal	Construction Workers	Adult	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002a	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	3,527	cm2	USEPA, 2014	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.1	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	125	days/year	(1)	
				ED	Exposure Duration	1	years	(1)	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 2014	

Notes:
1 - Professional judgment. For some factors, CTE is assumed to be 50 percent of RME.
2 - A value of 0.6 will be used for arsenic (USEPA, 2012) and 1 for all other chemicals.

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.
USEPA, 2002a Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.
USEPA, 2002b: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.
USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
USEPA, 2012: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil and Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil Documents. OSWER Directive 9200.1-113.
USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.14.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - CONSTRUCTION WORKERS - SOILS TO AIR
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Construction Workers	Adult	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	8	hours/day	(1)	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				EF	Exposure Frequency	125	days/year	(1)	
				ED	Exposure Duration	1	years	(1)	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 2014	
				PEF	Particulate Emission Factor	1.40E+06	m3/kg	USEPA, 2002a	
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	14.31	g/m2-s per kg/m3	USEPA, 2002a	

Notes:

1 - Professional judgment. For some factors, CTE is assumed to be 50 percent of RME.

Sources:

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.15.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - FARMER - CHILD - SOILS
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Farmer	Child	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	80	mg/day	USEPA, 2017	
				RBA	Relative Bioavailability	Chemical Specific	unitless	USEPA, 1989	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	USEPA, 1993	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 0 - 2)	1	years	(1), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 2 - 6)	1	years	(1), USEPA, 2005, 2011	
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 2014	
Dermal	Farmer	Child	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	2,373	cm2	USEPA, 2014	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.04	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 0 - 2)	1	years	(1), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 2 - 6)	1	years	(1), USEPA, 2005, 2011	
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 2014	

Notes:

1 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Tables 5-1 and 16-108.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

USEPA, 2017: Update for Chapter 5 of the Exposure Factors Handbook. EPA/600/R-17/384F.

TABLE 4.16.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - FARMER - CHILD - SOILS TO AIR
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Farmer	Child	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	24	hours/day	USEPA, 2014	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 0 - 2)	1	years	(1), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 2 - 6)	1	years	(1), USEPA, 2005, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 2014	
				PEF	Particulate Emission Factor	3.23E+09	m3/kg	USEPA, 2019	$PEF = Q/C_{wind} \times \frac{3600\ sec/hr}{0.036 \times (1-V) \times (U_m/U_t)^3 \times F(x)}$
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	87.36898	g/m2-s per kg/m3	USEPA, 2019	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2019	
				Um	Mean annual wind speed	4.29	m/sec	USEPA, 2019	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2019	
				F(x)	Function dependent of Um/Ut	0.09918	unitless	USEPA, 2019	

Notes:

1 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Table 16-108.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

USEPA, 2019: USEPA Regional Screening Level Calculator at http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. Values are for Philadelphia, PA.

TABLE 4.17.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - FARMER - CHILD - GROUNDWATER
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Farmer	Child	Baghurst Drive Site	CGW	Chemical Concentration in Groundwater	Max or 95% UCL	mg/kg	USEPA, 2014a	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	0.48	L/day	USEPA, 2011	CGW x CF x IR-GW x EF x ED
				EF	Exposure Frequency	234	days/year	USEPA, 1993	BW x AT
				ED1	Exposure Duration (Age 0 - 2)	1	years	(1), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 2 - 6)	1	years	(1), USEPA, 2005, 2011	
				BW	Body Weight	15	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 2014b	
Dermal	Farmer	Child	Baghurst Drive Site	DAevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	mg/kg	USEPA, 2014a	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	DAevent x EV x EF x ED x SA
				CF	Conversion factor	0.001	L/cm^3	- -	BW x AT
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				tevent	Duration of event	0.37	hr/event	USEPA, 2011	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	6,365	cm2	USEPA, 2014b	DAevent= 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/π]
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	For organics if tevent > t*
				ED1	Exposure Duration (Age 0 - 2)	1	years	(1), USEPA, 2005, 2011	DAevent =FA x Kp x Cw x CF x [tevent/(1+B) +
				ED2	Exposure Duration (Age 2 - 6)	1	years	(1), USEPA, 2005, 2011	2 x τ +(1 + 3B + $3B^2$)/(1+B^2)
				BW	Body Weight	15	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 2014b	

Notes:

1 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F. Tables 3-19, 16-29, and 16-108.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

USEPA, 2014b: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.18.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - FARM WORKERS - SOIL
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Farmer	Adult	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	165	mg/day	(1)	
				RBA	Relative Bioavailability	Chemical Specific	unitless	(2)	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	USEPA, 1993	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(3), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(3), USEPA, 2005, 2014	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 2014	
Dermal	Farmer	Adult	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	3,527	cm2	USEPA, 2004	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.1	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(3), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(3), USEPA, 2005, 2014	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 2014	

Notes:

1 - Professional judgment. For some factors, CTE is assumed to be 50 percent of RME.

2 - A value of 0.6 will be used for arsenic (USEPA, 2012) and 1 for all other chemicals.

3 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adults will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Table 5-1 and 16-3.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

USEPA, 2017: Update for Chapter 5 of the Exposure Factors Handbook. EPA/600/R-17/384F.

TABLE 4.19.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - FARM WORKERS - SOIL TO AIR

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Farmer	Adult	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	8	hours/day	USEPA, 2014	$\frac{CA \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 2005, 2014)	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(1), USEPA, 2005, 2014)	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	3,650	days	USEPA, 2014	
				PEF	Particulate Emission Factor	3.23E+09	m3/kg	USEPA, 2019	$PEF = Q/C_{wind} \times \frac{3600 \ sec/hr}{0.036 \times (1-V) \times (U_m/U_t)^3 \times F(x)}$
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at	87.36898	g/m2-s per	USEPA, 2019	
					center of source		kg/m3		
				F_D	dispersion correction factor	1	unitless	USEPA, 2002	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2019	
				Um	Mean annual wind speed	4.29	m/sec	USEPA, 2019	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2019	
				F(x)	Function dependent of Um/Ut	0.09918	unitless	USEPA, 2019	

Notes:

1 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adults will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b:Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

USEPA, 2019: USEPA Regional Screening Level Calculator at http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. Values are for Philadelphia, PA.

TABLE 4.20.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - FARMERS - GROUNDWATER

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Farmer	Adult	Baghurst Drive Site	CGW	Chemical Concentration in Groundwater	95% UCL or Max	ug/L	USEPA, 2014a	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	1.2	L/day	USEPA, 2011	CGW x CF x IR-GW x EF x ED
				EF	Exposure Frequency	234	days/year	USEPA, 1993	BW x AT
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(1), USEPA, 2005, 2014	
				BW	Body Weight	80	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014b	
Dermal	Farmer	Adult	Baghurst Drive Site	DAevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2014a	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	DAevent x EV x EF x ED x SA
				CF	Conversion factor	0.001	L/cm^3	- -	BW x AT
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				tevent	Duration of event	0.25	hr/event	USEPA, 2011	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	19,652	cm2	USEPA, 2014b	DAevent= 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/π]
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 2005, 2014	DAevent =FA x Kp x Cw x CF x [tevent/(1+B) +
				ED2	Exposure Duration (Age 16 - 26)	10	years	(1), USEPA, 2005, 2014	
				BW	Body Weight	80	kg	USEPA, 2014b	$2 \times \tau + (1 + 3B + 3B^2)/(1+B^2)$
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014b	

Notes:

1 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adults will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

USEPA, 2014b: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.21.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURE - FARMERS - INHALATION OF VOLATILES FROM GROUNDWATER

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Farmer	Adult	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 1991	Exposure Concentration (mg/m^3) =
				GW	Chemical concentration in water.	95% UCL or Max	ug/L	USEPA, 2014a	
				CF	Conversion Factor	0.001	mg/ug	--	CA x ET x EF x ED
				ET	Exposure Time	24	hours/day	USEPA, 2014b	AT x 24 hours/day
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 2005, 2014b)	CA = CW x CF x VF
				ED2	Exposure Duration (Age 16 - 26)	10	years	(1), USEPA, 2005, 2014b)	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014b	
				VF	Volatilization Factor	0.5	L/m3	USEPA, 1991	

Notes:

1 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adults will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1991: Human Health Evaluation Manual, Part B: Development of Risk-based Preliminary Remediation Goals. OSWER Directive 9285.7-01B.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

USEPA, 2014b: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.22.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURE - FARMERS - GROUNDWATER USED FOR IRRIGATION
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Farmer	Adult	Baghurst Drive Site	CGW	Chemical Concentration in Groundwater	95% UCL or Max	ug/L	USEPA, 2014a	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	0.05	L/day	(1)	$\frac{CGW \times CF \times IR\text{-}GW \times EF \times ED}{BW \times AT}$
				EF	Exposure Frequency	60	days/year	(1)	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(1), USEPA, 2005, 2014	
				BW	Body Weight	80	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014b	
Dermal	Farmer	Adult	Baghurst Drive Site	DAevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2002	$\frac{DAevent \times EV \times EF \times ED \times SA}{BW \times AT}$
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	
				CF	Conversion factor	0.001	L/cm^3	- -	
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	For inorganics
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	
				tevent	Duration of event	1	hr/event	(1)	For organics if tevent <= t*
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	DAevent= $2 \times FA \times Kp \times Cw \times CF \times \mathrm{sqrt}[(6 \times \tau \times tevent)/\pi]$
				SA	Skin Surface Available for Contact	3,527	cm2	USEPA, 2014	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	60	days/year	(1)	For organics if tevent > t*
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(1), USEPA, 2005, 2014	DAevent =$FA \times Kp \times Cw \times CF \times [tevent/(1+B) +$
				BW	Body Weight	80	kg	USEPA, 2014b	$2 \times \tau + (1 + 3B + 3B^2)/(1+B^2)$
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014b	

Notes:

1 - Professional judgment. Assumes exposed for three days a week, 20 weeks a year (May through September) for one hours a day.

Sources:

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

USEPA, 2014b: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.23.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - FARMERS - INHALATION OF VOLATILES FROM GROUNDWATER USED FOR IRRIGATION

LOWER DARBY CREEK AREA, PENNSYLVANIA

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 Equation/ Model Name
Inhalation	Farmer	Adult	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	UF, 2009	Exposure Concentration (mg/m^3) =
				CW	Chemical concentration in water	Max or 95% UCL	ug/L	USEPA, 2014a	
				CF	Conversion Factor	0.001	mg/ug	--	$\frac{CA \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$
				ET	Exposure Time	1	hours/day	(1)	
				EF	Exposure Frequency	60	days/year	(1)	
				ED1	Exposure Duration (Age 6 - 16)	10	years	(1), USEPA, 2005, 2014	
				ED2	Exposure Duration (Age 16 - 26)	10	years	(1), USEPA, 2005, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	7,300	days	USEPA, 2014b	

Notes:

1 - Professional judgment. Assumes exposed for three days a week, 20 weeks a year (May through September) forone hours a day.

2 - USEPA, 2011. Exposure Factors Handbook: 2011 Edition, Table 16-103.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

USEPA, 2014b: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

UF, 2009. Letter from Stephen Roberts, Ph.D to Ligia Mora-Applegate, Methodology for the Development of Irrigation Water Risk-Based Criteria. January 14

TABLE 4.24.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - CHILD RESIDENTS - SOILS
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Child	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	80	mg/day	USEPA, 2017	
				RBA	Relative Bioavailability	Chemical Specific	unitless	(1)	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	USEPA, 1993	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 0 - 2)	1	years	(2), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 2 - 6)	1	years	(2), USEPA, 2005, 2011	
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 2014	
Dermal	Resident	Child	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	2,373	cm2	USEPA, 2014	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.04	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 0 - 2)	1	years	(2), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 2 - 6)	1	years	(2), USEPA, 2005, 2011	
				BW	Body Weight	15	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 2014	

Notes:

1 - A value of 0.6 will be used for arsenic (USEPA, 2012) and 1 for all other chemicals.

2 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Tables 5-1 and 16-108.

USEPA, 2012: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil and Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil Documents. OSWER Directive 9200.1-113.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

USEPA, 2017: Update for Chapter 5 of the Exposure Factors Handbook. EPA/600/R-17/384F.

TABLE 4.25.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - CHILD RESIDENTS - SOILS TO AIR
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Child	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	24	hours/day	USEPA, 2014	$\frac{CA \times ET \times EF \times ED}{AT \times 24 \text{ hours/day}}$
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 0 - 2)	1	years	(1), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 2 - 6)	1	years	(1), USEPA, 2005, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 2014	
				PEF	Particulate Emission Factor	3.23E+09	m3/kg	USEPA, 2019	$PEF = Q/C_{wind} \times \frac{3600 \ sec/hr}{0.036 \times (1-V) \times (U_m/U_t)^3 \times F(x)}$
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	87.36898	g/m2-s per kg/m3	USEPA, 2019	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2019	
				Um	Mean annual wind speed	4.29	m/sec	USEPA, 2019	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2019	
				F(x)	Function dependent of Um/Ut	0.09918	unitless	USEPA, 2019	

Notes:

1 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Table 16-108.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

USEPA, 2019: USEPA Regional Screening Level Calculator at http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. Values are for Philadelphia, PA.

TABLE 4.26.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - CHILD RESIDENTS - GROUNDWATER
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Residents	Child	Baghurst Drive Site	CGW	Chemical Concentration in Groundwater	Max or 95% UCL	mg/kg	USEPA, 2014a	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	0.48	L/day	USEPA, 2011	CGW × CF × IR-GW × EF × ED
				EF	Exposure Frequency	234	days/year	USEPA, 1993	BW × AT
				ED1	Exposure Duration (Age 0 - 2)	1	years	(1), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 2 - 6)	1	years	(1), USEPA, 2005, 2011	
				BW	Body Weight	15	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 2014b	
Dermal	Residents	Child	Baghurst Drive Site	DAevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2014a	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	DAevent × EV × EF × ED × SA
				CF	Conversion factor	0.001	L/cm^3	- -	BW × AT
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp × CW × CF × tevent
				tevent	Duration of event	0.37	hr/event	USEPA, 2011	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	6,365	cm2	USEPA, 2014b	DAevent= 2 × FA × Kp × Cw × CF × sqrt[(6 × τ × tevent)/π]
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	For organics if tevent > t*
				ED1	Exposure Duration (Age 0 - 2)	1	years	(1), USEPA, 2005, 2011	DAevent =FA × Kp × Cw × CF × [tevent/(1+B) +
				ED2	Exposure Duration (Age 2 - 6)	1	years	(1), USEPA, 2005, 2011	2 × τ +(1 + 3B + 3B^2)/(1+B^2)
				BW	Body Weight	15	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	730	days	USEPA, 2014b	

Notes:

1 - Children will be evaluated as one age group (0 - 6 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, residential children will be evaluated as two age groups, 0 - 2 years and 2 - 6 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10, December.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F. Tables 3-19, 16-29, and 16-108.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

USEPA, 2014b: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.27.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - ADULT RESIDENTS - SOILS
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface/Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Resident	Adult	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Intake (mg/kg/day) =
				IR-S	Ingestion Rate	30	mg/day	USEPA, 2017	
				RBA	Relative Bioavailability	Chemical Specific	unitless	(1)	Cs x RBA x IRS x CF3 x FI x EF x ED
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	BW x AT
				FI	Fraction Ingested	1	unitless	USEPA, 1993	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 6 - 16)	2	years	(2), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 16 - 26)	5	years	(2), USEPA, 2005, 2011	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 2014	
Dermal	Resident	Adult	Baghurst Drive Site	CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002	Dermally Absorbed Dose (mg/kg/day) =
				CF3	Conversion Factor 3	1.0E-06	kg/mg	--	
				SA	Skin Surface Available for Contact	6,032	cm2	USEPA, 2014	CS x CF3 x SA x SSAF x DABS x EV x EF x ED
				SSAF	Soil to Skin Adherence Factor	0.01	mg/cm2/event	USEPA, 2004	BW x AT
				DABS	Absorption Factor	Chemical Specific	unitless	USEPA, 2004	
				EV	Events Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 6 - 16)	2	years	(2), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 16 - 26)	5	years	(2), USEPA, 2005, 2011	
				BW	Body Weight	80	kg	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 2014	

Notes:

1 - A value of 0.6 will be used for arsenic (USEPA, 2012) and 1 for all other chemicals.

2 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adults will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A.
USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.
USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.
USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Table 16-108.
USEPA, 2012: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil and Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil Documents. OSWER Directive 9200.1-113.
USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.
USEPA, 2017: Update for Chapter 5 of the Exposure Factors Handbook. EPA/600/R-17/384F.

TABLE 4.28.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - ADULT RESIDENTS - SOILS TO AIR

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	Resident	Adult	Baghurst Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 2002a	Exposure Concentration (mg/m^3) =
				CS	Chemical concentration in soil	Max or 95% UCL	mg/kg	USEPA, 2002b	
				ET	Exposure Time	24	hours/day	USEPA, 2014	$\frac{CA \times ET \times EF \times ED}{AT \times 24\ hours/day}$
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 6 - 16)	2	years	(1), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 16 - 26)	5	years	(1), USEPA, 2005, 2011	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014	CA = (1/PEF + 1/VF) x Cs
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 2014	
				PEF	Particulate Emission Factor	3.23E+09	m3/kg	USEPA, 2019	$PEF = Q/C_{wind} \times \frac{3600\ sec/hr}{0.036 \times (1 - V) \times (U_m/U_t)^3 \times F(x)}$
				VF	Volatilization Factor	Chemical-specific	m3/kg	USEPA, 2002a	
				Q/C	Inverse of mean concentration at center of source	87.36898	g/m2-s per kg/m3	USEPA, 2019	
				Ut	Equivalent threshold of wind velocity at 7m.	11.32	m/sec	USEPA, 2019	
				Um	Mean annual wind speed	4.29	m/sec	USEPA, 2019	
				V	Fraction of vegetative cover	0.5	unitless	USEPA, 2019	
				F(x)	Function dependent of Um/Ut	0.09918	unitless	USEPA, 2019	

Notes:

1 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adults will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002a: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2002b: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Table 16-108.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

USEPA, 2019: USEPA Regional Screening Level Calculator at http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. Default values.

USEPA, 2019: USEPA Regional Screening Level Calculator at http://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. Values are for Philadelphia, PA.

TABLE 4.29.CTE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY EXPOSURES - ADULT RESIDENTS - GROUNDWATER
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Residents	Adult	Baghurst Drive Site	CGW	Chemical Concentration in Groundwater	95% UCL or Max	ug/L	USEPA, 2014a	Chronic Daily Intake (CDI) (mg/kg/day) =
				CF	Conversion Factor	0.001	mg/ug	--	
				IR-GW	Ingestion Rate of Groundwater	1.2	L/day	USEPA, 2011	$\frac{CGW \times CF \times IR\text{-}GW \times EF \times ED}{BW \times AT}$
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 6 - 16)	2	years	(1), USEPA, 2005, 2011	
				ED2	Exposure Duration (Age 16 - 26)	5	years	(1), USEPA, 2005, 2011	
				BW	Body Weight	80	kg	USEPA, 2014b	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 2014b	
Dermal	Residents	Adult	Baghurst Drive Site	DAevent	Dermally Absorbed Dose per Event	Calculated	mg/cm2-event	USEPA, 2004	Dermally Absorbed Dose (mg/kg/day) =
				Cw	Chemical Concentration in Groundwater	Max or 95% UCL	ug/L	USEPA, 2014a	
				FA	Fraction Absorbed	Chemical Specific	unitless	USEPA, 2004	$\frac{DAevent \times EV \times EF \times ED \times SA}{BW \times AT}$
				CF	Conversion factor	0.001	L/cm^3	- -	
				Kp	Permeability coefficient	Chemical Specific	cm/hr	USEPA, 2004	
				τ	Lag time	Chemical Specific	hr/event	USEPA, 2004	For inorganics
				t*	Time it takes to reach steady state	Chemical Specific	hr/event	USEPA, 2004	DAevent = Kp x CW x CF x tevent
				tevent	Duration of event	0.25	hr/event	USEPA, 2011	
				B	Bunge model constant	Chemical Specific	unitless	USEPA, 2004	For organics if tevent <= t*
				SA	Skin Surface Available for Contact	19,652	cm2	USEPA, 2014b	DAevent= 2 x FA x Kp x Cw x CF x sqrt[(6 x τ x tevent)/π]
				EV	Event Frequency	1	events/day	USEPA, 2004	
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED1	Exposure Duration (Age 6 - 16)	2	years	(1), USEPA, 2005, 2011	DAevent =FA x Kp x Cw x CF x [tevent/(1+B) +
				ED2	Exposure Duration (Age 16 - 26)	5	years	(1), USEPA, 2005, 2011	
				BW	Body Weight	80	kg	USEPA, 2014b	$2 \times \tau + (1 + 3B + 3B^2)/(1+B^2)$)
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	2,555	days	USEPA, 2014b	

Notes:

1 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adults will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

Sources:

USEPA, 1993: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.

USEPA, 2002: Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10.

USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.

USEPA, 2011: Exposure Factors Handbook: 2011 Edition. EPA/600R-090/052F, Table 3-33, 16-30, 16-34, and 16-108.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

USEPA, 2014b: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

TABLE 4.30.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURES - ADULT RESIDENTS - INHALATION OF VOLATILES FROM GROUNDWATER

BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Inhalation	On-Site Residents	Adult	Baghusrt Drive Site	CA	Chemical concentration in air	Calculated	mg/m3	USEPA, 1991	Exposure Concentration (mg/m3) =
				CGW	Chemical concentration in water.	95% UCL or Max	ug/L	USEPA, 2014a	
				CF	Conversion Factor	0.001	mg/ug	--	CA x ET x EF x ED
				ET	Exposure Time	24	hours/day	USEPA, 2014b	AT x 24 hours/day
				EF	Exposure Frequency	234	days/year	USEPA, 1993	
				ED	Exposure Duration (Age 6 - 16)	2	years	(1), USEPA, 2005, 2011	CA = CGW x CF x VF
				ED	Exposure Duration (Age 6 - 16)	5	years	(1), USEPA, 2005, 2011	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, 2014b	
				AT-N	Averaging Time (Non-Cancer)	2555	days	USEPA, 2014b	
				VF	Volatilization Factor	0.5	L/m3	USEPA, 1991	

Notes:

1 - Adults will be evaluated as one age group (7 - 26 years) for non-mutagenic chemicals. For chemicals that act via the mutagenic mode of action, adults will be evaluated as two age groups, 7 - 16 years and 16 - 26 years in accordance with USEPA's Supplemental Guidance of Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005).

USEPA, 1989: Risk Assessment Guidance for Superfund. Vol 1: Human Health Evaluation Manual, Part A. EPA/540/1-86/060.

USEPA, 1991: Human Health Evaluation Manual, Part B: Development of Risk-based Preliminary Remediation Goals. OSWER Directive 9285.7-01B.

USEPA, 2014a: Determining Groundwater Exposure Point Concentrations. OSWER 9283.1-42

USEPA, 2014b: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120.

RAGS Part D Table 5

Non-Cancer Toxicity Data

LIST OF TABLES
RAGS PART D TABLE 5
NON-CANCER TOXICITY DATA

TABLE 5.1
NON-CANCER TOXICITY DATA - ORAL/DERMAL
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)[3] (MM/DD/YYYY)
Volatile Organic Compounds										
1,1,1-Trichloroethane	Subchronic	7.0E+00	mg/kg/day	1	7.0E+00	mg/kg/day	Body Weight	300	IRIS	1/28/2019
	Chronic	2.0E+00	mg/kg/day	1	2.0E+00	mg/kg/day	Body Weight	1000	IRIS	1/28/2019
1,1,2-Trichloroethane	Subchronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Immune	1000	PPRTV	4/1/2011
	Chronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Immune, Hematologic	1000	IRIS	1/28/2019
1,1-Dichloroethane	Subchronic	2.0E+00	mg/kg/day	1	2.0E+00	mg/kg/day	Urinary	300	PPRTV	9/27/2006
	Chronic	2.0E-01	mg/kg/day	1	2.0E-01	mg/kg/day	Urinary	3000	PPRTV	9/27/2006
1,1-Dichloroethene	Chronic	5.0E-02	mg/kg/day	1	5.0E-02	mg/kg/day	Hepatic	100	IRIS	1/28/2019
1,2-Dichloroethane	Subchronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Urinary	3000	PPRTV	10/1/2010
	Chronic	6.0E-03	mg/kg/day	1	6.0E-03	mg/kg/day	Urinary	30000	PPRTV X	10/1/2010
2-Hexanone	Chronic	5.0E-03	mg/kg/day	1	5.0E-03	mg/kg/day	Nervous	1000	IRIS	1/28/2019
Benzene	Subchronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Hematologic	100	PPRTV	9/29/2009
	Chronic	4.0E-03	mg/kg/day	1	4.0E-03	mg/kg/day	Immune	300	IRIS	1/28/2019
Bromodichloromethane	Chronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Urinary	1000	IRIS	1/28/2019
Chloroform	Subchronic	1.0E-01	mg/kg/day	1	1.0E-01	mg/kg/day	Hepatic	100	ATSDR	9/1997
	Chronic	1.0E-02	mg/kg/day	1	1.0E-02	mg/kg/day	Hepatic	100	IRIS	1/28/2019
Methyl Tert-Butyl Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	Subchronic	6.0E-02	mg/kg/day	1	6.0E-02	mg/kg/day	Hepatic	100	HEAST	1/28/2019
	Chronic	6.0E-03	mg/kg/day	1	6.0E-03	mg/kg/day	Hepatic	30	IRIS	1/28/2019
Tetrachloroethene	Subchronic	1.0E-01	mg/kg/day	1	1.0E-01	mg/kg/day	Hepatic	100	HEAST	1/28/2019
	Chronic	6.0E-03	mg/kg/day	1	6.0E-03	mg/kg/day	Nervous, Ocular	1000	IRIS	1/28/2019
Trichloroethene	Subchronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Developmental, Immune	10 - 100	ATSDR	10/2014
	Chronic	5.0E-04	mg/kg/day	1	5.0E-04	mg/kg/day	Cardiovascular, Developmental, Immune	10 - 1000	IRIS	1/28/2019
Vinyl Chloride	Chronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Hepatic	30	IRIS	1/28/2019
Semivolatile Organic Compounds										
1,4-Dioxane	Subchronic	5.0E-01	mg/kg/day	1	5.0E-01	mg/kg/day	Hepatic	100	ATSDR	4/2012
	Chronic	3.0E-02	mg/kg/day	1	3.0E-02	mg/kg/day	Hepatic, Urinary	300	IRIS	1/28/2019
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides										
Aldrin	Subchronic	4.0E-05	mg/kg/day	1	4.0E-05	mg/kg/day	Urinary	1000	PPRTV	3/14/2005
	Chronic	3.0E-05	mg/kg/day	1	3.0E-05	mg/kg/day	Hepatic	1000	IRIS	1/28/2019
delta-BHC[4]	Chronic	8.0E-03	mg/kg/day	1	8.0E-03	mg/kg/day	Hepatic	100	ATSDR	8/2005
Dieldrin	Subchronic	1.0E-04	mg/kg/day	1	1.0E-04	mg/kg/day	Nervous System	100	ATSDR	9/2002
	Chronic	5.0E-05	mg/kg/day	1	5.0E-05	mg/kg/day	Hepatic	100	IRIS	1/28/2019
Heptachlor Epoxide	Subchronic	1.3E-05	mg/kg/day	1	1.3E-05	mg/kg/day	Hepatic	1000	HEAST	1/28/2019
	Chronic	1.3E-05	mg/kg/day	1	1.3E-05	mg/kg/day	Hepatic	1000	IRIS	1/28/2019
Inorganics										
Aluminum	Subchronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	Nervous System	30	ATSDR	9/2008
	Chronic	1.0E+00	mg/kg/day	1	1.0E+00	mg/kg/day	Nervous System	100	PPRTV	10/23/2006
Antimony	Subchronic	4.0E-04	mg/kg/day	0.15	6.0E-05	mg/kg/day	Whole Body	1000	PPRTV	7/29/2008
	Chronic	4.0E-04	mg/kg/day	0.15	6.0E-05	mg/kg/day	Hematologic	1000	IRIS	1/28/2019
Arsenic	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Cardiovascular System, Dermal	3	IRIS	1/28/2019
Cadmium (water)	Subchronic	5.0E-04	mg/kg/day	0.05	2.5E-05	mg/kg/day	Musculoskeletal	100	ATSDR	9/2012
	Chronic	5.0E-04	mg/kg/day	0.05	2.5E-05	mg/kg/day	Urinary	10	IRIS	1/28/2019
Chromium[5]	Subchronic	5.0E-03	mg/kg/day	0.025	1.3E-04	mg/kg/day	Hematologic	100	ATSDR	9/2012
	Chronic	3.0E-03	mg/kg/day	0.025	7.5E-05	mg/kg/day	None Reported	300	IRIS	1/28/2019

TABLE 5.1
NON-CANCER TOXICITY DATA - ORAL/DERMAL
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal[1]	Absorbed RfD for Dermal[2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)[3] (MM/DD/YYYY)
Cobalt	Subchronic	3.0E-03	mg/kg/day	1	3.0E-03	mg/kg/day	Thyroid	300	PPRTV	8/25/2008
	Chronic	3.0E-04	mg/kg/day	1	3.0E-04	mg/kg/day	Thyroid	3000	PPRTV	8/25/2008
Copper	Chronic	4.0E-02	mg/kg/day	1	4.0E-02	mg/kg/day	Gastrointestinal System	NA	HEAST	1/28/2019
Cyanide	Subchronic	2.0E-02	mg/kg/day	1	2.0E-02	mg/kg/day	Whole Body, Thyroid, Nervous System	500	HEAST	1/28/2019
	Chronic	6.0E-04	mg/kg/day	1	6.0E-04	mg/kg/day	Reproductive	3000	IRIS	1/28/2019
Iron	Subchronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	Gastrointestinal System	1.5	PPRTV	9/11/2006
	Chronic	7.0E-01	mg/kg/day	1	7.0E-01	mg/kg/day	Gastrointestinal System	1.5	PPRTV	9/11/2006
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese[6]	Chronic	2.4E-02	mg/kg/day	0.04	9.6E-04	mg/kg/day	Nervous System	3	IRIS	1/28/2019
Nickel	Subchronic	2.0E-02	mg/kg/day	0.04	8.0E-04	mg/kg/day	Body Weight	300	HEAST	1/28/2019
	Chronic	2.0E-02	mg/kg/day	0.04	8.0E-04	mg/kg/day	Body Weight	300	IRIS	1/28/2019
Thallium	Subchronic	4.0E-05	mg/kg/day	1	4.0E-05	mg/kg/day	Dermal	1000	PPRTV X	10/25/2012
	Chronic	1.0E-05	mg/kg/day	1	1.0E-05	mg/kg/day	Dermal	3000	PPRTV X	10/25/2012
Vanadium[7]	Subchronic	1.0E-02	mg/kg/day	0.026	2.6E-04	mg/kg/day	Hematologic	10	ATSDR	9/2012
	Chronic	5.0E-03	mg/kg/day	0.026	1.3E-04	mg/kg/day	Dermal	300	IRIS	1/28/2019

Footnotes:

1 - U.S. EPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
2 - Adjusted dermal RfD = Oral RfD x Oral Absorption Efficiency for Dermal.
3 - Dates for IRIS and HEAST are the date the databases were searched. The dates for ATSDR and PPRTV are the dates of the reference documents containing the toxicity values.
4 - Values are for alpha-BHC.
5 - Values are for hexavalent chromium.
6 - Adjusted IRIS value in accordance with IRIS.
7 - Chronic value from IRIS adjusted as specified in the USEPA Regional Screening Level User Guide (November 2018).

Definitions:

ATSDR = Agency for Toxic Substances and Disease Registry.
HEAST = Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System
NA = Not Available.
PPRTV = Provisional Peer Reviewed Toxicity Value.
PPRTV X = Provisional Peer Reviewed Toxicity Appendix Screening Value

TABLE 5.2
NON-CANCER TOXICITY DATA - INHALATION
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units			Source(s)	Date(s)[1] (MM/DD/YYYY)
Volatile Organic Compounds							
1,1,1-Trichloroethane	Subchronic	5.0E+00	mg/m^3	Hepatic	100	IRIS	1/28/2019
	Chronic	5.0E+00	mg/m^3	Hepatic	100	IRIS	1/28/2019
1,1,2-Trichloroethane	Subchronic	2.0E-03	mg/m^3	Respiratory	300	PPRTV X	4/1/2011
	Chronic	2.0E-04	mg/m^3	Respiratory	3000	PPRTV X	4/1/2011
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	Chronic	2.0E-01	mg/m^3	Hepatic	30	IRIS	1/28/2019
1,2-Dichloroethane	Subchronic	7.0E-02	mg/m^3	Nervous System	300	PPRTV	10/1/2010
	Chronic	7.0E-03	mg/m^3	Nervous System	3000	PPRTV	10/1/2010
2-Hexanone	Chronic	3.0E-02	mg/m^3	Nervous	3000	IRIS	1/28/2019
Benzene	Subchronic	8.0E-02	mg/m^3	Hemotologic	100	PPRTV	9/29/2009
	Chronic	3.0E-02	mg/m^3	Immune	300	IRIS	1/28/2019
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA
Chloroform	Subchronic	2.4E-01	mg/m^3	Hepatic	300	ATSDR	9/1997
	Chronic	9.8E-02	mg/m^3	Hepatic	100	ATSDR	9/1997
Methyl Tert-Butyl Ether	Chronic	3.0E+00	mg/m^3	Hepatic, Urinary, Ocular	100	IRIS	1/28/2019
Methylene Chloride	Subchronic	1.0E+00	mg/m^3	Hepatic	90	ATSDR	9/2000
	Chronic	6.0E-01	mg/m^3	Hepatic	30	IRIS	1/28/2019
Tetrachloroethene	Chronic	4.0E-02	mg/m^3	Nervous System, Ocular	1000	IRIS	1/28/2019
Trichloroethene	Chronic	2.0E-03	mg/m^3	Cardiovascular, Developmental, Immune	10 - 100	IRIS	1/28/2019
Vinyl Chloride	Chronic	1.0E-01	mg/m^3	Hepatic	30	IRIS	1/28/2019
Semivolatile Organic Compounds							
1,4-Dioxane	Subchronic	7.2E-01	mg/m^3	Respiratory	30	ATSDR	4/2012
	Chronic	3.0E-02	mg/m^3	Nervous System, Respiratory	1000	IRIS	1/28/2019
Dibenzo(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA
Pesticides							
Aldrin	NA	NA	NA	NA	NA	NA	NA
delta-BHC	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	NA
Heptachlor Epoxide	NA	NA	NA	NA	NA	NA	NA

TABLE 5.2
NON-CANCER TOXICITY DATA - INHALATION
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units			Source(s)	Date(s)[1] (MM/DD/YYYY)
Inorganics							
Aluminum	Chronic	5.0E-03	mg/m^3	Nervous System	300	PPRTV	10/23/2006
Antimony	NA	NA	NA	NA	NA	NA	NA
Arsenic	Chronic	1.5E-05	mg/m^3	Cardiovascular System, Dermal	NA	Cal EPA	2008
Cadmium	Chronic	1.0E-05	mg/m^3	Urinary	9	ATSDR	9/2012
Chromium[2]	Subchronic	3.0E-04	mg/m^3	Respiratory	30	ATSDR	9/2012
	Chronic	1.0E-04	mg/m^3	Respiratory	300	IRIS	1/28/2019
Cobalt	Subchronic	2.0E-05	mg/m^3	Respiratory	100	PPRTV	8/25/2008
	Chronic	6.0E-06	mg/m^3	Respiratory	300	PPRTV	8/25/2008
Copper	NA	NA	NA	NA	NA	NA	NA
Cyanide[3]	Chronic	8.0E-04	mg/m^3	Endocrine	3000	IRIS	1/28/2019
Iron	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA
Manganese	Chronic	5.0E-05	mg/m^3	Nervous System	1000	IRIS	1/28/2019
Nickel	Subchronic	2.0E-04	mg/m^3	Respiratory	30	ATSDR	8/2005
	Chronic	9.0E-05	mg/m^3	Respiratory	30	ATSDR	8/2005
Thallium	NA	NA	NA	NA	NA	NA	NA
Vanadium	Chronic	1.0E-04	mg/m^3	Respiratory	30	ATSDR	9/2012

Footnotes:

1 - Dates for IRIS and HEAST are the date the databases were searched. The dates for ATSDR, PPRTV, and Cal EPA are the dates of the reference documents containing the toxicity values.
2 - Values are for hexavalent chromium.
3 - Values are for hydrogen cyanide.

Definitions:

ATSDR = Agency for Toxic Substances and Disease Registry.
Cal EPA = California Environmental Protection Agency, Technical Support Document for Noncancer RELs, 2008.
HEAST = Health Effects Assessment Summary Table
IRIS = Integrated Risk Information System
NA = Not Applicable
PPRTV = Provisional Peer Reviewed Toxicity Value.
PPRTV X = Provisional Peer Reviewed Toxicity Appendix Screening Value

RAGS Part D Table 6

Cancer Toxicity Data

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CANCER TOXICITY DATA

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TABLE 6.1
CANCER TOXICITY DATA - ORAL/DERMAL
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA
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Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence/ Cancer Guideline Description[3]	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s)[4] (MM/DD/YYYY)
Volatile Organic Compounds								
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	IRIS	1/28/2019
1,1,2-Trichloroethane	5.7E-02	$(mg/kg/day)^{-1}$	1	5.7E-02	$(mg/kg/day)^{-1}$	C (Possible human carcinogen)	IRIS	1/28/2019
1,1-Dichloroethane	5.7E-03	$(mg/kg/day)^{-1}$	1	5.7E-03	$(mg/kg/day)^{-1}$	C (Possible human carcinogen)	Cal EPA	6/2009
1,1-Dichloroethene	NA	NA	NA	NA	NA	Data are inadequate for an assessment of human carcinogenic potential (Oral route)	IRIS	1/28/2019
1,2-Dichloroethane	9.1E-02	$(mg/kg/day)^{-1}$	1	9.1E-02	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	1/28/2019
2-Hexanone	NA	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	IRIS	1/28/2019
Benzene	5.5E-02	$(mg/kg/day)^{-1}$	1	5.5E-02	$(mg/kg/day)^{-1}$	Known/likely human carcinogen	IRIS	1/28/2019
Bromodichloromethane	6.2E-02	$(mg/kg/day)^{-1}$	1	6.2E-02	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	1/28/2019
Chloroform	3.1E-02	$(mg/kg/day)^{-1}$	1	3.1E-02	$(mg/kg/day)^{-1}$	Likely to be carcinogenic to humans	Cal EPA	6/2009
Methyl Tert-Butyl Ether	1.8E-03	$(mg/kg/day)^{-1}$	1	1.8E-03	$(mg/kg/day)^{-1}$	NA	Cal EPA	6/2009
Methylene Chloride	2.0E-03	$(mg/kg/day)^{-1}$	1	2.0E-03	$(mg/kg/day)^{-1}$	Likely to be carcinogenic to humans	IRIS	1/28/2019
Tetrachloroethene	2.1E-03	$(mg/kg/day)^{-1}$	1	2.1E-03	$(mg/kg/day)^{-1}$	Likely to be carcinogenic to humans	IRIS	1/28/2019
Trichloroethene - (Nonmutagenic)[5]	3.7E-02	$(mg/kg/day)^{-1}$	1	3.7E-02	$(mg/kg/day)^{-1}$	Carcinogenic to humans	IRIS	1/28/2019
Trichloroethene (Mutagenic)[5,6]	9.3E-03	$(mg/kg/day)^{-1}$	1	9.3E-03	$(mg/kg/day)^{-1}$	Carcinogenic to humans	IRIS	1/28/2019
Vinyl Chloride	7.2E-01	$(mg/kg/day)^{-1}$	1	7.2E-01	$(mg/kg/day)^{-1}$	Known/likely human carcinogen	IRIS	1/28/2019
Semivolatile Organic Compounds								
1,4-Dioxane	1.0E-01	$(mg/kg/day)^{-1}$	1	1.0E-01	$(mg/kg/day)^{-1}$	Likely to be carcinogenic to humans	IRIS	1/28/2019
Dibenzo(a,h)anthracene[6]	1.0E+00	$(mg/kg/day)^{-1}$	1	1.0E+00	$(mg/kg/day)^{-1}$	Carcinogenic to humans	USEPA(1)	7/1993
Pesticides								
Aldrin	1.7E+01	$(mg/kg/day)^{-1}$	1	1.7E+01	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	1/28/2019
delta-BHC[7]	6.3E+00	$(mg/kg/day)^{-1}$	1	6.3E+00	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	1/28/2019
Dieldrin	1.6E+01	$(mg/kg/day)^{-1}$	1	1.6E+01	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	1/28/2019
Heptachlor Epoxide	9.1E+00	$(mg/kg/day)^{-1}$	1	9.1E+00	$(mg/kg/day)^{-1}$	B2 (Probable human carcinogen)	IRIS	1/28/2019
Inorganics								
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	1.5E+00	$(mg/kg/day)^{-1}$	1	1.5E+00	$(mg/kg/day)^{-1}$	A (human carcinogen)	IRIS	1/28/2019
Cadmium	NA	NA	NA	NA	NA	B1 (Probable human carcinogen)	NA	NA
Chromium[6,8]	5.0E-01	$(mg/kg/day)^{-1}$	0.025	2.0E+01	$(mg/kg/day)^{-1}$	Carcinogenic potential cannot be determined	Cal EPA	7/29/2011
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA
Cyanide	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	B2 (Probable human carcinogen)	NA	NA

TABLE 6.1
CANCER TOXICITY DATA - ORAL/DERMAL
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal[1]	Absorbed Cancer Slope Factor for Dermal[2]		Weight of Evidence/ Cancer Guideline Description[3]	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s)[4] (MM/DD/YYYY)
Manganese	NA	NA	NA	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA

Footnotes:
1 - USEPA, 2004: Risk Assessment Guidance for Superfund (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005.
2 - Weight of evidence description is the most recent one presented in IRIS.
3 - Dates for IRIS are the date the databases was searched. The dates for Cal EPA are the dates of the reference documents containing the toxicity values.
4 - Adjusted cancer slope factor for dermal = Oral cancer slope factor / Oral absorption efficiency for dermal.
5 - See text for a discussion of trichloroethene toxicity.
6 - Trichloroethene, dibenzo(a,h)anthracene, and hexavalent chromium are considered to act via the mutagenic mode of action. These chemicals are evaluated in accordance with USEPA's for Assessing Susceptibility from Early-Life Exposure to Carcinogens (March 2005).
7 - Alpha-BHC is used as a surrogate for delta-BHC.
8 - Values are for hexavalent chromium.

Definitions:
Cal EPA = California Environmental Protection Agency, Air Toxics Support Program Technical Support Document for Cancer Potencies, June 2009.
IRIS = Integrated Risk Information System.
NA = Not Available.
USEPA(1) = USEPA Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons, 1993b, EPA/600/R-93/089.

TABLE 6.2
CANCER TOXICITY DATA - INHALATION
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Chemical of Potential Concern	Unit Risk		Weight of Evidence/ Cancer Guideline Description[1]	Unit Risk : Inhalation	
	Value	Units		Source(s)	Date(s)[2] (MM/DD/YYYY)
Volatile Organic Compounds					
1,1,1-Trichloroethane	NA	NA	Inadequate information to assess carcinogenic potential	IRIS	1/28/2019
1,1,2-Trichloroethane	1.6E-05	$(ug/m^3)^{-1}$	C (Possible human carcinogen)	IRIS	1/28/2019
1,1-Dichloroethane	1.6E-06	$(ug/m^3)^{-1}$	C (Possible human carcinogen)	Cal EPA	6/2009
1,1-Dichloroethene	NA	NA	Suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential (Inhalation route)	IRIS	1/28/2019
1,2-Dichloroethane	2.6E-05	$(ug/m^3)^{-1}$	B2 (Probable human carcinogen)	IRIS	1/28/2019
2-Hexanone	NA	NA	Inadequate information to assess carcinogenic potential	IRIS	1/28/2019
Benzene	7.8E-06	$(ug/m^3)^{-1}$	Known/likely human carcinogen	IRIS	1/28/2019
Bromodichloromethane	3.7E-05	$(ug/m^3)^{-1}$	NA	Cal EPA	6/2009
Chloroform	2.3E-05	$(ug/m^3)^{-1}$	Likely to be carcinogenic to humans	IRIS	1/28/2019
Methyl Tert-Butyl Ether	2.6E-07	$(ug/m^3)^{-1}$	NA	Cal EPA	6/2009
Methylene Chloride	1.0E-08	$(ug/m^3)^{-1}$	Likely to be carcinogenic to humans	IRIS	1/28/2019
Tetrachloroethene	2.6E-07	$(ug/m^3)^{-1}$	Likely to be carcinogenic to humans	IRIS	1/28/2019
Trichloroethene - (Nonmutagenic)[3]	3.1E-06	$(ug/m^3)^{-1}$	Carcinogenic to humans	IRIS	1/28/2019
Trichloroethene - (Mutagenic)[3,4]	1.0E-06	$(ug/m^3)^{-1}$	Carcinogenic to humans	IRIS	1/28/2019
Vinyl Chloride	4.4E-06	$(ug/m^3)^{-1}$	Known/likely human carcinogen	IRIS	1/28/2019
Semivolatile Organic Compounds					
1,4-Dioxane	5.0E-06	$(ug/m^3)^{-1}$	Likely to be carcinogenic to humans	IRIS	1/28/2019
Dibenzo(a,h)anthracene[4]	6.0E-04	$(ug/m^3)^{-1}$	Carcinogenic to humans	USEPA(1)	7/1993
Pesticides					
Aldrin	4.9E-03	$(ug/m^3)^{-1}$	B2 (Probable human carcinogen)	IRIS	1/28/2019
delta-BHC[6]	1.8E-03	$(ug/m^3)^{-1}$	B2 (Probable human carcinogen)	IRIS	1/28/2019
Dieldrin	4.6E-03	$(ug/m^3)^{-1}$	B2 (Probable human carcinogen)	IRIS	1/28/2019
Heptachlor Epoxide	2.6E-03	$(ug/m^3)^{-1}$	B2 (Probable human carcinogen)	IRIS	1/28/2019
Inorganics					
Aluminum	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA

TABLE 6.2
CANCER TOXICITY DATA - INHALATION
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Chemical of Potential Concern	Unit Risk		Weight of Evidence/ Cancer Guideline Description[1]	Unit Risk : Inhalation	
	Value	Units		Source(s)	Date(s)[2] (MM/DD/YYYY)
Arsenic	4.3E-03	$(ug/m^3)^{-1}$	A (Known human carcinogen)	IRIS	1/28/2019
Cadmium	1.8E-03	$(ug/m^3)^{-1}$	B1 (Probable human carcinogen)	IRIS	1/28/2019
Chromium[4,6]	8.4E-02	$(ug/m^3)^{-1}$	Known/likely human carcinogen (Inhalation route)	IRIS	1/28/2019
Cobalt	9.0E-03	$(ug/m^3)^{-1}$	NA	PPRTV	8/25/2008
Copper	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA
Cyanide	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA
Iron	NA	NA	NA	NA	NA
Lead	NA	NA	B2 (Probable human carcinogen)	NA	NA
Manganese	NA	NA	D (Not classifiable as to human carcinogenicity)	NA	NA
Nickel	2.6E-04	$(ug/m^3)^{-1}$	NA	Cal EPA	6/2009
Thallium	NA	NA	Inadequate information to assess carcinogenic potential	NA	NA
Vanadium	NA	NA	NA	NA	NA

Footnotes:

1 - Weight of evidence description is the most recent one presented in IRIS.

2 - Dates for IRIS are the date the databases was searched. The dates for Cal EPA are the dates of the reference documents containing the toxicity values.

3 - See text for a discussion of trichloroethene toxicity.

4 - Trichloroethene, dibenzo(a,h)anthracene, and hexavalent chromium are considered to act via the mutagenic mode of action. These chemicals are evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (March 2005).

5 - Alpha-BHC is used as a surrogate for delta-BHC.

6 - Values are for hexavalent chromium.

Definitions:

Cal EPA = California Environmental Protection Agency, Air Toxics Support Program Technical Support Document for Cancer Potencies, June 2009.

IRIS = Integrated Risk Information System.

NA = Not Available.

PPRTV = Provisional Peer Reviewed Toxicity Value.

USEPA(1) = USEPA Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons, 1993b, EPA/600/R-93/089.

RAGS Part D Table 7

Calculation of Cancer Risks and Non-Cancer Hazards

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RAGS PART D TABLE 7

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

TABLE 7.1.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Intermittent Stream	Ingestion	1,1-Dichloroethane	22.4	ug/L	1.5E-06	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	8E-09	1.0E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.00005
				Dieldrin	0.072	ug/L	4.7E-09	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	8E-08	3.3E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0007
				Heptachlor Epoxide	0.037	ug/L	2.4E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	2E-08	1.7E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.001
				Arsenic	10.2	ug/L	6.7E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1E-06	4.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.02
				Chromium	1.59	ug/L	3.1E-07	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	2E-07	7.3E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0002
				Manganese	1970	ug/L	1.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	9.1E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.04
			Exp. Route Total								1E-06					0.06
			Dermal	1,1-Dichloroethane	22.4	ug/L	6.1E-07	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	3E-09	4.3E-06	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.00002
				Dieldrin	0.072	ug/L	3.4E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	5E-07	2.4E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.005
				Heptachlor Epoxide	0.037	ug/L	1.2E-08	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1E-07	8.3E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.006
				Arsenic	10.2	ug/L	3.5E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	5E-08	2.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0008
				Chromium	1.59	ug/L	3.3E-08	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	7E-07	7.7E-08	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.001
				Manganese	1970	ug/L	6.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	4.8E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.05
			Exp. Route Total								1E-06					0.06
		Exposure Point Total									3E-06					0.1
	Exposure Medium Total										3E-06					0.1
Medium Total											3E-06					0.1
Sediment	Sediment	Intermittent Stream	Ingestion	Arsenic	15.3	mg/kg	2.1E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3E-07	1.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.005
				Chromium	39	mg/kg	2.7E-06	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1E-06	6.3E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.002
				Cobalt	18.9	mg/kg	4.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	3.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.01
				Iron	46700	mg/kg	1.1E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	7.6E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.01
			Exp. Route Total								2E-06					0.03
			Dermal	Arsenic	15.3	mg/kg	8.0E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1E-07	5.6E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.002
				Chromium	39	mg/kg	2.0E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	4E-06	4.7E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.006
				Cobalt	18.9	mg/kg	3.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	2.3E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0008
				Iron	46700	mg/kg	8.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -	5.7E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0008
			Exp. Route Total								4E-06					0.010
		Exposure Point Total									6E-06					0.04
	Exposure Medium Total										6E-06					0.04
Medium Total											6E-06					0.04
										Total of Receptor Risks Across All Media	8E-06				Total of Receptor Hazards Across All Media	0.2

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.2.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA
PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Recreational User
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Perkiomen Creek	Ingestion	Arsenic	1.3	ug/L	See Table 7.4.RME for Cancer Risks					5.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.020
			Exp. Route Total													0.020
			Dermal	Arsenic	1.3	ug/L						1.2E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00039
			Exp. Route Total													0.00039
		Exposure Point Total														0.020
	Exposure Medium Total															0.020
Medium Total																0.020
Sediment	Sediment	Perkiomen Creek	Ingestion	Chromium	44.8	mg/kg						8.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.028
			Exp. Route Total													0.028
			Dermal	Chromium	44.8	mg/kg						2.0E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.027
			Exp. Route Total													0.027
		Exposure Point Total														0.055
	Exposure Medium Total															0.055
Medium Total																0.055
												Total of Receptor Hazards Across All Media				0.075

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.3.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Recreational Users
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Perkiomen Creek	Ingestion	Arsenic	1.3	ug/L	See Table 7.4.RME for Cancer Risks					6.6E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0022
			Exp. Route Total													0.0022
			Dermal	Arsenic	1.3	ug/L						5.6E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00019
			Exp. Route Total													0.00019
		Exposure Point Total														0.0024
	Exposure Medium Total															0.0024
Medium Total																0.0024
Sediment	Sediment	Perkiomen Creek	Ingestion	Chromium	44.8	mg/kg						8.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0027
			Exp. Route Total													0.0027
			Dermal	Chromium	44.8	mg/kg						3.4E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0045
			Exp. Route Total													0.0045
		Exposure Point Total														0.0072
	Exposure Medium Total															0.0072
Medium Total																0.0072
												Total of Receptor Hazards Across All Media				0.0095

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.4.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Recreational Users
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Perkiomen Creek	Ingestion	Arsenic	1.3	ug/L	7.0E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.0E-06	See Tables 7.2.RME and 7.3.RME for Hazard Indices				
			Exp. Route Total								1.0E-06					
			Dermal	Arsenic	1.3	ug/L	2.6E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.9E-08					
			Exp. Route Total								3.9E-08					
		Exposure Point Total									1.1E-06					
	Exposure Medium Total										1.1E-06					
Medium Total											1.1E-06					
Sediment	Sediment	Perkiomen Creek	Ingestion	Chromium	44.8	mg/kg	4.3E-05	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	2.2E-05					
			Exp. Route Total								2.2E-05					
			Dermal	Chromium	44.8	mg/kg	1.1E-06	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	2.2E-05					
			Exp. Route Total								2.2E-05					
		Exposure Point Total									4.4E-05					
	Exposure Medium Total										4.4E-05					
Medium Total											4.4E-05					
										Total of Receptor Risks Across All Media	4.5E-05					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.5.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA
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Scenario Timeframe: Future
Receptor Population: Construction Worker
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Baghusrt Drive Site	Ingestion	Aluminum	28200	mg/kg	1.1E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	8.0E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.080
				Arsenic	35.5	mg/kg	8.6E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	1.3E-06	6.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.20
				Chromium	41	mg/kg	1.7E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	8.3E-07	1.2E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.023
				Cobalt	20.4	mg/kg	8.2E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	5.8E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.019
				Copper	915	mg/kg	3.7E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.6E-03	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.065
				Iron	37600	mg/kg	1.5E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.1E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.15
				Manganese	807	mg/kg	3.3E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.3E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.095
				Thallium	0.548	mg/kg	2.2E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.5E-06	(mg/kg/day)	4.0E-05	(mg/kg/day)	0.039
				Vanadium	72.3	mg/kg	2.9E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.0E-04	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.020
			Exp. Route Total								2.1E-06					0.69
			Dermal	Aluminum	28200	mg/kg	3.6E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.6E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0026
				Arsenic	35.5	mg/kg	1.4E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	2.1E-07	9.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.032
				Chromium	41	mg/kg	5.3E-08	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	1.1E-06	3.7E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.030
				Cobalt	20.4	mg/kg	2.6E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.8E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00062
				Copper	915	mg/kg	1.2E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	8.3E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.0021
				Iron	37600	mg/kg	4.9E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.4E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0049
				Manganese	807	mg/kg	1.0E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	7.3E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.076
				Thallium	0.548	mg/kg	7.1E-10	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	5.0E-08	(mg/kg/day)	4.0E-05	(mg/kg/day)	0.0012
				Vanadium	72.3	mg/kg	9.4E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	6.5E-06	(mg/kg/day)	2.6E-04	(mg/kg/day)	0.025
			Exp. Route Total								1.3E-06					0.17
		Exposure Point Total									3.4E-06					0.87
	Exposure Medium Total										3.4E-06					0.87
	Air	Baghusrt Drive Site	Inhalation	Aluminum	2.0E-02	mg/m^3	6.6E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	4.6E-03	(mg/m^3)	5.0E-03	(mg/m^3)	0.92
				Arsenic	2.5E-05	mg/m^3	8.3E-08	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	3.6E-07	5.8E-06	(mg/m^3)	1.5E-05	(mg/m^3)	0.39
				Chromium	2.9E-05	mg/m^3	9.6E-08	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	8.0E-06	6.7E-06	(mg/m^3)	3.0E-04	(mg/m^3)	0.022
				Cobalt	1.5E-05	mg/m^3	4.8E-08	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	4.3E-07	3.3E-06	(mg/m^3)	2.0E-05	(mg/m^3)	0.17
				Copper	6.5E-04	mg/m^3	2.1E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	1.5E-04	(mg/m^3)	NA	(mg/m^3)	--
				Iron	2.7E-02	mg/m^3	8.8E-05	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	6.1E-03	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	5.8E-04	mg/m^3	1.9E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	1.3E-04	(mg/m^3)	5.0E-05	(mg/m^3)	2.6
				Thallium	3.9E-07	mg/m^3	1.3E-09	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	8.9E-08	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	5.2E-05	mg/m^3	1.7E-07	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	1.2E-05	(mg/m^3)	1.0E-04	(mg/m^3)	0.12
			Exp. Route Total								8.8E-06					4.2
		Exposure Point Total									8.8E-06					4.2
	Exposure Medium Total										8.8E-06					4.2
Medium Total											1.2E-05					5.1
										Total of Receptor Risks Across All Media	1.2E-05				Total of Receptor Hazards Across All Media	5.1

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.6.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmer
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Ingestion	Aluminum	28200	mg/kg	See Table 7.8.RME for Cancer Risks					3.6E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.36
				Arsenic	35.5	mg/kg						2.7E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.91
				Chromium	41	mg/kg						5.2E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.17
				Cobalt	20.4	mg/kg						2.6E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.87
				Copper	915	mg/kg						1.2E-02	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.29
				Iron	37600	mg/kg						4.8E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.69
				Manganese	807	mg/kg						1.0E-02	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.43
				Thallium	0.548	mg/kg						7.0E-06	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.70
				Vanadium	72.3	mg/kg						9.2E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.18
			Exp. Route Total													4.6
			Dermal	Aluminum	28200	mg/kg						8.6E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0086
				Arsenic	35.5	mg/kg						3.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.11
				Chromium	41	mg/kg						1.2E-05	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.17
				Cobalt	20.4	mg/kg						6.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.021
				Copper	915	mg/kg						2.8E-04	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.0069
				Iron	37600	mg/kg						1.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.016
				Manganese	807	mg/kg						2.4E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.26
				Thallium	0.548	mg/kg						1.7E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.017
				Vanadium	72.3	mg/kg						2.2E-05	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.17
			Exp. Route Total													0.77
		Exposure Point Total														5.4
	Exposure Medium Total															5.4
	Air	Baghurst Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3						8.4E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.0017
				Arsenic	1.1E-08	mg/m^3						1.1E-08	(mg/m^3)	1.5E-05	(mg/m^3)	0.00070
				Chromium	1.3E-08	mg/m^3						1.2E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.00012
				Cobalt	6.3E-09	mg/m^3						6.1E-09	(mg/m^3)	6.0E-06	(mg/m^3)	0.0010
				Copper	2.8E-07	mg/m^3						2.7E-07	(mg/m^3)	NA	(mg/m^3)	--
				Iron	1.2E-05	mg/m^3						1.1E-05	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	2.5E-07	mg/m^3						2.4E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.0048
				Thallium	1.7E-10	mg/m^3						1.6E-10	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	2.2E-08	mg/m^3						2.1E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.00021
			Exp. Route Total													0.0085
		Exposure Point Total														0.0085
	Exposure Medium Total															0.0085
Medium Total																5.4
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L						2.0E-01	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.10
				1,1,2-Trichloroethane	0.476	ug/L						2.4E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0059
				1,1-Dichloroethane	198	ug/L						9.9E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.049
				1,1-Dichloroethene	1231	ug/L						6.1E-02	(mg/kg/day)	5.0E-02	(mg/kg/day)	1.2
				1,2-Dichloroethane	1.23	ug/L						6.1E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.010
				2-Hexanone	12	ug/L						6.0E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.12
				Benzene	0.423	ug/L						2.1E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0053
				Bromodichloromethane	1.1	ug/L						5.5E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0027
				Chloroform	2.65	ug/L						1.3E-04	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.013
				Methyl tert-butyl ether	3.79	ug/L						1.9E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						5.4E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0090
				Tetrachloroethene	1.23	ug/L						6.1E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.010
				Trichloroethene (Mutagenic)	19.4	ug/L						9.7E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						9.7E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.9
				Vinyl chloride	0.853	ug/L						4.3E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.014
				1,4-Dioxane	74.4	ug/L						3.7E-03	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.12
				Dibenzo(a,h)anthracene	0.064	ug/L						3.2E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						1.1E-06	(mg/kg/day)	3.0E-05	(mg/kg/day)	0.038
				delta-BHC	0.0086	ug/L						4.3E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000054
				Dieldrin	0.0064	ug/L						3.2E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0064

TABLE 7.6.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmer
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	Aluminum	2089	ug/L						1.0E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.10
				Antimony	1.3	ug/L						6.5E-05	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.16
				Arsenic	7.8	ug/L						3.9E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.3
				Cadmium	0.439	ug/L						2.2E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.044
				Chromium	13.3	ug/L						6.6E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.22
				Cobalt	1.59	ug/L						7.9E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.26
				Cyanide	19.1	ug/L						9.5E-04	(mg/kg/day)	6.3E-04	(mg/kg/day)	1.5
				Iron	2504	ug/L						1.2E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.18
				Lead	1.66	ug/L						8.3E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						4.8E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.20
				Nickel	9.34	ug/L						4.7E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.023
				Thallium	0.094	ug/L						4.7E-06	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.47
				Vanadium	4.94	ug/L						2.5E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.049
			Exp. Route Total													8.2
			Dermal	1,1,1-Trichloroethane	4085	ug/L						3.3E-02	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.016
				1,1,2-Trichloroethane	0.476	ug/L						1.5E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00038
				1,1-Dichloroethane	198	ug/L						6.8E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0034
				1,1-Dichloroethene	1231	ug/L						7.2E-03	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.14
				1,2-Dichloroethane	1.23	ug/L						2.6E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00044
				2-Hexanone	12	ug/L						2.2E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0044
				Benzene	0.423	ug/L						2.8E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00070
				Bromodichloromethane	1.1	ug/L						3.4E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.00017
				Chloroform	2.65	ug/L						1.0E-05	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.0010
				Methyl tert-butyl ether	3.79	ug/L						3.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						1.8E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00030
				Tetrachloroethene	1.23	ug/L						3.2E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0053
				Trichloroethene (Mutagenic)	19.4	ug/L						1.4E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						1.4E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.28
				Vinyl chloride	0.853	ug/L						2.9E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00096
				1,4-Dioxane	74.4	ug/L						1.2E-05	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00039
				Dibenzo(a,h)anthracene	0.064	ug/L						0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				delta-BHC	0.0086	ug/L						2.8E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000035
				Dieldrin	0.0064	ug/L						5.2E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.010
				Aluminum	2089	ug/L						4.6E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00046
				Antimony	1.3	ug/L						2.9E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	0.0048
				Arsenic	7.8	ug/L						1.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0057
				Cadmium	0.439	ug/L						9.6E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.0039
				Chromium	13.3	ug/L						5.8E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.078
				Cobalt	1.59	ug/L						1.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00047
				Cyanide	19.1	ug/L						4.2E-06	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.0067
				Iron	2504	ug/L						5.5E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00079
				Lead	1.66	ug/L						3.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						2.1E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.022
				Nickel	9.34	ug/L						4.1E-07	(mg/kg/day)	8.0E-04	(mg/kg/day)	0.00051
				Thallium	0.094	ug/L						2.1E-08	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.0021
				Vanadium	4.94	ug/L						1.1E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.0083
			Exp. Route Total													0.60
		Exposure Point Total														8.8
	Exposure Medium Total															8.8
Medium Total																8.8
												Total of Receptor Hazards Across All Media				14

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.7.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface/Subsurface Soil	Surface/Subsurface Soil	Baghusrt Drive Site	Ingestion	Aluminum	28200	mg/kg	3.2E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.2E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.22
				Arsenic	35.5	mg/kg	2.4E-05	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	3.6E-05	1.7E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.56
				Chromium	41	mg/kg	9.3E-05	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	4.6E-05	3.2E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.11
				Cobalt	20.4	mg/kg	2.3E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.6E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.54
				Copper	915	mg/kg	1.0E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	7.2E-03	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.18
				Iron	37600	mg/kg	4.2E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.0E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.42
				Manganese	807	mg/kg	9.1E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	6.4E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.27
				Thallium	0.548	mg/kg	6.2E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	4.3E-06	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.43
				Vanadium	72.3	mg/kg	8.2E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	5.7E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.11
			Exp. Route Total								8.2E-05					2.9
			Dermal	Aluminum	28200	mg/kg	1.0E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	7.2E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0072
				Arsenic	35.5	mg/kg	3.9E-06	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	5.8E-06	2.7E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.090
				Chromium	41	mg/kg	3.0E-06	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	5.9E-05	1.0E-05	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.14
				Cobalt	20.4	mg/kg	7.4E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	5.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.017
				Copper	915	mg/kg	3.3E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.3E-04	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.0058
				Iron	37600	mg/kg	1.4E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	9.5E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.014
				Manganese	807	mg/kg	2.9E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.0E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.21
				Thallium	0.548	mg/kg	2.0E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.4E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.014
				Vanadium	72.3	mg/kg	2.6E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.8E-05	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.14
			Exp. Route Total								6.5E-05					0.64
		Exposure Point Total									1.5E-04					3.5
	Exposure Medium Total										1.5E-04					3.5
	Air	Baghusrt Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3	2.4E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	1.7E-05	(mg/m^3)	5.0E-03	(mg/m^3)	0.0033
				Arsenic	1.1E-08	mg/m^3	3.0E-09	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	1.3E-08	2.1E-08	(mg/m^3)	1.5E-05	(mg/m^3)	0.0014
				Chromium	1.3E-08	mg/m^3	7.0E-09	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	5.8E-07	2.4E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.00024
				Cobalt	6.3E-09	mg/m^3	1.7E-09	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	1.6E-08	1.2E-08	(mg/m^3)	6.0E-06	(mg/m^3)	0.00202
				Copper	2.8E-07	mg/m^3	7.8E-08	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	5.4E-07	(mg/m^3)	NA	(mg/m^3)	--
				Iron	1.2E-05	mg/m^3	3.2E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	2.2E-05	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	2.5E-07	mg/m^3	6.8E-08	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	4.8E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.0096
				Thallium	1.7E-10	mg/m^3	4.6E-11	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	3.3E-10	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	2.2E-08	mg/m^3	6.1E-09	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	4.3E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.00043
			Exp. Route Total								6.1E-07					0.0170
		Exposure Point Total									6.1E-07					0.0170
	Exposure Medium Total										6.1E-07					0.0170
Medium Total											1.5E-04					3.5
Groundwater	Groundwater Potable Use	Baghusrt Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L	3.5E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.2E-01	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.061
				1,1,2-Trichloroethane	0.476	ug/L	4.1E-06	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	2.3E-07	1.4E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0036
				1,1-Dichloroethane	198	ug/L	1.7E-03	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	9.7E-06	5.9E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.030
				1,1-Dichloroethene	1231	ug/L	1.1E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.7E-02	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.74
				1,2-Dichloroethane	1.23	ug/L	1.1E-05	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	9.6E-07	3.7E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0061
				2-Hexanone	12	ug/L	1.0E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.6E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.072
				Benzene	0.423	ug/L	3.6E-06	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	2.0E-07	1.3E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0032
				Bromodichloromethane	1.1	ug/L	9.4E-06	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	5.8E-07	3.3E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0016
				Chloroform	2.65	ug/L	2.3E-05	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	7.0E-07	7.9E-05	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.0079
				Methyl tert-butyl ether	3.79	ug/L	3.2E-05	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	5.8E-08	1.1E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L	1.8E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	3.7E-08	3.2E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0054
				Tetrachloroethene	1.23	ug/L	1.1E-05	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	2.2E-08	3.7E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0061
				Trichloroethene (Mutagenic)	19.4	ug/L	3.3E-04	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	3.1E-06	5.8E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L	1.7E-04	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	6.1E-06	5.8E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.2
				Vinyl chloride	0.853	ug/L	7.3E-06	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	5.3E-06	2.6E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0085
				1,4-Dioxane	74.4	ug/L	6.4E-04	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	6.4E-05	2.2E-03	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.074
				Dibenzo(a,h)anthracene	0.064	ug/L	1.1E-06	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	1.1E-06	1.9E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L	2.0E-07	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	3.3E-06	6.9E-07	(mg/kg/day)	3.0E-05	(mg/kg/day)	0.023
				delta-BHC	0.0086	ug/L	7.4E-08	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	4.6E-07	2.6E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000032
				Dieldrin	0.0064	ug/L	5.5E-08	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	8.8E-07	1.9E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0038
				Aluminum	2089	ug/L	1.8E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	6.3E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.063
				Antimony	1.3	ug/L	1.1E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.9E-05	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.097

TABLE 7.7.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghusrt Drive Site	Ingestion	Arsenic	7.8	ug/L	6.7E-05	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	1.0E-04	2.3E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.78
	Potable Use			Cadmium	0.439	ug/L	3.8E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.3E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.026
				Chromium	13.3	ug/L	2.3E-04	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	1.1E-04	4.0E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.13
				Cobalt	1.59	ug/L	1.4E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	4.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.16
				Cyanide	19.1	ug/L	1.6E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	5.7E-04	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.91
				Iron	2504	ug/L	2.1E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	7.5E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.11
				Lead	1.66	ug/L	1.4E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	5.0E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L	8.3E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.9E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.12
				Nickel	9.34	ug/L	8.0E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.8E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.014
				Thallium	0.094	ug/L	8.0E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.8E-06	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.28
				Vanadium	4.94	ug/L	4.2E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.5E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.030
			Exp. Route Total								3.1E-04					4.9
			Dermal	1,1,1-Trichloroethane	4085	ug/L	6.2E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.2E-02	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.011
				1,1,2-Trichloroethane	0.476	ug/L	2.9E-07	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	1.6E-08	1.0E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00025
				1,1-Dichloroethane	198	ug/L	1.3E-04	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	7.3E-07	4.5E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0023
				1,1-Dichloroethene	1231	ug/L	1.4E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	4.8E-03	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.096
				1,2-Dichloroethane	1.23	ug/L	5.0E-07	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	4.5E-08	1.7E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00029
				2-Hexanone	12	ug/L	4.1E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.4E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0029
				Benzene	0.423	ug/L	5.4E-07	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	3.0E-08	1.9E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00048
				Bromodichloromethane	1.1	ug/L	6.5E-07	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	4.0E-08	2.3E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.00011
				Chloroform	2.65	ug/L	2.0E-06	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	6.2E-08	7.0E-06	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.00070
				Methyl tert-butyl ether	3.79	ug/L	7.2E-07	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	1.3E-09	2.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L	6.7E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	1.3E-09	1.2E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00020
				Tetrachloroethene	1.23	ug/L	6.1E-06	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	1.3E-08	2.1E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0035
				Trichloroethene (Mutagenic)	19.4	ug/L	5.3E-05	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	5.0E-07	9.3E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L	2.7E-05	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	9.9E-07	9.3E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.19
				Vinyl chloride	0.853	ug/L	5.7E-07	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	4.1E-07	2.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00066
				1,4-Dioxane	74.4	ug/L	2.2E-06	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	2.2E-07	7.8E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00026
				Dibenzo(a,h)anthracene	0.064	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	--	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	--	0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				delta-BHC	0.0086	ug/L	5.3E-08	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	3.3E-07	1.8E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000023
				Dieldrin	0.0064	ug/L	9.9E-08	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	1.6E-06	3.5E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0069
				Aluminum	2089	ug/L	1.0E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.5E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00035
				Antimony	1.3	ug/L	6.2E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.2E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	0.0036
				Arsenic	7.8	ug/L	3.7E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	5.6E-07	1.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0043
				Cadmium	0.439	ug/L	2.1E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	7.3E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.0029
				Chromium	13.3	ug/L	2.5E-06	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	5.1E-05	4.4E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.059
				Cobalt	1.59	ug/L	3.0E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.1E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00035
				Cyanide	19.1	ug/L	9.1E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.2E-06	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.0051
				Iron	2504	ug/L	1.2E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	4.2E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00060
				Lead	1.66	ug/L	7.9E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L	4.6E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.6E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.017
				Nickel	9.34	ug/L	8.9E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.1E-07	(mg/kg/day)	8.0E-04	(mg/kg/day)	0.00039
				Thallium	0.094	ug/L	4.5E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.6E-08	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.0016
				Vanadium	4.94	ug/L	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	8.3E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.0064
			Exp. Route Total								5.6E-05					0.41
		Exposure Point Total									3.7E-04					5.3
	Exposure Medium Total										3.7E-04					5.3
	Air	Baghusrt Drive Site	Inhalation	1,1,1-Trichloroethane	2.0E+00	mg/m^3	5.6E-01	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	2.0E+00	(mg/m^3)	5.0E+00	(mg/m^3)	0.39
	Potable Use			1,1,2-Trichloroethane	2.4E-04	mg/m^3	6.5E-05	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	1.0E-06	2.3E-04	(mg/m^3)	2.0E-04	(mg/m^3)	1.1
				1,1-Dichloroethane	9.9E-02	mg/m^3	2.7E-02	(mg/m^3)	1.6E-06	(ug/m^3)$^{-1}$	4.3E-05	9.5E-02	(mg/m^3)	NA	(mg/m^3)	--
				1,1-Dichloroethene	6.2E-01	mg/m^3	1.7E-01	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	5.9E-01	(mg/m^3)	2.0E-01	(mg/m^3)	3.0
				1,2-Dichloroethane	6.2E-04	mg/m^3	1.7E-04	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	4.4E-06	5.9E-04	(mg/m^3)	7.0E-03	(mg/m^3)	0.084
				2-Hexanone	6.0E-03	mg/m^3	1.6E-03	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	5.8E-03	(mg/m^3)	3.0E-02	(mg/m^3)	0.19
				Benzene	2.1E-04	mg/m^3	5.8E-05	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	4.5E-07	2.0E-04	(mg/m^3)	3.0E-02	(mg/m^3)	0.0068
				Bromodichloromethane	5.5E-04	mg/m^3	1.5E-04	(mg/m^3)	3.7E-05	(ug/m^3)$^{-1}$	5.6E-06	5.3E-04	(mg/m^3)	NA	(mg/m^3)	--
				Chloroform	1.3E-03	mg/m^3	3.6E-04	(mg/m^3)	2.3E-05	(ug/m^3)$^{-1}$	8.3E-06	1.3E-03	(mg/m^3)	9.8E-02	(mg/m^3)	0.013

TABLE 7.7.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air	Baghusrt Drive Site	Inhalation	Methyl tert-butyl ether	1.9E-03	mg/m^3	5.2E-04	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	1.3E-07	1.8E-03	(mg/m^3)	3.0E+00	(mg/m^3)	0.00061
	Potable Use			Methylene chloride	5.4E-04	mg/m^3	3.0E-04	(mg/m^3)	1.0E-08	(ug/m^3)$^{-1}$	3.0E-09	5.2E-04	(mg/m^3)	6.0E-01	(mg/m^3)	0.00086
				Tetrachloroethene	6.2E-04	mg/m^3	1.7E-04	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	4.4E-08	5.9E-04	(mg/m^3)	4.0E-02	(mg/m^3)	0.015
				Trichloroethene (Mutagenic)	9.7E-03	mg/m^3	5.3E-03	(mg/m^3)	1.0E-06	(ug/m^3)$^{-1}$	5.3E-06	9.3E-03	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene (Nonmutagenic)	9.7E-03	mg/m^3	2.7E-03	(mg/m^3)	3.1E-06	(ug/m^3)$^{-1}$	8.2E-06	9.3E-03	(mg/m^3)	2.0E-03	(mg/m^3)	4.7
				Vinyl chloride	4.3E-04	mg/m^3	1.2E-04	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	5.1E-07	4.1E-04	(mg/m^3)	1.0E-01	(mg/m^3)	0.0041
				1,4-Dioxane	3.7E-02	mg/m^3	1.0E-02	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	5.1E-05	3.6E-02	(mg/m^3)	3.0E-02	(mg/m^3)	1.2
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aldrin	1.2E-05	mg/m^3	3.2E-06	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	1.5E-05	1.1E-05	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Cyanide	9.6E-03	mg/m^3	2.6E-03	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	9.2E-03	(mg/m^3)	8.0E-04	(mg/m^3)	11
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	9.0E-05	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
			Exp. Route Total								1.4E-04					22
		Exposure Point Total									1.4E-04					22
	Exposure Medium Total										1.4E-04					22
Medium Total											5.1E-04					27
Groundwater	Groundwater	Baghusrt Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L	2.4E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	4.2E-04	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.00021
	Irrigation			1,1,2-Trichloroethane	0.476	ug/L	2.8E-08	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	1.6E-09	4.9E-08	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.000012
				1,1-Dichloroethane	198	ug/L	1.2E-05	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	6.6E-08	2.0E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.00010
				1,1-Dichloroethene	1231	ug/L	7.2E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.3E-04	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.0025
				1,2-Dichloroethane	1.23	ug/L	7.2E-08	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	6.6E-09	1.3E-07	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.000021
				2-Hexanone	12	ug/L	7.0E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.2E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.00025
				Benzene	0.423	ug/L	2.5E-08	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	1.4E-09	4.3E-08	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.000011
				Bromodichloromethane	1.1	ug/L	6.5E-08	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	4.0E-09	1.1E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0000057
				Chloroform	2.65	ug/L	1.6E-07	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	4.8E-09	2.7E-07	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.000027
				Methyl tert-butyl ether	3.79	ug/L	2.2E-07	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	4.0E-10	3.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L	9.5E-08	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	1.9E-10	1.1E-07	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.000018
				Tetrachloroethene	1.23	ug/L	7.2E-08	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	1.5E-10	1.3E-07	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.000021
				Trichloroethene (Mutagenic)	19.4	ug/L	1.7E-06	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	1.6E-08	2.0E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L	1.1E-06	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	4.2E-08	2.0E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0040
				Vinyl chloride	0.853	ug/L	5.0E-08	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	3.6E-08	8.8E-08	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.000029
				1,4-Dioxane	74.4	ug/L	4.4E-06	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	4.4E-07	7.6E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00025
				Dibenzo(a,h)anthracene	0.064	ug/L	5.6E-09	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	5.6E-09	6.6E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L	1.4E-09	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	2.3E-08	2.4E-09	(mg/kg/day)	3.0E-05	(mg/kg/day)	0.000079
				delta-BHC	0.0086	ug/L	5.0E-10	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	3.2E-09	8.8E-10	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.00000011
				Dieldrin	0.0064	ug/L	3.8E-10	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	6.0E-09	6.6E-10	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.000013
				Aluminum	2089	ug/L	1.2E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.1E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00021
				Antimony	1.3	ug/L	7.6E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.3E-07	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.00033
				Arsenic	7.8	ug/L	4.6E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	6.9E-07	8.0E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0027
				Cadmium	0.439	ug/L	2.6E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	4.5E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.000090
				Chromium	13.3	ug/L	1.2E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	5.9E-07	1.4E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00046
				Cobalt	1.59	ug/L	9.3E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.6E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00054
				Cyanide	19.1	ug/L	1.1E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.0E-06	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.0031
				Iron	2504	ug/L	1.5E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.6E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00037
				Lead	1.66	ug/L	9.7E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--

TABLE 7.7.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater Irrigation	Baghusrt Drive Site	Ingestion	Manganese	97	ug/L	5.7E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.0E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.00042
				Nickel	9.34	ug/L	5.5E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	9.6E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.000048
				Thallium	0.094	ug/L	5.5E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	9.7E-09	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.00097
				Vanadium	4.94	ug/L	2.9E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	5.1E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.00010
			Exp. Route Total								1.9E-06					0.017
			Dermal	1,1,1-Trichloroethane	4085	ug/L	6.7E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.2E-03	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.00058
				1,1,2-Trichloroethane	0.476	ug/L	3.1E-08	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	1.8E-09	5.5E-08	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.000014
				1,1-Dichloroethane	198	ug/L	1.5E-05	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	8.6E-08	2.6E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.00013
				1,1-Dichloroethene	1231	ug/L	1.6E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.8E-04	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.0056
				1,2-Dichloroethane	1.23	ug/L	5.8E-08	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	5.3E-09	1.0E-07	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.000017
				2-Hexanone	12	ug/L	4.8E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	8.5E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.00017
				Benzene	0.423	ug/L	6.5E-08	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	3.6E-09	1.1E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.000029
				Bromodichloromethane	1.1	ug/L	6.7E-08	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	4.1E-09	1.2E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0000058
				Chloroform	2.65	ug/L	2.2E-07	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	6.9E-09	3.9E-07	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.000039
				Methyl tert-butyl ether	3.79	ug/L	8.8E-08	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	1.6E-10	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L	6.2E-08	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	1.2E-10	7.2E-08	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.000012
				Tetrachloroethene	1.23	ug/L	6.3E-07	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	1.3E-09	1.1E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00018
				Trichloroethene (Mutagenic)	19.4	ug/L	4.3E-06	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	4.0E-08	5.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L	2.9E-06	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	1.1E-07	5.1E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.010
				Vinyl chloride	0.853	ug/L	7.2E-08	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	5.2E-08	1.3E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.000042
				1,4-Dioxane	74.4	ug/L	2.7E-07	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	2.7E-08	4.8E-07	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.000016
				Dibenzo(a,h)anthracene	0.064	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	--	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	--	0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				delta-BHC	0.0086	ug/L	5.5E-09	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	3.4E-08	9.6E-09	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.0000012
				Dieldrin	0.0064	ug/L	1.0E-08	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	1.6E-07	1.8E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.00036
				Aluminum	2089	ug/L	1.7E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.0E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.000030
				Antimony	1.3	ug/L	1.1E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.9E-08	(mg/kg/day)	6.0E-05	(mg/kg/day)	0.00031
				Arsenic	7.8	ug/L	6.5E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	9.7E-08	1.1E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00038
				Cadmium	0.439	ug/L	3.6E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	6.4E-09	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.00025
				Chromium	13.3	ug/L	3.3E-07	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	6.6E-06	3.9E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0051
				Cobalt	1.59	ug/L	5.3E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	9.2E-09	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.000031
				Cyanide	19.1	ug/L	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.8E-07	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.00044
				Iron	2504	ug/L	2.1E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.6E-05	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.000052
				Lead	1.66	ug/L	1.4E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.4E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L	8.0E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.4E-06	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.0015
				Nickel	9.34	ug/L	1.5E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.7E-08	(mg/kg/day)	8.0E-04	(mg/kg/day)	0.000034
				Thallium	0.094	ug/L	7.8E-10	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.4E-09	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.00014
				Vanadium	4.94	ug/L	4.1E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	7.2E-08	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.00055
			Exp. Route Total								7.2E-06					0.026
		Exposure Point Total									9.2E-06					0.043
	Exposure Medium Total										9.2E-06					0.043
	Air Irrigation	Baghusrt Drive Site	Inhalation	1,1,1-Trichloroethane	1.2E-01	mg/m^3	9.7E-07	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	1.7E-06	(mg/m^3)	5.0E+00	(mg/m^3)	0.00000034
				1,1,2-Trichloroethane	9.1E-06	mg/m^3	7.1E-11	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	1.1E-12	1.2E-10	(mg/m^3)	2.0E-04	(mg/m^3)	0.00000062
				1,1-Dichloroethane	5.2E-03	mg/m^3	4.1E-08	(mg/m^3)	1.6E-06	(ug/m^3)$^{-1}$	6.5E-11	7.1E-08	(mg/m^3)	NA	(mg/m^3)	--
				1,1-Dichloroethene	3.9E-02	mg/m^3	3.1E-07	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	5.4E-07	(mg/m^3)	2.0E-01	(mg/m^3)	0.0000027
				1,2-Dichloroethane	2.5E-05	mg/m^3	2.0E-10	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	5.1E-12	3.4E-10	(mg/m^3)	7.0E-03	(mg/m^3)	4.9E-8
				2-Hexanone	1.3E-04	mg/m^3	1.0E-09	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	1.8E-09	(mg/m^3)	3.0E-02	(mg/m^3)	6.1E-8
				Benzene	1.1E-05	mg/m^3	8.6E-11	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	6.7E-13	1.5E-10	(mg/m^3)	3.0E-02	(mg/m^3)	5.0E-9
				Bromodichloromethane	2.5E-05	mg/m^3	1.9E-10	(mg/m^3)	3.7E-05	(ug/m^3)$^{-1}$	7.2E-12	3.4E-10	(mg/m^3)	NA	(mg/m^3)	--
				Chloroform	6.5E-05	mg/m^3	5.1E-10	(mg/m^3)	2.3E-05	(ug/m^3)$^{-1}$	1.2E-11	8.9E-10	(mg/m^3)	9.8E-02	(mg/m^3)	9.1E-9
				Methyl tert-butyl ether	6.8E-05	mg/m^3	5.3E-10	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	1.4E-13	9.3E-10	(mg/m^3)	3.0E+00	(mg/m^3)	3.1E-10
				Methylene chloride	2.6E-05	mg/m^3	3.1E-10	(mg/m^3)	1.0E-08	(ug/m^3)$^{-1}$	3.1E-15	3.6E-10	(mg/m^3)	6.0E-01	(mg/m^3)	6.0E-10
				Tetrachloroethene	3.7E-05	mg/m^3	2.9E-10	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	7.6E-14	5.1E-10	(mg/m^3)	4.0E-02	(mg/m^3)	1.3E-8
				Trichloroethene (Mutagenic)	5.5E-04	mg/m^3	6.4E-09	(mg/m^3)	1.0E-06	(ug/m^3)$^{-1}$	6.4E-12	7.5E-09	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene (Nonmutagenic)	5.5E-04	mg/m^3	4.3E-09	(mg/m^3)	3.1E-06	(ug/m^3)$^{-1}$	1.3E-11	7.5E-09	(mg/m^3)	2.0E-03	(mg/m^3)	0.0000037
				Vinyl chloride	2.7E-05	mg/m^3	2.1E-10	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	9.4E-13	3.7E-10	(mg/m^3)	1.0E-01	(mg/m^3)	3.7E-9
				1,4-Dioxane	1.1E-05	mg/m^3	8.2E-11	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	4.1E-13	1.4E-10	(mg/m^3)	3.0E-02	(mg/m^3)	4.8E-9

TABLE 7.7.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air	Baghusrt Drive Site	Inhalation	Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
	Irrigation			Aldrin	1.9E-07	mg/m^3	1.5E-12	(mg/m^3)	4.9E-03	$(ug/m^3)^{-1}$	7.3E-12	2.6E-12	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Cyanide	2.2E-04	mg/m^3	1.7E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	3.0E-09	(mg/m^3)	8.0E-04	(mg/m^3)	0.0000037
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	9.0E-05	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
			Exp. Route Total								1.2E-10					0.000011
		Exposure Point Total									1.2E-10					0.000011
	Exposure Medium Total										1.2E-10					0.000011
Medium Total											9.2E-06					0.043
										Total of Receptor Risks Across All Media	6.7E-04				Total of Receptor Hazards Across All Media	31

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.8.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface/Subsurface Soil	Surface/Subsurface Soil	Baghusrt Drive Site	Ingestion	Aluminum	28200	mg/kg	6.3E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Arsenic	35.5	mg/kg	4.7E-05	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	7.1E-05					
				Chromium	41	mg/kg	3.3E-04	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	1.7E-04					
				Cobalt	20.4	mg/kg	4.5E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Copper	915	mg/kg	2.0E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Iron	37600	mg/kg	8.4E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Manganese	807	mg/kg	1.8E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Thallium	0.548	mg/kg	1.2E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Vanadium	72.3	mg/kg	1.6E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
			Exp. Route Total								2.4E-04					
			Dermal	Aluminum	28200	mg/kg	1.8E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Arsenic	35.5	mg/kg	6.6E-06	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	9.9E-06					
				Chromium	41	mg/kg	8.7E-06	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	1.7E-04					
				Cobalt	20.4	mg/kg	1.3E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Copper	915	mg/kg	5.7E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Iron	37600	mg/kg	2.3E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Manganese	807	mg/kg	5.0E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Thallium	0.548	mg/kg	3.4E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Vanadium	72.3	mg/kg	4.5E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
			Exp. Route Total								1.8E-04					
		Exposure Point Total									4.2E-04					
	Exposure Medium Total										4.2E-04					
	Air	Baghusrt Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3	3.1E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Arsenic	1.1E-08	mg/m^3	3.9E-09	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	1.7E-08					
				Chromium	1.3E-08	mg/m^3	1.3E-08	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	1.1E-06					
				Cobalt	6.3E-09	mg/m^3	2.2E-09	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	2.0E-08					
				Copper	2.8E-07	mg/m^3	1.0E-07	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Iron	1.2E-05	mg/m^3	4.1E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Manganese	2.5E-07	mg/m^3	8.9E-08	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Thallium	1.7E-10	mg/m^3	6.0E-11	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Vanadium	2.2E-08	mg/m^3	8.0E-09	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
			Exp. Route Total								1.1E-06					
		Exposure Point Total									1.1E-06					
	Exposure Medium Total										1.1E-06					
Medium Total											4.2E-04					
Groundwater	Groundwater Potable Use	Baghusrt Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L	5.2E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				1,1,2-Trichloroethane	0.476	ug/L	6.1E-06	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	3.5E-07					
				1,1-Dichloroethane	198	ug/L	2.5E-03	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	1.4E-05					
				1,1-Dichloroethene	1231	ug/L	1.6E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				1,2-Dichloroethane	1.23	ug/L	1.6E-05	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	1.4E-06					
				2-Hexanone	12	ug/L	1.5E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Benzene	0.423	ug/L	5.4E-06	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	3.0E-07					
				Bromodichloromethane	1.1	ug/L	1.4E-05	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	8.8E-07					
				Chloroform	2.65	ug/L	3.4E-05	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	1.1E-06					
				Methyl tert-butyl ether	3.79	ug/L	4.9E-05	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	8.8E-08					
				Methylene chloride	1.08	ug/L	4.3E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	8.6E-08					
				Tetrachloroethene	1.23	ug/L	1.6E-05	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	3.3E-08					
				Trichloroethene (Mutagenic)	19.4	ug/L	7.7E-04	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	7.2E-06					
				Trichloroethene (Nonmutagenic)	19.4	ug/L	2.5E-04	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	9.2E-06					
				Vinyl chloride	0.853	ug/L	5.5E-05	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	4.0E-05					
				1,4-Dioxane	74.4	ug/L	9.5E-04	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	9.5E-05					
				Dibenzo(a,h)anthracene	0.064	ug/L	2.6E-06	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	2.6E-06					
				Aldrin	0.023	ug/L	3.0E-07	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	5.0E-06					
				delta-BHC	0.0086	ug/L	1.1E-07	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	7.0E-07					
				Dieldrin	0.0064	ug/L	8.2E-08	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	1.3E-06					
				Aluminum	2089	ug/L	2.7E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Antimony	1.3	ug/L	1.7E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					

TABLE 7.8.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghusrt Drive Site	Ingestion	Arsenic	7.8	ug/L	1.0E-04	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.5E-04					
	Potable Use			Cadmium	0.439	ug/L	5.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Chromium	13.3	ug/L	5.3E-04	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	2.7E-04					
				Cobalt	1.59	ug/L	2.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Cyanide	19.1	ug/L	2.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Iron	2504	ug/L	3.2E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Lead	1.66	ug/L	2.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Manganese	97	ug/L	1.2E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Nickel	9.34	ug/L	1.2E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Thallium	0.094	ug/L	1.2E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Vanadium	4.94	ug/L	6.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
			Exp. Route Total								6.0E-04					
			Dermal	1,1,1-Trichloroethane	4085	ug/L	9.0E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				1,1,2-Trichloroethane	0.476	ug/L	4.2E-07	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	2.4E-08					
				1,1-Dichloroethane	198	ug/L	1.9E-04	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	1.1E-06					
				1,1-Dichloroethene	1231	ug/L	2.0E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				1,2-Dichloroethane	1.23	ug/L	7.2E-07	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	6.6E-08					
				2-Hexanone	12	ug/L	6.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Benzene	0.423	ug/L	7.8E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	4.3E-08					
				Bromodichloromethane	1.1	ug/L	9.4E-07	(mg/kg/day)	6.2E-02	$(mg/kg/day)^{-1}$	5.8E-08					
				Chloroform	2.65	ug/L	2.9E-06	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	8.9E-08					
				Methyl tert-butyl ether	3.79	ug/L	1.0E-06	(mg/kg/day)	1.8E-03	$(mg/kg/day)^{-1}$	1.9E-09					
				Methylene chloride	1.08	ug/L	1.5E-06	(mg/kg/day)	2.0E-03	$(mg/kg/day)^{-1}$	3.0E-09					
				Tetrachloroethene	1.23	ug/L	8.8E-06	(mg/kg/day)	2.1E-03	$(mg/kg/day)^{-1}$	1.9E-08					
				Trichloroethene (Mutagenic)	19.4	ug/L	1.2E-04	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	1.1E-06					
				Trichloroethene (Nonmutagenic)	19.4	ug/L	3.9E-05	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	1.4E-06					
				Vinyl chloride	0.853	ug/L	3.8E-06	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	2.7E-06					
				1,4-Dioxane	74.4	ug/L	3.2E-06	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	3.2E-07					
				Dibenzo(a,h)anthracene	0.064	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	--					
				Aldrin	0.023	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	--					
				delta-BHC	0.0086	ug/L	7.7E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	4.8E-07					
				Dieldrin	0.0064	ug/L	1.4E-07	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	2.3E-06					
				Aluminum	2089	ug/L	1.4E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Antimony	1.3	ug/L	8.7E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Arsenic	7.8	ug/L	5.2E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	7.8E-07					
				Cadmium	0.439	ug/L	2.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Chromium	13.3	ug/L	5.2E-06	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	1.0E-04					
				Cobalt	1.59	ug/L	4.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Cyanide	19.1	ug/L	1.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Iron	2504	ug/L	1.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Lead	1.66	ug/L	1.1E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Manganese	97	ug/L	6.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Nickel	9.34	ug/L	1.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Thallium	0.094	ug/L	6.3E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Vanadium	4.94	ug/L	3.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
			Exp. Route Total								1.1E-04					
		Exposure Point Total									7.1E-04					
	Exposure Medium Total										7.1E-04					
	Air	Baghusrt Drive Site	Inhalation	1,1,1-Trichloroethane	2.0E+00	mg/m^3	5.6E-01	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--					
	Potable Use			1,1,2-Trichloroethane	2.4E-04	mg/m^3	6.5E-05	(mg/m^3)	1.6E-05	$(ug/m^3)^{-1}$	1.0E-06					
				1,1-Dichloroethane	9.9E-02	mg/m^3	2.7E-02	(mg/m^3)	1.6E-06	$(ug/m^3)^{-1}$	4.3E-05					
				1,1-Dichloroethene	6.2E-01	mg/m^3	1.7E-01	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--					
				1,2-Dichloroethane	6.2E-04	mg/m^3	1.7E-04	(mg/m^3)	2.6E-05	$(ug/m^3)^{-1}$	4.4E-06					
				2-Hexanone	6.0E-03	mg/m^3	1.6E-03	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--					
				Benzene	2.1E-04	mg/m^3	5.8E-05	(mg/m^3)	7.8E-06	$(ug/m^3)^{-1}$	4.5E-07					
				Bromodichloromethane	5.5E-04	mg/m^3	1.5E-04	(mg/m^3)	3.7E-05	$(ug/m^3)^{-1}$	5.6E-06					
				Chloroform	1.3E-03	mg/m^3	3.6E-04	(mg/m^3)	2.3E-05	$(ug/m^3)^{-1}$	8.3E-06					
				Methyl tert-butyl ether	1.9E-03	mg/m^3	5.2E-04	(mg/m^3)	2.6E-07	$(ug/m^3)^{-1}$	1.3E-07					

TABLE 7.8.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air	Baghusrt Drive Site	Inhalation	Methylene chloride	5.4E-04	mg/m^3	3.0E-04	(mg/m^3)	1.0E-08	(ug/m^3)$^{-1}$	3.0E-09					
	Potable Use			Tetrachloroethene	6.2E-04	mg/m^3	1.7E-04	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	4.4E-08					
				Trichloroethene (Mutagenic)	9.7E-03	mg/m^3	5.3E-03	(mg/m^3)	1.0E-06	(ug/m^3)$^{-1}$	5.3E-06					
				Trichloroethene (Nonmutagenic)	9.7E-03	mg/m^3	2.7E-03	(mg/m^3)	3.1E-06	(ug/m^3)$^{-1}$	8.2E-06					
				Vinyl chloride	4.3E-04	mg/m^3	1.2E-04	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	5.1E-07					
				1,4-Dioxane	3.7E-02	mg/m^3	1.0E-02	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	5.1E-05					
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	--					
				Aldrin	1.2E-05	mg/m^3	3.2E-06	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	1.5E-05					
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	--					
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	--					
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	--					
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	--					
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	--					
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	--					
				Cyanide	9.6E-03	mg/m^3	2.6E-03	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	(ug/m^3)$^{-1}$	--					
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
			Exp. Route Total								1.4E-04					
		Exposure Point Total									1.4E-04					
	Exposure Medium Total										1.4E-04					
Medium Total											8.5E-04					
Groundwater	Groundwater	Baghusrt Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L	2.4E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
	Irrigation			1,1,2-Trichloroethane	0.476	ug/L	2.8E-08	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	1.6E-09					
				1,1-Dichloroethane	198	ug/L	1.2E-05	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	6.6E-08					
				1,1-Dichloroethene	1231	ug/L	7.2E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				1,2-Dichloroethane	1.23	ug/L	7.2E-08	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	6.6E-09					
				2-Hexanone	12	ug/L	7.0E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Benzene	0.423	ug/L	2.5E-08	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	1.4E-09					
				Bromodichloromethane	1.1	ug/L	6.5E-08	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	4.0E-09					
				Chloroform	2.65	ug/L	1.6E-07	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	4.8E-09					
				Methyl tert-butyl ether	3.79	ug/L	2.2E-07	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	4.0E-10					
				Methylene chloride	1.08	ug/L	9.5E-08	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	1.9E-10					
				Tetrachloroethene	1.23	ug/L	7.2E-08	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	1.5E-10					
				Trichloroethene (Mutagenic)	19.4	ug/L	1.7E-06	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	1.6E-08					
				Trichloroethene (Nonmutagenic)	19.4	ug/L	1.1E-06	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	4.2E-08					
				Vinyl chloride	0.853	ug/L	5.0E-08	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	3.6E-08					
				1,4-Dioxane	74.4	ug/L	4.4E-06	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	4.4E-07					
				Dibenzo(a,h)anthracene	0.064	ug/L	5.6E-09	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	5.6E-09					
				Aldrin	0.023	ug/L	1.4E-09	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	2.3E-08					
				delta-BHC	0.0086	ug/L	5.0E-10	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	3.2E-09					
				Dieldrin	0.0064	ug/L	3.8E-10	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	6.0E-09					
				Aluminum	2089	ug/L	1.2E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Antimony	1.3	ug/L	7.6E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Arsenic	7.8	ug/L	4.6E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	6.9E-07					
				Cadmium	0.439	ug/L	2.6E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Chromium	13.3	ug/L	1.2E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	5.9E-07					
				Cobalt	1.59	ug/L	9.3E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Cyanide	19.1	ug/L	1.1E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Iron	2504	ug/L	1.5E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Lead	1.66	ug/L	9.7E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Manganese	97	ug/L	5.7E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Nickel	9.34	ug/L	5.5E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					

TABLE 7.8.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghusrt Drive Site	Ingestion	Thallium	0.094	ug/L	5.5E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
	Irrigation			Vanadium	4.94	ug/L	2.9E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
			Exp. Route Total								1.9E-06					
			Dermal	1,1,1-Trichloroethane	4085	ug/L	6.7E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				1,1,2-Trichloroethane	0.476	ug/L	3.1E-08	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	1.8E-09					
				1,1-Dichloroethane	198	ug/L	1.5E-05	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	8.6E-08					
				1,1-Dichloroethene	1231	ug/L	1.6E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				1,2-Dichloroethane	1.23	ug/L	5.8E-08	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	5.3E-09					
				2-Hexanone	12	ug/L	4.8E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Benzene	0.423	ug/L	6.5E-08	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	3.6E-09					
				Bromodichloromethane	1.1	ug/L	6.7E-08	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	4.1E-09					
				Chloroform	2.65	ug/L	2.2E-07	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	6.9E-09					
				Methyl tert-butyl ether	3.79	ug/L	8.8E-08	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	1.6E-10					
				Methylene chloride	1.08	ug/L	6.2E-08	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	1.2E-10					
				Tetrachloroethene	1.23	ug/L	6.3E-07	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	1.3E-09					
				Trichloroethene (Mutagenic)	19.4	ug/L	4.3E-06	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	4.0E-08					
				Trichloroethene (Nonmutagenic)	19.4	ug/L	2.9E-06	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	1.1E-07					
				Vinyl chloride	0.853	ug/L	7.2E-08	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	5.2E-08					
				1,4-Dioxane	74.4	ug/L	2.7E-07	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	2.7E-08					
				Dibenzo(a,h)anthracene	0.064	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	--					
				Aldrin	0.023	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	--					
				delta-BHC	0.0086	ug/L	5.5E-09	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	3.4E-08					
				Dieldrin	0.0064	ug/L	1.0E-08	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	1.6E-07					
				Aluminum	2089	ug/L	1.7E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Antimony	1.3	ug/L	1.1E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Arsenic	7.8	ug/L	6.5E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	9.7E-08					
				Cadmium	0.439	ug/L	3.6E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Chromium	13.3	ug/L	3.3E-07	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	6.6E-06					
				Cobalt	1.59	ug/L	5.3E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Cyanide	19.1	ug/L	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Iron	2504	ug/L	2.1E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Lead	1.66	ug/L	1.4E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Manganese	97	ug/L	8.0E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Nickel	9.34	ug/L	1.5E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Thallium	0.094	ug/L	7.8E-10	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Vanadium	4.94	ug/L	4.1E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
			Exp. Route Total								7.2E-06					
		Exposure Point Total									9.2E-06					
	Exposure Medium Total										9.2E-06					
	Air	Baghusrt Drive Site	Inhalation	1,1,1-Trichloroethane	1.2E-01	mg/m^3	9.7E-07	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
	Irrigation			1,1,2-Trichloroethane	9.1E-06	mg/m^3	7.1E-11	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	1.1E-12					
				1,1-Dichloroethane	5.2E-03	mg/m^3	4.1E-08	(mg/m^3)	1.6E-06	(ug/m^3)$^{-1}$	6.5E-11					
				1,1-Dichloroethene	3.9E-02	mg/m^3	3.1E-07	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				1,2-Dichloroethane	2.5E-05	mg/m^3	2.0E-10	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	5.1E-12					
				2-Hexanone	1.3E-04	mg/m^3	1.0E-09	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Benzene	1.1E-05	mg/m^3	8.6E-11	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	6.7E-13					
				Bromodichloromethane	2.5E-05	mg/m^3	1.9E-10	(mg/m^3)	3.7E-05	(ug/m^3)$^{-1}$	7.2E-12					
				Chloroform	6.5E-05	mg/m^3	5.1E-10	(mg/m^3)	2.3E-05	(ug/m^3)$^{-1}$	1.2E-11					
				Methyl tert-butyl ether	6.8E-05	mg/m^3	5.3E-10	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	1.4E-13					
				Methylene chloride	2.6E-05	mg/m^3	3.1E-10	(mg/m^3)	1.0E-08	(ug/m^3)$^{-1}$	3.1E-15					
				Tetrachloroethene	3.7E-05	mg/m^3	2.9E-10	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	7.6E-14					
				Trichloroethene (Mutagenic)	5.5E-04	mg/m^3	6.4E-09	(mg/m^3)	1.0E-06	(ug/m^3)$^{-1}$	6.4E-12					
				Trichloroethene (Nonmutagenic)	5.5E-04	mg/m^3	4.3E-09	(mg/m^3)	3.1E-06	(ug/m^3)$^{-1}$	1.3E-11					
				Vinyl chloride	2.7E-05	mg/m^3	2.1E-10	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	9.4E-13					
				1,4-Dioxane	1.1E-05	mg/m^3	8.2E-11	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	4.1E-13					
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	--					
				Aldrin	1.9E-07	mg/m^3	1.5E-12	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	7.3E-12					
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	--					

TABLE 7.8.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air	Baghusrt Drive Site	Inhalation	Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	--					
	Irrigation			Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	--					
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	--					
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	--					
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	--					
				Cyanide	2.2E-04	mg/m^3	1.7E-09	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	(ug/m^3)$^{-1}$	--					
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
			Exp. Route Total								1.2E-10					
		Exposure Point Total									1.2E-10					
	Exposure Medium Total										1.2E-10					
Medium Total											9.2E-06					
										Total of Receptor Risks Across All Media	1.3E-03					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.9.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Ingestion	Aluminum	28200	mg/kg	4.6E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	5.4E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.054
				Arsenic	35.5	mg/kg	3.5E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	5.2E-06	4.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.13
				Chromium	41	mg/kg	3.6E-05	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.8E-05	7.8E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.026
				Cobalt	20.4	mg/kg	3.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.9E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.13
				Copper	915	mg/kg	1.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.7E-03	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.043
				Iron	37600	mg/kg	6.1E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	7.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.10
				Manganese	807	mg/kg	1.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.5E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.064
				Thallium	0.548	mg/kg	8.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.0E-06	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.10
				Vanadium	72.3	mg/kg	1.2E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.4E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.027
			Exp. Route Total								2.3E-05					0.68
			Dermal	Aluminum	28200	mg/kg	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.3E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0013
				Arsenic	35.5	mg/kg	4.1E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	6.2E-07	4.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.016
				Chromium	41	mg/kg	8.4E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	1.7E-05	1.8E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.025
				Cobalt	20.4	mg/kg	7.9E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	9.2E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0031
				Copper	915	mg/kg	3.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	4.1E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.0010
				Iron	37600	mg/kg	1.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.7E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0024
				Manganese	807	mg/kg	3.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.6E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.038
				Thallium	0.548	mg/kg	2.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	2.5E-08	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.0025
				Vanadium	72.3	mg/kg	2.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.3E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.025
			Exp. Route Total								1.8E-05					0.11
		Exposure Point Total									4.1E-05					0.80
	Exposure Medium Total										4.1E-05					0.80
	Air	Baghurst Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3	1.8E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	2.1E-07	(mg/m^3)	5.0E-03	(mg/m^3)	0.000041
				Arsenic	1.1E-08	mg/m^3	2.2E-11	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	9.6E-11	2.6E-10	(mg/m^3)	1.5E-05	(mg/m^3)	0.000017
				Chromium	1.3E-08	mg/m^3	1.4E-10	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	1.2E-08	3.0E-10	(mg/m^3)	1.0E-04	(mg/m^3)	0.0000030
				Cobalt	6.3E-09	mg/m^3	1.3E-11	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	1.2E-10	1.5E-10	(mg/m^3)	6.0E-06	(mg/m^3)	0.000025
				Copper	2.8E-07	mg/m^3	5.8E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	6.7E-09	(mg/m^3)	NA	(mg/m^3)	--
				Iron	1.2E-05	mg/m^3	2.4E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	2.8E-07	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	2.5E-07	mg/m^3	5.1E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	5.9E-09	(mg/m^3)	5.0E-05	(mg/m^3)	0.00012
				Thallium	1.7E-10	mg/m^3	3.5E-13	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	4.0E-12	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	2.2E-08	mg/m^3	4.6E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	5.3E-10	(mg/m^3)	1.0E-04	(mg/m^3)	0.0000053
			Exp. Route Total								1.2E-08					0.00021
		Exposure Point Total									1.2E-08					0.00021
	Exposure Medium Total										1.2E-08					0.00021
Medium Total											4.1E-05					0.80
Surface Water	Surface Water	Intermittent Stream	Ingestion	1,1-Dichloroethane	22.4	ug/L	8.8E-06	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	5.0E-08	1.0E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.00051
				Dieldrin	0.072	ug/L	2.8E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	4.5E-07	3.3E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0066
				Heptachlor Epoxide	0.037	ug/L	1.4E-08	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.3E-07	1.7E-07	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.013
				Arsenic	10.2	ug/L	4.0E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	6.0E-06	4.7E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.16
				Chromium	1.59	ug/L	3.3E-06	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.7E-06	7.2E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0024
				Manganese	1970	ug/L	7.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	9.0E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.37
			Exp. Route Total								8.3E-06					0.55
			Dermal	1,1-Dichloroethane	22.4	ug/L	1.4E-06	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	7.8E-09	1.6E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.000080
				Dieldrin	0.072	ug/L	7.6E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	1.2E-06	8.8E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.018
				Heptachlor Epoxide	0.037	ug/L	2.6E-08	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	2.4E-07	3.1E-07	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.024
				Arsenic	10.2	ug/L	7.9E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.2E-07	9.2E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0031
				Chromium	1.59	ug/L	1.3E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	2.6E-06	2.9E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0038
				Manganese	1970	ug/L	1.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.8E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.19
			Exp. Route Total								4.2E-06					0.23
		Exposure Point Total									1.2E-05					0.78
	Exposure Medium Total										1.2E-05					0.78
Medium Total											1.2E-05					0.78

TABLE 7.9.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Perkiomen Creek	Ingestion	Arsenic	1.3	ug/L	5.1E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	7.6E-07	5.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.020
			Exp. Route Total								7.6E-07					0.020
			Dermal	Arsenic	1.3	ug/L	1.0E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	1.5E-08	1.2E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00039
			Exp. Route Total								1.5E-08					0.00039
		Exposure Point Total									7.8E-07					0.020
	Exposure Medium Total										7.8E-07					0.020
Medium Total											7.8E-07					0.020
Sediment	Sediment	Intermittent Stream	Ingestion	Arsenic	15.3	mg/kg	1.5E-06	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	2.2E-06	1.7E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.058
				Chromium	39	mg/kg	3.4E-05	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	1.7E-05	7.4E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.025
				Cobalt	18.9	mg/kg	3.1E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.6E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.12
				Iron	46700	mg/kg	7.6E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	8.9E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.13
			Exp. Route Total								1.9E-05					0.33
			Dermal	Arsenic	15.3	mg/kg	1.8E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	2.7E-07	2.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0069
				Chromium	39	mg/kg	8.0E-07	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	1.6E-05	1.8E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.023
				Cobalt	18.9	mg/kg	7.3E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	8.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0028
				Iron	46700	mg/kg	1.8E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.1E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0030
			Exp. Route Total								1.6E-05					0.036
		Exposure Point Total									3.6E-05					0.37
	Exposure Medium Total										3.6E-05					0.37
Medium Total											3.6E-05					0.37
Sediment	Sediment	Perkiomen Creek	Ingestion	Chromium	44.8	mg/kg	3.9E-05	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	1.9E-05	8.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.028
			Exp. Route Total								1.9E-05					0.028
			Dermal	Chromium	44.8	mg/kg	9.2E-07	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	1.8E-05	2.0E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.027
			Exp. Route Total								1.8E-05					0.027
		Exposure Point Total									3.8E-05					0.055
	Exposure Medium Total										3.8E-05					0.055
Medium Total											3.8E-05					0.055
										Receptor Risk Total - Subsurface Soil and Intermittent Stream	8.9E-05				Receptor HI Total - Subsurface Soil and Intermittent Stream	1.9
										Receptor Risk Total - Subsurface Soil and Perkiomen Creek	7.9E-05				Receptor HI Total - Subsurface Soil and Perkiomen Creek	0.87

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.10.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Ingestion	Aluminum	28200	mg/kg	1.4E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	5.0E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0050
				Arsenic	35.5	mg/kg	1.1E-06	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	1.6E-06	3.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.013
				Chromium	41	mg/kg	4.2E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	2.1E-06	7.3E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0024
				Cobalt	20.4	mg/kg	1.0E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.012
				Copper	915	mg/kg	4.7E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.6E-04	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.0041
				Iron	37600	mg/kg	1.9E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	6.7E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0096
				Manganese	807	mg/kg	4.1E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.4E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.0060
				Thallium	0.548	mg/kg	2.8E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	9.8E-08	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.0098
				Vanadium	72.3	mg/kg	3.7E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.3E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0026
			Exp. Route Total								3.7E-06					0.064
			Dermal	Aluminum	28200	mg/kg	6.1E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.1E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00021
				Arsenic	35.5	mg/kg	2.3E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	3.4E-07	8.0E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0027
				Chromium	41	mg/kg	1.8E-07	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	3.5E-06	3.1E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0041
				Cobalt	20.4	mg/kg	4.4E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00051
				Copper	915	mg/kg	2.0E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	6.9E-06	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.00017
				Iron	37600	mg/kg	8.1E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.8E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00040
				Manganese	807	mg/kg	1.7E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	6.1E-06	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.0063
				Thallium	0.548	mg/kg	1.2E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	4.1E-09	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.00041
				Vanadium	72.3	mg/kg	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	5.4E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.0042
			Exp. Route Total								3.9E-06					0.019
		Exposure Point Total									7.6E-06					0.083
	Exposure Medium Total										7.6E-06					0.083
	Air	Baghurst Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3	5.9E-08	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	2.1E-07	(mg/m^3)	5.0E-03	(mg/m^3)	0.000041
				Arsenic	1.1E-08	mg/m^3	7.5E-11	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	3.2E-10	2.6E-10	(mg/m^3)	1.5E-05	(mg/m^3)	0.000017
				Chromium	1.3E-08	mg/m^3	1.7E-10	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	1.4E-08	3.0E-10	(mg/m^3)	1.0E-04	(mg/m^3)	0.0000030
				Cobalt	6.3E-09	mg/m^3	4.3E-11	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	3.9E-10	1.5E-10	(mg/m^3)	6.0E-06	(mg/m^3)	0.000025
				Copper	2.8E-07	mg/m^3	1.9E-09	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	6.7E-09	(mg/m^3)	NA	(mg/m^3)	--
				Iron	1.2E-05	mg/m^3	7.9E-08	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	2.8E-07	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	2.5E-07	mg/m^3	1.7E-09	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	5.9E-09	(mg/m^3)	5.0E-05	(mg/m^3)	0.00012
				Thallium	1.7E-10	mg/m^3	1.2E-12	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	4.0E-12	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	2.2E-08	mg/m^3	1.5E-10	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	5.3E-10	(mg/m^3)	1.0E-04	(mg/m^3)	0.0000053
			Exp. Route Total								1.5E-08					0.00021
		Exposure Point Total									1.5E-08					0.00021
	Exposure Medium Total										1.5E-08					0.00021
Medium Total											7.6E-06					0.083
Surface Water	Surface Water	Intermittent Stream	Ingestion	1,1-Dichloroethane	22.4	ug/L	3.2E-06	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	1.8E-08	1.1E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.000057
				Dieldrin	0.072	ug/L	1.0E-08	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	1.7E-07	3.6E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.00073
				Heptachlor Epoxide	0.037	ug/L	5.3E-09	(mg/kg/day)	9.1E+00	(mg/kg/day)$^{-1}$	4.9E-08	1.9E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0014
				Arsenic	10.2	ug/L	1.5E-06	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	2.2E-06	5.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.017
				Chromium	1.59	ug/L	4.6E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	2.3E-07	8.0E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00027
				Manganese	1970	ug/L	2.8E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.0E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.042
			Exp. Route Total								2.7E-06					0.061
			Dermal	1,1-Dichloroethane	22.4	ug/L	2.2E-06	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	1.2E-08	7.6E-06	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.000038
				Dieldrin	0.072	ug/L	1.2E-07	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	1.9E-06	4.2E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0084
				Heptachlor Epoxide	0.037	ug/L	4.2E-08	(mg/kg/day)	9.1E+00	(mg/kg/day)$^{-1}$	3.8E-07	1.5E-07	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.011
				Arsenic	10.2	ug/L	1.3E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	1.9E-07	4.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0015
				Chromium	1.59	ug/L	7.8E-08	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	1.6E-06	1.4E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0018
				Manganese	1970	ug/L	2.4E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	8.5E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.09
			Exp. Route Total								4.1E-06					0.11
		Exposure Point Total									6.7E-06					0.17
	Exposure Medium Total										6.7E-06					0.17
Medium Total											6.7E-06					0.17

TABLE 7.10.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Perkiomen Creek	Ingestion	Arsenic	1.3	ug/L	1.9E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.8E-07	6.6E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0022
			Exp. Route Total								2.8E-07					0.0022
			Dermal	Arsenic	1.3	ug/L	1.6E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.4E-08	5.6E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00019
			Exp. Route Total								2.4E-08					0.00019
		Exposure Point Total									3.1E-07					0.0024
	Exposure Medium Total										3.1E-07					0.0024
Medium Total											3.1E-07					0.0024
Sediment	Sediment	Intermittent Stream	Ingestion	Arsenic	15.3	mg/kg	4.7E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	7.0E-07	1.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0054
				Chromium	39	mg/kg	4.0E-06	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	2.0E-06	6.9E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0023
				Cobalt	18.9	mg/kg	9.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.4E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.011
				Iron	46700	mg/kg	2.4E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	8.3E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.012
			Exp. Route Total								2.7E-06					0.031
			Dermal	Arsenic	15.3	mg/kg	9.9E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.5E-07	3.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0012
				Chromium	39	mg/kg	1.7E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	3.4E-06	2.9E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0039
				Cobalt	18.9	mg/kg	4.1E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00047
				Iron	46700	mg/kg	1.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.5E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00050
			Exp. Route Total								3.5E-06					0.0060
		Exposure Point Total									6.2E-06					0.037
	Exposure Medium Total										6.2E-06					0.037
Medium Total											6.2E-06					0.037
Sediment	Sediment	Perkiomen Creek	Ingestion	Chromium	44.8	mg/kg	4.6E-06	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	2.3E-06	8.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0027
			Exp. Route Total								2.3E-06					0.0027
			Dermal	Chromium	44.8	mg/kg	1.9E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	3.8E-06	3.4E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0045
			Exp. Route Total								3.8E-06					0.0045
		Exposure Point Total									6.1E-06					0.0072
	Exposure Medium Total										6.1E-06					0.0072
Medium Total											6.1E-06					0.0072
										Receptor Risk Total - Subsurface Soil and Intermittent Stream	2.1E-05	Receptor HI Total - Subsurface Soil and Intermittent Stream				0.29
										Receptor Risk Total - Subsurface Soil and Perkiomen Creek	1.4E-05	Receptor HI Total - Subsurface Soil and Perkiomen Creek				0.093

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.11.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Ingestion	Aluminum	28200	mg/kg	6.0E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Arsenic	35.5	mg/kg	4.6E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	6.8E-06					
				Chromium	41	mg/kg	4.0E-05	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	2.0E-05					
				Cobalt	20.4	mg/kg	4.4E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Copper	915	mg/kg	2.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Iron	37600	mg/kg	8.0E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Manganese	807	mg/kg	1.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Thallium	0.548	mg/kg	1.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Vanadium	72.3	mg/kg	1.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
			Exp. Route Total								2.7E-05					
			Dermal	Aluminum	28200	mg/kg	1.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Arsenic	35.5	mg/kg	6.4E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	9.6E-07					
				Chromium	41	mg/kg	1.0E-06	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	2.0E-05					
				Cobalt	20.4	mg/kg	1.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Copper	915	mg/kg	5.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Iron	37600	mg/kg	2.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Manganese	807	mg/kg	4.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Thallium	0.548	mg/kg	3.3E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Vanadium	72.3	mg/kg	4.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
			Exp. Route Total								2.1E-05					
		Exposure Point Total									4.8E-05					
	Exposure Medium Total										4.8E-05					
	Air	Baghurst Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3	7.7E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				Arsenic	1.1E-08	mg/m^3	9.7E-11	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	4.2E-10					
				Chromium	1.3E-08	mg/m^3	3.1E-10	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	2.6E-08					
				Cobalt	6.3E-09	mg/m^3	5.6E-11	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	5.0E-10					
				Copper	2.8E-07	mg/m^3	2.5E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				Iron	1.2E-05	mg/m^3	1.0E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				Manganese	2.5E-07	mg/m^3	2.2E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				Thallium	1.7E-10	mg/m^3	1.5E-12	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				Vanadium	2.2E-08	mg/m^3	2.0E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
			Exp. Route Total								2.7E-08					
		Exposure Point Total									2.7E-08					
	Exposure Medium Total										2.7E-08					
Medium Total											4.8E-05					
Surface Water	Surface Water	Intermittent Stream	Ingestion	1,1-Dichloroethane	22.4	ug/L	1.2E-05	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	6.8E-08					
				Dieldrin	0.072	ug/L	3.9E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	6.2E-07					
				Heptachlor Epoxide	0.037	ug/L	2.0E-08	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	1.8E-07					
				Arsenic	10.2	ug/L	5.5E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	8.2E-06					
				Chromium	1.59	ug/L	3.8E-06	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.9E-06					
				Manganese	1970	ug/L	1.2E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
			Exp. Route Total								1.1E-05					
			Dermal	1,1-Dichloroethane	22.4	ug/L	3.5E-06	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	2.0E-08					
				Dieldrin	0.072	ug/L	2.0E-07	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	3.1E-06					
				Heptachlor Epoxide	0.037	ug/L	6.8E-08	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	6.2E-07					
				Arsenic	10.2	ug/L	2.0E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.1E-07					
				Chromium	1.59	ug/L	2.1E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	4.2E-06					
				Manganese	1970	ug/L	4.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
			Exp. Route Total								8.3E-06					
		Exposure Point Total									1.9E-05					
	Exposure Medium Total										1.9E-05					
Medium Total											1.9E-05					

TABLE 7.11.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Perkiomen Creek	Ingestion	Arsenic	1.3	ug/L	7.0E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.0E-06					
			Exp. Route Total								1.0E-06					
			Dermal	Arsenic	1.3	ug/L	2.6E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.9E-08					
			Exp. Route Total								3.9E-08					
		Exposure Point Total									1.1E-06					
	Exposure Medium Total										1.1E-06					
Medium Total											1.1E-06					
Sediment	Sediment	Intermittent Stream	Ingestion	Arsenic	15.3	mg/kg	2.0E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.9E-06					
				Chromium	39	mg/kg	3.8E-05	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.9E-05					
				Cobalt	18.9	mg/kg	4.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Iron	46700	mg/kg	1.0E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
			Exp. Route Total								2.2E-05					
			Dermal	Arsenic	15.3	mg/kg	2.8E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	4.1E-07					
				Chromium	39	mg/kg	9.7E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	1.9E-05					
				Cobalt	18.9	mg/kg	1.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Iron	46700	mg/kg	2.8E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
			Exp. Route Total								2.0E-05					
		Exposure Point Total									4.2E-05					
	Exposure Medium Total										4.2E-05					
Medium Total											4.2E-05					
Sediment	Sediment	Perkiomen Creek	Ingestion	Chromium	44.8	mg/kg	4.3E-05	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	2.2E-05					
			Exp. Route Total								2.2E-05					
			Dermal	Chromium	44.8	mg/kg	1.1E-06	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	2.2E-05					
			Exp. Route Total								2.2E-05					
		Exposure Point Total									4.4E-05					
	Exposure Medium Total										4.4E-05					
Medium Total											4.4E-05					
Receptor Risk Total - Subsurface Soil and Intermittent Stream											1.1E-04					
Receptor Risk Total - Subsurface Soil and Perkiomen Creek											9.3E-05					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.12.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Ingestion	Aluminum	28200	mg/kg	6.5E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	4.6E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0046
				Arsenic	35.5	mg/kg	4.9E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	7.4E-07	3.4E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.011
				Chromium	41	mg/kg	2.8E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	1.4E-06	6.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0022
				Cobalt	20.4	mg/kg	4.7E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.011
				Copper	915	mg/kg	2.1E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.5E-04	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.0037
				Iron	37600	mg/kg	8.7E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	6.1E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0087
				Manganese	807	mg/kg	1.9E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.0054
				Thallium	0.548	mg/kg	1.3E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	8.9E-08	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.0089
				Vanadium	72.3	mg/kg	1.7E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.2E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0023
			Exp. Route Total								2.2E-06					0.058
			Dermal	Aluminum	28200	mg/kg	4.9E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.4E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00034
				Arsenic	35.5	mg/kg	1.8E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	2.8E-07	1.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0043
				Chromium	41	mg/kg	2.1E-07	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	4.3E-06	5.0E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0066
				Cobalt	20.4	mg/kg	3.5E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00083
				Copper	915	mg/kg	1.6E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.1E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.00028
				Iron	37600	mg/kg	6.5E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	4.6E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00065
				Manganese	807	mg/kg	1.4E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	9.8E-06	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.010
				Thallium	0.548	mg/kg	9.5E-10	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	6.7E-09	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.00067
				Vanadium	72.3	mg/kg	1.3E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	8.8E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.0068
			Exp. Route Total								4.5E-06					0.031
		Exposure Point Total									6.7E-06					0.089
	Exposure Medium Total										6.7E-06					0.089
	Air	Baghurst Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3	1.5E-08	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	1.0E-07	(mg/m^3)	5.0E-03	(mg/m^3)	0.000021
				Arsenic	1.1E-08	mg/m^3	1.9E-11	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	8.0E-11	1.3E-10	(mg/m^3)	1.5E-05	(mg/m^3)	0.0000087
				Chromium	1.3E-08	mg/m^3	6.5E-11	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	5.4E-09	1.5E-10	(mg/m^3)	1.0E-04	(mg/m^3)	0.0000015
				Cobalt	6.3E-09	mg/m^3	1.1E-11	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	9.6E-11	7.5E-11	(mg/m^3)	6.0E-06	(mg/m^3)	0.000012
				Copper	2.8E-07	mg/m^3	4.8E-10	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	3.4E-09	(mg/m^3)	NA	(mg/m^3)	--
				Iron	1.2E-05	mg/m^3	2.0E-08	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	1.4E-07	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	2.5E-07	mg/m^3	4.2E-10	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	3.0E-09	(mg/m^3)	5.0E-05	(mg/m^3)	0.000059
				Thallium	1.7E-10	mg/m^3	2.9E-13	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	2.0E-12	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	2.2E-08	mg/m^3	3.8E-11	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	2.7E-10	(mg/m^3)	1.0E-04	(mg/m^3)	0.0000027
			Exp. Route Total								5.6E-09					0.00011
		Exposure Point Total									5.6E-09					0.00011
	Exposure Medium Total										5.6E-09					0.00011
Medium Total											6.7E-06					0.089
Surface Water	Surface Water	Intermittent Stream	Ingestion	1,1-Dichloroethane	22.4	ug/L	1.5E-06	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	8.4E-09	1.0E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.000051
				Dieldrin	0.072	ug/L	4.7E-09	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	7.6E-08	3.3E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.00066
				Heptachlor Epoxide	0.037	ug/L	2.4E-09	(mg/kg/day)	9.1E+00	(mg/kg/day)$^{-1}$	2.2E-08	1.7E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0013
				Arsenic	10.2	ug/L	6.7E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	1.0E-06	4.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.016
				Chromium	1.59	ug/L	3.1E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	1.6E-07	7.3E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00024
				Manganese	1970	ug/L	1.3E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	9.1E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.038
			Exp. Route Total								1.3E-06					0.056
			Dermal	1,1-Dichloroethane	22.4	ug/L	6.1E-07	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	3.5E-09	4.3E-06	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.000021
				Dieldrin	0.072	ug/L	3.4E-08	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	5.4E-07	2.4E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0048
				Heptachlor Epoxide	0.037	ug/L	1.2E-08	(mg/kg/day)	9.1E+00	(mg/kg/day)$^{-1}$	1.1E-07	8.3E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0064
				Arsenic	10.2	ug/L	3.5E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	5.3E-08	2.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00083
				Chromium	1.59	ug/L	3.3E-08	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	6.6E-07	7.7E-08	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0010
				Manganese	1970	ug/L	6.8E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	4.8E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.050
			Exp. Route Total								1.4E-06					0.063
		Exposure Point Total									2.6E-06					0.12
	Exposure Medium Total										2.6E-06					0.12
Medium Total											2.6E-06					0.12

TABLE 7.12.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Sediment	Intermittent Stream	Ingestion	Arsenic	15.3	mg/kg	2.1E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.2E-07	1.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0050
				Chromium	39	mg/kg	2.7E-06	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.4E-06	6.3E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0021
				Cobalt	18.9	mg/kg	4.4E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.010
				Iron	46700	mg/kg	1.1E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	7.6E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.011
			Exp. Route Total								1.7E-06					0.028
			Dermal	Arsenic	15.3	mg/kg	8.0E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.2E-07	5.6E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0019
				Chromium	39	mg/kg	2.0E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	4.1E-06	4.7E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0063
				Cobalt	18.9	mg/kg	3.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	2.3E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00076
				Iron	46700	mg/kg	8.1E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	5.7E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00081
			Exp. Route Total								4.2E-06					0.0097
		Exposure Point Total									5.8E-06					0.038
	Exposure Medium Total										5.8E-06					0.038
Medium Total											5.8E-06					0.038
										Total of Receptor Risks Across All Media	1.5E-05				Total of Receptor Hazards Across All Media	0.25

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.13.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L	See Table 7.15.RME for Cancer Risks					2.0E-01	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.10
				1,1,2-Trichloroethane	0.476	ug/L						2.4E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0059
				1,1-Dichloroethane	198	ug/L						9.9E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.049
				1,1-Dichloroethene	1231	ug/L						6.1E-02	(mg/kg/day)	5.0E-02	(mg/kg/day)	1.2
				1,2-Dichloroethane	1.23	ug/L						6.1E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.010
				2-Hexanone	12	ug/L						6.0E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.12
				Benzene	0.423	ug/L						2.1E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0053
				Bromodichloromethane	1.1	ug/L						5.5E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0027
				Chloroform	2.65	ug/L						1.3E-04	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.013
				Methyl tert-butyl ether	3.79	ug/L						1.9E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						5.4E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0090
				Tetrachloroethene	1.23	ug/L						6.1E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.010
				Trichloroethene (Mutagenic)	19.4	ug/L						9.7E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						9.7E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.9
				Vinyl chloride	0.853	ug/L						4.3E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.014
				1,4-Dioxane	74.4	ug/L						3.7E-03	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.12
				Dibenzo(a,h)anthracene	0.064	ug/L						3.2E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						1.1E-06	(mg/kg/day)	3.0E-05	(mg/kg/day)	0.038
				delta-BHC	0.0086	ug/L						4.3E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000054
				Dieldrin	0.0064	ug/L						3.2E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0064
				Aluminum	2089	ug/L						1.0E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.10
				Antimony	1.3	ug/L						6.5E-05	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.16
				Arsenic	7.8	ug/L						3.9E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.3
				Cadmium	0.439	ug/L						2.2E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.044
				Chromium	13.3	ug/L						6.6E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.22
				Cobalt	1.59	ug/L						7.9E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.26
				Cyanide	19.1	ug/L						9.5E-04	(mg/kg/day)	6.3E-04	(mg/kg/day)	1.5
				Iron	2504	ug/L						1.2E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.18
				Lead	1.66	ug/L						8.3E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						4.8E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.20
				Nickel	9.34	ug/L						4.7E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.023
				Thallium	0.094	ug/L						4.7E-06	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.47
				Vanadium	4.94	ug/L						2.5E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.049
			Exp. Route Total													8.2
			Dermal	1,1,1-Trichloroethane	4085	ug/L						3.3E-02	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.016
				1,1,2-Trichloroethane	0.476	ug/L						1.5E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00038
				1,1-Dichloroethane	198	ug/L						6.8E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0034
				1,1-Dichloroethene	1231	ug/L						7.2E-03	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.14
				1,2-Dichloroethane	1.23	ug/L						2.6E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00044
				2-Hexanone	12	ug/L						2.2E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0044
				Benzene	0.423	ug/L						2.8E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00070
				Bromodichloromethane	1.1	ug/L						3.4E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.00017
				Chloroform	2.65	ug/L						1.0E-05	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.0010
				Methyl tert-butyl ether	3.79	ug/L						3.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						1.8E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00030
				Tetrachloroethene	1.23	ug/L						3.2E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0053
				Trichloroethene (Mutagenic)	19.4	ug/L						1.4E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						1.4E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.28
				Vinyl chloride	0.853	ug/L						2.9E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00096
				1,4-Dioxane	74.4	ug/L						1.2E-05	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00039
				Dibenzo(a,h)anthracene	0.064	ug/L						0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				delta-BHC	0.0086	ug/L						2.8E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000035
				Dieldrin	0.0064	ug/L						5.2E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.010

TABLE 7.13.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Dermal	Aluminum	2089	ug/L						4.6E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00046
				Antimony	1.3	ug/L						2.9E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	0.0048
				Arsenic	7.8	ug/L						1.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0057
				Cadmium	0.439	ug/L						9.6E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.0039
				Chromium	13.3	ug/L						5.8E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.078
				Cobalt	1.59	ug/L						1.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00047
				Cyanide	19.1	ug/L						4.2E-06	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.0067
				Iron	2504	ug/L						5.5E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00079
				Lead	1.66	ug/L						3.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						2.1E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.022
				Nickel	9.34	ug/L						4.1E-07	(mg/kg/day)	8.0E-04	(mg/kg/day)	0.00051
				Thallium	0.094	ug/L						2.1E-08	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.0021
				Vanadium	4.94	ug/L						1.1E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.0083
			Exp. Route Total													0.60
		Exposure Point Total														8.8
	Exposure Medium Total															8.8
Medium Total																8.8
												Total of Receptor Hazards Across All Media				8.8

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.14.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L	See Table 7.15.RME for Cancer Risks					1.2E-01	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.061
				1,1,2-Trichloroethane	0.476	ug/L						1.4E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0036
				1,1-Dichloroethane	198	ug/L						5.9E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.030
				1,1-Dichloroethene	1231	ug/L						3.7E-02	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.74
				1,2-Dichloroethane	1.23	ug/L						3.7E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0061
				2-Hexanone	12	ug/L						3.6E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.072
				Benzene	0.423	ug/L						1.3E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0032
				Bromodichloromethane	1.1	ug/L						3.3E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0016
				Chloroform	2.65	ug/L						7.9E-05	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.0079
				Methyl tert-butyl ether	3.79	ug/L						1.1E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						3.2E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0054
				Tetrachloroethene	1.23	ug/L						3.7E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0061
				Trichloroethene (Mutagenic)	19.4	ug/L						5.8E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						5.8E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.2
				Vinyl chloride	0.853	ug/L						2.6E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0085
				1,4-Dioxane	74.4	ug/L						2.2E-03	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.074
				Dibenzo(a,h)anthracene	0.064	ug/L						1.9E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						6.9E-07	(mg/kg/day)	3.0E-05	(mg/kg/day)	0.023
				delta-BHC	0.0086	ug/L						2.6E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000032
				Dieldrin	0.0064	ug/L						1.9E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0038
				Aluminum	2089	ug/L						6.3E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.063
				Antimony	1.3	ug/L						3.9E-05	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.097
				Arsenic	7.8	ug/L						2.3E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.78
				Cadmium	0.439	ug/L						1.3E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.026
				Chromium	13.3	ug/L						4.0E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.13
				Cobalt	1.59	ug/L						4.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.16
				Cyanide	19.1	ug/L						5.7E-04	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.91
				Iron	2504	ug/L						7.5E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.11
				Lead	1.66	ug/L						5.0E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						2.9E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.12
				Nickel	9.34	ug/L						2.8E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.014
				Thallium	0.094	ug/L						2.8E-06	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.28
				Vanadium	4.94	ug/L						1.5E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.030
			Exp. Route Total													4.9
			Dermal	1,1,1-Trichloroethane	4085	ug/L						2.2E-02	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.011
				1,1,2-Trichloroethane	0.476	ug/L						1.0E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00025
				1,1-Dichloroethane	198	ug/L						4.5E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0023
				1,1-Dichloroethene	1231	ug/L						4.8E-03	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.096
				1,2-Dichloroethane	1.23	ug/L						1.7E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00029
				2-Hexanone	12	ug/L						1.4E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0029
				Benzene	0.423	ug/L						1.9E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00048
				Bromodichloromethane	1.1	ug/L						2.3E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.00011
				Chloroform	2.65	ug/L						7.0E-06	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.00070
				Methyl tert-butyl ether	3.79	ug/L						2.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						1.2E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00020
				Tetrachloroethene	1.23	ug/L						2.1E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0035
				Trichloroethene (Mutagenic)	19.4	ug/L						9.3E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						9.3E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.19
				Vinyl chloride	0.853	ug/L						2.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00066
				1,4-Dioxane	74.4	ug/L						7.8E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00026
				Dibenzo(a,h)anthracene	0.064	ug/L						0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				delta-BHC	0.0086	ug/L						1.8E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000023
				Dieldrin	0.0064	ug/L						3.5E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0069
				Aluminum	2089	ug/L						3.5E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00035
				Antimony	1.3	ug/L						2.2E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	0.0036
				Arsenic	7.8	ug/L						1.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0043
				Cadmium	0.439	ug/L						7.3E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.0029

TABLE 7.14.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA
PAGE 2 OF 2

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Dermal	Chromium	13.3	ug/L						4.4E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.059
				Cobalt	1.59	ug/L						1.1E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00035
				Cyanide	19.1	ug/L						3.2E-06	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.0051
				Iron	2504	ug/L						4.2E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00060
				Lead	1.66	ug/L						2.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						1.6E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.017
				Nickel	9.34	ug/L						3.1E-07	(mg/kg/day)	8.0E-04	(mg/kg/day)	0.00039
				Thallium	0.094	ug/L						1.6E-08	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.0016
				Vanadium	4.94	ug/L						8.3E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.0064
			Exp. Route Total													0.41
		Exposure Point Total														5.3
	Exposure Medium Total															5.3
	Air	Baghurst Drive Site	Inhalation	1,1,1-Trichloroethane	2.0E+00	mg/m^3						2.0E+00	(mg/m^3)	5.0E+00	(mg/m^3)	0.39
				1,1,2-Trichloroethane	2.4E-04	mg/m^3						2.3E-04	(mg/m^3)	2.0E-04	(mg/m^3)	1.1
				1,1-Dichloroethane	9.9E-02	mg/m^3						9.5E-02	(mg/m^3)	NA	(mg/m^3)	--
				1,1-Dichloroethene	6.2E-01	mg/m^3						5.9E-01	(mg/m^3)	2.0E-01	(mg/m^3)	3.0
				1,2-Dichloroethane	6.2E-04	mg/m^3						5.9E-04	(mg/m^3)	7.0E-03	(mg/m^3)	0.084
				2-Hexanone	6.0E-03	mg/m^3						5.8E-03	(mg/m^3)	3.0E-02	(mg/m^3)	0.19
				Benzene	2.1E-04	mg/m^3						2.0E-04	(mg/m^3)	3.0E-02	(mg/m^3)	0.0068
				Bromodichloromethane	5.5E-04	mg/m^3						5.3E-04	(mg/m^3)	NA	(mg/m^3)	--
				Chloroform	1.3E-03	mg/m^3						1.3E-03	(mg/m^3)	9.8E-02	(mg/m^3)	0.013
				Methyl tert-butyl ether	1.9E-03	mg/m^3						1.8E-03	(mg/m^3)	3.0E+00	(mg/m^3)	0.00061
				Methylene chloride	5.4E-04	mg/m^3						5.2E-04	(mg/m^3)	6.0E-01	(mg/m^3)	0.00086
				Tetrachloroethene	6.2E-04	mg/m^3						5.9E-04	(mg/m^3)	4.0E-02	(mg/m^3)	0.015
				Trichloroethene (Mutagenic)	9.7E-03	mg/m^3						9.3E-03	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene (Nonmutagenic)	9.7E-03	mg/m^3						9.3E-03	(mg/m^3)	2.0E-03	(mg/m^3)	4.7
				Vinyl chloride	4.3E-04	mg/m^3						4.1E-04	(mg/m^3)	1.0E-01	(mg/m^3)	0.0041
				1,4-Dioxane	3.7E-02	mg/m^3						3.6E-02	(mg/m^3)	3.0E-02	(mg/m^3)	1.2
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aldrin	1.2E-05	mg/m^3						1.1E-05	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Cyanide	9.6E-03	mg/m^3						9.2E-03	(mg/m^3)	8.0E-04	(mg/m^3)	11
				Iron	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Nickel	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	9.0E-05	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
			Exp. Route Total													22
		Exposure Point Total														22
	Exposure Medium Total															22
Medium Total																27
												Total of Receptor Hazards Across All Media				27

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.15.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA
PAGE 1 OF 2

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L	5.2E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	See Tables 7.13.RME and 7.14.RME for Hazard Indices				
				1,1,2-Trichloroethane	0.476	ug/L	6.1E-06	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	3.5E-07					
				1,1-Dichloroethane	198	ug/L	2.5E-03	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	1.4E-05					
				1,1-Dichloroethene	1231	ug/L	1.6E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				1,2-Dichloroethane	1.23	ug/L	1.6E-05	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	1.4E-06					
				2-Hexanone	12	ug/L	1.5E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Benzene	0.423	ug/L	5.4E-06	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	3.0E-07					
				Bromodichloromethane	1.1	ug/L	1.4E-05	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	8.8E-07					
				Chloroform	2.65	ug/L	3.4E-05	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	1.1E-06					
				Methyl tert-butyl ether	3.79	ug/L	4.9E-05	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	8.8E-08					
				Methylene chloride	1.08	ug/L	4.3E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	8.6E-08					
				Tetrachloroethene	1.23	ug/L	1.6E-05	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	3.3E-08					
				Trichloroethene (Mutagenic)	19.4	ug/L	7.7E-04	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	7.2E-06					
				Trichloroethene (Nonmutagenic)	19.4	ug/L	2.5E-04	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	9.2E-06					
				Vinyl chloride	0.853	ug/L	5.5E-05	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	4.0E-05					
				1,4-Dioxane	74.4	ug/L	9.5E-04	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	9.5E-05					
				Dibenzo(a,h)anthracene	0.064	ug/L	2.6E-06	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	2.6E-06					
				Aldrin	0.023	ug/L	3.0E-07	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	5.0E-06					
				delta-BHC	0.0086	ug/L	1.1E-07	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	7.0E-07					
				Dieldrin	0.0064	ug/L	8.2E-08	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	1.3E-06					
				Aluminum	2089	ug/L	2.7E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Antimony	1.3	ug/L	1.7E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Arsenic	7.8	ug/L	1.0E-04	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	1.5E-04					
				Cadmium	0.439	ug/L	5.6E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Chromium	13.3	ug/L	5.3E-04	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	2.7E-04					
				Cobalt	1.59	ug/L	2.0E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Cyanide	19.1	ug/L	2.5E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Iron	2504	ug/L	3.2E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Lead	1.66	ug/L	2.1E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Manganese	97	ug/L	1.2E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Nickel	9.34	ug/L	1.2E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Thallium	0.094	ug/L	1.2E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Vanadium	4.94	ug/L	6.3E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
			Exp. Route Total								6.0E-04					
			Dermal	1,1,1-Trichloroethane	4085	ug/L	9.0E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				1,1,2-Trichloroethane	0.476	ug/L	4.2E-07	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	2.4E-08					
				1,1-Dichloroethane	198	ug/L	1.9E-04	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	1.1E-06					
				1,1-Dichloroethene	1231	ug/L	2.0E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				1,2-Dichloroethane	1.23	ug/L	7.2E-07	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	6.6E-08					
				2-Hexanone	12	ug/L	6.0E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Benzene	0.423	ug/L	7.8E-07	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	4.3E-08					
				Bromodichloromethane	1.1	ug/L	9.4E-07	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	5.8E-08					
				Chloroform	2.65	ug/L	2.9E-06	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	8.9E-08					
				Methyl tert-butyl ether	3.79	ug/L	1.0E-06	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	1.9E-09					
				Methylene chloride	1.08	ug/L	1.5E-06	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	3.0E-09					
				Tetrachloroethene	1.23	ug/L	8.8E-06	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	1.9E-08					
				Trichloroethene (Mutagenic)	19.4	ug/L	1.2E-04	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	1.1E-06					
				Trichloroethene (Nonmutagenic)	19.4	ug/L	3.9E-05	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	1.4E-06					
				Vinyl chloride	0.853	ug/L	3.8E-06	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	2.7E-06					
				1,4-Dioxane	74.4	ug/L	3.2E-06	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	3.2E-07					
				Dibenzo(a,h)anthracene	0.064	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	- -					
				Aldrin	0.023	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	- -					
				delta-BHC	0.0086	ug/L	7.7E-08	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	4.8E-07					
				Dieldrin	0.0064	ug/L	1.4E-07	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	2.3E-06					
				Aluminum	2089	ug/L	1.4E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Antimony	1.3	ug/L	8.7E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Arsenic	7.8	ug/L	5.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	7.8E-07					
				Cadmium	0.439	ug/L	2.9E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					

TABLE 7.15.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Dermal	Chromium	13.3	ug/L	5.2E-06	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	1.0E-04					
				Cobalt	1.59	ug/L	4.2E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Cyanide	19.1	ug/L	1.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Iron	2504	ug/L	1.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Lead	1.66	ug/L	1.1E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Manganese	97	ug/L	6.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Nickel	9.34	ug/L	1.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Thallium	0.094	ug/L	6.3E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Vanadium	4.94	ug/L	3.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
			Exp. Route Total								1.1E-04					
		Exposure Point Total									7.1E-04					
	Exposure Medium Total										7.1E-04					
	Air	Baghurst Drive Site	Inhalation	1,1,1-Trichloroethane	2.0E+00	mg/m^3	5.6E-01	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				1,1,2-Trichloroethane	2.4E-04	mg/m^3	6.5E-05	(mg/m^3)	1.6E-05	$(ug/m^3)^{-1}$	1.0E-06					
				1,1-Dichloroethane	9.9E-02	mg/m^3	2.7E-02	(mg/m^3)	1.6E-06	$(ug/m^3)^{-1}$	4.3E-05					
				1,1-Dichloroethene	6.2E-01	mg/m^3	1.7E-01	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				1,2-Dichloroethane	6.2E-04	mg/m^3	1.7E-04	(mg/m^3)	2.6E-05	$(ug/m^3)^{-1}$	4.4E-06					
				2-Hexanone	6.0E-03	mg/m^3	1.6E-03	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				Benzene	2.1E-04	mg/m^3	5.8E-05	(mg/m^3)	7.8E-06	$(ug/m^3)^{-1}$	4.5E-07					
				Bromodichloromethane	5.5E-04	mg/m^3	1.5E-04	(mg/m^3)	3.7E-05	$(ug/m^3)^{-1}$	5.6E-06					
				Chloroform	1.3E-03	mg/m^3	3.6E-04	(mg/m^3)	2.3E-05	$(ug/m^3)^{-1}$	8.3E-06					
				Methyl tert-butyl ether	1.9E-03	mg/m^3	5.2E-04	(mg/m^3)	2.6E-07	$(ug/m^3)^{-1}$	1.3E-07					
				Methylene chloride	5.4E-04	mg/m^3	3.0E-04	(mg/m^3)	1.0E-08	$(ug/m^3)^{-1}$	3.0E-09					
				Tetrachloroethene	6.2E-04	mg/m^3	1.7E-04	(mg/m^3)	2.6E-07	$(ug/m^3)^{-1}$	4.4E-08					
				Trichloroethene (Mutagenic)	9.7E-03	mg/m^3	5.3E-03	(mg/m^3)	1.0E-06	$(ug/m^3)^{-1}$	5.3E-06					
				Trichloroethene (Nonmutagenic)	9.7E-03	mg/m^3	2.7E-03	(mg/m^3)	3.1E-06	$(ug/m^3)^{-1}$	8.2E-06					
				Vinyl chloride	4.3E-04	mg/m^3	1.2E-04	(mg/m^3)	4.4E-06	$(ug/m^3)^{-1}$	5.1E-07					
				1,4-Dioxane	3.7E-02	mg/m^3	1.0E-02	(mg/m^3)	5.0E-06	$(ug/m^3)^{-1}$	5.1E-05					
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	- -					
				Aldrin	1.2E-05	mg/m^3	3.2E-06	(mg/m^3)	4.9E-03	$(ug/m^3)^{-1}$	1.5E-05					
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -					
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	$(ug/m^3)^{-1}$	- -					
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	- -					
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	- -					
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	- -					
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	- -					
				Cyanide	9.6E-03	mg/m^3	2.6E-03	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	$(ug/m^3)^{-1}$	- -					
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
			Exp. Route Total								1.4E-04					
		Exposure Point Total									1.4E-04					
	Exposure Medium Total										1.4E-04					
Medium Total											8.5E-04					
										Total of Receptor Risks Across All Media	8.5E-04					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.16.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Ingestion	Aluminum	28200	mg/kg	See Table 7.18.RME for Cancer Risks					3.6E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.36
				Arsenic	35.5	mg/kg						2.7E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.91
				Chromium	41	mg/kg						5.2E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.17
				Cobalt	20.4	mg/kg						2.6E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.87
				Copper	915	mg/kg						1.2E-02	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.29
				Iron	37600	mg/kg						4.8E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.69
				Manganese	807	mg/kg						1.0E-02	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.43
				Thallium	0.548	mg/kg						7.0E-06	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.70
				Vanadium	72.3	mg/kg						9.2E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.18
			Exp. Route Total													4.6
			Dermal	Aluminum	28200	mg/kg						8.6E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0086
				Arsenic	35.5	mg/kg						3.2E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.11
				Chromium	41	mg/kg						1.2E-05	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.17
				Cobalt	20.4	mg/kg						6.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.021
				Copper	915	mg/kg						2.8E-04	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.0069
				Iron	37600	mg/kg						1.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.016
				Manganese	807	mg/kg						2.4E-04	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.26
				Thallium	0.548	mg/kg						1.7E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.017
				Vanadium	72.3	mg/kg						2.2E-05	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.17
			Exp. Route Total													0.77
		Exposure Point Total														5.4
	Exposure Medium Total															5.4
	Air	Baghurst Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3						8.4E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.0017
				Arsenic	1.1E-08	mg/m^3						1.1E-08	(mg/m^3)	1.5E-05	(mg/m^3)	0.00070
				Chromium	1.3E-08	mg/m^3						1.2E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.00012
				Cobalt	6.3E-09	mg/m^3						6.1E-09	(mg/m^3)	6.0E-06	(mg/m^3)	0.0010
				Copper	2.8E-07	mg/m^3						2.7E-07	(mg/m^3)	NA	(mg/m^3)	--
				Iron	1.2E-05	mg/m^3						1.1E-05	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	2.5E-07	mg/m^3						2.4E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.0048
				Thallium	1.7E-10	mg/m^3						1.6E-10	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	2.2E-08	mg/m^3						2.1E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.00021
			Exp. Route Total													0.0085
		Exposure Point Total														0.0085
	Exposure Medium Total															0.0085
Medium Total																5.4
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L						2.0E-01	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.10
				1,1,2-Trichloroethane	0.476	ug/L						2.4E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0059
				1,1-Dichloroethane	198	ug/L						9.9E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.049
				1,1-Dichloroethene	1231	ug/L						6.1E-02	(mg/kg/day)	5.0E-02	(mg/kg/day)	1.2
				1,2-Dichloroethane	1.23	ug/L						6.1E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.010
				2-Hexanone	12	ug/L						6.0E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.12
				Benzene	0.423	ug/L						2.1E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0053
				Bromodichloromethane	1.1	ug/L						5.5E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0027
				Chloroform	2.65	ug/L						1.3E-04	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.013
				Methyl tert-butyl ether	3.79	ug/L						1.9E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						5.4E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0090
				Tetrachloroethene	1.23	ug/L						6.1E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.010
				Trichloroethene (Mutagenic)	19.4	ug/L						9.7E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						9.7E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.9
				Vinyl chloride	0.853	ug/L						4.3E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.014
				1,4-Dioxane	74.4	ug/L						3.7E-03	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.12
				Dibenzo(a,h)anthracene	0.064	ug/L						3.2E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						1.1E-06	(mg/kg/day)	3.0E-05	(mg/kg/day)	0.038
				delta-BHC	0.0086	ug/L						4.3E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000054
				Dieldrin	0.0064	ug/L						3.2E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0064

TABLE 7.16.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA
PAGE 2 OF 2

Scenario Timeframe: 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	Aluminum	2089	ug/L						1.0E-01	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.10
				Antimony	1.3	ug/L						6.5E-05	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.16
				Arsenic	7.8	ug/L						3.9E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	1.3
				Cadmium	0.439	ug/L						2.2E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.044
				Chromium	13.3	ug/L						6.6E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.22
				Cobalt	1.59	ug/L						7.9E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.26
				Cyanide	19.1	ug/L						9.5E-04	(mg/kg/day)	6.3E-04	(mg/kg/day)	1.5
				Iron	2504	ug/L						1.2E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.18
				Lead	1.66	ug/L						8.3E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						4.8E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.20
				Nickel	9.34	ug/L						4.7E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.023
				Thallium	0.094	ug/L						4.7E-06	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.47
				Vanadium	4.94	ug/L						2.5E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.049
			Exp. Route Total													8.2
			Dermal	1,1,1-Trichloroethane	4085	ug/L						3.3E-02	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.016
				1,1,2-Trichloroethane	0.476	ug/L						1.5E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00038
				1,1-Dichloroethane	198	ug/L						6.8E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0034
				1,1-Dichloroethene	1231	ug/L						7.2E-03	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.14
				1,2-Dichloroethane	1.23	ug/L						2.6E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00044
				2-Hexanone	12	ug/L						2.2E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0044
				Benzene	0.423	ug/L						2.8E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00070
				Bromodichloromethane	1.1	ug/L						3.4E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.00017
				Chloroform	2.65	ug/L						1.0E-05	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.0010
				Methyl tert-butyl ether	3.79	ug/L						3.8E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						1.8E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00030
				Tetrachloroethene	1.23	ug/L						3.2E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0053
				Trichloroethene (Mutagenic)	19.4	ug/L						1.4E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						1.4E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.28
				Vinyl chloride	0.853	ug/L						2.9E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00096
				1,4-Dioxane	74.4	ug/L						1.2E-05	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00039
				Dibenzo(a,h)anthracene	0.064	ug/L						0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				delta-BHC	0.0086	ug/L						2.8E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000035
				Dieldrin	0.0064	ug/L						5.2E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.010
				Aluminum	2089	ug/L						4.6E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00046
				Antimony	1.3	ug/L						2.9E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	0.0048
				Arsenic	7.8	ug/L						1.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0057
				Cadmium	0.439	ug/L						9.6E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.0039
				Chromium	13.3	ug/L						5.8E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.078
				Cobalt	1.59	ug/L						1.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00047
				Cyanide	19.1	ug/L						4.2E-06	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.0067
				Iron	2504	ug/L						5.5E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00079
				Lead	1.66	ug/L						3.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						2.1E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.022
				Nickel	9.34	ug/L						4.1E-07	(mg/kg/day)	8.0E-04	(mg/kg/day)	0.00051
				Thallium	0.094	ug/L						2.1E-08	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.0021
				Vanadium	4.94	ug/L						1.1E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.0083
			Exp. Route Total													0.60
		Exposure Point Total														8.8
	Exposure Medium Total															8.8
Medium Total																8.8
												Total of Receptor Hazards Across All Media				14

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.17.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Ingestion	Aluminum	28200	mg/kg	See Table 7.18.RME for Cancer Risks					3.4E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.034
				Arsenic	35.5	mg/kg						2.6E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.085
				Chromium	41	mg/kg						4.9E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.016
				Cobalt	20.4	mg/kg						2.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.082
				Copper	915	mg/kg						1.1E-03	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.027
				Iron	37600	mg/kg						4.5E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.064
				Manganese	807	mg/kg						9.7E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.040
				Thallium	0.548	mg/kg						6.6E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.066
				Vanadium	72.3	mg/kg						8.7E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.017
			Exp. Route Total													0.43
			Dermal	Aluminum	28200	mg/kg						1.4E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0014
				Arsenic	35.5	mg/kg						5.4E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.018
				Chromium	41	mg/kg						2.1E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.028
				Cobalt	20.4	mg/kg						1.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0034
				Copper	915	mg/kg						4.6E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.0012
				Iron	37600	mg/kg						1.9E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0027
				Manganese	807	mg/kg						4.1E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.043
				Thallium	0.548	mg/kg						2.8E-08	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.0028
				Vanadium	72.3	mg/kg						3.7E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.028
			Exp. Route Total													0.13
		Exposure Point Total														0.56
	Exposure Medium Total															0.56
	Air	Baghurst Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3						8.4E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.0017
				Arsenic	1.1E-08	mg/m^3						1.1E-08	(mg/m^3)	1.5E-05	(mg/m^3)	0.00070
				Chromium	1.3E-08	mg/m^3						1.2E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.00012
				Cobalt	6.3E-09	mg/m^3						6.1E-09	(mg/m^3)	6.0E-06	(mg/m^3)	0.0010
				Copper	2.8E-07	mg/m^3						2.7E-07	(mg/m^3)	NA	(mg/m^3)	--
				Iron	1.2E-05	mg/m^3						1.1E-05	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	2.5E-07	mg/m^3						2.4E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.0048
				Thallium	1.7E-10	mg/m^3						1.6E-10	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	2.2E-08	mg/m^3						2.1E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.00021
			Exp. Route Total													0.0085
		Exposure Point Total														0.0085
	Exposure Medium Total															0.0085
Medium Total																0.57
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L						1.2E-01	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.061
				1,1,2-Trichloroethane	0.476	ug/L						1.4E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0036
				1,1-Dichloroethane	198	ug/L						5.9E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.030
				1,1-Dichloroethene	1231	ug/L						3.7E-02	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.74
				1,2-Dichloroethane	1.23	ug/L						3.7E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0061
				2-Hexanone	12	ug/L						3.6E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.072
				Benzene	0.423	ug/L						1.3E-05	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0032
				Bromodichloromethane	1.1	ug/L						3.3E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0016
				Chloroform	2.65	ug/L						7.9E-05	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.0079
				Methyl tert-butyl ether	3.79	ug/L						1.1E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						3.2E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0054
				Tetrachloroethene	1.23	ug/L						3.7E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0061
				Trichloroethene (Mutagenic)	19.4	ug/L						5.8E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						5.8E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	1.2
				Vinyl chloride	0.853	ug/L						2.6E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0085
				1,4-Dioxane	74.4	ug/L						2.2E-03	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.074
				Dibenzo(a,h)anthracene	0.064	ug/L						1.9E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						6.9E-07	(mg/kg/day)	3.0E-05	(mg/kg/day)	0.023
				delta-BHC	0.0086	ug/L						2.6E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000032
				Dieldrin	0.0064	ug/L						1.9E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0038

TABLE 7.17.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	Aluminum	2089	ug/L						6.3E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.063
				Antimony	1.3	ug/L						3.9E-05	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.097
				Arsenic	7.8	ug/L						2.3E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.78
				Cadmium	0.439	ug/L						1.3E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.026
				Chromium	13.3	ug/L						4.0E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.13
				Cobalt	1.59	ug/L						4.8E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.16
				Cyanide	19.1	ug/L						5.7E-04	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.91
				Iron	2504	ug/L						7.5E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.11
				Lead	1.66	ug/L						5.0E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						2.9E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.12
				Nickel	9.34	ug/L						2.8E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.014
				Thallium	0.094	ug/L						2.8E-06	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.28
				Vanadium	4.94	ug/L						1.5E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.030
			Exp. Route Total													4.9
			Dermal	1,1,1-Trichloroethane	4085	ug/L						2.2E-02	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.011
				1,1,2-Trichloroethane	0.476	ug/L						1.0E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00025
				1,1-Dichloroethane	198	ug/L						4.5E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0023
				1,1-Dichloroethene	1231	ug/L						4.8E-03	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.096
				1,2-Dichloroethane	1.23	ug/L						1.7E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00029
				2-Hexanone	12	ug/L						1.4E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0029
				Benzene	0.423	ug/L						1.9E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00048
				Bromodichloromethane	1.1	ug/L						2.3E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.00011
				Chloroform	2.65	ug/L						7.0E-06	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.00070
				Methyl tert-butyl ether	3.79	ug/L						2.5E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						1.2E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00020
				Tetrachloroethene	1.23	ug/L						2.1E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0035
				Trichloroethene (Mutagenic)	19.4	ug/L						9.3E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						9.3E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.19
				Vinyl chloride	0.853	ug/L						2.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00066
				1,4-Dioxane	74.4	ug/L						7.8E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00026
				Dibenzo(a,h)anthracene	0.064	ug/L						0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				delta-BHC	0.0086	ug/L						1.8E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000023
				Dieldrin	0.0064	ug/L						3.5E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0069
				Aluminum	2089	ug/L						3.5E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00035
				Antimony	1.3	ug/L						2.2E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	0.0036
				Arsenic	7.8	ug/L						1.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0043
				Cadmium	0.439	ug/L						7.3E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.0029
				Chromium	13.3	ug/L						4.4E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.059
				Cobalt	1.59	ug/L						1.1E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00035
				Cyanide	19.1	ug/L						3.2E-06	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.0051
				Iron	2504	ug/L						4.2E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00060
				Lead	1.66	ug/L						2.8E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						1.6E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.017
				Nickel	9.34	ug/L						3.1E-07	(mg/kg/day)	8.0E-04	(mg/kg/day)	0.00039
				Thallium	0.094	ug/L						1.6E-08	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.0016
				Vanadium	4.94	ug/L						8.3E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.0064
			Exp. Route Total													0.41
		Exposure Point Total														5.3
	Exposure Medium Total															5.3

TABLE 7.17.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air	Baghurst Drive Site	Inhalation	1,1,1-Trichloroethane	2.0E+00	mg/m^3						2.0E+00	(mg/m^3)	5.0E+00	(mg/m^3)	0.39
				1,1,2-Trichloroethane	2.4E-04	mg/m^3						2.3E-04	(mg/m^3)	2.0E-04	(mg/m^3)	1.1
				1,1-Dichloroethane	9.9E-02	mg/m^3						9.5E-02	(mg/m^3)	NA	(mg/m^3)	--
				1,1-Dichloroethene	6.2E-01	mg/m^3						5.9E-01	(mg/m^3)	2.0E-01	(mg/m^3)	3.0
				1,2-Dichloroethane	6.2E-04	mg/m^3						5.9E-04	(mg/m^3)	7.0E-03	(mg/m^3)	0.084
				2-Hexanone	6.0E-03	mg/m^3						5.8E-03	(mg/m^3)	3.0E-02	(mg/m^3)	0.19
				Benzene	2.1E-04	mg/m^3						2.0E-04	(mg/m^3)	3.0E-02	(mg/m^3)	0.0068
				Bromodichloromethane	5.5E-04	mg/m^3						5.3E-04	(mg/m^3)	NA	(mg/m^3)	--
				Chloroform	1.3E-03	mg/m^3						1.3E-03	(mg/m^3)	9.8E-02	(mg/m^3)	0.013
				Methyl tert-butyl ether	1.9E-03	mg/m^3						1.8E-03	(mg/m^3)	3.0E+00	(mg/m^3)	0.00061
				Methylene chloride	5.4E-04	mg/m^3						5.2E-04	(mg/m^3)	6.0E-01	(mg/m^3)	0.00086
				Tetrachloroethene	6.2E-04	mg/m^3						5.9E-04	(mg/m^3)	4.0E-02	(mg/m^3)	0.015
				Trichloroethene (Mutagenic)	9.7E-03	mg/m^3						9.3E-03	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene (Nonmutagenic)	9.7E-03	mg/m^3						9.3E-03	(mg/m^3)	2.0E-03	(mg/m^3)	4.7
				Vinyl chloride	4.3E-04	mg/m^3						4.1E-04	(mg/m^3)	1.0E-01	(mg/m^3)	0.0041
				1,4-Dioxane	3.7E-02	mg/m^3						3.6E-02	(mg/m^3)	3.0E-02	(mg/m^3)	1.2
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aldrin	1.2E-05	mg/m^3						1.1E-05	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Cyanide	9.6E-03	mg/m^3						9.2E-03	(mg/m^3)	8.0E-04	(mg/m^3)	11
				Iron	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Nickel	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	9.0E-05	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
			Exp. Route Total													22
		Exposure Point Total														22
	Exposure Medium Total															22
Medium Total																27
												Total of Receptor Hazards Across All Media				28

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.18.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA
PAGE 1 OF 3

Scenario Timeframe: Future
Receptor Population: On-Site Residents
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Ingestion	Aluminum	28200	mg/kg	4.1E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	See Tables 7.16.RME and 7.17.RME for Hazard Indices				
				Arsenic	35.5	mg/kg	3.1E-05	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	4.6E-05					
				Chromium	41	mg/kg	2.7E-04	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	1.3E-04					
				Cobalt	20.4	mg/kg	2.9E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Copper	915	mg/kg	1.3E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Iron	37600	mg/kg	5.4E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Manganese	807	mg/kg	1.2E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Thallium	0.548	mg/kg	7.9E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Vanadium	72.3	mg/kg	1.0E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
			Exp. Route Total								1.8E-04					
			Dermal	Aluminum	28200	mg/kg	1.1E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Arsenic	35.5	mg/kg	4.3E-06	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	6.5E-06					
				Chromium	41	mg/kg	6.9E-06	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	1.4E-04					
				Cobalt	20.4	mg/kg	8.3E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Copper	915	mg/kg	3.7E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Iron	37600	mg/kg	1.5E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Manganese	807	mg/kg	3.3E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Thallium	0.548	mg/kg	2.2E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Vanadium	72.3	mg/kg	2.9E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
			Exp. Route Total								1.4E-04					
		Exposure Point Total									3.2E-04					
	Exposure Medium Total										3.2E-04					
	Air	Baghurst Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3	3.1E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Arsenic	1.1E-08	mg/m^3	3.9E-09	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	1.7E-08					
				Chromium	1.3E-08	mg/m^3	1.3E-08	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	1.1E-06					
				Cobalt	6.3E-09	mg/m^3	2.2E-09	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	2.0E-08					
				Copper	2.8E-07	mg/m^3	1.0E-07	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Iron	1.2E-05	mg/m^3	4.1E-06	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Manganese	2.5E-07	mg/m^3	8.9E-08	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Thallium	1.7E-10	mg/m^3	6.0E-11	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Vanadium	2.2E-08	mg/m^3	8.0E-09	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
			Exp. Route Total								1.1E-06					
		Exposure Point Total									1.1E-06					
	Exposure Medium Total										1.1E-06					
Medium Total											3.2E-04					
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L	5.2E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				1,1,2-Trichloroethane	0.476	ug/L	6.1E-06	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	3.5E-07					
				1,1-Dichloroethane	198	ug/L	2.5E-03	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	1.4E-05					
				1,1-Dichloroethene	1231	ug/L	1.6E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				1,2-Dichloroethane	1.23	ug/L	1.6E-05	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	1.4E-06					
				2-Hexanone	12	ug/L	1.5E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Benzene	0.423	ug/L	5.4E-06	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	3.0E-07					
				Bromodichloromethane	1.1	ug/L	1.4E-05	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	8.8E-07					
				Chloroform	2.65	ug/L	3.4E-05	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	1.1E-06					
				Methyl tert-butyl ether	3.79	ug/L	4.9E-05	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	8.8E-08					
				Methylene chloride	1.08	ug/L	4.3E-05	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	8.6E-08					
				Tetrachloroethene	1.23	ug/L	1.6E-05	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	3.3E-08					
				Trichloroethene (Mutagenic)	19.4	ug/L	7.7E-04	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	7.2E-06					
				Trichloroethene (Nonmutagenic)	19.4	ug/L	2.5E-04	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	9.2E-06					
				Vinyl chloride	0.853	ug/L	5.5E-05	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	4.0E-05					
				1,4-Dioxane	74.4	ug/L	9.5E-04	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	9.5E-05					
				Dibenzo(a,h)anthracene	0.064	ug/L	2.6E-06	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	2.6E-06					
				Aldrin	0.023	ug/L	3.0E-07	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	5.0E-06					
				delta-BHC	0.0086	ug/L	1.1E-07	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	7.0E-07					
				Dieldrin	0.0064	ug/L	8.2E-08	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	1.3E-06					

TABLE 7.18.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	Aluminum	2089	ug/L	2.7E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Antimony	1.3	ug/L	1.7E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Arsenic	7.8	ug/L	1.0E-04	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	1.5E-04					
				Cadmium	0.439	ug/L	5.6E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Chromium	13.3	ug/L	5.3E-04	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	2.7E-04					
				Cobalt	1.59	ug/L	2.0E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Cyanide	19.1	ug/L	2.5E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Iron	2504	ug/L	3.2E-02	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Lead	1.66	ug/L	2.1E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Manganese	97	ug/L	1.2E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Nickel	9.34	ug/L	1.2E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Thallium	0.094	ug/L	1.2E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Vanadium	4.94	ug/L	6.3E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
			Exp. Route Total								6.0E-04					
			Dermal	1,1,1-Trichloroethane	4085	ug/L	9.0E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				1,1,2-Trichloroethane	0.476	ug/L	4.2E-07	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	2.4E-08					
				1,1-Dichloroethane	198	ug/L	1.9E-04	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	1.1E-06					
				1,1-Dichloroethene	1231	ug/L	2.0E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				1,2-Dichloroethane	1.23	ug/L	7.2E-07	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	6.6E-08					
				2-Hexanone	12	ug/L	6.0E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Benzene	0.423	ug/L	7.8E-07	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	4.3E-08					
				Bromodichloromethane	1.1	ug/L	9.4E-07	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	5.8E-08					
				Chloroform	2.65	ug/L	2.9E-06	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	8.9E-08					
				Methyl tert-butyl ether	3.79	ug/L	1.0E-06	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	1.9E-09					
				Methylene chloride	1.08	ug/L	1.5E-06	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	3.0E-09					
				Tetrachloroethene	1.23	ug/L	8.8E-06	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	1.9E-08					
				Trichloroethene (Mutagenic)	19.4	ug/L	1.2E-04	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	1.1E-06					
				Trichloroethene (Nonmutagenic)	19.4	ug/L	3.9E-05	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	1.4E-06					
				Vinyl chloride	0.853	ug/L	3.8E-06	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	2.7E-06					
				1,4-Dioxane	74.4	ug/L	3.2E-06	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	3.2E-07					
				Dibenzo(a,h)anthracene	0.064	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	- -					
				Aldrin	0.023	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	- -					
				delta-BHC	0.0086	ug/L	7.7E-08	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	4.8E-07					
				Dieldrin	0.0064	ug/L	1.4E-07	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	2.3E-06					
				Aluminum	2089	ug/L	1.4E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Antimony	1.3	ug/L	8.7E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Arsenic	7.8	ug/L	5.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	7.8E-07					
				Cadmium	0.439	ug/L	2.9E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Chromium	13.3	ug/L	5.2E-06	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	1.0E-04					
				Cobalt	1.59	ug/L	4.2E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Cyanide	19.1	ug/L	1.3E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Iron	2504	ug/L	1.7E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Lead	1.66	ug/L	1.1E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Manganese	97	ug/L	6.5E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Nickel	9.34	ug/L	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Thallium	0.094	ug/L	6.3E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Vanadium	4.94	ug/L	3.3E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
			Exp. Route Total								1.1E-04					
		Exposure Point Total									7.1E-04					
	Exposure Medium Total										7.1E-04					

TABLE 7.18.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air	Baghurst Drive Site	Inhalation	1,1,1-Trichloroethane	2.0E+00	mg/m^3	5.6E-01	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				1,1,2-Trichloroethane	2.4E-04	mg/m^3	6.5E-05	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	1.0E-06					
				1,1-Dichloroethane	9.9E-02	mg/m^3	2.7E-02	(mg/m^3)	1.6E-06	(ug/m^3)$^{-1}$	4.3E-05					
				1,1-Dichloroethene	6.2E-01	mg/m^3	1.7E-01	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				1,2-Dichloroethane	6.2E-04	mg/m^3	1.7E-04	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	4.4E-06					
				2-Hexanone	6.0E-03	mg/m^3	1.6E-03	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Benzene	2.1E-04	mg/m^3	5.8E-05	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	4.5E-07					
				Bromodichloromethane	5.5E-04	mg/m^3	1.5E-04	(mg/m^3)	3.7E-05	(ug/m^3)$^{-1}$	5.6E-06					
				Chloroform	1.3E-03	mg/m^3	3.6E-04	(mg/m^3)	2.3E-05	(ug/m^3)$^{-1}$	8.3E-06					
				Methyl tert-butyl ether	1.9E-03	mg/m^3	5.2E-04	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	1.3E-07					
				Methylene chloride	5.4E-04	mg/m^3	3.0E-04	(mg/m^3)	1.0E-08	(ug/m^3)$^{-1}$	3.0E-09					
				Tetrachloroethene	6.2E-04	mg/m^3	1.7E-04	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	4.4E-08					
				Trichloroethene (Mutagenic)	9.7E-03	mg/m^3	5.3E-03	(mg/m^3)	1.0E-06	(ug/m^3)$^{-1}$	5.3E-06					
				Trichloroethene (Nonmutagenic)	9.7E-03	mg/m^3	2.7E-03	(mg/m^3)	3.1E-06	(ug/m^3)$^{-1}$	8.2E-06					
				Vinyl chloride	4.3E-04	mg/m^3	1.2E-04	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	5.1E-07					
				1,4-Dioxane	3.7E-02	mg/m^3	1.0E-02	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	5.1E-05					
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -					
				Aldrin	1.2E-05	mg/m^3	3.2E-06	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	1.5E-05					
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -					
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -					
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -					
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -					
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -					
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -					
				Cyanide	9.6E-03	mg/m^3	2.6E-03	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	(ug/m^3)$^{-1}$	- -					
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
			Exp. Route Total								1.4E-04					
		Exposure Point Total									1.4E-04					
	Exposure Medium Total										1.4E-04					
Medium Total											8.5E-04					
										Total of Receptor Risks Across All Media	1.2E-03					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.1.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Intermittent Stream	Ingestion	1,1-Dichloroethane	22.4	ug/L	1.1E-07	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	6E-10	7.6E-07	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.000004
				Dieldrin	0.072	ug/L	3.5E-10	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	6E-09	2.4E-09	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.00005
				Heptachlor Epoxide	0.037	ug/L	1.8E-10	(mg/kg/day)	9.1E+00	(mg/kg/day)$^{-1}$	2E-09	1.3E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.00010
				Arsenic	10.2	ug/L	5.0E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	7E-08	3.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.001
				Chromium	1.59	ug/L	2.3E-08	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	1E-08	5.4E-08	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00002
				Manganese	1970	ug/L	9.6E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	6.7E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.003
			Exp. Route Total								9E-08					0.004
			Dermal	1,1-Dichloroethane	22.4	ug/L	1.8E-07	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	1E-09	1.2E-06	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.000006
				Dieldrin	0.072	ug/L	1.2E-08	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	2E-07	8.4E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.002
				Heptachlor Epoxide	0.037	ug/L	4.2E-09	(mg/kg/day)	9.1E+00	(mg/kg/day)$^{-1}$	4E-08	2.9E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.002
				Arsenic	10.2	ug/L	8.8E-09	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	1E-08	6.2E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0002
				Chromium	1.59	ug/L	8.3E-09	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	2E-07	1.9E-08	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0003
				Manganese	1970	ug/L	1.7E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	1.2E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.01
			Exp. Route Total								4E-07					0.02
		Exposure Point Total									5E-07					0.02
	Exposure Medium Total										5E-07					0.02
Medium Total											5E-07					0.02
Sediment	Sediment	Intermittent Stream	Ingestion	Arsenic	15.3	mg/kg	5.3E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	8E-08	3.7E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.001
				Chromium	39	mg/kg	6.8E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	3E-07	1.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0005
				Cobalt	18.9	mg/kg	1.1E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	7.6E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.003
				Iron	46700	mg/kg	2.7E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	1.9E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.003
			Exp. Route Total								4E-07					0.007
			Dermal	Arsenic	15.3	mg/kg	8.0E-09	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	1E-08	5.6E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0002
				Chromium	39	mg/kg	2.0E-08	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	4E-07	4.7E-08	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0006
				Cobalt	18.9	mg/kg	3.3E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	2.3E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00008
				Iron	46700	mg/kg	8.1E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	5.7E-05	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00008
			Exp. Route Total								4E-07					0.0010
		Exposure Point Total									8E-07					0.008
	Exposure Medium Total										8E-07					0.008
Medium Total											8E-07					0.008
										Total of Receptor Risks Across All Media	1E-06				Total of Receptor Hazards Across All Media	0.03

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.2.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Recreational User
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Perkiomen Creek	Ingestion	Arsenic	1.3	ug/L	See Table 7.4.CTE for Cancer Risks					6.1E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0020
			Exp. Route Total													0.0020
			Dermal	Arsenic	1.3	ug/L						2.9E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.000098
			Exp. Route Total													0.000098
		Exposure Point Total														0.0021
	Exposure Medium Total															0.0021
Medium Total																0.0021
Sediment	Sediment	Perkiomen Creek	Ingestion	Chromium	44.8	mg/kg						1.7E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0057
			Exp. Route Total													0.0057
			Dermal	Chromium	44.8	mg/kg						2.0E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0027
			Exp. Route Total													0.0027
		Exposure Point Total														0.0084
	Exposure Medium Total															0.0084
Medium Total																0.0084
												Total of Receptor Hazards Across All Media				0.010

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.3.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA
PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Recreational Users
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Perkiomen Creek	Ingestion	Arsenic	1.3	ug/L	See Table 7.4.CTE for Cancer Risks					4.9E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00016
			Exp. Route Total													0.00016
			Dermal	Arsenic	1.3	ug/L						1.4E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.000047
			Exp. Route Total													0.000047
		Exposure Point Total														0.00021
	Exposure Medium Total															0.00021
Medium Total																0.00021
Sediment	Sediment	Perkiomen Creek	Ingestion	Chromium	44.8	mg/kg						1.2E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00040
			Exp. Route Total													0.00040
			Dermal	Chromium	44.8	mg/kg						1.7E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0022
			Exp. Route Total													0.0022
		Exposure Point Total														0.0026
	Exposure Medium Total															0.0026
Medium Total																0.0026
												Total of Receptor Hazards Across All Media				0.0029

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.4.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA
PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Recreational Users
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Perkiomen Creek	Ingestion	Arsenic	1.3	ug/L	2.2E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.3E-08	See Tables 7.2.CTE and 7.3.CTE for Hazard Indices				
			Exp. Route Total								3.3E-08					
			Dermal	Arsenic	1.3	ug/L	2.2E-09	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.4E-09					
			Exp. Route Total								3.4E-09					
		Exposure Point Total									3.7E-08					
	Exposure Medium Total										3.7E-08					
Medium Total											3.7E-08					
Sediment	Sediment	Perkiomen Creek	Ingestion	Chromium	44.8	mg/kg	3.8E-06	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.9E-06					
			Exp. Route Total								1.9E-06					
			Dermal	Chromium	44.8	mg/kg	1.3E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	2.7E-06					
			Exp. Route Total								2.7E-06					
		Exposure Point Total									4.6E-06					
	Exposure Medium Total										4.6E-06					
Medium Total											4.6E-06					
										Total of Receptor Risks Across All Media	4.6E-06					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.5.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Construction Worker
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Baghusrt Drive Site	Ingestion	Aluminum	28200	mg/kg	2.8E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.0E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.020
				Arsenic	35.5	mg/kg	2.1E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	3.2E-07	1.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.050
				Chromium	41	mg/kg	4.1E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	2.1E-07	2.9E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0058
				Cobalt	20.4	mg/kg	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.4E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0048
				Copper	915	mg/kg	9.2E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	6.5E-04	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.016
				Iron	37600	mg/kg	3.8E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.7E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.038
				Manganese	807	mg/kg	8.1E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	5.7E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.024
				Thallium	0.548	mg/kg	5.5E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.9E-07	(mg/kg/day)	4.0E-05	(mg/kg/day)	0.0097
				Vanadium	72.3	mg/kg	7.3E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	5.1E-05	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.0051
			Exp. Route Total								5.3E-07					0.17
			Dermal	Aluminum	28200	mg/kg	6.1E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	4.3E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00043
				Arsenic	35.5	mg/kg	2.3E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	3.4E-08	1.6E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0054
				Chromium	41	mg/kg	8.8E-09	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	1.8E-07	6.2E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.0050
				Cobalt	20.4	mg/kg	4.4E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.1E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00010
				Copper	915	mg/kg	2.0E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.4E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.00035
				Iron	37600	mg/kg	8.1E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	5.7E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00081
				Manganese	807	mg/kg	1.7E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.2E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.013
				Thallium	0.548	mg/kg	1.2E-10	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	8.3E-09	(mg/kg/day)	4.0E-05	(mg/kg/day)	0.00021
				Vanadium	72.3	mg/kg	1.6E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.1E-06	(mg/kg/day)	2.6E-04	(mg/kg/day)	0.0042
			Exp. Route Total								2.1E-07					0.029
		Exposure Point Total									7.4E-07					0.20
	Exposure Medium Total										7.4E-07					0.20
	Air	Baghusrt Drive Site	Inhalation	Aluminum	2.0E-02	mg/m^3	3.3E-05	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	2.3E-03	(mg/m^3)	5.0E-03	(mg/m^3)	0.46
				Arsenic	2.5E-05	mg/m^3	4.1E-08	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	1.8E-07	2.9E-06	(mg/m^3)	1.5E-05	(mg/m^3)	0.19
				Chromium	2.9E-05	mg/m^3	4.8E-08	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	4.0E-06	3.3E-06	(mg/m^3)	3.0E-04	(mg/m^3)	0.011
				Cobalt	1.5E-05	mg/m^3	2.4E-08	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	2.1E-07	1.7E-06	(mg/m^3)	2.0E-05	(mg/m^3)	0.083
				Copper	6.5E-04	mg/m^3	1.1E-06	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	7.5E-05	(mg/m^3)	NA	(mg/m^3)	--
				Iron	2.7E-02	mg/m^3	4.4E-05	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	3.1E-03	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	5.8E-04	mg/m^3	9.4E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	6.6E-05	(mg/m^3)	5.0E-05	(mg/m^3)	1.3
				Thallium	3.9E-07	mg/m^3	6.4E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	4.5E-08	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	5.2E-05	mg/m^3	8.4E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	5.9E-06	(mg/m^3)	1.0E-04	(mg/m^3)	0.059
			Exp. Route Total								4.4E-06					2.1
		Exposure Point Total									4.4E-06					2.1
	Exposure Medium Total										4.4E-06					2.1
Medium Total											5.1E-06					2.3
										Total of Receptor Risks Across All Media	5.1E-06				Total of Receptor Hazards Across All Media	2.3

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.6.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA
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Scenario Timeframe: Future
Receptor Population: Farmer
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Ingestion	Aluminum	28200	mg/kg	See Table 7.8.CTE for Cancer Risks					9.6E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.096
				Arsenic	35.5	mg/kg						7.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.24
				Chromium	41	mg/kg						1.4E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.047
				Cobalt	20.4	mg/kg						7.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.23
				Copper	915	mg/kg						3.1E-03	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.078
				Iron	37600	mg/kg						1.3E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.18
				Manganese	807	mg/kg						2.8E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.11
				Thallium	0.548	mg/kg						1.9E-06	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.19
				Vanadium	72.3	mg/kg						2.5E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.049
			Exp. Route Total													1.2
			Dermal	Aluminum	28200	mg/kg						1.1E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0011
				Arsenic	35.5	mg/kg						4.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.014
				Chromium	41	mg/kg						1.7E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.022
				Cobalt	20.4	mg/kg						8.3E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0028
				Copper	915	mg/kg						3.7E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.00093
				Iron	37600	mg/kg						1.5E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0022
				Manganese	807	mg/kg						3.3E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.034
				Thallium	0.548	mg/kg						2.2E-08	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.0022
				Vanadium	72.3	mg/kg						2.9E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.023
			Exp. Route Total													0.10
		Exposure Point Total														1.3
	Exposure Medium Total															1.3
	Air	Baghurst Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3						5.6E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.0011
				Arsenic	1.1E-08	mg/m^3						7.0E-09	(mg/m^3)	1.5E-05	(mg/m^3)	0.00047
				Chromium	1.3E-08	mg/m^3						8.1E-09	(mg/m^3)	1.0E-04	(mg/m^3)	0.000081
				Cobalt	6.3E-09	mg/m^3						4.0E-09	(mg/m^3)	6.0E-06	(mg/m^3)	0.00067
				Copper	2.8E-07	mg/m^3						1.8E-07	(mg/m^3)	NA	(mg/m^3)	--
				Iron	1.2E-05	mg/m^3						7.5E-06	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	2.5E-07	mg/m^3						1.6E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.0032
				Thallium	1.7E-10	mg/m^3						1.1E-10	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	2.2E-08	mg/m^3						1.4E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.00014
			Exp. Route Total													0.0057
		Exposure Point Total														0.0057
	Exposure Medium Total															0.0057
Medium Total																1.3
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L						8.4E-02	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.042
				1,1,2-Trichloroethane	0.476	ug/L						9.8E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0024
				1,1-Dichloroethane	198	ug/L						4.1E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.020
				1,1-Dichloroethene	1231	ug/L						2.5E-02	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.51
				1,2-Dichloroethane	1.23	ug/L						2.5E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0042
				2-Hexanone	12	ug/L						2.5E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.049
				Benzene	0.423	ug/L						8.7E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0022
				Bromodichloromethane	1.1	ug/L						2.3E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0011
				Chloroform	2.65	ug/L						5.4E-05	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.0054
				Methyl tert-butyl ether	3.79	ug/L						7.8E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						2.2E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0037
				Tetrachloroethene	1.23	ug/L						2.5E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0042
				Trichloroethene (Mutagenic)	19.4	ug/L						4.0E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						4.0E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.80
				Vinyl chloride	0.853	ug/L						1.7E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0058
				1,4-Dioxane	74.4	ug/L						1.5E-03	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.051
				Dibenzo(a,h)anthracene	0.064	ug/L						1.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						4.7E-07	(mg/kg/day)	3.0E-05	(mg/kg/day)	0.016
				delta-BHC	0.0086	ug/L						1.8E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000022
				Dieldrin	0.0064	ug/L						1.3E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0026

TABLE 7.6.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmer
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	Aluminum	2089	ug/L						4.3E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.043
				Antimony	1.3	ug/L						2.7E-05	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.067
				Arsenic	7.8	ug/L						1.6E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.53
				Cadmium	0.439	ug/L						9.0E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.018
				Chromium	13.3	ug/L						2.7E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.091
				Cobalt	1.59	ug/L						3.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.11
				Cyanide	19.1	ug/L						3.9E-04	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.62
				Iron	2504	ug/L						5.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.073
				Lead	1.66	ug/L						3.4E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						2.0E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.083
				Nickel	9.34	ug/L						1.9E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0096
				Thallium	0.094	ug/L						1.9E-06	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.19
				Vanadium	4.94	ug/L						1.0E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.020
			Exp. Route Total													3.4
			Dermal	1,1,1-Trichloroethane	4085	ug/L						1.8E-02	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.0090
				1,1,2-Trichloroethane	0.476	ug/L						8.4E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00021
				1,1-Dichloroethane	198	ug/L						3.8E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0019
				1,1-Dichloroethene	1231	ug/L						4.0E-03	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.080
				1,2-Dichloroethane	1.23	ug/L						1.5E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00024
				2-Hexanone	12	ug/L						1.2E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0024
				Benzene	0.423	ug/L						1.5E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00039
				Bromodichloromethane	1.1	ug/L						1.9E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.000094
				Chloroform	2.65	ug/L						5.8E-06	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.00058
				Methyl tert-butyl ether	3.79	ug/L						2.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						9.8E-07	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00016
				Tetrachloroethene	1.23	ug/L						1.8E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0030
				Trichloroethene (Mutagenic)	19.4	ug/L						7.8E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						7.8E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.16
				Vinyl chloride	0.853	ug/L						1.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00053
				1,4-Dioxane	74.4	ug/L						6.5E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00022
				Dibenzo(a,h)anthracene	0.064	ug/L						0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				delta-BHC	0.0086	ug/L						1.5E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000019
				Dieldrin	0.0064	ug/L						2.9E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0058
				Aluminum	2089	ug/L						2.1E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00021
				Antimony	1.3	ug/L						1.3E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	0.0022
				Arsenic	7.8	ug/L						7.9E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0026
				Cadmium	0.439	ug/L						4.4E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.0018
				Chromium	13.3	ug/L						2.7E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.036
				Cobalt	1.59	ug/L						6.4E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00021
				Cyanide	19.1	ug/L						1.9E-06	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.0031
				Iron	2504	ug/L						2.5E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00036
				Lead	1.66	ug/L						1.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						9.8E-06	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.010
				Nickel	9.34	ug/L						1.9E-07	(mg/kg/day)	8.0E-04	(mg/kg/day)	0.00024
				Thallium	0.094	ug/L						9.5E-09	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.00095
				Vanadium	4.94	ug/L						5.0E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.0038
			Exp. Route Total													0.32
		Exposure Point Total														3.7
	Exposure Medium Total															3.7
Medium Total																3.7
												Total of Receptor Hazards Across All Media				5.0

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.7.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface/Subsurface Soil	Surface/Subsurface Soil	Baghusrt Drive Site	Ingestion	Aluminum	28200	mg/kg	1.1E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	7.5E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.075
				Arsenic	35.5	mg/kg	8.0E-06	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.2E-05	5.6E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.19
				Chromium	41	mg/kg	3.1E-05	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.5E-05	1.1E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.036
				Cobalt	20.4	mg/kg	7.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	5.4E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.18
				Copper	915	mg/kg	3.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	2.4E-03	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.060
				Iron	37600	mg/kg	1.4E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	9.9E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.14
				Manganese	807	mg/kg	3.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	2.1E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.089
				Thallium	0.548	mg/kg	2.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.4E-06	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.14
				Vanadium	72.3	mg/kg	2.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.9E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.038
			Exp. Route Total								2.8E-05					0.95
			Dermal	Aluminum	28200	mg/kg	2.3E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.6E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0016
				Arsenic	35.5	mg/kg	8.6E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.3E-06	6.0E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.020
				Chromium	41	mg/kg	6.6E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	1.3E-05	2.3E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.031
				Cobalt	20.4	mg/kg	1.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0038
				Copper	915	mg/kg	7.4E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	5.2E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.0013
				Iron	37600	mg/kg	3.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	2.1E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0030
				Manganese	807	mg/kg	6.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	4.6E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.048
				Thallium	0.548	mg/kg	4.4E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.1E-08	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.0031
				Vanadium	72.3	mg/kg	5.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	4.1E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.031
			Exp. Route Total								1.5E-05					0.14
		Exposure Point Total									4.2E-05					1.1
	Exposure Medium Total										4.2E-05					1.1
	Air	Baghusrt Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3	5.3E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	3.7E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.00075
				Arsenic	1.1E-08	mg/m^3	6.7E-10	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	2.9E-09	4.7E-09	(mg/m^3)	1.5E-05	(mg/m^3)	0.00031
				Chromium	1.3E-08	mg/m^3	1.6E-09	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	1.3E-07	5.4E-09	(mg/m^3)	1.0E-04	(mg/m^3)	0.000054
				Cobalt	6.3E-09	mg/m^3	3.9E-10	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	3.5E-09	2.7E-09	(mg/m^3)	6.0E-06	(mg/m^3)	0.00045
				Copper	2.8E-07	mg/m^3	1.7E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	1.2E-07	(mg/m^3)	NA	(mg/m^3)	--
				Iron	1.2E-05	mg/m^3	7.1E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	5.0E-06	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	2.5E-07	mg/m^3	1.5E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	1.1E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.0021
				Thallium	1.7E-10	mg/m^3	1.0E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	7.3E-11	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	2.2E-08	mg/m^3	1.4E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	9.6E-09	(mg/m^3)	1.0E-04	(mg/m^3)	0.000096
			Exp. Route Total								1.4E-07					0.0038
		Exposure Point Total									1.4E-07					0.0038
	Exposure Medium Total										1.4E-07					0.0038
Medium Total											4.2E-05					1.1
Groundwater	Groundwater Potable Use	Baghusrt Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L	1.1E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.9E-02	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.020
				1,1,2-Trichloroethane	0.476	ug/L	1.3E-06	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	7.5E-08	4.6E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0011
				1,1-Dichloroethane	198	ug/L	5.4E-04	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	3.1E-06	1.9E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0095
				1,1-Dichloroethene	1231	ug/L	3.4E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.2E-02	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.24
				1,2-Dichloroethane	1.23	ug/L	3.4E-06	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	3.1E-07	1.2E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0020
				2-Hexanone	12	ug/L	3.3E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.2E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.023
				Benzene	0.423	ug/L	1.2E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	6.4E-08	4.1E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0010
				Bromodichloromethane	1.1	ug/L	3.0E-06	(mg/kg/day)	6.2E-02	$(mg/kg/day)^{-1}$	1.9E-07	1.1E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.00053
				Chloroform	2.65	ug/L	7.3E-06	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	2.3E-07	2.5E-05	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.0025
				Methyl tert-butyl ether	3.79	ug/L	1.0E-05	(mg/kg/day)	1.8E-03	$(mg/kg/day)^{-1}$	1.9E-08	3.6E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L	5.9E-06	(mg/kg/day)	2.0E-03	$(mg/kg/day)^{-1}$	1.2E-08	1.0E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0017
				Tetrachloroethene	1.23	ug/L	3.4E-06	(mg/kg/day)	2.1E-03	$(mg/kg/day)^{-1}$	7.1E-09	1.2E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0020
				Trichloroethene (Mutagenic)	19.4	ug/L	1.1E-04	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	9.9E-07	1.9E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L	5.3E-05	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	2.0E-06	1.9E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.37
				Vinyl chloride	0.853	ug/L	2.3E-06	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	1.7E-06	8.2E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0027
				1,4-Dioxane	74.4	ug/L	2.0E-04	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	2.0E-05	7.2E-04	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.024
				Dibenzo(a,h)anthracene	0.064	ug/L	3.5E-07	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	3.5E-07	6.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L	6.3E-08	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	1.1E-06	2.2E-07	(mg/kg/day)	3.0E-05	(mg/kg/day)	0.0074
				delta-BHC	0.0086	ug/L	2.4E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	1.5E-07	8.3E-08	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000010
				Dieldrin	0.0064	ug/L	1.8E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	2.8E-07	6.2E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0012
				Aluminum	2089	ug/L	5.7E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	2.0E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.020
				Antimony	1.3	ug/L	3.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.3E-05	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.031

TABLE 7.7.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghusrt Drive Site	Ingestion	Arsenic	7.8	ug/L	2.1E-05	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	3.2E-05	7.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.25
	Potable Use			Cadmium	0.439	ug/L	1.2E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	4.2E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0084
				Chromium	13.3	ug/L	7.3E-05	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	3.7E-05	1.3E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.043
				Cobalt	1.59	ug/L	4.4E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.051
				Cyanide	19.1	ug/L	5.2E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.8E-04	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.29
				Iron	2504	ug/L	6.9E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.4E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.034
				Lead	1.66	ug/L	4.6E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.6E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L	2.7E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	9.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.039
				Nickel	9.34	ug/L	2.6E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	9.0E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0045
				Thallium	0.094	ug/L	2.6E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	9.0E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.090
				Vanadium	4.94	ug/L	1.4E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	4.8E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0095
			Exp. Route Total								1.0E-04					1.6
			Dermal	1,1,1-Trichloroethane	4085	ug/L	4.9E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.7E-02	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.0086
				1,1,2-Trichloroethane	0.476	ug/L	2.3E-07	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	1.3E-08	8.0E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00020
				1,1-Dichloroethane	198	ug/L	1.1E-04	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	6.0E-07	3.7E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0018
				1,1-Dichloroethene	1231	ug/L	1.1E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.9E-03	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.078
				1,2-Dichloroethane	1.23	ug/L	4.1E-07	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	3.7E-08	1.4E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00024
				2-Hexanone	12	ug/L	3.4E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.2E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0024
				Benzene	0.423	ug/L	4.4E-07	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	2.4E-08	1.5E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00039
				Bromodichloromethane	1.1	ug/L	5.1E-07	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	3.2E-08	1.8E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.000090
				Chloroform	2.65	ug/L	1.6E-06	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	4.9E-08	5.5E-06	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.00055
				Methyl tert-butyl ether	3.79	ug/L	5.9E-07	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	1.1E-09	2.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L	5.6E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	1.1E-09	9.8E-07	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00016
				Tetrachloroethene	1.23	ug/L	4.8E-06	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	1.0E-08	1.7E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0028
				Trichloroethene (Mutagenic)	19.4	ug/L	4.2E-05	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	3.9E-07	7.4E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L	2.1E-05	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	7.8E-07	7.4E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.15
				Vinyl chloride	0.853	ug/L	4.7E-07	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	3.4E-07	1.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00055
				1,4-Dioxane	74.4	ug/L	1.8E-06	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	1.8E-07	6.4E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00021
				Dibenzo(a,h)anthracene	0.064	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	--	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	--	0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				delta-BHC	0.0086	ug/L	4.2E-08	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	2.6E-07	1.5E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000018
				Dieldrin	0.0064	ug/L	7.8E-08	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	1.3E-06	2.7E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0055
				Aluminum	2089	ug/L	9.4E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.3E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00033
				Antimony	1.3	ug/L	5.8E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.0E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	0.0034
				Arsenic	7.8	ug/L	3.5E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	5.3E-07	1.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0041
				Cadmium	0.439	ug/L	2.0E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	6.9E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.0028
				Chromium	13.3	ug/L	2.4E-06	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	4.8E-05	4.2E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.056
				Cobalt	1.59	ug/L	2.9E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.0E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00033
				Cyanide	19.1	ug/L	8.6E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.0E-06	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.0048
				Iron	2504	ug/L	1.1E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.9E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00056
				Lead	1.66	ug/L	7.5E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L	4.4E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.5E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.016
				Nickel	9.34	ug/L	8.4E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.9E-07	(mg/kg/day)	8.0E-04	(mg/kg/day)	0.00037
				Thallium	0.094	ug/L	4.2E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.5E-08	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.0015
				Vanadium	4.94	ug/L	2.2E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	7.8E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.0060
			Exp. Route Total								5.2E-05					0.35
		Exposure Point Total									1.5E-04					1.9
	Exposure Medium Total										1.5E-04					1.9
	Air	Baghusrt Drive Site	Inhalation	1,1,1-Trichloroethane	2.0E+00	mg/m^3	3.7E-01	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	1.3E+00	(mg/m^3)	5.0E+00	(mg/m^3)	0.26
	Potable Use			1,1,2-Trichloroethane	2.4E-04	mg/m^3	4.4E-05	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	7.0E-07	1.5E-04	(mg/m^3)	2.0E-04	(mg/m^3)	0.76
				1,1-Dichloroethane	9.9E-02	mg/m^3	1.8E-02	(mg/m^3)	1.6E-06	(ug/m^3)$^{-1}$	2.9E-05	6.3E-02	(mg/m^3)	NA	(mg/m^3)	--
				1,1-Dichloroethene	6.2E-01	mg/m^3	1.1E-01	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	3.9E-01	(mg/m^3)	2.0E-01	(mg/m^3)	2.0
				1,2-Dichloroethane	6.2E-04	mg/m^3	1.1E-04	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	2.9E-06	3.9E-04	(mg/m^3)	7.0E-03	(mg/m^3)	0.056
				2-Hexanone	6.0E-03	mg/m^3	1.1E-03	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	3.8E-03	(mg/m^3)	3.0E-02	(mg/m^3)	0.13
				Benzene	2.1E-04	mg/m^3	3.9E-05	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	3.0E-07	1.4E-04	(mg/m^3)	3.0E-02	(mg/m^3)	0.0045
				Bromodichloromethane	5.5E-04	mg/m^3	1.0E-04	(mg/m^3)	3.7E-05	(ug/m^3)$^{-1}$	3.7E-06	3.5E-04	(mg/m^3)	NA	(mg/m^3)	--
				Chloroform	1.3E-03	mg/m^3	2.4E-04	(mg/m^3)	2.3E-05	(ug/m^3)$^{-1}$	5.6E-06	8.5E-04	(mg/m^3)	9.8E-02	(mg/m^3)	0.0087

TABLE 7.7.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air	Baghusrt Drive Site	Inhalation	Methyl tert-butyl ether	1.9E-03	mg/m^3	3.5E-04	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	9.0E-08	1.2E-03	(mg/m^3)	3.0E+00	(mg/m^3)	0.00040
	Potable Use			Methylene chloride	5.4E-04	mg/m^3	2.0E-04	(mg/m^3)	1.0E-08	(ug/m^3)$^{-1}$	2.0E-09	3.5E-04	(mg/m^3)	6.0E-01	(mg/m^3)	0.00058
				Tetrachloroethene	6.2E-04	mg/m^3	1.1E-04	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	2.9E-08	3.9E-04	(mg/m^3)	4.0E-02	(mg/m^3)	0.0099
				Trichloroethene (Mutagenic)	9.7E-03	mg/m^3	3.6E-03	(mg/m^3)	1.0E-06	(ug/m^3)$^{-1}$	3.6E-06	6.2E-03	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene (Nonmutagenic)	9.7E-03	mg/m^3	1.8E-03	(mg/m^3)	3.1E-06	(ug/m^3)$^{-1}$	5.5E-06	6.2E-03	(mg/m^3)	2.0E-03	(mg/m^3)	3.1
				Vinyl chloride	4.3E-04	mg/m^3	7.8E-05	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	3.4E-07	2.7E-04	(mg/m^3)	1.0E-01	(mg/m^3)	0.0027
				1,4-Dioxane	3.7E-02	mg/m^3	6.8E-03	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	3.4E-05	2.4E-02	(mg/m^3)	3.0E-02	(mg/m^3)	0.79
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aldrin	1.2E-05	mg/m^3	2.1E-06	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	1.0E-05	7.4E-06	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Cyanide	9.6E-03	mg/m^3	1.7E-03	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	6.1E-03	(mg/m^3)	8.0E-04	(mg/m^3)	7.7
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	9.0E-05	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
			Exp. Route Total								9.6E-05					15
		Exposure Point Total									9.6E-05					15
	Exposure Medium Total										9.6E-05					15
Medium Total											2.5E-04					17
Groundwater	Groundwater	Baghusrt Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L	1.2E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	4.2E-04	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.00021
	Irrigation			1,1,2-Trichloroethane	0.476	ug/L	1.4E-08	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	8.0E-10	4.9E-08	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.000012
				1,1-Dichloroethane	198	ug/L	5.8E-06	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	3.3E-08	2.0E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.00010
				1,1-Dichloroethene	1231	ug/L	3.6E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.3E-04	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.0025
				1,2-Dichloroethane	1.23	ug/L	3.6E-08	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	3.3E-09	1.3E-07	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.000021
				2-Hexanone	12	ug/L	3.5E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.2E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.00025
				Benzene	0.423	ug/L	1.2E-08	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	6.8E-10	4.3E-08	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.000011
				Bromodichloromethane	1.1	ug/L	3.2E-08	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	2.0E-09	1.1E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0000057
				Chloroform	2.65	ug/L	7.8E-08	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	2.4E-09	2.7E-07	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.000027
				Methyl tert-butyl ether	3.79	ug/L	1.1E-07	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	2.0E-10	3.9E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L	6.3E-08	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	1.3E-10	1.1E-07	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.000018
				Tetrachloroethene	1.23	ug/L	3.6E-08	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	7.6E-11	1.3E-07	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.000021
				Trichloroethene (Mutagenic)	19.4	ug/L	1.1E-06	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	1.1E-08	2.0E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L	5.7E-07	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	2.1E-08	2.0E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0040
				Vinyl chloride	0.853	ug/L	2.5E-08	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	1.8E-08	8.8E-08	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.000029
				1,4-Dioxane	74.4	ug/L	2.2E-06	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	2.2E-07	7.6E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00025
				Dibenzo(a,h)anthracene	0.064	ug/L	3.8E-09	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	3.8E-09	6.6E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L	6.8E-10	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	1.1E-08	2.4E-09	(mg/kg/day)	3.0E-05	(mg/kg/day)	0.000079
				delta-BHC	0.0086	ug/L	2.5E-10	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	1.6E-09	8.8E-10	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.00000011
				Dieldrin	0.0064	ug/L	1.9E-10	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	3.0E-09	6.6E-10	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.000013
				Aluminum	2089	ug/L	6.1E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.1E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00021
				Antimony	1.3	ug/L	3.8E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.3E-07	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.00033
				Arsenic	7.8	ug/L	2.3E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	3.4E-07	8.0E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0027
				Cadmium	0.439	ug/L	1.3E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	4.5E-08	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.000090
				Chromium	13.3	ug/L	7.8E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	3.9E-07	1.4E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00046
				Cobalt	1.59	ug/L	4.7E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.6E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00054
				Cyanide	19.1	ug/L	5.6E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.0E-06	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.0031
				Iron	2504	ug/L	7.4E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.6E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00037
				Lead	1.66	ug/L	4.9E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.7E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L	2.8E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.0E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.00042

TABLE 7.7.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater Irrigation	Baghusrt Drive Site	Ingestion	Nickel	9.34	ug/L	2.7E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	9.6E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.000048
				Thallium	0.094	ug/L	2.8E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	9.7E-09	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.00097
				Vanadium	4.94	ug/L	1.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	5.1E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.00010
			Exp. Route Total								1.1E-06					0.017
			Dermal	1,1,1-Trichloroethane	4085	ug/L	1.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	4.0E-04	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.00020
				1,1,2-Trichloroethane	0.476	ug/L	5.3E-09	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	3.0E-10	1.8E-08	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0000046
				1,1-Dichloroethane	198	ug/L	2.3E-06	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	1.3E-08	8.2E-06	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.000041
				1,1-Dichloroethene	1231	ug/L	2.5E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	8.7E-05	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.0017
				1,2-Dichloroethane	1.23	ug/L	9.1E-09	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	8.3E-10	3.2E-08	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0000053
				2-Hexanone	12	ug/L	7.5E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	2.6E-07	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.000053
				Benzene	0.423	ug/L	9.7E-09	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	5.3E-10	3.4E-08	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0000085
				Bromodichloromethane	1.1	ug/L	1.2E-08	(mg/kg/day)	6.2E-02	$(mg/kg/day)^{-1}$	7.3E-10	4.1E-08	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0000021
				Chloroform	2.65	ug/L	3.6E-08	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	1.1E-09	1.3E-07	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.000013
				Methyl tert-butyl ether	3.79	ug/L	1.3E-08	(mg/kg/day)	1.8E-03	$(mg/kg/day)^{-1}$	2.4E-11	4.6E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L	1.2E-08	(mg/kg/day)	2.0E-03	$(mg/kg/day)^{-1}$	2.5E-11	2.1E-08	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0000036
				Tetrachloroethene	1.23	ug/L	1.1E-07	(mg/kg/day)	2.1E-03	$(mg/kg/day)^{-1}$	2.3E-10	3.9E-07	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.000065
				Trichloroethene (Mutagenic)	19.4	ug/L	9.7E-07	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	9.1E-09	1.7E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L	4.9E-07	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	1.8E-08	1.7E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0034
				Vinyl chloride	0.853	ug/L	9.9E-09	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	7.1E-09	3.5E-08	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.000012
				1,4-Dioxane	74.4	ug/L	4.0E-08	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	4.0E-09	1.4E-07	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.0000047
				Dibenzo(a,h)anthracene	0.064	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	--	0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	--	0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				delta-BHC	0.0086	ug/L	9.6E-10	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	6.1E-09	3.4E-09	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.00000042
				Dieldrin	0.0064	ug/L	1.8E-09	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	2.9E-08	6.3E-09	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.00013
				Aluminum	2089	ug/L	1.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.8E-06	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0000038
				Antimony	1.3	ug/L	6.7E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	2.4E-09	(mg/kg/day)	6.0E-05	(mg/kg/day)	0.000039
				Arsenic	7.8	ug/L	4.0E-09	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	6.1E-09	1.4E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.000047
				Cadmium	0.439	ug/L	2.3E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	8.0E-10	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.000032
				Chromium	13.3	ug/L	2.8E-08	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	5.5E-07	4.8E-08	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.00064
				Cobalt	1.59	ug/L	3.3E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.2E-09	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0000038
				Cyanide	19.1	ug/L	9.9E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.5E-08	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.000055
				Iron	2504	ug/L	1.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	4.5E-06	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0000065
				Lead	1.66	ug/L	8.6E-11	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.0E-10	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L	5.0E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.8E-07	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.00018
				Nickel	9.34	ug/L	9.7E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.4E-09	(mg/kg/day)	8.0E-04	(mg/kg/day)	0.0000042
				Thallium	0.094	ug/L	4.9E-11	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.7E-10	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.000017
				Vanadium	4.94	ug/L	2.6E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	9.0E-09	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.000069
			Exp. Route Total								6.5E-07					0.0068
		Exposure Point Total									1.7E-06					0.024
	Exposure Medium Total										1.7E-06					0.024
	Air Irrigation	Baghusrt Drive Site	Inhalation	1,1,1-Trichloroethane	1.2E-01	mg/m^3	2.4E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	8.5E-07	(mg/m^3)	5.0E+00	(mg/m^3)	0.00000017
				1,1,2-Trichloroethane	9.1E-06	mg/m^3	1.8E-11	(mg/m^3)	1.6E-05	$(ug/m^3)^{-1}$	2.8E-13	6.2E-11	(mg/m^3)	2.0E-04	(mg/m^3)	0.00000031
				1,1-Dichloroethane	5.2E-03	mg/m^3	1.0E-08	(mg/m^3)	1.6E-06	$(ug/m^3)^{-1}$	1.6E-11	3.5E-08	(mg/m^3)	NA	(mg/m^3)	--
				1,1-Dichloroethene	3.9E-02	mg/m^3	7.7E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	2.7E-07	(mg/m^3)	2.0E-01	(mg/m^3)	0.0000013
				1,2-Dichloroethane	2.5E-05	mg/m^3	4.9E-11	(mg/m^3)	2.6E-05	$(ug/m^3)^{-1}$	1.3E-12	1.7E-10	(mg/m^3)	7.0E-03	(mg/m^3)	2.5E-8
				2-Hexanone	1.3E-04	mg/m^3	2.6E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	9.1E-10	(mg/m^3)	3.0E-02	(mg/m^3)	3.0E-8
				Benzene	1.1E-05	mg/m^3	2.2E-11	(mg/m^3)	7.8E-06	$(ug/m^3)^{-1}$	1.7E-13	7.6E-11	(mg/m^3)	3.0E-02	(mg/m^3)	2.5E-9
				Bromodichloromethane	2.5E-05	mg/m^3	4.9E-11	(mg/m^3)	3.7E-05	$(ug/m^3)^{-1}$	1.8E-12	1.7E-10	(mg/m^3)	NA	(mg/m^3)	--
				Chloroform	6.5E-05	mg/m^3	1.3E-10	(mg/m^3)	2.3E-05	$(ug/m^3)^{-1}$	2.9E-12	4.5E-10	(mg/m^3)	9.8E-02	(mg/m^3)	4.6E-9
				Methyl tert-butyl ether	6.8E-05	mg/m^3	1.3E-10	(mg/m^3)	2.6E-07	$(ug/m^3)^{-1}$	3.4E-14	4.6E-10	(mg/m^3)	3.0E+00	(mg/m^3)	1.5E-10
				Methylene chloride	2.6E-05	mg/m^3	1.0E-10	(mg/m^3)	1.0E-08	$(ug/m^3)^{-1}$	1.0E-15	1.8E-10	(mg/m^3)	6.0E-01	(mg/m^3)	3.0E-10
				Tetrachloroethene	3.7E-05	mg/m^3	7.3E-11	(mg/m^3)	2.6E-07	$(ug/m^3)^{-1}$	1.9E-14	2.6E-10	(mg/m^3)	4.0E-02	(mg/m^3)	6.4E-9
				Trichloroethene (Mutagenic)	5.5E-04	mg/m^3	2.1E-09	(mg/m^3)	1.0E-06	$(ug/m^3)^{-1}$	2.1E-12	3.7E-09	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene (Nonmutagenic)	5.5E-04	mg/m^3	1.1E-09	(mg/m^3)	3.1E-06	$(ug/m^3)^{-1}$	3.3E-12	3.7E-09	(mg/m^3)	2.0E-03	(mg/m^3)	0.0000019
				Vinyl chloride	2.7E-05	mg/m^3	5.3E-11	(mg/m^3)	4.4E-06	$(ug/m^3)^{-1}$	2.4E-13	1.9E-10	(mg/m^3)	1.0E-01	(mg/m^3)	1.9E-9
				1,4-Dioxane	1.1E-05	mg/m^3	2.1E-11	(mg/m^3)	5.0E-06	$(ug/m^3)^{-1}$	1.0E-13	7.2E-11	(mg/m^3)	3.0E-02	(mg/m^3)	2.4E-9
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--

TABLE 7.7.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air Irrigation	Baghusrt Drive Site	Inhalation	Aldrin	1.9E-07	mg/m^3	3.7E-13	(mg/m^3)	4.9E-03	$(ug/m^3)^{-1}$	1.8E-12	1.3E-12	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Cyanide	2.2E-04	mg/m^3	4.3E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	1.5E-09	(mg/m^3)	8.0E-04	(mg/m^3)	0.0000019
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	9.0E-05	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
			Exp. Route Total								3.0E-11					0.0000056
		Exposure Point Total									3.0E-11					0.0000056
	Exposure Medium Total										3.0E-11					0.0000056
Medium Total											1.7E-06					0.024
										Total of Receptor Risks Across All Media	2.9E-04				Total of Receptor Hazards Across All Media	18

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.8.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface/Subsurface Soil	Surface/Subsurface Soil	Baghusrt Drive Site	Ingestion	Aluminum	28200	mg/kg	1.3E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Arsenic	35.5	mg/kg	1.0E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.5E-05					
				Chromium	41	mg/kg	5.7E-05	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	2.9E-05					
				Cobalt	20.4	mg/kg	9.7E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Copper	915	mg/kg	4.4E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Iron	37600	mg/kg	1.8E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Manganese	807	mg/kg	3.8E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Thallium	0.548	mg/kg	2.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Vanadium	72.3	mg/kg	3.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
			Exp. Route Total								4.4E-05					
			Dermal	Aluminum	28200	mg/kg	2.6E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Arsenic	35.5	mg/kg	9.8E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.5E-06					
				Chromium	41	mg/kg	9.7E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	1.9E-05					
				Cobalt	20.4	mg/kg	1.9E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Copper	915	mg/kg	8.4E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Iron	37600	mg/kg	3.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Manganese	807	mg/kg	7.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Thallium	0.548	mg/kg	5.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Vanadium	72.3	mg/kg	6.7E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
			Exp. Route Total								2.1E-05					
		Exposure Point Total									6.5E-05					
	Exposure Medium Total										6.5E-05					
	Air	Baghusrt Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3	6.9E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--					
				Arsenic	1.1E-08	mg/m^3	8.7E-10	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	3.8E-09					
				Chromium	1.3E-08	mg/m^3	3.1E-09	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	2.6E-07					
				Cobalt	6.3E-09	mg/m^3	5.0E-10	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	4.5E-09					
				Copper	2.8E-07	mg/m^3	2.2E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--					
				Iron	1.2E-05	mg/m^3	9.2E-07	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--					
				Manganese	2.5E-07	mg/m^3	2.0E-08	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--					
				Thallium	1.7E-10	mg/m^3	1.3E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--					
				Vanadium	2.2E-08	mg/m^3	1.8E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--					
			Exp. Route Total								2.7E-07					
		Exposure Point Total									2.7E-07					
	Exposure Medium Total										2.7E-07					
Medium Total											6.5E-05					
Groundwater	Groundwater Potable Use	Baghusrt Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L	1.4E-02	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				1,1,2-Trichloroethane	0.476	ug/L	1.6E-06	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	9.0E-08					
				1,1-Dichloroethane	198	ug/L	6.6E-04	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	3.8E-06					
				1,1-Dichloroethene	1231	ug/L	4.1E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				1,2-Dichloroethane	1.23	ug/L	4.1E-06	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	3.7E-07					
				2-Hexanone	12	ug/L	4.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Benzene	0.423	ug/L	1.4E-06	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	7.8E-08					
				Bromodichloromethane	1.1	ug/L	3.7E-06	(mg/kg/day)	6.2E-02	$(mg/kg/day)^{-1}$	2.3E-07					
				Chloroform	2.65	ug/L	8.8E-06	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	2.7E-07					
				Methyl tert-butyl ether	3.79	ug/L	1.3E-05	(mg/kg/day)	1.8E-03	$(mg/kg/day)^{-1}$	2.3E-08					
				Methylene chloride	1.08	ug/L	1.0E-05	(mg/kg/day)	2.0E-03	$(mg/kg/day)^{-1}$	2.0E-08					
				Tetrachloroethene	1.23	ug/L	4.1E-06	(mg/kg/day)	2.1E-03	$(mg/kg/day)^{-1}$	8.6E-09					
				Trichloroethene (Mutagenic)	19.4	ug/L	1.8E-04	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	1.7E-06					
				Trichloroethene (Nonmutagenic)	19.4	ug/L	6.5E-05	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	2.4E-06					
				Vinyl chloride	0.853	ug/L	3.0E-05	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	2.2E-05					
				1,4-Dioxane	74.4	ug/L	2.5E-04	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	2.5E-05					
				Dibenzo(a,h)anthracene	0.064	ug/L	6.0E-07	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	6.0E-07					
				Aldrin	0.023	ug/L	7.7E-08	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	1.3E-06					
				delta-BHC	0.0086	ug/L	2.9E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	1.8E-07					
				Dieldrin	0.0064	ug/L	2.1E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	3.4E-07					
				Aluminum	2089	ug/L	7.0E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					
				Antimony	1.3	ug/L	4.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--					

TABLE 7.8.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater Potable Use	Baghusrt Drive Site	Ingestion	Arsenic	7.8	ug/L	2.6E-05	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	3.9E-05					
				Cadmium	0.439	ug/L	1.5E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Chromium	13.3	ug/L	1.2E-04	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	6.2E-05					
				Cobalt	1.59	ug/L	5.3E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Cyanide	19.1	ug/L	6.4E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Iron	2504	ug/L	8.3E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Lead	1.66	ug/L	5.5E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Manganese	97	ug/L	3.2E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Nickel	9.34	ug/L	3.1E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Thallium	0.094	ug/L	3.1E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Vanadium	4.94	ug/L	1.6E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
			Exp. Route Total								1.6E-04					
			Dermal	1,1,1-Trichloroethane	4085	ug/L	5.4E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				1,1,2-Trichloroethane	0.476	ug/L	2.5E-07	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	1.4E-08					
				1,1-Dichloroethane	198	ug/L	1.2E-04	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	6.6E-07					
				1,1-Dichloroethene	1231	ug/L	1.2E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				1,2-Dichloroethane	1.23	ug/L	4.5E-07	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	4.1E-08					
				2-Hexanone	12	ug/L	3.7E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Benzene	0.423	ug/L	4.9E-07	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	2.7E-08					
				Bromodichloromethane	1.1	ug/L	5.7E-07	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	3.5E-08					
				Chloroform	2.65	ug/L	1.7E-06	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	5.4E-08					
				Methyl tert-butyl ether	3.79	ug/L	6.5E-07	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	1.2E-09					
				Methylene chloride	1.08	ug/L	7.4E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	1.5E-09					
				Tetrachloroethene	1.23	ug/L	5.3E-06	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	1.1E-08					
				Trichloroethene (Mutagenic)	19.4	ug/L	5.7E-05	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	5.3E-07					
				Trichloroethene (Nonmutagenic)	19.4	ug/L	2.3E-05	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	8.7E-07					
				Vinyl chloride	0.853	ug/L	3.0E-06	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	2.2E-06					
				1,4-Dioxane	74.4	ug/L	2.0E-06	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	2.0E-07					
				Dibenzo(a,h)anthracene	0.064	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	--					
				Aldrin	0.023	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	--					
				delta-BHC	0.0086	ug/L	4.6E-08	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	2.9E-07					
				Dieldrin	0.0064	ug/L	8.7E-08	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	1.4E-06					
				Aluminum	2089	ug/L	1.0E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Antimony	1.3	ug/L	6.2E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Arsenic	7.8	ug/L	3.7E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	5.6E-07					
				Cadmium	0.439	ug/L	2.1E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Chromium	13.3	ug/L	2.9E-06	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	5.8E-05					
				Cobalt	1.59	ug/L	3.0E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Cyanide	19.1	ug/L	9.1E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Iron	2504	ug/L	1.2E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Lead	1.66	ug/L	7.9E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Manganese	97	ug/L	4.6E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Nickel	9.34	ug/L	8.9E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Thallium	0.094	ug/L	4.5E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Vanadium	4.94	ug/L	2.4E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
			Exp. Route Total								6.5E-05					
		Exposure Point Total									2.2E-04					
	Exposure Medium Total										2.2E-04					
	Air Potable Use	Baghusrt Drive Site	Inhalation	1,1,1-Trichloroethane	2.0E+00	mg/m^3	3.7E-01	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				1,1,2-Trichloroethane	2.4E-04	mg/m^3	4.4E-05	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	7.0E-07					
				1,1-Dichloroethane	9.9E-02	mg/m^3	1.8E-02	(mg/m^3)	1.6E-06	(ug/m^3)$^{-1}$	2.9E-05					
				1,1-Dichloroethene	6.2E-01	mg/m^3	1.1E-01	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				1,2-Dichloroethane	6.2E-04	mg/m^3	1.1E-04	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	2.9E-06					
				2-Hexanone	6.0E-03	mg/m^3	1.1E-03	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Benzene	2.1E-04	mg/m^3	3.9E-05	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	3.0E-07					
				Bromodichloromethane	5.5E-04	mg/m^3	1.0E-04	(mg/m^3)	3.7E-05	(ug/m^3)$^{-1}$	3.7E-06					
				Chloroform	1.3E-03	mg/m^3	2.4E-04	(mg/m^3)	2.3E-05	(ug/m^3)$^{-1}$	5.6E-06					
				Methyl tert-butyl ether	1.9E-03	mg/m^3	3.5E-04	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	9.0E-08					

TABLE 7.8.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air	Baghusrt Drive Site	Inhalation	Methylene chloride	5.4E-04	mg/m^3	2.0E-04	(mg/m^3)	1.0E-08	(ug/m^3)$^{-1}$	2.0E-09					
	Potable Use			Tetrachloroethene	6.2E-04	mg/m^3	1.1E-04	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	2.9E-08					
				Trichloroethene (Mutagenic)	9.7E-03	mg/m^3	3.6E-03	(mg/m^3)	1.0E-06	(ug/m^3)$^{-1}$	3.6E-06					
				Trichloroethene (Nonmutagenic)	9.7E-03	mg/m^3	1.8E-03	(mg/m^3)	3.1E-06	(ug/m^3)$^{-1}$	5.5E-06					
				Vinyl chloride	4.3E-04	mg/m^3	7.8E-05	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	3.4E-07					
				1,4-Dioxane	3.7E-02	mg/m^3	6.8E-03	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	3.4E-05					
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	--					
				Aldrin	1.2E-05	mg/m^3	2.1E-06	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	1.0E-05					
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	--					
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	--					
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	--					
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	--					
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	--					
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	--					
				Cyanide	9.6E-03	mg/m^3	1.7E-03	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	(ug/m^3)$^{-1}$	--					
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
			Exp. Route Total								9.6E-05					
		Exposure Point Total									9.6E-05					
	Exposure Medium Total										9.6E-05					
Medium Total											3.2E-04					
Groundwater	Groundwater	Baghusrt Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L	1.2E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
	Irrigation			1,1,2-Trichloroethane	0.476	ug/L	1.4E-08	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	8.0E-10					
				1,1-Dichloroethane	198	ug/L	5.8E-06	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	3.3E-08					
				1,1-Dichloroethene	1231	ug/L	3.6E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				1,2-Dichloroethane	1.23	ug/L	3.6E-08	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	3.3E-09					
				2-Hexanone	12	ug/L	3.5E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Benzene	0.423	ug/L	1.2E-08	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	6.8E-10					
				Bromodichloromethane	1.1	ug/L	3.2E-08	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	2.0E-09					
				Chloroform	2.65	ug/L	7.8E-08	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	2.4E-09					
				Methyl tert-butyl ether	3.79	ug/L	1.1E-07	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	2.0E-10					
				Methylene chloride	1.08	ug/L	6.3E-08	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	1.3E-10					
				Tetrachloroethene	1.23	ug/L	3.6E-08	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	7.6E-11					
				Trichloroethene (Mutagenic)	19.4	ug/L	1.1E-06	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	1.1E-08					
				Trichloroethene (Nonmutagenic)	19.4	ug/L	5.7E-07	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	2.1E-08					
				Vinyl chloride	0.853	ug/L	2.5E-08	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	1.8E-08					
				1,4-Dioxane	74.4	ug/L	2.2E-06	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	2.2E-07					
				Dibenzo(a,h)anthracene	0.064	ug/L	3.8E-09	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	3.8E-09					
				Aldrin	0.023	ug/L	6.8E-10	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	1.1E-08					
				delta-BHC	0.0086	ug/L	2.5E-10	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	1.6E-09					
				Dieldrin	0.0064	ug/L	1.9E-10	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	3.0E-09					
				Aluminum	2089	ug/L	6.1E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Antimony	1.3	ug/L	3.8E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Arsenic	7.8	ug/L	2.3E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	3.4E-07					
				Cadmium	0.439	ug/L	1.3E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Chromium	13.3	ug/L	7.8E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	3.9E-07					
				Cobalt	1.59	ug/L	4.7E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Cyanide	19.1	ug/L	5.6E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Iron	2504	ug/L	7.4E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Lead	1.66	ug/L	4.9E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Manganese	97	ug/L	2.8E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Nickel	9.34	ug/L	2.7E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					

TABLE 7.8.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater Irrigation	Baghusrt Drive Site	Ingestion	Thallium	0.094	ug/L	2.8E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Vanadium	4.94	ug/L	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
			Exp. Route Total								1.1E-06					
			Dermal	1,1,1-Trichloroethane	4085	ug/L	1.1E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				1,1,2-Trichloroethane	0.476	ug/L	5.3E-09	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	3.0E-10					
				1,1-Dichloroethane	198	ug/L	2.3E-06	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	1.3E-08					
				1,1-Dichloroethene	1231	ug/L	2.5E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				1,2-Dichloroethane	1.23	ug/L	9.1E-09	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	8.3E-10					
				2-Hexanone	12	ug/L	7.5E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Benzene	0.423	ug/L	9.7E-09	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	5.3E-10					
				Bromodichloromethane	1.1	ug/L	1.2E-08	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	7.3E-10					
				Chloroform	2.65	ug/L	3.6E-08	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	1.1E-09					
				Methyl tert-butyl ether	3.79	ug/L	1.3E-08	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	2.4E-11					
				Methylene chloride	1.08	ug/L	1.2E-08	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	2.5E-11					
				Tetrachloroethene	1.23	ug/L	1.1E-07	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	2.3E-10					
				Trichloroethene (Mutagenic)	19.4	ug/L	9.7E-07	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	9.1E-09					
				Trichloroethene (Nonmutagenic)	19.4	ug/L	4.9E-07	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	1.8E-08					
				Vinyl chloride	0.853	ug/L	9.9E-09	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	7.1E-09					
				1,4-Dioxane	74.4	ug/L	4.0E-08	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	4.0E-09					
				Dibenzo(a,h)anthracene	0.064	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	--					
				Aldrin	0.023	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	--					
				delta-BHC	0.0086	ug/L	9.6E-10	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	6.1E-09					
				Dieldrin	0.0064	ug/L	1.8E-09	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	2.9E-08					
				Aluminum	2089	ug/L	1.1E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Antimony	1.3	ug/L	6.7E-10	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Arsenic	7.8	ug/L	4.0E-09	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	6.1E-09					
				Cadmium	0.439	ug/L	2.3E-10	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Chromium	13.3	ug/L	2.8E-08	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	5.5E-07					
				Cobalt	1.59	ug/L	3.3E-10	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Cyanide	19.1	ug/L	9.9E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Iron	2504	ug/L	1.3E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Lead	1.66	ug/L	8.6E-11	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Manganese	97	ug/L	5.0E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Nickel	9.34	ug/L	9.7E-10	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Thallium	0.094	ug/L	4.9E-11	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
				Vanadium	4.94	ug/L	2.6E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--					
			Exp. Route Total								6.5E-07					
		Exposure Point Total									1.7E-06					
	Exposure Medium Total										1.7E-06					
	Air Irrigation	Baghusrt Drive Site	Inhalation	1,1,1-Trichloroethane	1.2E-01	mg/m^3	2.4E-07	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				1,1,2-Trichloroethane	9.1E-06	mg/m^3	1.8E-11	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	2.8E-13					
				1,1-Dichloroethane	5.2E-03	mg/m^3	1.0E-08	(mg/m^3)	1.6E-06	(ug/m^3)$^{-1}$	1.6E-11					
				1,1-Dichloroethene	3.9E-02	mg/m^3	7.7E-08	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				1,2-Dichloroethane	2.5E-05	mg/m^3	4.9E-11	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	1.3E-12					
				2-Hexanone	1.3E-04	mg/m^3	2.6E-10	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Benzene	1.1E-05	mg/m^3	2.2E-11	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	1.7E-13					
				Bromodichloromethane	2.5E-05	mg/m^3	4.9E-11	(mg/m^3)	3.7E-05	(ug/m^3)$^{-1}$	1.8E-12					
				Chloroform	6.5E-05	mg/m^3	1.3E-10	(mg/m^3)	2.3E-05	(ug/m^3)$^{-1}$	2.9E-12					
				Methyl tert-butyl ether	6.8E-05	mg/m^3	1.3E-10	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	3.4E-14					
				Methylene chloride	2.6E-05	mg/m^3	1.0E-10	(mg/m^3)	1.0E-08	(ug/m^3)$^{-1}$	1.0E-15					
				Tetrachloroethene	3.7E-05	mg/m^3	7.3E-11	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	1.9E-14					
				Trichloroethene (Mutagenic)	5.5E-04	mg/m^3	2.1E-09	(mg/m^3)	1.0E-06	(ug/m^3)$^{-1}$	2.1E-12					
				Trichloroethene (Nonmutagenic)	5.5E-04	mg/m^3	1.1E-09	(mg/m^3)	3.1E-06	(ug/m^3)$^{-1}$	3.3E-12					
				Vinyl chloride	2.7E-05	mg/m^3	5.3E-11	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	2.4E-13					
				1,4-Dioxane	1.1E-05	mg/m^3	2.1E-11	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	1.0E-13					
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	--					
				Aldrin	1.9E-07	mg/m^3	3.7E-13	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	1.8E-12					
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	--					

TABLE 7.8.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air	Baghusrt Drive Site	Inhalation	Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	--					
	Irrigation			Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	--					
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	--					
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	--					
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	--					
				Cyanide	2.2E-04	mg/m^3	4.3E-10	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	(ug/m^3)$^{-1}$	--					
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--					
			Exp. Route Total								3.0E-11					
		Exposure Point Total									3.0E-11					
	Exposure Medium Total										3.0E-11					
Medium Total											1.7E-06					
										Total of Receptor Risks Across All Media	3.9E-04					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.9.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Ingestion	Aluminum	28200	mg/kg	3.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.1E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.011
				Arsenic	35.5	mg/kg	2.3E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	3.5E-07	8.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.027
				Chromium	41	mg/kg	2.9E-06	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	1.4E-06	1.6E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0052
				Cobalt	20.4	mg/kg	2.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	7.8E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.026
				Copper	915	mg/kg	9.9E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.5E-04	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.0087
				Iron	37600	mg/kg	4.1E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.4E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.020
				Manganese	807	mg/kg	8.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.1E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.013
				Thallium	0.548	mg/kg	5.9E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	2.1E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.021
				Vanadium	72.3	mg/kg	7.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	2.7E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0055
			Exp. Route Total								1.8E-06					0.14
			Dermal	Aluminum	28200	mg/kg	3.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.3E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00013
				Arsenic	35.5	mg/kg	1.4E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.1E-08	4.8E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0016
				Chromium	41	mg/kg	3.4E-08	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	6.9E-07	1.8E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0025
				Cobalt	20.4	mg/kg	2.6E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	9.2E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00031
				Copper	915	mg/kg	1.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	4.1E-06	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.00010
				Iron	37600	mg/kg	4.8E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.7E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00024
				Manganese	807	mg/kg	1.0E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.6E-06	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.0038
				Thallium	0.548	mg/kg	7.1E-11	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	2.5E-09	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.00025
				Vanadium	72.3	mg/kg	9.3E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	3.3E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.0025
			Exp. Route Total								7.1E-07					0.011
		Exposure Point Total									2.5E-06					0.15
	Exposure Medium Total										2.5E-06					0.15
	Air	Baghurst Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3	1.5E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	5.2E-08	(mg/m^3)	5.0E-03	(mg/m^3)	0.000010
				Arsenic	1.1E-08	mg/m^3	1.9E-12	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	8.0E-12	6.5E-11	(mg/m^3)	1.5E-05	(mg/m^3)	0.0000043
				Chromium	1.3E-08	mg/m^3	1.4E-11	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	1.2E-09	7.5E-11	(mg/m^3)	1.0E-04	(mg/m^3)	0.00000075
				Cobalt	6.3E-09	mg/m^3	1.1E-12	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	9.6E-12	3.7E-11	(mg/m^3)	6.0E-06	(mg/m^3)	0.0000062
				Copper	2.8E-07	mg/m^3	4.8E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	1.7E-09	(mg/m^3)	NA	(mg/m^3)	--
				Iron	1.2E-05	mg/m^3	2.0E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	6.9E-08	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	2.5E-07	mg/m^3	4.2E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	1.5E-09	(mg/m^3)	5.0E-05	(mg/m^3)	0.000030
				Thallium	1.7E-10	mg/m^3	2.9E-14	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	1.0E-12	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	2.2E-08	mg/m^3	3.8E-12	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	1.3E-10	(mg/m^3)	1.0E-04	(mg/m^3)	0.0000013
			Exp. Route Total								1.2E-09					0.000053
		Exposure Point Total									1.2E-09					0.000053
	Exposure Medium Total										1.2E-09					0.000053
Medium Total											2.5E-06					0.15
Surface Water	Surface Water	Intermittent Stream	Ingestion	1,1-Dichloroethane	22.4	ug/L	3.0E-07	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	1.7E-09	1.0E-05	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.000052
				Dieldrin	0.072	ug/L	9.6E-10	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	1.5E-08	3.4E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.00067
				Heptachlor Epoxide	0.037	ug/L	4.9E-10	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	4.5E-09	1.7E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0013
				Arsenic	10.2	ug/L	1.4E-07	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	2.0E-07	4.7E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.016
				Chromium	1.59	ug/L	1.4E-07	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	6.9E-08	7.4E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00025
				Manganese	1970	ug/L	2.6E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	9.2E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.038
			Exp. Route Total								2.9E-07					0.056
			Dermal	1,1-Dichloroethane	22.4	ug/L	1.3E-07	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	7.6E-10	4.6E-06	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.000023
				Dieldrin	0.072	ug/L	8.9E-09	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	1.4E-07	3.1E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0063
				Heptachlor Epoxide	0.037	ug/L	3.1E-09	(mg/kg/day)	9.1E+00	$(mg/kg/day)^{-1}$	2.8E-08	1.1E-07	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0084
				Arsenic	10.2	ug/L	6.6E-09	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	9.9E-09	2.3E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00077
				Chromium	1.59	ug/L	1.3E-08	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	2.7E-07	7.2E-08	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.00096
				Manganese	1970	ug/L	1.3E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	4.4E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.046
			Exp. Route Total								4.5E-07					0.063
		Exposure Point Total									7.4E-07					0.12
	Exposure Medium Total										7.4E-07					0.12
Medium Total											7.4E-07					0.12

TABLE 7.9.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Perkiomen Creek	Ingestion	Arsenic	1.3	ug/L	1.7E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	2.6E-08	6.1E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0020
			Exp. Route Total								2.6E-08					0.0020
			Dermal	Arsenic	1.3	ug/L	8.4E-10	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	1.3E-09	2.9E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.000098
			Exp. Route Total								1.3E-09					0.000098
		Exposure Point Total									2.7E-08					0.0021
	Exposure Medium Total										2.7E-08					0.0021
Medium Total											2.7E-08					0.0021
Sediment	Sediment	Intermittent Stream	Ingestion	Arsenic	15.3	mg/kg	1.0E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	1.5E-07	3.5E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.012
				Chromium	39	mg/kg	2.8E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	1.4E-06	1.5E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0049
				Cobalt	18.9	mg/kg	2.1E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	7.2E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.024
				Iron	46700	mg/kg	5.1E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.8E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.025
			Exp. Route Total								1.5E-06					0.066
			Dermal	Arsenic	15.3	mg/kg	5.9E-09	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	8.9E-09	2.1E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00069
				Chromium	39	mg/kg	3.3E-08	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	6.5E-07	1.8E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0023
				Cobalt	18.9	mg/kg	2.4E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	8.5E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00028
				Iron	46700	mg/kg	6.0E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.1E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00030
			Exp. Route Total								6.6E-07					0.0036
		Exposure Point Total									2.2E-06					0.069
	Exposure Medium Total										2.2E-06					0.069
Medium Total											2.2E-06					0.069
Sediment	Sediment	Perkiomen Creek	Ingestion	Chromium	44.8	mg/kg	3.2E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	1.6E-06	1.7E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0057
			Exp. Route Total								1.6E-06					0.0057
			Dermal	Chromium	44.8	mg/kg	3.8E-08	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	7.5E-07	2.0E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0027
			Exp. Route Total								7.5E-07					0.0027
		Exposure Point Total									2.3E-06					0.0084
	Exposure Medium Total										2.3E-06					0.0084
Medium Total											2.3E-06					0.0084
										Receptor Risk Total - Subsurface Soil and Intermittent Stream	5.4E-06				Receptor HI Total - Subsurface Soil and Intermittent Stream	0.34
										Receptor Risk Total - Subsurface Soil and Perkiomen Creek	4.9E-06				Receptor HI Total - Subsurface Soil and Perkiomen Creek	0.16

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.10.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Ingestion	Aluminum	28200	mg/kg	7.5E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	7.5E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00075
				Arsenic	35.5	mg/kg	5.7E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	8.5E-08	5.7E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0019
				Chromium	41	mg/kg	1.7E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	8.6E-08	1.1E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00037
				Cobalt	20.4	mg/kg	5.4E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	5.4E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0018
				Copper	915	mg/kg	2.4E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.4E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.00061
				Iron	37600	mg/kg	1.0E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.0E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0014
				Manganese	807	mg/kg	2.2E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.2E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.00090
				Thallium	0.548	mg/kg	1.5E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.5E-08	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.0015
				Vanadium	72.3	mg/kg	1.9E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.9E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.00039
			Exp. Route Total								1.7E-07					0.0096
			Dermal	Aluminum	28200	mg/kg	1.5E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.5E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.000015
				Arsenic	35.5	mg/kg	5.7E-09	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	8.6E-09	5.7E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00019
				Chromium	41	mg/kg	3.5E-09	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	6.9E-08	2.2E-08	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.00029
				Cobalt	20.4	mg/kg	1.1E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.1E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.000037
				Copper	915	mg/kg	4.9E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	4.9E-07	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.000012
				Iron	37600	mg/kg	2.0E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.0E-05	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.000029
				Manganese	807	mg/kg	4.3E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	4.3E-07	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.00045
				Thallium	0.548	mg/kg	2.9E-11	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.9E-10	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.000029
				Vanadium	72.3	mg/kg	3.9E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.9E-08	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.00030
			Exp. Route Total								7.8E-08					0.0014
		Exposure Point Total									2.5E-07					0.011
	Exposure Medium Total										2.5E-07					0.011
	Air	Baghurst Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3	5.2E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	5.2E-08	(mg/m^3)	5.0E-03	(mg/m^3)	0.000010
				Arsenic	1.1E-08	mg/m^3	6.5E-12	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	2.8E-11	6.5E-11	(mg/m^3)	1.5E-05	(mg/m^3)	0.0000043
				Chromium	1.3E-08	mg/m^3	1.2E-11	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	9.9E-10	7.5E-11	(mg/m^3)	1.0E-04	(mg/m^3)	0.00000075
				Cobalt	6.3E-09	mg/m^3	3.7E-12	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	3.4E-11	3.7E-11	(mg/m^3)	6.0E-06	(mg/m^3)	0.0000062
				Copper	2.8E-07	mg/m^3	1.7E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	1.7E-09	(mg/m^3)	NA	(mg/m^3)	--
				Iron	1.2E-05	mg/m^3	6.9E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	6.9E-08	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	2.5E-07	mg/m^3	1.5E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	1.5E-09	(mg/m^3)	5.0E-05	(mg/m^3)	0.000030
				Thallium	1.7E-10	mg/m^3	1.0E-13	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	1.0E-12	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	2.2E-08	mg/m^3	1.3E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	--	1.3E-10	(mg/m^3)	1.0E-04	(mg/m^3)	0.0000013
			Exp. Route Total								1.1E-09					0.000053
		Exposure Point Total									1.1E-09					0.000053
	Exposure Medium Total										1.1E-09					0.000053
Medium Total											2.5E-07					0.011
Surface Water	Surface Water	Intermittent Stream	Ingestion	1,1-Dichloroethane	22.4	ug/L	8.4E-08	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	4.8E-10	8.4E-07	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0000042
				Dieldrin	0.072	ug/L	2.7E-10	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	4.3E-09	2.7E-09	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.000054
				Heptachlor Epoxide	0.037	ug/L	1.4E-10	(mg/kg/day)	9.1E+00	(mg/kg/day)$^{-1}$	1.3E-09	1.4E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.00011
				Arsenic	10.2	ug/L	3.8E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	5.7E-08	3.8E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0013
				Chromium	1.59	ug/L	9.3E-09	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	4.7E-09	5.9E-08	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.000020
				Manganese	1970	ug/L	7.4E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	7.4E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.0031
			Exp. Route Total								6.8E-08					0.0045
			Dermal	1,1-Dichloroethane	22.4	ug/L	2.2E-07	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	1.3E-09	2.2E-06	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.000011
				Dieldrin	0.072	ug/L	1.5E-08	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	2.4E-07	1.5E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0030
				Heptachlor Epoxide	0.037	ug/L	5.2E-09	(mg/kg/day)	9.1E+00	(mg/kg/day)$^{-1}$	4.7E-08	5.2E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0040
				Arsenic	10.2	ug/L	1.1E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	1.6E-08	1.1E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00037
				Chromium	1.59	ug/L	5.4E-09	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	1.1E-07	3.4E-08	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.00046
				Manganese	1970	ug/L	2.1E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.1E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.022
			Exp. Route Total								4.1E-07					0.030
		Exposure Point Total									4.8E-07					0.034
	Exposure Medium Total										4.8E-07					0.034
Medium Total											4.8E-07					0.034

TABLE 7.10.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Perkiomen Creek	Ingestion	Arsenic	1.3	ug/L	4.9E-09	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	7.3E-09	4.9E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00016
			Exp. Route Total								7.3E-09					0.00016
			Dermal	Arsenic	1.3	ug/L	1.4E-09	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	2.1E-09	1.4E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.000047
			Exp. Route Total								2.1E-09					0.000047
		Exposure Point Total									9.4E-09					0.00021
	Exposure Medium Total										9.4E-09					0.00021
Medium Total											9.4E-09					0.00021
Sediment	Sediment	Intermittent Stream	Ingestion	Arsenic	15.3	mg/kg	7.0E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	1.1E-07	2.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00082
				Chromium	39	mg/kg	6.0E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	3.0E-07	1.0E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00035
				Cobalt	18.9	mg/kg	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	5.0E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0017
				Iron	46700	mg/kg	3.6E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.2E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0018
			Exp. Route Total								4.0E-07					0.0046
			Dermal	Arsenic	15.3	mg/kg	4.9E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	7.4E-08	1.7E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00058
				Chromium	39	mg/kg	8.4E-08	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	1.7E-06	1.5E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0020
				Cobalt	18.9	mg/kg	2.0E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	7.1E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00024
				Iron	46700	mg/kg	5.0E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.8E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00025
			Exp. Route Total								1.7E-06					0.0030
		Exposure Point Total									2.2E-06					0.0076
	Exposure Medium Total										2.2E-06					0.0076
Medium Total											2.2E-06					0.0076
Sediment	Sediment	Perkiomen Creek	Ingestion	Chromium	44.8	mg/kg	6.8E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	3.4E-07	1.2E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00040
			Exp. Route Total								3.4E-07					0.00040
			Dermal	Chromium	44.8	mg/kg	9.6E-08	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	1.9E-06	1.7E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0022
			Exp. Route Total								1.9E-06					0.0022
		Exposure Point Total									2.3E-06					0.0026
	Exposure Medium Total										2.3E-06					0.0026
Medium Total											2.3E-06					0.0026
										Receptor Risk Total - Subsurface Soil and Intermittent Stream	2.9E-06				Receptor HI Total - Subsurface Soil and Intermittent Stream	0.053
										Receptor Risk Total - Subsurface Soil and Perkiomen Creek	3E-06				Receptor HI Total - Subsurface Soil and Perkiomen Creek	0.01

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.11.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Ingestion	Aluminum	28200	mg/kg	3.8E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Arsenic	35.5	mg/kg	2.9E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	4.3E-07					
				Chromium	41	mg/kg	3.1E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	1.5E-06					
				Cobalt	20.4	mg/kg	2.8E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Copper	915	mg/kg	1.2E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Iron	37600	mg/kg	5.1E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Manganese	807	mg/kg	1.1E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Thallium	0.548	mg/kg	7.4E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Vanadium	72.3	mg/kg	9.8E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
			Exp. Route Total								2.0E-06					
			Dermal	Aluminum	28200	mg/kg	5.1E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Arsenic	35.5	mg/kg	1.9E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	2.9E-08					
				Chromium	41	mg/kg	3.8E-08	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	7.6E-07					
				Cobalt	20.4	mg/kg	3.7E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Copper	915	mg/kg	1.7E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Iron	37600	mg/kg	6.9E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Manganese	807	mg/kg	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Thallium	0.548	mg/kg	1.0E-10	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Vanadium	72.3	mg/kg	1.3E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
			Exp. Route Total								7.8E-07					
		Exposure Point Total									2.7E-06					
	Exposure Medium Total										2.7E-06					
	Air	Baghurst Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3	6.7E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				Arsenic	1.1E-08	mg/m^3	8.4E-12	(mg/m^3)	4.3E-03	$(ug/m^3)^{-1}$	3.6E-11					
				Chromium	1.3E-08	mg/m^3	2.6E-11	(mg/m^3)	8.4E-02	$(ug/m^3)^{-1}$	2.2E-09					
				Cobalt	6.3E-09	mg/m^3	4.8E-12	(mg/m^3)	9.0E-03	$(ug/m^3)^{-1}$	4.3E-11					
				Copper	2.8E-07	mg/m^3	2.2E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				Iron	1.2E-05	mg/m^3	8.9E-09	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				Manganese	2.5E-07	mg/m^3	1.9E-10	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				Thallium	1.7E-10	mg/m^3	1.3E-13	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
				Vanadium	2.2E-08	mg/m^3	1.7E-11	(mg/m^3)	NA	$(ug/m^3)^{-1}$	- -					
			Exp. Route Total								2.2E-09					
		Exposure Point Total									2.2E-09					
	Exposure Medium Total										2.2E-09					
Medium Total											2.8E-06					
Surface Water	Surface Water	Intermittent Stream	Ingestion	1,1-Dichloroethane	22.4	ug/L	3.8E-07	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	2.2E-09					
				Dieldrin	0.072	ug/L	1.2E-09	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	2.0E-08					
				Heptachlor Epoxide	0.037	ug/L	6.3E-10	(mg/kg/day)	9.1E+00	(mg/kg/day)$^{-1}$	5.7E-09					
				Arsenic	10.2	ug/L	1.7E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	2.6E-07					
				Chromium	1.59	ug/L	1.5E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	7.3E-08					
				Manganese	1970	ug/L	4.0E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
			Exp. Route Total								3.6E-07					
			Dermal	1,1-Dichloroethane	22.4	ug/L	3.5E-07	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	2.0E-09					
				Dieldrin	0.072	ug/L	2.4E-08	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	3.8E-07					
				Heptachlor Epoxide	0.037	ug/L	8.3E-09	(mg/kg/day)	9.1E+00	(mg/kg/day)$^{-1}$	7.5E-08					
				Arsenic	10.2	ug/L	1.8E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	2.6E-08					
				Chromium	1.59	ug/L	1.9E-08	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	3.7E-07					
				Manganese	1970	ug/L	3.7E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
			Exp. Route Total								8.6E-07					
		Exposure Point Total									1.2E-06					
	Exposure Medium Total										1.2E-06					
Medium Total											1.2E-06					

TABLE 7.11.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Water	Surface Water	Perkiomen Creek	Ingestion	Arsenic	1.3	ug/L	2.2E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	3.3E-08					
			Exp. Route Total								3.3E-08					
			Dermal	Arsenic	1.3	ug/L	2.2E-09	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	3.4E-09					
			Exp. Route Total								3.4E-09					
		Exposure Point Total									3.7E-08					
	Exposure Medium Total										3.7E-08					
Medium Total											3.7E-08					
Sediment	Sediment	Intermittent Stream	Ingestion	Arsenic	15.3	mg/kg	1.7E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	2.5E-07					
				Chromium	39	mg/kg	3.3E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	1.7E-06					
				Cobalt	18.9	mg/kg	3.5E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Iron	46700	mg/kg	8.6E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
			Exp. Route Total								1.9E-06					
			Dermal	Arsenic	15.3	mg/kg	5.5E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	8.3E-08					
				Chromium	39	mg/kg	1.2E-07	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	2.3E-06					
				Cobalt	18.9	mg/kg	2.3E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Iron	46700	mg/kg	5.6E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
			Exp. Route Total								2.4E-06					
		Exposure Point Total									4.3E-06					
	Exposure Medium Total										4.3E-06					
Medium Total											4.3E-06					
Sediment	Sediment	Perkiomen Creek	Ingestion	Chromium	44.8	mg/kg	3.8E-06	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	1.9E-06					
			Exp. Route Total								1.9E-06					
			Dermal	Chromium	44.8	mg/kg	1.3E-07	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	2.7E-06					
			Exp. Route Total								2.7E-06					
		Exposure Point Total									4.6E-06					
	Exposure Medium Total										4.6E-06					
Medium Total											4.6E-06					
Receptor Risk Total - Subsurface Soil and Intermittent Stream											8.3E-06					
Receptor Risk Total - Subsurface Soil and Perkiomen Creek											7.4E-06					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.12.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA
PAGE 1 OF 2

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Ingestion	Aluminum	28200	mg/kg	1.6E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.1E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0011
				Arsenic	35.5	mg/kg	1.2E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	1.8E-07	8.6E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0029
				Chromium	41	mg/kg	7.1E-07	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	3.6E-07	1.7E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00055
				Cobalt	20.4	mg/kg	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	8.3E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0028
				Copper	915	mg/kg	5.3E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.7E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.00093
				Iron	37600	mg/kg	2.2E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.5E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0022
				Manganese	807	mg/kg	4.7E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.3E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.0014
				Thallium	0.548	mg/kg	3.2E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.2E-08	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.0022
				Vanadium	72.3	mg/kg	4.2E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.9E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.00059
			Exp. Route Total								5.4E-07					0.015
			Dermal	Aluminum	28200	mg/kg	4.9E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	3.4E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.000034
				Arsenic	35.5	mg/kg	1.8E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	2.8E-08	1.3E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00043
				Chromium	41	mg/kg	2.1E-08	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	4.3E-07	5.0E-08	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.00066
				Cobalt	20.4	mg/kg	3.5E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	2.5E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.000083
				Copper	915	mg/kg	1.6E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.1E-06	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.000028
				Iron	37600	mg/kg	6.5E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	4.6E-05	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.000065
				Manganese	807	mg/kg	1.4E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	9.8E-07	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.0010
				Thallium	0.548	mg/kg	9.5E-11	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	6.7E-10	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.000067
				Vanadium	72.3	mg/kg	1.3E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	8.8E-08	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.00068
			Exp. Route Total								4.5E-07					0.0031
		Exposure Point Total									9.9E-07					0.018
	Exposure Medium Total										9.9E-07					0.018
	Air	Baghurst Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3	3.7E-09	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	2.6E-08	(mg/m^3)	5.0E-03	(mg/m^3)	0.0000052
				Arsenic	1.1E-08	mg/m^3	4.7E-12	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	2.0E-11	3.3E-11	(mg/m^3)	1.5E-05	(mg/m^3)	0.0000022
				Chromium	1.3E-08	mg/m^3	1.6E-11	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	1.4E-09	3.8E-11	(mg/m^3)	1.0E-04	(mg/m^3)	0.00000038
				Cobalt	6.3E-09	mg/m^3	2.7E-12	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	2.4E-11	1.9E-11	(mg/m^3)	6.0E-06	(mg/m^3)	0.0000031
				Copper	2.8E-07	mg/m^3	1.2E-10	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	8.4E-10	(mg/m^3)	NA	(mg/m^3)	--
				Iron	1.2E-05	mg/m^3	4.9E-09	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	3.5E-08	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	2.5E-07	mg/m^3	1.1E-10	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	7.4E-10	(mg/m^3)	5.0E-05	(mg/m^3)	0.000015
				Thallium	1.7E-10	mg/m^3	7.2E-14	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	5.0E-13	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	2.2E-08	mg/m^3	9.5E-12	(mg/m^3)	NA	(ug/m^3)$^{-1}$	--	6.6E-11	(mg/m^3)	1.0E-04	(mg/m^3)	0.00000066
			Exp. Route Total								1.4E-09					0.000026
		Exposure Point Total									1.4E-09					0.000026
	Exposure Medium Total										1.4E-09					0.000026
Medium Total											1.0E-06					0.018
Surface Water	Surface Water	Intermittent Stream	Ingestion	1,1-Dichloroethane	22.4	ug/L	1.1E-07	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	6.2E-10	7.6E-07	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0000038
				Dieldrin	0.072	ug/L	3.5E-10	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	5.6E-09	2.4E-09	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.000049
				Heptachlor Epoxide	0.037	ug/L	1.8E-10	(mg/kg/day)	9.1E+00	(mg/kg/day)$^{-1}$	1.6E-09	1.3E-09	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.000097
				Arsenic	10.2	ug/L	5.0E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	7.4E-08	3.5E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0012
				Chromium	1.59	ug/L	2.3E-08	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	1.2E-08	5.4E-08	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.000018
				Manganese	1970	ug/L	9.6E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	6.7E-05	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.0028
			Exp. Route Total								9.4E-08					0.0041
			Dermal	1,1-Dichloroethane	22.4	ug/L	1.8E-07	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	1.0E-09	1.2E-06	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0000062
				Dieldrin	0.072	ug/L	1.2E-08	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	1.9E-07	8.4E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0017
				Heptachlor Epoxide	0.037	ug/L	4.2E-09	(mg/kg/day)	9.1E+00	(mg/kg/day)$^{-1}$	3.8E-08	2.9E-08	(mg/kg/day)	1.3E-05	(mg/kg/day)	0.0023
				Arsenic	10.2	ug/L	8.8E-09	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	1.3E-08	6.2E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00021
				Chromium	1.59	ug/L	8.3E-09	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	1.7E-07	1.9E-08	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.00026
				Manganese	1970	ug/L	1.7E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	--	1.2E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.012
			Exp. Route Total								4.1E-07					0.017
		Exposure Point Total									5.0E-07					0.021
	Exposure Medium Total										5.0E-07					0.021
Medium Total											5.0E-07					0.021

TABLE 7.12.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Sediment	Sediment	Intermittent Stream	Ingestion	Arsenic	15.3	mg/kg	5.3E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	8.0E-08	3.7E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0012
				Chromium	39	mg/kg	6.8E-07	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	3.4E-07	1.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00053
				Cobalt	18.9	mg/kg	1.1E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	7.6E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0025
				Iron	46700	mg/kg	2.7E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	1.9E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0027
			Exp. Route Total								4.2E-07					0.0070
			Dermal	Arsenic	15.3	mg/kg	8.0E-09	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.2E-08	5.6E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00019
				Chromium	39	mg/kg	2.0E-08	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	4.1E-07	4.7E-08	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.00063
				Cobalt	18.9	mg/kg	3.3E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	2.3E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.000076
				Iron	46700	mg/kg	8.1E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	--	5.7E-05	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.000081
			Exp. Route Total								4.2E-07					0.00097
		Exposure Point Total									8.4E-07					0.0080
	Exposure Medium Total										8.4E-07					0.0080
Medium Total											8.4E-07					0.0080
										Total of Receptor Risks Across All Media	2.3E-06				Total of Receptor Hazards Across All Media	0.047

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.13.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L	See Table 7.15.CTE for Cancer Risks					8.4E-02	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.042
				1,1,2-Trichloroethane	0.476	ug/L						9.8E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0024
				1,1-Dichloroethane	198	ug/L						4.1E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.020
				1,1-Dichloroethene	1231	ug/L						2.5E-02	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.51
				1,2-Dichloroethane	1.23	ug/L						2.5E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0042
				2-Hexanone	12	ug/L						2.5E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.049
				Benzene	0.423	ug/L						8.7E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0022
				Bromodichloromethane	1.1	ug/L						2.3E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0011
				Chloroform	2.65	ug/L						5.4E-05	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.0054
				Methyl tert-butyl ether	3.79	ug/L						7.8E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						2.2E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0037
				Tetrachloroethene	1.23	ug/L						2.5E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0042
				Trichloroethene (Mutagenic)	19.4	ug/L						4.0E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						4.0E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.80
				Vinyl chloride	0.853	ug/L						1.7E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0058
				1,4-Dioxane	74.4	ug/L						1.5E-03	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.051
				Dibenzo(a,h)anthracene	0.064	ug/L						1.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						4.7E-07	(mg/kg/day)	3.0E-05	(mg/kg/day)	0.016
				delta-BHC	0.0086	ug/L						1.8E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000022
				Dieldrin	0.0064	ug/L						1.3E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0026
				Aluminum	2089	ug/L						4.3E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.043
				Antimony	1.3	ug/L						2.7E-05	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.067
				Arsenic	7.8	ug/L						1.6E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.53
				Cadmium	0.439	ug/L						9.0E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.018
				Chromium	13.3	ug/L						2.7E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.091
				Cobalt	1.59	ug/L						3.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.11
				Cyanide	19.1	ug/L						3.9E-04	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.62
				Iron	2504	ug/L						5.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.073
				Lead	1.66	ug/L						3.4E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						2.0E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.083
				Nickel	9.34	ug/L						1.9E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0096
				Thallium	0.094	ug/L						1.9E-06	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.19
				Vanadium	4.94	ug/L						1.0E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.020
			Exp. Route Total													3.4
			Dermal	1,1,1-Trichloroethane	4085	ug/L						1.8E-02	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.0090
				1,1,2-Trichloroethane	0.476	ug/L						8.4E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00021
				1,1-Dichloroethane	198	ug/L						3.8E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0019
				1,1-Dichloroethene	1231	ug/L						4.0E-03	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.080
				1,2-Dichloroethane	1.23	ug/L						1.5E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00024
				2-Hexanone	12	ug/L						1.2E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0024
				Benzene	0.423	ug/L						1.5E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00039
				Bromodichloromethane	1.1	ug/L						1.9E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.000094
				Chloroform	2.65	ug/L						5.8E-06	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.00058
				Methyl tert-butyl ether	3.79	ug/L						2.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						9.8E-07	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00016
				Tetrachloroethene	1.23	ug/L						1.8E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0030
				Trichloroethene (Mutagenic)	19.4	ug/L						7.8E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						7.8E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.16
				Vinyl chloride	0.853	ug/L						1.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00053
				1,4-Dioxane	74.4	ug/L						6.5E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00022
				Dibenzo(a,h)anthracene	0.064	ug/L						0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				delta-BHC	0.0086	ug/L						1.5E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000019
				Dieldrin	0.0064	ug/L						2.9E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0058

TABLE 7.13.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Dermal	Aluminum	2089	ug/L						2.1E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00021
				Antimony	1.3	ug/L						1.3E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	0.0022
				Arsenic	7.8	ug/L						7.9E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0026
				Cadmium	0.439	ug/L						4.4E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.0018
				Chromium	13.3	ug/L						2.7E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.036
				Cobalt	1.59	ug/L						6.4E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00021
				Cyanide	19.1	ug/L						1.9E-06	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.0031
				Iron	2504	ug/L						2.5E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00036
				Lead	1.66	ug/L						1.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						9.8E-06	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.010
				Nickel	9.34	ug/L						1.9E-07	(mg/kg/day)	8.0E-04	(mg/kg/day)	0.00024
				Thallium	0.094	ug/L						9.5E-09	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.00095
				Vanadium	4.94	ug/L						5.0E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.0038
			Exp. Route Total													0.32
		Exposure Point Total														3.7
	Exposure Medium Total															3.7
Medium Total																3.7
												Total of Receptor Hazards Across All Media				3.7

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.14.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L	See Table 7.15.CTE for Cancer Risks					3.9E-02	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.020
				1,1,2-Trichloroethane	0.476	ug/L						4.6E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0011
				1,1-Dichloroethane	198	ug/L						1.9E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0095
				1,1-Dichloroethene	1231	ug/L						1.2E-02	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.24
				1,2-Dichloroethane	1.23	ug/L						1.2E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0020
				2-Hexanone	12	ug/L						1.2E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.023
				Benzene	0.423	ug/L						4.1E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0010
				Bromodichloromethane	1.1	ug/L						1.1E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.00053
				Chloroform	2.65	ug/L						2.5E-05	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.0025
				Methyl tert-butyl ether	3.79	ug/L						3.6E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						1.0E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0017
				Tetrachloroethene	1.23	ug/L						1.2E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0020
				Trichloroethene (Mutagenic)	19.4	ug/L						1.9E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						1.9E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.37
				Vinyl chloride	0.853	ug/L						8.2E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0027
				1,4-Dioxane	74.4	ug/L						7.2E-04	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.024
				Dibenzo(a,h)anthracene	0.064	ug/L						6.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						2.2E-07	(mg/kg/day)	3.0E-05	(mg/kg/day)	0.0074
				delta-BHC	0.0086	ug/L						8.3E-08	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000010
				Dieldrin	0.0064	ug/L						6.2E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0012
				Aluminum	2089	ug/L						2.0E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.020
				Antimony	1.3	ug/L						1.3E-05	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.031
				Arsenic	7.8	ug/L						7.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.25
				Cadmium	0.439	ug/L						4.2E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0084
				Chromium	13.3	ug/L						1.3E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.043
				Cobalt	1.59	ug/L						1.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.051
				Cyanide	19.1	ug/L						1.8E-04	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.29
				Iron	2504	ug/L						2.4E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.034
				Lead	1.66	ug/L						1.6E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						9.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.039
				Nickel	9.34	ug/L						9.0E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0045
				Thallium	0.094	ug/L						9.0E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.090
				Vanadium	4.94	ug/L						4.8E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0095
			Exp. Route Total													1.6
			Dermal	1,1,1-Trichloroethane	4085	ug/L						8.6E-03	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.0043
				1,1,2-Trichloroethane	0.476	ug/L						4.0E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00010
				1,1-Dichloroethane	198	ug/L						1.8E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.00089
				1,1-Dichloroethene	1231	ug/L						1.9E-03	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.038
				1,2-Dichloroethane	1.23	ug/L						6.9E-07	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00012
				2-Hexanone	12	ug/L						5.7E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0011
				Benzene	0.423	ug/L						7.4E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00018
				Bromodichloromethane	1.1	ug/L						9.0E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.000045
				Chloroform	2.65	ug/L						2.8E-06	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.00028
				Methyl tert-butyl ether	3.79	ug/L						1.0E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						4.7E-07	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.000078
				Tetrachloroethene	1.23	ug/L						8.4E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0014
				Trichloroethene (Mutagenic)	19.4	ug/L						3.7E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						3.7E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.074
				Vinyl chloride	0.853	ug/L						7.5E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00025
				1,4-Dioxane	74.4	ug/L						3.1E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00010
				Dibenzo(a,h)anthracene	0.064	ug/L						0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				delta-BHC	0.0086	ug/L						7.3E-08	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.0000092
				Dieldrin	0.0064	ug/L						1.4E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0027
				Aluminum	2089	ug/L						8.2E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.000082
				Antimony	1.3	ug/L						5.1E-08	(mg/kg/day)	6.0E-05	(mg/kg/day)	0.00085
				Arsenic	7.8	ug/L						3.1E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0010
				Cadmium	0.439	ug/L						1.7E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.00069

TABLE 7.14.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Dermal	Chromium	13.3	ug/L						1.0E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.014
				Cobalt	1.59	ug/L						2.5E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.000083
				Cyanide	19.1	ug/L						7.5E-07	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.0012
				Iron	2504	ug/L						9.9E-05	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00014
				Lead	1.66	ug/L						6.5E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						3.8E-06	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.0040
				Nickel	9.34	ug/L						7.4E-08	(mg/kg/day)	8.0E-04	(mg/kg/day)	0.000092
				Thallium	0.094	ug/L						3.7E-09	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.00037
				Vanadium	4.94	ug/L						1.9E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.0015
			Exp. Route Total													0.15
		Exposure Point Total														1.7
	Exposure Medium Total															1.7
	Air	Baghurst Drive Site	Inhalation	1,1,1-Trichloroethane	2.0E+00	mg/m^3						1.3E+00	(mg/m^3)	5.0E+00	(mg/m^3)	0.26
				1,1,2-Trichloroethane	2.4E-04	mg/m^3						1.5E-04	(mg/m^3)	2.0E-04	(mg/m^3)	0.76
				1,1-Dichloroethane	9.9E-02	mg/m^3						6.3E-02	(mg/m^3)	NA	(mg/m^3)	--
				1,1-Dichloroethene	6.2E-01	mg/m^3						3.9E-01	(mg/m^3)	2.0E-01	(mg/m^3)	2.0
				1,2-Dichloroethane	6.2E-04	mg/m^3						3.9E-04	(mg/m^3)	7.0E-03	(mg/m^3)	0.056
				2-Hexanone	6.0E-03	mg/m^3						3.8E-03	(mg/m^3)	3.0E-02	(mg/m^3)	0.13
				Benzene	2.1E-04	mg/m^3						1.4E-04	(mg/m^3)	3.0E-02	(mg/m^3)	0.0045
				Bromodichloromethane	5.5E-04	mg/m^3						3.5E-04	(mg/m^3)	NA	(mg/m^3)	--
				Chloroform	1.3E-03	mg/m^3						8.5E-04	(mg/m^3)	9.8E-02	(mg/m^3)	0.0087
				Methyl tert-butyl ether	1.9E-03	mg/m^3						1.2E-03	(mg/m^3)	3.0E+00	(mg/m^3)	0.00040
				Methylene chloride	5.4E-04	mg/m^3						3.5E-04	(mg/m^3)	6.0E-01	(mg/m^3)	0.00058
				Tetrachloroethene	6.2E-04	mg/m^3						3.9E-04	(mg/m^3)	4.0E-02	(mg/m^3)	0.0099
				Trichloroethene (Mutagenic)	9.7E-03	mg/m^3						6.2E-03	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene (Nonmutagenic)	9.7E-03	mg/m^3						6.2E-03	(mg/m^3)	2.0E-03	(mg/m^3)	3.1
				Vinyl chloride	4.3E-04	mg/m^3						2.7E-04	(mg/m^3)	1.0E-01	(mg/m^3)	0.0027
				1,4-Dioxane	3.7E-02	mg/m^3						2.4E-02	(mg/m^3)	3.0E-02	(mg/m^3)	0.79
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aldrin	1.2E-05	mg/m^3						7.4E-06	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Cyanide	9.6E-03	mg/m^3						6.1E-03	(mg/m^3)	8.0E-04	(mg/m^3)	7.7
				Iron	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Nickel	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	9.0E-05	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
			Exp. Route Total													15
		Exposure Point Total														15
	Exposure Medium Total															15
Medium Total																16
												Total of Receptor Hazards Across All Media				16

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.15.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L	6.3E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	See Tables 7.13.CTE and 7.14.CTE for Hazard Indices				
				1,1,2-Trichloroethane	0.476	ug/L	7.4E-07	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	4.2E-08					
				1,1-Dichloroethane	198	ug/L	3.1E-04	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	1.7E-06					
				1,1-Dichloroethene	1231	ug/L	1.9E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				1,2-Dichloroethane	1.23	ug/L	1.9E-06	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	1.7E-07					
				2-Hexanone	12	ug/L	1.9E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Benzene	0.423	ug/L	6.5E-07	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	3.6E-08					
				Bromodichloromethane	1.1	ug/L	1.7E-06	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	1.1E-07					
				Chloroform	2.65	ug/L	4.1E-06	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	1.3E-07					
				Methyl tert-butyl ether	3.79	ug/L	5.9E-06	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	1.1E-08					
				Methylene chloride	1.08	ug/L	5.7E-06	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	1.1E-08					
				Tetrachloroethene	1.23	ug/L	1.9E-06	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	4.0E-09					
				Trichloroethene (Mutagenic)	19.4	ug/L	1.0E-04	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	9.6E-07					
				Trichloroethene (Nonmutagenic)	19.4	ug/L	3.0E-05	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	1.1E-06					
				Vinyl chloride	0.853	ug/L	2.9E-05	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	2.1E-05					
				1,4-Dioxane	74.4	ug/L	1.2E-04	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	1.2E-05					
				Dibenzo(a,h)anthracene	0.064	ug/L	3.4E-07	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	3.4E-07					
				Aldrin	0.023	ug/L	3.6E-08	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	6.1E-07					
				delta-BHC	0.0086	ug/L	1.3E-08	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	8.4E-08					
				Dieldrin	0.0064	ug/L	9.9E-09	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	1.6E-07					
				Aluminum	2089	ug/L	3.2E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Antimony	1.3	ug/L	2.0E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Arsenic	7.8	ug/L	1.2E-05	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	1.8E-05					
				Cadmium	0.439	ug/L	6.8E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Chromium	13.3	ug/L	7.1E-05	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	3.5E-05					
				Cobalt	1.59	ug/L	2.5E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Cyanide	19.1	ug/L	3.0E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Iron	2504	ug/L	3.9E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Lead	1.66	ug/L	2.6E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Manganese	97	ug/L	1.5E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Nickel	9.34	ug/L	1.4E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Thallium	0.094	ug/L	1.5E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Vanadium	4.94	ug/L	7.6E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
			Exp. Route Total								9.1E-05					
			Dermal	1,1,1-Trichloroethane	4085	ug/L	1.4E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				1,1,2-Trichloroethane	0.476	ug/L	6.4E-08	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	3.7E-09					
				1,1-Dichloroethane	198	ug/L	2.9E-05	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	1.6E-07					
				1,1-Dichloroethene	1231	ug/L	3.0E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				1,2-Dichloroethane	1.23	ug/L	1.1E-07	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	1.0E-08					
				2-Hexanone	12	ug/L	9.2E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Benzene	0.423	ug/L	1.2E-07	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	6.5E-09					
				Bromodichloromethane	1.1	ug/L	1.4E-07	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	8.9E-09					
				Chloroform	2.65	ug/L	4.4E-07	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	1.4E-08					
				Methyl tert-butyl ether	3.79	ug/L	1.6E-07	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	2.9E-10					
				Methylene chloride	1.08	ug/L	2.6E-07	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	5.1E-10					
				Tetrachloroethene	1.23	ug/L	1.4E-06	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	2.8E-09					
				Trichloroethene (Mutagenic)	19.4	ug/L	2.0E-05	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	1.9E-07					
				Trichloroethene (Nonmutagenic)	19.4	ug/L	5.9E-06	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	2.2E-07					
				Vinyl chloride	0.853	ug/L	2.6E-06	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	1.9E-06					
				1,4-Dioxane	74.4	ug/L	4.9E-07	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	4.9E-08					
				Dibenzo(a,h)anthracene	0.064	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	- -					
				Aldrin	0.023	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	- -					
				delta-BHC	0.0086	ug/L	1.2E-08	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	7.4E-08					
				Dieldrin	0.0064	ug/L	2.2E-08	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	3.5E-07					
				Aluminum	2089	ug/L	1.4E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Antimony	1.3	ug/L	8.9E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Arsenic	7.8	ug/L	5.3E-08	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	8.0E-08					
				Cadmium	0.439	ug/L	3.0E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					

TABLE 7.15.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Dermal	Chromium	13.3	ug/L	6.6E-07	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	1.3E-05					
				Cobalt	1.59	ug/L	4.3E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Cyanide	19.1	ug/L	1.3E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Iron	2504	ug/L	1.7E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Lead	1.66	ug/L	1.1E-09	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Manganese	97	ug/L	6.6E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Nickel	9.34	ug/L	1.3E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Thallium	0.094	ug/L	6.4E-10	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Vanadium	4.94	ug/L	3.4E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
			Exp. Route Total								1.6E-05					
		Exposure Point Total									1.1E-04					
	Exposure Medium Total										1.1E-04					
	Air	Baghurst Drive Site	Inhalation	1,1,1-Trichloroethane	2.0E+00	mg/m^3	1.3E-01	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				1,1,2-Trichloroethane	2.4E-04	mg/m^3	1.5E-05	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	2.4E-07					
				1,1-Dichloroethane	9.9E-02	mg/m^3	6.3E-03	(mg/m^3)	1.6E-06	(ug/m^3)$^{-1}$	1.0E-05					
				1,1-Dichloroethene	6.2E-01	mg/m^3	3.9E-02	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				1,2-Dichloroethane	6.2E-04	mg/m^3	3.9E-05	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	1.0E-06					
				2-Hexanone	6.0E-03	mg/m^3	3.8E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Benzene	2.1E-04	mg/m^3	1.4E-05	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	1.1E-07					
				Bromodichloromethane	5.5E-04	mg/m^3	3.5E-05	(mg/m^3)	3.7E-05	(ug/m^3)$^{-1}$	1.3E-06					
				Chloroform	1.3E-03	mg/m^3	8.5E-05	(mg/m^3)	2.3E-05	(ug/m^3)$^{-1}$	2.0E-06					
				Methyl tert-butyl ether	1.9E-03	mg/m^3	1.2E-04	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	3.2E-08					
				Methylene chloride	5.4E-04	mg/m^3	5.4E-05	(mg/m^3)	1.0E-08	(ug/m^3)$^{-1}$	5.4E-10					
				Tetrachloroethene	6.2E-04	mg/m^3	3.9E-05	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	1.0E-08					
				Trichloroethene (Mutagenic)	9.7E-03	mg/m^3	9.8E-04	(mg/m^3)	1.0E-06	(ug/m^3)$^{-1}$	9.8E-07					
				Trichloroethene (Nonmutagenic)	9.7E-03	mg/m^3	6.2E-04	(mg/m^3)	3.1E-06	(ug/m^3)$^{-1}$	1.9E-06					
				Vinyl chloride	4.3E-04	mg/m^3	2.7E-05	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	1.2E-07					
				1,4-Dioxane	3.7E-02	mg/m^3	2.4E-03	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	1.2E-05					
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -					
				Aldrin	1.2E-05	mg/m^3	7.4E-07	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	3.6E-06					
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -					
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -					
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -					
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -					
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -					
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -					
				Cyanide	9.6E-03	mg/m^3	6.1E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	(ug/m^3)$^{-1}$	- -					
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
			Exp. Route Total								3.3E-05					
		Exposure Point Total									3.3E-05					
	Exposure Medium Total										3.3E-05					
Medium Total											1.4E-04					
										Total of Receptor Risks Across All Media	1.4E-04					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.16.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Ingestion	Aluminum	28200	mg/kg	See Table 7.18.CTE for Cancer Risks					9.6E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.096
				Arsenic	35.5	mg/kg						7.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.24
				Chromium	41	mg/kg						1.4E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.047
				Cobalt	20.4	mg/kg						7.0E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.23
				Copper	915	mg/kg						3.1E-03	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.078
				Iron	37600	mg/kg						1.3E-01	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.18
				Manganese	807	mg/kg						2.8E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.11
				Thallium	0.548	mg/kg						1.9E-06	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.19
				Vanadium	72.3	mg/kg						2.5E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.049
			Exp. Route Total													1.2
			Dermal	Aluminum	28200	mg/kg						1.1E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0011
				Arsenic	35.5	mg/kg						4.3E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.014
				Chromium	41	mg/kg						1.7E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.022
				Cobalt	20.4	mg/kg						8.3E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0028
				Copper	915	mg/kg						3.7E-05	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.00093
				Iron	37600	mg/kg						1.5E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.0022
				Manganese	807	mg/kg						3.3E-05	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.034
				Thallium	0.548	mg/kg						2.2E-08	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.0022
				Vanadium	72.3	mg/kg						2.9E-06	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.023
			Exp. Route Total													0.10
		Exposure Point Total														1.3
	Exposure Medium Total															1.3
	Air	Baghurst Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3						5.6E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.0011
				Arsenic	1.1E-08	mg/m^3						7.0E-09	(mg/m^3)	1.5E-05	(mg/m^3)	0.00047
				Chromium	1.3E-08	mg/m^3						8.1E-09	(mg/m^3)	1.0E-04	(mg/m^3)	0.000081
				Cobalt	6.3E-09	mg/m^3						4.0E-09	(mg/m^3)	6.0E-06	(mg/m^3)	0.00067
				Copper	2.8E-07	mg/m^3						1.8E-07	(mg/m^3)	NA	(mg/m^3)	--
				Iron	1.2E-05	mg/m^3						7.5E-06	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	2.5E-07	mg/m^3						1.6E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.0032
				Thallium	1.7E-10	mg/m^3						1.1E-10	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	2.2E-08	mg/m^3						1.4E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.00014
			Exp. Route Total													0.0057
		Exposure Point Total														0.0057
	Exposure Medium Total															0.0057
Medium Total																1.3
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L						8.4E-02	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.042
				1,1,2-Trichloroethane	0.476	ug/L						9.8E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0024
				1,1-Dichloroethane	198	ug/L						4.1E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.020
				1,1-Dichloroethene	1231	ug/L						2.5E-02	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.51
				1,2-Dichloroethane	1.23	ug/L						2.5E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0042
				2-Hexanone	12	ug/L						2.5E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.049
				Benzene	0.423	ug/L						8.7E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0022
				Bromodichloromethane	1.1	ug/L						2.3E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0011
				Chloroform	2.65	ug/L						5.4E-05	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.0054
				Methyl tert-butyl ether	3.79	ug/L						7.8E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						2.2E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0037
				Tetrachloroethene	1.23	ug/L						2.5E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0042
				Trichloroethene (Mutagenic)	19.4	ug/L						4.0E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						4.0E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.80
				Vinyl chloride	0.853	ug/L						1.7E-05	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0058
				1,4-Dioxane	74.4	ug/L						1.5E-03	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.051
				Dibenzo(a,h)anthracene	0.064	ug/L						1.3E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						4.7E-07	(mg/kg/day)	3.0E-05	(mg/kg/day)	0.016
				delta-BHC	0.0086	ug/L						1.8E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000022
				Dieldrin	0.0064	ug/L						1.3E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0026

TABLE 7.16.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	Aluminum	2089	ug/L						4.3E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.043
				Antimony	1.3	ug/L						2.7E-05	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.067
				Arsenic	7.8	ug/L						1.6E-04	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.53
				Cadmium	0.439	ug/L						9.0E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.018
				Chromium	13.3	ug/L						2.7E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.091
				Cobalt	1.59	ug/L						3.3E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.11
				Cyanide	19.1	ug/L						3.9E-04	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.62
				Iron	2504	ug/L						5.1E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.073
				Lead	1.66	ug/L						3.4E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						2.0E-03	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.083
				Nickel	9.34	ug/L						1.9E-04	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0096
				Thallium	0.094	ug/L						1.9E-06	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.19
				Vanadium	4.94	ug/L						1.0E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.020
			Exp. Route Total													3.4
			Dermal	1,1,1-Trichloroethane	4085	ug/L						1.8E-02	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.0090
				1,1,2-Trichloroethane	0.476	ug/L						8.4E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00021
				1,1-Dichloroethane	198	ug/L						3.8E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0019
				1,1-Dichloroethene	1231	ug/L						4.0E-03	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.080
				1,2-Dichloroethane	1.23	ug/L						1.5E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00024
				2-Hexanone	12	ug/L						1.2E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0024
				Benzene	0.423	ug/L						1.5E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00039
				Bromodichloromethane	1.1	ug/L						1.9E-06	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.000094
				Chloroform	2.65	ug/L						5.8E-06	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.00058
				Methyl tert-butyl ether	3.79	ug/L						2.1E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						9.8E-07	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00016
				Tetrachloroethene	1.23	ug/L						1.8E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0030
				Trichloroethene (Mutagenic)	19.4	ug/L						7.8E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						7.8E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.16
				Vinyl chloride	0.853	ug/L						1.6E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00053
				1,4-Dioxane	74.4	ug/L						6.5E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00022
				Dibenzo(a,h)anthracene	0.064	ug/L						0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				delta-BHC	0.0086	ug/L						1.5E-07	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000019
				Dieldrin	0.0064	ug/L						2.9E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0058
				Aluminum	2089	ug/L						2.1E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00021
				Antimony	1.3	ug/L						1.3E-07	(mg/kg/day)	6.0E-05	(mg/kg/day)	0.0022
				Arsenic	7.8	ug/L						7.9E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0026
				Cadmium	0.439	ug/L						4.4E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.0018
				Chromium	13.3	ug/L						2.7E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.036
				Cobalt	1.59	ug/L						6.4E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00021
				Cyanide	19.1	ug/L						1.9E-06	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.0031
				Iron	2504	ug/L						2.5E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00036
				Lead	1.66	ug/L						1.7E-08	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						9.8E-06	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.010
				Nickel	9.34	ug/L						1.9E-07	(mg/kg/day)	8.0E-04	(mg/kg/day)	0.00024
				Thallium	0.094	ug/L						9.5E-09	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.00095
				Vanadium	4.94	ug/L						5.0E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.0038
			Exp. Route Total													0.32
		Exposure Point Total														3.7
	Exposure Medium Total															3.7
Medium Total																3.7
												Total of Receptor Hazards Across All Media				5.0

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.17.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Ingestion	Aluminum	28200	mg/kg	See Table 7.18.CTE for Cancer Risks					6.8E-03	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.0068
				Arsenic	35.5	mg/kg						5.1E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.017
				Chromium	41	mg/kg						9.9E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0033
				Cobalt	20.4	mg/kg						4.9E-06	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.016
				Copper	915	mg/kg						2.2E-04	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.0055
				Iron	37600	mg/kg						9.0E-03	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.013
				Manganese	807	mg/kg						1.9E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.0081
				Thallium	0.548	mg/kg						1.3E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.013
				Vanadium	72.3	mg/kg						1.7E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0035
			Exp. Route Total													0.087
			Dermal	Aluminum	28200	mg/kg						1.4E-04	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.00014
				Arsenic	35.5	mg/kg						5.1E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0017
				Chromium	41	mg/kg						2.0E-07	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.0026
				Cobalt	20.4	mg/kg						9.9E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.00033
				Copper	915	mg/kg						4.4E-06	(mg/kg/day)	4.0E-02	(mg/kg/day)	0.00011
				Iron	37600	mg/kg						1.8E-04	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00026
				Manganese	807	mg/kg						3.9E-06	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.0041
				Thallium	0.548	mg/kg						2.6E-09	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.00026
				Vanadium	72.3	mg/kg						3.5E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.0027
			Exp. Route Total													0.012
		Exposure Point Total														0.099
	Exposure Medium Total															0.099
	Air	Baghurst Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3						5.6E-06	(mg/m^3)	5.0E-03	(mg/m^3)	0.0011
				Arsenic	1.1E-08	mg/m^3						7.0E-09	(mg/m^3)	1.5E-05	(mg/m^3)	0.00047
				Chromium	1.3E-08	mg/m^3						8.1E-09	(mg/m^3)	1.0E-04	(mg/m^3)	0.000081
				Cobalt	6.3E-09	mg/m^3						4.0E-09	(mg/m^3)	6.0E-06	(mg/m^3)	0.00067
				Copper	2.8E-07	mg/m^3						1.8E-07	(mg/m^3)	NA	(mg/m^3)	--
				Iron	1.2E-05	mg/m^3						7.5E-06	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	2.5E-07	mg/m^3						1.6E-07	(mg/m^3)	5.0E-05	(mg/m^3)	0.0032
				Thallium	1.7E-10	mg/m^3						1.1E-10	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	2.2E-08	mg/m^3						1.4E-08	(mg/m^3)	1.0E-04	(mg/m^3)	0.00014
			Exp. Route Total													0.0057
		Exposure Point Total														0.0057
	Exposure Medium Total															0.0057
Medium Total																0.10
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L						3.9E-02	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.020
				1,1,2-Trichloroethane	0.476	ug/L						4.6E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0011
				1,1-Dichloroethane	198	ug/L						1.9E-03	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.0095
				1,1-Dichloroethene	1231	ug/L						1.2E-02	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.24
				1,2-Dichloroethane	1.23	ug/L						1.2E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0020
				2-Hexanone	12	ug/L						1.2E-04	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.023
				Benzene	0.423	ug/L						4.1E-06	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.0010
				Bromodichloromethane	1.1	ug/L						1.1E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.00053
				Chloroform	2.65	ug/L						2.5E-05	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.0025
				Methyl tert-butyl ether	3.79	ug/L						3.6E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						1.0E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0017
				Tetrachloroethene	1.23	ug/L						1.2E-05	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0020
				Trichloroethene (Mutagenic)	19.4	ug/L						1.9E-04	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						1.9E-04	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.37
				Vinyl chloride	0.853	ug/L						8.2E-06	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.0027
				1,4-Dioxane	74.4	ug/L						7.2E-04	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.024
				Dibenzo(a,h)anthracene	0.064	ug/L						6.2E-07	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						2.2E-07	(mg/kg/day)	3.0E-05	(mg/kg/day)	0.0074
				delta-BHC	0.0086	ug/L						8.3E-08	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.000010
				Dieldrin	0.0064	ug/L						6.2E-08	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0012

TABLE 7.17.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	Aluminum	2089	ug/L						2.0E-02	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.020
				Antimony	1.3	ug/L						1.3E-05	(mg/kg/day)	4.0E-04	(mg/kg/day)	0.031
				Arsenic	7.8	ug/L						7.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.25
				Cadmium	0.439	ug/L						4.2E-06	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.0084
				Chromium	13.3	ug/L						1.3E-04	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.043
				Cobalt	1.59	ug/L						1.5E-05	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.051
				Cyanide	19.1	ug/L						1.8E-04	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.29
				Iron	2504	ug/L						2.4E-02	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.034
				Lead	1.66	ug/L						1.6E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						9.3E-04	(mg/kg/day)	2.4E-02	(mg/kg/day)	0.039
				Nickel	9.34	ug/L						9.0E-05	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.0045
				Thallium	0.094	ug/L						9.0E-07	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.090
				Vanadium	4.94	ug/L						4.8E-05	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0095
			Exp. Route Total													1.6
			Dermal	1,1,1-Trichloroethane	4085	ug/L						8.6E-03	(mg/kg/day)	2.0E+00	(mg/kg/day)	0.0043
				1,1,2-Trichloroethane	0.476	ug/L						4.0E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00010
				1,1-Dichloroethane	198	ug/L						1.8E-04	(mg/kg/day)	2.0E-01	(mg/kg/day)	0.00089
				1,1-Dichloroethene	1231	ug/L						1.9E-03	(mg/kg/day)	5.0E-02	(mg/kg/day)	0.038
				1,2-Dichloroethane	1.23	ug/L						6.9E-07	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.00012
				2-Hexanone	12	ug/L						5.7E-06	(mg/kg/day)	5.0E-03	(mg/kg/day)	0.0011
				Benzene	0.423	ug/L						7.4E-07	(mg/kg/day)	4.0E-03	(mg/kg/day)	0.00018
				Bromodichloromethane	1.1	ug/L						9.0E-07	(mg/kg/day)	2.0E-02	(mg/kg/day)	0.000045
				Chloroform	2.65	ug/L						2.8E-06	(mg/kg/day)	1.0E-02	(mg/kg/day)	0.00028
				Methyl tert-butyl ether	3.79	ug/L						1.0E-06	(mg/kg/day)	NA	(mg/kg/day)	--
				Methylene chloride	1.08	ug/L						4.7E-07	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.000078
				Tetrachloroethene	1.23	ug/L						8.4E-06	(mg/kg/day)	6.0E-03	(mg/kg/day)	0.0014
				Trichloroethene (Mutagenic)	19.4	ug/L						3.7E-05	(mg/kg/day)	NA	(mg/kg/day)	--
				Trichloroethene (Nonmutagenic)	19.4	ug/L						3.7E-05	(mg/kg/day)	5.0E-04	(mg/kg/day)	0.074
				Vinyl chloride	0.853	ug/L						7.5E-07	(mg/kg/day)	3.0E-03	(mg/kg/day)	0.00025
				1,4-Dioxane	74.4	ug/L						3.1E-06	(mg/kg/day)	3.0E-02	(mg/kg/day)	0.00010
				Dibenzo(a,h)anthracene	0.064	ug/L						0.0E+00	(mg/kg/day)	NA	(mg/kg/day)	--
				Aldrin	0.023	ug/L						0.0E+00	(mg/kg/day)	3.0E-05	(mg/kg/day)	--
				delta-BHC	0.0086	ug/L						7.3E-08	(mg/kg/day)	8.0E-03	(mg/kg/day)	0.0000092
				Dieldrin	0.0064	ug/L						1.4E-07	(mg/kg/day)	5.0E-05	(mg/kg/day)	0.0027
				Aluminum	2089	ug/L						8.2E-05	(mg/kg/day)	1.0E+00	(mg/kg/day)	0.000082
				Antimony	1.3	ug/L						5.1E-08	(mg/kg/day)	6.0E-05	(mg/kg/day)	0.00085
				Arsenic	7.8	ug/L						3.1E-07	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.0010
				Cadmium	0.439	ug/L						1.7E-08	(mg/kg/day)	2.5E-05	(mg/kg/day)	0.00069
				Chromium	13.3	ug/L						1.0E-06	(mg/kg/day)	7.5E-05	(mg/kg/day)	0.014
				Cobalt	1.59	ug/L						2.5E-08	(mg/kg/day)	3.0E-04	(mg/kg/day)	0.000083
				Cyanide	19.1	ug/L						7.5E-07	(mg/kg/day)	6.3E-04	(mg/kg/day)	0.0012
				Iron	2504	ug/L						9.9E-05	(mg/kg/day)	7.0E-01	(mg/kg/day)	0.00014
				Lead	1.66	ug/L						6.5E-09	(mg/kg/day)	NA	(mg/kg/day)	--
				Manganese	97	ug/L						3.8E-06	(mg/kg/day)	9.6E-04	(mg/kg/day)	0.0040
				Nickel	9.34	ug/L						7.4E-08	(mg/kg/day)	8.0E-04	(mg/kg/day)	0.000092
				Thallium	0.094	ug/L						3.7E-09	(mg/kg/day)	1.0E-05	(mg/kg/day)	0.00037
				Vanadium	4.94	ug/L						1.9E-07	(mg/kg/day)	1.3E-04	(mg/kg/day)	0.0015
			Exp. Route Total													0.15
		Exposure Point Total														1.7
	Exposure Medium Total															1.7

TABLE 7.17.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air	Baghurst Drive Site	Inhalation	1,1,1-Trichloroethane	2.0E+00	mg/m^3						1.3E+00	(mg/m^3)	5.0E+00	(mg/m^3)	0.26
				1,1,2-Trichloroethane	2.4E-04	mg/m^3						1.5E-04	(mg/m^3)	2.0E-04	(mg/m^3)	0.76
				1,1-Dichloroethane	9.9E-02	mg/m^3						6.3E-02	(mg/m^3)	NA	(mg/m^3)	--
				1,1-Dichloroethene	6.2E-01	mg/m^3						3.9E-01	(mg/m^3)	2.0E-01	(mg/m^3)	2.0
				1,2-Dichloroethane	6.2E-04	mg/m^3						3.9E-04	(mg/m^3)	7.0E-03	(mg/m^3)	0.056
				2-Hexanone	6.0E-03	mg/m^3						3.8E-03	(mg/m^3)	3.0E-02	(mg/m^3)	0.13
				Benzene	2.1E-04	mg/m^3						1.4E-04	(mg/m^3)	3.0E-02	(mg/m^3)	0.0045
				Bromodichloromethane	5.5E-04	mg/m^3						3.5E-04	(mg/m^3)	NA	(mg/m^3)	--
				Chloroform	1.3E-03	mg/m^3						8.5E-04	(mg/m^3)	9.8E-02	(mg/m^3)	0.0087
				Methyl tert-butyl ether	1.9E-03	mg/m^3						1.2E-03	(mg/m^3)	3.0E+00	(mg/m^3)	0.00040
				Methylene chloride	5.4E-04	mg/m^3						3.5E-04	(mg/m^3)	6.0E-01	(mg/m^3)	0.00058
				Tetrachloroethene	6.2E-04	mg/m^3						3.9E-04	(mg/m^3)	4.0E-02	(mg/m^3)	0.0099
				Trichloroethene (Mutagenic)	9.7E-03	mg/m^3						6.2E-03	(mg/m^3)	NA	(mg/m^3)	--
				Trichloroethene (Nonmutagenic)	9.7E-03	mg/m^3						6.2E-03	(mg/m^3)	2.0E-03	(mg/m^3)	3.1
				Vinyl chloride	4.3E-04	mg/m^3						2.7E-04	(mg/m^3)	1.0E-01	(mg/m^3)	0.0027
				1,4-Dioxane	3.7E-02	mg/m^3						2.4E-02	(mg/m^3)	3.0E-02	(mg/m^3)	0.79
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aldrin	1.2E-05	mg/m^3						7.4E-06	(mg/m^3)	NA	(mg/m^3)	--
				delta-BHC	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Dieldrin	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Aluminum	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	5.0E-03	(mg/m^3)	--
				Antimony	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Arsenic	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	1.5E-05	(mg/m^3)	--
				Cadmium	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	1.0E-05	(mg/m^3)	--
				Chromium	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
				Cobalt	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	6.0E-06	(mg/m^3)	--
				Cyanide	9.6E-03	mg/m^3						6.1E-03	(mg/m^3)	8.0E-04	(mg/m^3)	7.7
				Iron	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Lead	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Manganese	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	5.0E-05	(mg/m^3)	--
				Nickel	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	9.0E-05	(mg/m^3)	--
				Thallium	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	NA	(mg/m^3)	--
				Vanadium	0.0E+00	mg/m^3						0.0E+00	(mg/m^3)	1.0E-04	(mg/m^3)	--
			Exp. Route Total													15
		Exposure Point Total														15
	Exposure Medium Total															15
Medium Total																16
												Total of Receptor Hazards Across All Media				17

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 7.18.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Ingestion	Aluminum	28200	mg/kg	3.4E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -	See Tables 7.16.CTE and 7.17.CTE for Hazard Indices				
				Arsenic	35.5	mg/kg	2.6E-06	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	3.9E-06					
				Chromium	41	mg/kg	2.8E-05	(mg/kg/day)	5.0E-01	(mg/kg/day)$^{-1}$	1.4E-05					
				Cobalt	20.4	mg/kg	2.5E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Copper	915	mg/kg	1.1E-04	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Iron	37600	mg/kg	4.6E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Manganese	807	mg/kg	9.8E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Thallium	0.548	mg/kg	6.7E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Vanadium	72.3	mg/kg	8.8E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
			Exp. Route Total								1.8E-05					
			Dermal	Aluminum	28200	mg/kg	4.6E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Arsenic	35.5	mg/kg	1.7E-07	(mg/kg/day)	1.5E+00	(mg/kg/day)$^{-1}$	2.6E-07					
				Chromium	41	mg/kg	3.4E-07	(mg/kg/day)	2.0E+01	(mg/kg/day)$^{-1}$	6.8E-06					
				Cobalt	20.4	mg/kg	3.4E-08	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Copper	915	mg/kg	1.5E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Iron	37600	mg/kg	6.2E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Manganese	807	mg/kg	1.3E-06	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Thallium	0.548	mg/kg	9.0E-10	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Vanadium	72.3	mg/kg	1.2E-07	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
			Exp. Route Total								7.1E-06					
		Exposure Point Total									2.5E-05					
	Exposure Medium Total										2.5E-05					
	Air	Baghurst Drive Site	Inhalation	Aluminum	8.7E-06	mg/m^3	7.2E-07	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Arsenic	1.1E-08	mg/m^3	9.1E-10	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	3.9E-09					
				Chromium	1.3E-08	mg/m^3	2.8E-09	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	2.3E-07					
				Cobalt	6.3E-09	mg/m^3	5.2E-10	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	4.7E-09					
				Copper	2.8E-07	mg/m^3	2.3E-08	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Iron	1.2E-05	mg/m^3	9.6E-07	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Manganese	2.5E-07	mg/m^3	2.1E-08	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Thallium	1.7E-10	mg/m^3	1.4E-11	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Vanadium	2.2E-08	mg/m^3	1.8E-09	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
			Exp. Route Total								2.4E-07					
		Exposure Point Total									2.4E-07					
	Exposure Medium Total										2.4E-07					
Medium Total											2.5E-05					
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	1,1,1-Trichloroethane	4085	ug/L	6.3E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				1,1,2-Trichloroethane	0.476	ug/L	7.4E-07	(mg/kg/day)	5.7E-02	(mg/kg/day)$^{-1}$	4.2E-08					
				1,1-Dichloroethane	198	ug/L	3.1E-04	(mg/kg/day)	5.7E-03	(mg/kg/day)$^{-1}$	1.7E-06					
				1,1-Dichloroethene	1231	ug/L	1.9E-03	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				1,2-Dichloroethane	1.23	ug/L	1.9E-06	(mg/kg/day)	9.1E-02	(mg/kg/day)$^{-1}$	1.7E-07					
				2-Hexanone	12	ug/L	1.9E-05	(mg/kg/day)	NA	(mg/kg/day)$^{-1}$	- -					
				Benzene	0.423	ug/L	6.5E-07	(mg/kg/day)	5.5E-02	(mg/kg/day)$^{-1}$	3.6E-08					
				Bromodichloromethane	1.1	ug/L	1.7E-06	(mg/kg/day)	6.2E-02	(mg/kg/day)$^{-1}$	1.1E-07					
				Chloroform	2.65	ug/L	4.1E-06	(mg/kg/day)	3.1E-02	(mg/kg/day)$^{-1}$	1.3E-07					
				Methyl tert-butyl ether	3.79	ug/L	5.9E-06	(mg/kg/day)	1.8E-03	(mg/kg/day)$^{-1}$	1.1E-08					
				Methylene chloride	1.08	ug/L	5.7E-06	(mg/kg/day)	2.0E-03	(mg/kg/day)$^{-1}$	1.1E-08					
				Tetrachloroethene	1.23	ug/L	1.9E-06	(mg/kg/day)	2.1E-03	(mg/kg/day)$^{-1}$	4.0E-09					
				Trichloroethene (Mutagenic)	19.4	ug/L	1.0E-04	(mg/kg/day)	9.3E-03	(mg/kg/day)$^{-1}$	9.6E-07					
				Trichloroethene (Nonmutagenic)	19.4	ug/L	3.0E-05	(mg/kg/day)	3.7E-02	(mg/kg/day)$^{-1}$	1.1E-06					
				Vinyl chloride	0.853	ug/L	2.9E-05	(mg/kg/day)	7.2E-01	(mg/kg/day)$^{-1}$	2.1E-05					
				1,4-Dioxane	74.4	ug/L	1.2E-04	(mg/kg/day)	1.0E-01	(mg/kg/day)$^{-1}$	1.2E-05					
				Dibenzo(a,h)anthracene	0.064	ug/L	3.4E-07	(mg/kg/day)	1.0E+00	(mg/kg/day)$^{-1}$	3.4E-07					
				Aldrin	0.023	ug/L	3.6E-08	(mg/kg/day)	1.7E+01	(mg/kg/day)$^{-1}$	6.1E-07					
				delta-BHC	0.0086	ug/L	1.3E-08	(mg/kg/day)	6.3E+00	(mg/kg/day)$^{-1}$	8.4E-08					
				Dieldrin	0.0064	ug/L	9.9E-09	(mg/kg/day)	1.6E+01	(mg/kg/day)$^{-1}$	1.6E-07					

TABLE 7.18.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Baghurst Drive Site	Ingestion	Aluminum	2089	ug/L	3.2E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Antimony	1.3	ug/L	2.0E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Arsenic	7.8	ug/L	1.2E-05	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	1.8E-05					
				Cadmium	0.439	ug/L	6.8E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Chromium	13.3	ug/L	7.1E-05	(mg/kg/day)	5.0E-01	$(mg/kg/day)^{-1}$	3.5E-05					
				Cobalt	1.59	ug/L	2.5E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Cyanide	19.1	ug/L	3.0E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Iron	2504	ug/L	3.9E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Lead	1.66	ug/L	2.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Manganese	97	ug/L	1.5E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Nickel	9.34	ug/L	1.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Thallium	0.094	ug/L	1.5E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Vanadium	4.94	ug/L	7.6E-06	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
			Exp. Route Total								9.1E-05					
			Dermal	1,1,1-Trichloroethane	4085	ug/L	1.4E-03	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				1,1,2-Trichloroethane	0.476	ug/L	6.4E-08	(mg/kg/day)	5.7E-02	$(mg/kg/day)^{-1}$	3.7E-09					
				1,1-Dichloroethane	198	ug/L	2.9E-05	(mg/kg/day)	5.7E-03	$(mg/kg/day)^{-1}$	1.6E-07					
				1,1-Dichloroethene	1231	ug/L	3.0E-04	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				1,2-Dichloroethane	1.23	ug/L	1.1E-07	(mg/kg/day)	9.1E-02	$(mg/kg/day)^{-1}$	1.0E-08					
				2-Hexanone	12	ug/L	9.2E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Benzene	0.423	ug/L	1.2E-07	(mg/kg/day)	5.5E-02	$(mg/kg/day)^{-1}$	6.5E-09					
				Bromodichloromethane	1.1	ug/L	1.4E-07	(mg/kg/day)	6.2E-02	$(mg/kg/day)^{-1}$	8.9E-09					
				Chloroform	2.65	ug/L	4.4E-07	(mg/kg/day)	3.1E-02	$(mg/kg/day)^{-1}$	1.4E-08					
				Methyl tert-butyl ether	3.79	ug/L	1.6E-07	(mg/kg/day)	1.8E-03	$(mg/kg/day)^{-1}$	2.9E-10					
				Methylene chloride	1.08	ug/L	2.6E-07	(mg/kg/day)	2.0E-03	$(mg/kg/day)^{-1}$	5.1E-10					
				Tetrachloroethene	1.23	ug/L	1.4E-06	(mg/kg/day)	2.1E-03	$(mg/kg/day)^{-1}$	2.8E-09					
				Trichloroethene (Mutagenic)	19.4	ug/L	2.0E-05	(mg/kg/day)	9.3E-03	$(mg/kg/day)^{-1}$	1.9E-07					
				Trichloroethene (Nonmutagenic)	19.4	ug/L	5.9E-06	(mg/kg/day)	3.7E-02	$(mg/kg/day)^{-1}$	2.2E-07					
				Vinyl chloride	0.853	ug/L	2.6E-06	(mg/kg/day)	7.2E-01	$(mg/kg/day)^{-1}$	1.9E-06					
				1,4-Dioxane	74.4	ug/L	4.9E-07	(mg/kg/day)	1.0E-01	$(mg/kg/day)^{-1}$	4.9E-08					
				Dibenzo(a,h)anthracene	0.064	ug/L	0.0E+00	(mg/kg/day)	1.0E+00	$(mg/kg/day)^{-1}$	- -					
				Aldrin	0.023	ug/L	0.0E+00	(mg/kg/day)	1.7E+01	$(mg/kg/day)^{-1}$	- -					
				delta-BHC	0.0086	ug/L	1.2E-08	(mg/kg/day)	6.3E+00	$(mg/kg/day)^{-1}$	7.4E-08					
				Dieldrin	0.0064	ug/L	2.2E-08	(mg/kg/day)	1.6E+01	$(mg/kg/day)^{-1}$	3.5E-07					
				Aluminum	2089	ug/L	1.4E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Antimony	1.3	ug/L	8.9E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Arsenic	7.8	ug/L	5.3E-08	(mg/kg/day)	1.5E+00	$(mg/kg/day)^{-1}$	8.0E-08					
				Cadmium	0.439	ug/L	3.0E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Chromium	13.3	ug/L	6.6E-07	(mg/kg/day)	2.0E+01	$(mg/kg/day)^{-1}$	1.3E-05					
				Cobalt	1.59	ug/L	4.3E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Cyanide	19.1	ug/L	1.3E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Iron	2504	ug/L	1.7E-05	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Lead	1.66	ug/L	1.1E-09	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Manganese	97	ug/L	6.6E-07	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Nickel	9.34	ug/L	1.3E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Thallium	0.094	ug/L	6.4E-10	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
				Vanadium	4.94	ug/L	3.4E-08	(mg/kg/day)	NA	$(mg/kg/day)^{-1}$	- -					
			Exp. Route Total								1.6E-05					
		Exposure Point Total									1.1E-04					
	Exposure Medium Total										1.1E-04					

TABLE 7.18.CTE
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
Receptor Age: Lifelong (Child and 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	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Air	Baghurst Drive Site	Inhalation	1,1,1-Trichloroethane	2.0E+00	mg/m^3	1.3E-01	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				1,1,2-Trichloroethane	2.4E-04	mg/m^3	1.5E-05	(mg/m^3)	1.6E-05	(ug/m^3)$^{-1}$	2.4E-07					
				1,1-Dichloroethane	9.9E-02	mg/m^3	6.3E-03	(mg/m^3)	1.6E-06	(ug/m^3)$^{-1}$	1.0E-05					
				1,1-Dichloroethene	6.2E-01	mg/m^3	3.9E-02	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				1,2-Dichloroethane	6.2E-04	mg/m^3	3.9E-05	(mg/m^3)	2.6E-05	(ug/m^3)$^{-1}$	1.0E-06					
				2-Hexanone	6.0E-03	mg/m^3	3.8E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Benzene	2.1E-04	mg/m^3	1.4E-05	(mg/m^3)	7.8E-06	(ug/m^3)$^{-1}$	1.1E-07					
				Bromodichloromethane	5.5E-04	mg/m^3	3.5E-05	(mg/m^3)	3.7E-05	(ug/m^3)$^{-1}$	1.3E-06					
				Chloroform	1.3E-03	mg/m^3	8.5E-05	(mg/m^3)	2.3E-05	(ug/m^3)$^{-1}$	2.0E-06					
				Methyl tert-butyl ether	1.9E-03	mg/m^3	1.2E-04	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	3.2E-08					
				Methylene chloride	5.4E-04	mg/m^3	5.4E-05	(mg/m^3)	1.0E-08	(ug/m^3)$^{-1}$	5.4E-10					
				Tetrachloroethene	6.2E-04	mg/m^3	3.9E-05	(mg/m^3)	2.6E-07	(ug/m^3)$^{-1}$	1.0E-08					
				Trichloroethene (Mutagenic)	9.7E-03	mg/m^3	9.8E-04	(mg/m^3)	1.0E-06	(ug/m^3)$^{-1}$	9.8E-07					
				Trichloroethene (Nonmutagenic)	9.7E-03	mg/m^3	6.2E-04	(mg/m^3)	3.1E-06	(ug/m^3)$^{-1}$	1.9E-06					
				Vinyl chloride	4.3E-04	mg/m^3	2.7E-05	(mg/m^3)	4.4E-06	(ug/m^3)$^{-1}$	1.2E-07					
				1,4-Dioxane	3.7E-02	mg/m^3	2.4E-03	(mg/m^3)	5.0E-06	(ug/m^3)$^{-1}$	1.2E-05					
				Dibenzo(a,h)anthracene	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	6.0E-04	(ug/m^3)$^{-1}$	- -					
				Aldrin	1.2E-05	mg/m^3	7.4E-07	(mg/m^3)	4.9E-03	(ug/m^3)$^{-1}$	3.6E-06					
				delta-BHC	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -					
				Dieldrin	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.6E-03	(ug/m^3)$^{-1}$	- -					
				Aluminum	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Antimony	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Arsenic	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	4.3E-03	(ug/m^3)$^{-1}$	- -					
				Cadmium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	1.8E-03	(ug/m^3)$^{-1}$	- -					
				Chromium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	8.4E-02	(ug/m^3)$^{-1}$	- -					
				Cobalt	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	9.0E-03	(ug/m^3)$^{-1}$	- -					
				Cyanide	9.6E-03	mg/m^3	6.1E-04	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Iron	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Lead	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Manganese	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Nickel	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	2.6E-04	(ug/m^3)$^{-1}$	- -					
				Thallium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
				Vanadium	0.0E+00	mg/m^3	0.0E+00	(mg/m^3)	NA	(ug/m^3)$^{-1}$	- -					
			Exp. Route Total								3.3E-05					
		Exposure Point Total									3.3E-05					
	Exposure Medium Total										3.3E-05					
Medium Total											1.4E-04					
										Total of Receptor Risks Across All Media	1.7E-04					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

RAGS Part D Table 8
Calculation of Radiation Cancer Risks

No tables, Radiation cancer risks were not evaluated for the Baghurst Drive Site

RAGS Part D Table 9

Summary of Receptor Risks and Hazards for COPCs

LIST OF TABLES
RAGS PART D TABLE 9
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

Table No.

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Intermittent Stream	1,1-Dichloroethane	8E-09	--	3E-09	--	1E-08	Urinary	0.00005	--	0.00002	0.00007
			Dieldrin	8E-08	--	5E-07	--	6E-07	Hepatic	0.0007	--	0.005	0.005
			Heptachlor Epoxide	2E-08	--	1E-07	--	1E-07	Hepatic	0.001	--	0.006	0.008
			Arsenic	1E-06	--	5E-08	--	1E-06	Dermal, CVS	0.02	--	0.0008	0.02
			Chromium	2E-07	--	7E-07	--	8E-07	None Specified	0.0002	--	0.001	0.001
			Manganese	- -	--	- -	--	- -	Nervous	0.04	--	0.05	0.1
			Chemical Total	1E-06	--	1E-06	--	3E-06		0.06	--	0.06	0.1
		Exposure Point Total						3E-06					0.1
	Exposure Medium Total							3E-06					0.1
Medium Total								3E-06					0.1
Sediment	Sediment	Intermittent Stream	Arsenic	3E-07	--	1E-07	--	4E-07	Dermal, CVS	0.005	--	0.002	0.007
			Chromium	1E-06	--	4E-06	--	5E-06	None Specified	0.002	--	0.006	0.008
			Cobalt	- -	--	- -	--	- -	Thyroid	0.01	--	0.0008	0.01
			Iron	- -	--	- -	--	- -	GS	0.01	--	0.0008	0.01
			Chemical Total	2E-06	--	4E-06	--	6E-06		0.03	--	0.010	0.04
		Exposure Point Total						6E-06					0.04
	Exposure Medium Total							6E-06					0.04
Medium Total								6E-06					0.04
Receptor Total							Receptor Risk Total	8E-06				Receptor HI Total	0.2

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.2 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Perkiomen Creek	Arsenic	See Table 9.4 RME for Cancer Risks					Dermal, CVS	0.020	--	0.00039	0.020
			Chemical Total							0.020	--	0.00039	0.020
		Exposure Point Total											0.020
	Exposure Medium Total												0.020
Medium Total													0.020
Sediment	Sediment	Perkiomen Creek	Chromium						None Specified	0.028	--	0.027	0.055
			Chemical Total							0.028	--	0.027	0.055
		Exposure Point Total											0.055
	Exposure Medium Total												0.055
Medium Total													0.055
Receptor Total												Receptor HI Total	0.075

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.3.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Recreational Users
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Perkiomen Creek	Arsenic	See Table 9.4.RME for Cancer Risks					Dermal, CVS	0.0022	--	0.00019	0.0024
			Chemical Total							0.0022	--	0.00019	0.0024
		Exposure Point Total											0.0024
	Exposure Medium Total												0.0024
Medium Total													0.0024
Sediment	Sediment	Perkiomen Creek	Chromium						None Specified	0.0027	--	0.0045	0.0072
			Chemical Total							0.0027	--	0.0045	0.0072
		Exposure Point Total											0.0072
	Exposure Medium Total												0.0072
Medium Total													0.0072
Receptor Total												Receptor HI Total	0.0095

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.4.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Recreational Users
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Perkiomen Creek	Arsenic	1.0E-06	--	3.9E-08	--	1.1E-06	See Tables 9.2.RME and 9.3.RME for Hazard Indices				
			Chemical Total	1.0E-06	--	3.9E-08	--	1.1E-06					
		Exposure Point Total						1.1E-06					
	Exposure Medium Total							1.1E-06					
Medium Total								1.1E-06					
Sediment	Sediment	Perkiomen Creek	Chromium	2.2E-05	--	2.2E-05	--	4.4E-05					
			Chemical Total	2.2E-05	--	2.2E-05	--	4.4E-05					
		Exposure Point Total						4.4E-05					
	Exposure Medium Total							4.4E-05					
Medium Total								4.4E-05					
Receptor Total							Receptor Risk Total	4.5E-05					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghusrt Drive Site	Aluminum	--	--	--	--	--	Nervous	0.080	--	0.0026	0.082
			Arsenic	1.3E-06	--	2.1E-07	--	1.5E-06	Dermal, CVS	0.20	--	0.032	0.23
			Chromium	8.3E-07	--	1.1E-06	--	1.9E-06	Hematologic	0.023	--	0.030	0.053
			Cobalt	--	--	--	--	--	Thyroid	0.019	--	0.00062	0.020
			Copper	--	--	--	--	--	GS	0.065	--	0.0021	0.067
			Iron	--	--	--	--	--	GS	0.15	--	0.0049	0.16
			Manganese	--	--	--	--	--	Nervous	0.095	--	0.076	0.17
			Thallium	--	--	--	--	--	Dermal	0.039	--	0.0012	0.040
			Vanadium	--	--	--	--	--	Hematologic	0.020	--	0.025	0.046
			Chemical Total	2.1E-06	--	1.3E-06	--	3.4E-06		0.69	--	0.17	0.87
		Exposure Point Total						3.4E-06					0.87
	Exposure Medium Total							3.4E-06					0.87
	Air	Baghusrt Drive Site	Aluminum	--	--	--	--	--	Nervous	--	0.92	--	0.92
			Arsenic	--	3.6E-07	--	--	3.6E-07	Dermal, CVS	--	0.39	--	0.39
			Chromium	--	8.0E-06	--	--	8.0E-06	Respiratory	--	0.022	--	0.022
			Cobalt	--	4.3E-07	--	--	4.3E-07	Respiratory	--	0.17	--	0.17
			Copper	--	--	--	--	--	NA	--	--	--	--
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	Nervous	--	2.6	--	2.6
			Thallium	--	--	--	--	--	NA	--	--	--	--
			Vanadium	--	--	--	--	--	Respiratory	--	0.12	--	0.12
			Chemical Total	--	8.8E-06	--	--	8.8E-06		- -	4.2	- -	4.2
		Exposure Point Total						8.8E-06					4.2
	Exposure Medium Total							8.8E-06					4.2
Medium Total								1.2E-05					5.1
Receptor Total							Receptor Risk Total	1.2E-05				Receptor HI Total	5.1

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total CVS HI	0.62
Total Dermal HI	0.66
Total GS HI	0.22
Total Hematologic HI	0.098
Total Nervous HI	3.8
Total Respiratory HI	0.31
Total Thyroid HI	0.020

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmer
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum	See Table 9.8.RME for Cancer Risks					Nervous	0.36	–	0.0086	0.37
			Arsenic						Dermal, CVS	0.91	–	0.11	1.0
			Chromium						None Specified	0.17	–	0.17	0.34
			Cobalt						Thyroid	0.87	–	0.021	0.89
			Copper						GS	0.29	–	0.0069	0.30
			Iron						GS	0.69	–	0.016	0.70
			Manganese						Nervous	0.43	–	0.26	0.68
			Thallium						Dermal	0.70	–	0.017	0.72
			Vanadium						Dermal	0.18	–	0.17	0.35
			Chemical Total							4.6	–	0.77	5.4
		Exposure Point Total											5.4
	Exposure Medium Total												5.4
	Air	Baghurst Drive Site	Aluminum						Nervous	--	0.0017	--	0.0017
			Arsenic						Dermal, CVS	--	0.00070	--	0.00070
			Chromium						Respiratory	--	0.00012	--	0.00012
			Cobalt						Respiratory	--	0.0010	--	0.0010
			Copper						NA	--	–	--	–
			Iron						NA	--	–	--	–
			Manganese						Nervous	--	0.0048	--	0.0048
			Thallium						NA	--	–	--	–
			Vanadium						Respiratory	--	0.00021	--	0.00021
			Chemical Total							- -	0.0085	- -	0.0085
		Exposure Point Total											0.0085
	Exposure Medium Total												0.0085
Medium Total													5.4
Groundwater	Groundwater	Baghurst Drive Site	1,1,1-Trichloroethane						Body Weight	0.10	–	0.016	0.12
			1,1,2-Trichloroethane						Hematologic, Immune	0.0059	–	0.00038	0.0063
			1,1-Dichloroethane						Urinary	0.049	–	0.0034	0.053
			1,1-Dichloroethene						Hepatic	1.2	–	0.14	1.4
			1,2-Dichloroethane						Urinary	0.010	–	0.00044	0.011
			2-Hexanone						Nervous	0.12	–	0.0044	0.12
			Benzene						Immune	0.0053	–	0.00070	0.0060
			Bromodichloromethane						Urinary	0.0027	–	0.00017	0.0029
			Chloroform						Hepatic	0.013	–	0.0010	0.014
			Methyl tert-butyl ether						NA	--	–	--	–
			Methylene chloride						Hepatic	0.0090	–	0.00030	0.0093
			Tetrachloroethene						Nervous, Ocular	0.010	–	0.0053	0.016
			Trichloroethene (Mutagenic)						NA	--	–	--	–
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	1.9	–	0.28	2.2
			Vinyl chloride						Hepatic	0.014	–	0.00096	0.015
			1,4-Dioxane						Hepatic, Urinary	0.12	–	0.00039	0.12
			Dibenzo(a,h)anthracene						NA	--	–	--	–
			Aldrin						Hepatic	0.038	–	--	0.038
			delta-BHC						Hepatic	0.000054	–	0.000035	0.000088
			Dieldrin						Hepatic	0.0064	–	0.010	0.017
			Aluminum						Nervous	0.10	–	0.00046	0.10
			Antimony						Hematologic	0.16	–	0.0048	0.17
			Arsenic						Dermal, CVS	1.3	–	0.0057	1.3
			Cadmium						Urinary	0.044	–	0.0039	0.048
			Chromium						None Specified	0.22	–	0.078	0.30
			Cobalt						Thyroid	0.26	–	0.00047	0.26
			Cyanide						Reproductive	1.5	–	0.0067	1.5
			Iron						GS	0.18	–	0.00079	0.18
			Lead						NA	--	–	--	–
			Manganese						Nervous	0.20	–	0.022	0.22
			Nickel						Body Weight	0.023	–	0.00051	0.024
			Thallium						Dermal	0.47	–	0.0021	0.47
			Vanadium						Dermal	0.049	–	0.0083	0.058
			Chemical Total							8.2	–	0.60	8.8
		Exposure Point Total											8.8
	Exposure Medium Total												8.8
Medium Total													8.8
Receptor Total												Receptor HI Total	14.2

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmer
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total

Total Body Weight HI	0.14
Total CVS HI	4.5
Total Dermal HI	3.9
Total Developmental HI	2.2
Total GS HI	1.2
Total Hematologic HI	0.17
Total Hepatic HI	1.6
Total Immune HI	2.2
Total Nervous HI	1.5
Total None Specified HI	0.64
Total Reproductive HI	1.5
Total Respiratory HI	0.0013
Total Thyroid HI	1.2
Total Urinary HI	0.24

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface/Subsurface Soil	Surface/Subsurface Soil	Baghusrt Drive Site	Aluminum	--	--	--	--	--	Nervous	0.22	--	0.0072	0.23
			Arsenic	3.6E-05	--	5.8E-06	--	4.2E-05	Dermal, CVS	0.56	--	0.090	0.65
			Chromium	4.6E-05	--	5.9E-05	--	1.1E-04	None Specified	0.11	--	0.14	0.25
			Cobalt	--	--	--	--	--	Thyroid	0.54	--	0.017	0.56
			Copper	--	--	--	--	--	GS	0.18	--	0.0058	0.19
			Iron	--	--	--	--	--	GS	0.42	--	0.014	0.44
			Manganese	--	--	--	--	--	Nervous	0.27	--	0.21	0.48
			Thallium	--	--	--	--	--	Dermal	0.43	--	0.014	0.45
			Vanadium	--	--	--	--	--	Dermal	0.11	--	0.14	0.26
			Chemical Total	8.2E-05	--	6.5E-05	--	1.5E-04		2.9	--	0.64	3.5
		Exposure Point Total						1.5E-04					3.5
	Exposure Medium Total							1.5E-04					3.5
	Air	Baghusrt Drive Site	Aluminum	--	--	--	--	--	Nervous	--	0.0033	--	0.0033
			Arsenic	--	1.3E-08	--	--	1.3E-08	Dermal, CVS	--	0.00141	--	0.00141
			Chromium	--	5.8E-07	--	--	5.8E-07	Respiratory	--	0.000243	--	0.000243
			Cobalt	--	1.6E-08	--	--	1.6E-08	Respiratory	--	0.00202	--	0.00202
			Copper	--	--	--	--	--	NA	--	--	--	--
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	Nervous	--	0.0096	--	0.0096
			Thallium	--	--	--	--	--	NA	--	--	--	--
			Vanadium	--	--	--	--	--	Respiratory	--	0.00043	--	0.00043
			Chemical Total	--	6.1E-07	--	--	6.1E-07		- -	0.0170	- -	0.0170
		Exposure Point Total						6.1E-07					0.0170
	Exposure Medium Total							6.1E-07					0.0170
Medium Total								1.5E-04					3.5
Groundwater	Groundwater Potable Use	Baghusrt Drive Site	1,1,1-Trichloroethane	--	--	--	--	--	Body Weight	0.061	--	0.011	0.072
			1,1,2-Trichloroethane	2.3E-07	--	1.6E-08	--	2.5E-07	Hematologic, Immune	0.0036	--	0.00025	0.0038
			1,1-Dichloroethane	9.7E-06	--	7.3E-07	--	1.0E-05	Urinary	0.030	--	0.0023	0.032
			1,1-Dichloroethene	--	--	--	--	--	Hepatic	0.74	--	0.096	0.83
			1,2-Dichloroethane	9.6E-07	--	4.5E-08	--	1.0E-06	Urinary	0.0061	--	0.00029	0.0064
			2-Hexanone	--	--	--	--	--	Nervous	0.072	--	0.0029	0.075
			Benzene	2.0E-07	--	3.0E-08	--	2.3E-07	Immune	0.0032	--	0.00048	0.0036
			Bromodichloromethane	5.8E-07	--	4.0E-08	--	6.2E-07	Urinary	0.0016	--	0.00011	0.0018
			Chloroform	7.0E-07	--	6.2E-08	--	7.6E-07	Hepatic	0.0079	--	0.00070	0.0086
			Methyl tert-butyl ether	5.8E-08	--	1.3E-09	--	6.0E-08	NA	--	--	--	--
			Methylene chloride	3.7E-08	--	1.3E-09	--	3.8E-08	Hepatic	0.0054	--	0.00020	0.0056
			Tetrachloroethene	2.2E-08	--	1.3E-08	--	3.5E-08	Nervous, Ocular	0.0061	--	0.0035	0.0097
			Trichloroethene (Mutagenic)	3.1E-06	--	5.0E-07	--	3.6E-06	NA	--	--	--	--
			Trichloroethene (Nonmutagenic)	6.1E-06	--	9.9E-07	--	7.1E-06	CVS, Immune, Developmental	1.2	--	0.19	1.3
			Vinyl chloride	5.3E-06	--	4.1E-07	--	5.7E-06	Hepatic	0.0085	--	0.00066	0.0092
			1,4-Dioxane	6.4E-05	--	2.2E-07	--	6.4E-05	Hepatic, Urinary	0.074	--	0.00026	0.075
			Dibenzo(a,h)anthracene	1.1E-06	--	--	--	1.1E-06	NA	--	--	--	--
			Aldrin	3.3E-06	--	--	--	3.3E-06	Hepatic	0.023	--	--	0.023
			delta-BHC	4.6E-07	--	3.3E-07	--	8.0E-07	Hepatic	0.000032	--	0.000023	0.000055
			Dieldrin	8.8E-07	--	1.6E-06	--	2.5E-06	Hepatic	0.0038	--	0.0069	0.011
			Aluminum	--	--	--	--	--	Nervous	0.063	--	0.00035	0.063
			Antimony	--	--	--	--	--	Hematologic	0.097	--	0.0036	0.10
			Arsenic	1.0E-04	--	5.6E-07	--	1.0E-04	Dermal, CVS	0.78	--	0.0043	0.78
			Cadmium	--	--	--	--	--	Urinary	0.026	--	0.0029	0.029
			Chromium	1.1E-04	--	5.1E-05	--	1.6E-04	None Specified	0.13	--	0.059	0.19
			Cobalt	--	--	--	--	--	Thyroid	0.16	--	0.00035	0.16
			Cyanide	--	--	--	--	--	Reproductive	0.91	--	0.0051	0.91
			Iron	--	--	--	--	--	GS	0.11	--	0.00060	0.11
			Lead	--	--	--	--	--	NA	--	--	--	--

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater Potable Use	Baghusrt Drive Site	Manganese	--	--	--	--	--	Nervous	0.12	--	0.017	0.14
			Nickel	--	--	--	--	--	Body Weight	0.014	--	0.00039	0.014
			Thallium	--	--	--	--	--	Dermal	0.28	--	0.0016	0.28
			Vanadium	--	--	--	--	--	Dermal	0.030	--	0.0064	0.036
			Chemical Total	3.1E-04	--	5.6E-05	--	3.7E-04		4.9	--	0.41	5.3
		Exposure Point Total						3.7E-04					5.3
	Exposure Medium Total							3.7E-04					5.3
	Air Potable Use	Baghusrt Drive Site	1,1,1-Trichloroethane	--	--	--	--	--	Hepatic	--	0.39	--	0.39
			1,1,2-Trichloroethane	--	1.0E-06	--	--	1.0E-06	Respiratory	--	1.1	--	1.1
			1,1-Dichloroethane	--	4.3E-05	--	--	4.3E-05	NA	--	--	--	--
			1,1-Dichloroethene	--	--	--	--	--	Hepatic	--	3.0	--	3.0
			1,2-Dichloroethane	--	4.4E-06	--	--	4.4E-06	Nervous	--	0.084	--	0.084
			2-Hexanone	--	--	--	--	--	Nervous	--	0.19	--	0.19
			Benzene	--	4.5E-07	--	--	4.5E-07	Immune	--	0.0068	--	0.0068
			Bromodichloromethane	--	5.6E-06	--	--	5.6E-06	NA	--	--	--	--
			Chloroform	--	8.3E-06	--	--	8.3E-06	Hepatic	--	0.013	--	0.013
			Methyl tert-butyl ether	--	1.3E-07	--	--	1.3E-07	Hepatic, Urinary, Ocular	--	0.00061	--	0.00061
			Methylene chloride	--	3.0E-09	--	--	3.0E-09	Hepatic	--	0.00086	--	0.00086
			Tetrachloroethene	--	4.4E-08	--	--	4.4E-08	Nervous, Ocular	--	0.015	--	0.015
			Trichloroethene (Mutagenic)	--	5.3E-06	--	--	5.3E-06	NA	--	--	--	--
			Trichloroethene (Nonmutagenic)	--	8.2E-06	--	--	8.2E-06	CVS, Immune, Developmental	--	4.7	--	4.7
			Vinyl chloride	--	5.1E-07	--	--	5.1E-07	Hepatic	--	0.0041	--	0.0041
			1,4-Dioxane	--	5.1E-05	--	--	5.1E-05	Nervous, Respiratory	--	1.2	--	1.2
			Dibenzo(a,h)anthracene	--	--	--	--	--	NA	--	--	--	--
			Aldrin	--	1.5E-05	--	--	1.5E-05	NA	--	--	--	--
			delta-BHC	--	--	--	--	--	NA	--	--	--	--
			Dieldrin	--	--	--	--	--	NA	--	--	--	--
			Aluminum	--	--	--	--	--	Nervous	--	--	--	--
			Antimony	--	--	--	--	--	NA	--	--	--	--
			Arsenic	--	--	--	--	--	Dermal, CVS	--	--	--	--
			Cadmium	--	--	--	--	--	Urinary	--	--	--	--
			Chromium	--	--	--	--	--	Respiratory	--	--	--	--
			Cobalt	--	--	--	--	--	Respiratory	--	--	--	--
			Cyanide	--	--	--	--	--	Endocrine	--	11.4	--	11.4
			Iron	--	--	--	--	--	NA	--	--	--	--
			Lead	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	Nervous	--	--	--	--
			Nickel	--	--	--	--	--	Respiratory	--	--	--	--
			Thallium	--	--	--	--	--	NA	--	--	--	--
			Vanadium	--	--	--	--	--	Respiratory	--	--	--	--
			Chemical Total	--	1.4E-04	--	--	1.4E-04		- -	22.1	- -	22.1
		Exposure Point Total						1.4E-04					22.1
	Exposure Medium Total							1.4E-04					22.1
Medium Total								5.1E-04					27.4
Groundwater	Groundwater Irrigation	Baghusrt Drive Site	1,1,1-Trichloroethane	--	--	--	--	--	Body Weight	0.00021	--	0.00058	0.00079
			1,1,2-Trichloroethane	1.6E-09	--	1.8E-09	--	3.4E-09	Hematologic, Immune	0.000012	--	0.000014	0.000026
			1,1-Dichloroethane	6.6E-08	--	8.6E-08	--	1.5E-07	Urinary	0.00010	--	0.00013	0.00023
			1,1-Dichloroethene	--	--	--	--	--	Hepatic	0.0025	--	0.0056	0.0081
			1,2-Dichloroethane	6.6E-09	--	5.3E-09	--	1.2E-08	Urinary	0.000021	--	0.000017	0.000038
			2-Hexanone	--	--	--	--	--	Nervous	0.00025	--	0.00017	0.00042
			Benzene	1.4E-09	--	3.6E-09	--	5.0E-09	Immune	0.000011	--	0.000029	0.000040
			Bromodichloromethane	4.0E-09	--	4.1E-09	--	8.1E-09	Urinary	0.0000057	--	0.0000058	0.000011
			Chloroform	4.8E-09	--	6.9E-09	--	1.2E-08	Hepatic	0.000027	--	0.000039	0.000066
			Methyl tert-butyl ether	4.0E-10	--	1.6E-10	--	5.6E-10	NA	--	--	--	--

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater Irrigation	Baghusrt Drive Site	Methylene chloride	1.9E-10	--	1.2E-10	--	3.1E-10	Hepatic	0.000018	--	0.000012	0.000031
			Tetrachloroethene	1.5E-10	--	1.3E-09	--	1.5E-09	Nervous, Ocular	0.000021	--	0.00018	0.00020
			Trichloroethene (Mutagenic)	1.6E-08	--	4.0E-08	--	5.6E-08	NA	--	--	--	--
			Trichloroethene (Nonmutagenic)	4.2E-08	--	1.1E-07	--	1.5E-07	CVS, Immune, Developmental	0.0040	--	0.010	0.014
			Vinyl chloride	3.6E-08	--	5.2E-08	--	8.8E-08	Hepatic	0.000029	--	0.000042	0.000071
			1,4-Dioxane	4.4E-07	--	2.7E-08	--	4.6E-07	Hepatic, Urinary	0.00025	--	0.000016	0.00027
			Dibenzo(a,h)anthracene	5.6E-09	--	--	--	5.6E-09	NA	--	--	--	--
			Aldrin	2.3E-08	--	--	--	2.3E-08	Hepatic	0.000079	--	--	0.000079
			delta-BHC	3.2E-09	--	3.4E-08	--	3.8E-08	Hepatic	0.00000011	--	0.0000012	0.0000013
			Dieldrin	6.0E-09	--	1.6E-07	--	1.7E-07	Hepatic	0.000013	--	0.00036	0.00037
			Aluminum	--	--	--	--	--	Nervous	0.00021	--	0.000030	0.00024
			Antimony	--	--	--	--	--	Hematologic	0.00033	--	0.00031	0.00065
			Arsenic	6.9E-07	--	9.7E-08	--	7.8E-07	Dermal, CVS	0.0027	--	0.00038	0.0030
			Cadmium	--	--	--	--	--	Urinary	0.000090	--	0.00025	0.00034
			Chromium	5.9E-07	--	6.6E-06	--	7.2E-06	None Specified	0.00046	--	0.0051	0.0056
			Cobalt	--	--	--	--	--	Thyroid	0.00054	--	0.000031	0.00058
			Cyanide	--	--	--	--	--	Reproductive	0.0031	--	0.00044	0.0036
			Iron	--	--	--	--	--	GS	0.00037	--	0.000052	0.00042
			Lead	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	Nervous	0.00042	--	0.0015	0.0019
			Nickel	--	--	--	--	--	Body Weight	0.000048	--	0.000034	0.000082
			Thallium	--	--	--	--	--	Dermal	0.00097	--	0.00014	0.0011
			Vanadium	--	--	--	--	--	Dermal	0.00010	--	0.00055	0.00065
			Chemical Total	1.9E-06	--	7.2E-06	--	9.2E-06		0.017	--	0.026	0.043
		Exposure Point Total						9.2E-06					0.043
	Exposure Medium Total							9.2E-06					0.043
	Air Irrigation	Baghusrt Drive Site	1,1,1-Trichloroethane	--	--	--	--	--	Hepatic	--	0.00000034	--	0.00000034
			1,1,2-Trichloroethane	--	1.1E-12	--	--	1.1E-12	Respiratory	--	0.00000062	--	0.00000062
			1,1-Dichloroethane	--	6.5E-11	--	--	6.5E-11	NA	--	--	--	--
			1,1-Dichloroethene	--	--	--	--	--	Hepatic	--	0.0000027	--	0.0000027
			1,2-Dichloroethane	--	5.1E-12	--	--	5.1E-12	Nervous	--	4.9E-8	--	4.9E-8
			2-Hexanone	--	--	--	--	--	Nervous	--	6.1E-8	--	6.1E-8
			Benzene	--	6.7E-13	--	--	6.7E-13	Immune	--	5.0E-9	--	5.0E-9
			Bromodichloromethane	--	7.2E-12	--	--	7.2E-12	NA	--	--	--	--
			Chloroform	--	1.2E-11	--	--	1.2E-11	Hepatic	--	9.1E-9	--	9.1E-9
			Methyl tert-butyl ether	--	1.4E-13	--	--	1.4E-13	Hepatic, Urinary, Ocular	--	3.1E-10	--	3.1E-10
			Methylene chloride	--	3.1E-15	--	--	3.1E-15	Hepatic	--	6.0E-10	--	6.0E-10
			Tetrachloroethene	--	7.6E-14	--	--	7.6E-14	Nervous, Ocular	--	1.3E-8	--	1.3E-8
			Trichloroethene (Mutagenic)	--	6.4E-12	--	--	6.4E-12	NA	--	--	--	--
			Trichloroethene (Nonmutagenic)	--	1.3E-11	--	--	1.3E-11	CVS, Immune, Developmental	--	0.0000037	--	0.0000037
			Vinyl chloride	--	9.4E-13	--	--	9.4E-13	Hepatic	--	3.7E-9	--	3.7E-9
			1,4-Dioxane	--	4.1E-13	--	--	4.1E-13	Nervous, Respiratory	--	4.8E-9	--	4.8E-9
			Dibenzo(a,h)anthracene	--	--	--	--	--	NA	--	--	--	--
			Aldrin	--	7.3E-12	--	--	7.3E-12	NA	--	--	--	--
			delta-BHC	--	--	--	--	--	NA	--	--	--	--
			Dieldrin	--	--	--	--	--	NA	--	--	--	--
			Aluminum	--	--	--	--	--	Nervous	--	--	--	--
			Antimony	--	--	--	--	--	NA	--	--	--	--
			Arsenic	--	--	--	--	--	Dermal, CVS	--	--	--	--
			Cadmium	--	--	--	--	--	Urinary	--	--	--	--
			Chromium	--	--	--	--	--	Respiratory	--	--	--	--
			Cobalt	--	--	--	--	--	Respiratory	--	--	--	--
			Cyanide	--	--	--	--	--	Endocrine	--	0.0000037	--	0.0000037
			Iron	--	--	--	--	--	NA	--	--	--	--

TABLE 9.7.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air Irrigation	Baghusrt Drive Site	Lead	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	Nervous	--	--	--	--
			Nickel	--	--	--	--	--	Respiratory	--	--	--	--
			Thallium	--	--	--	--	--	NA	--	--	--	--
			Vanadium	--	--	--	--	--	Respiratory	--	--	--	--
			Chemical Total	--	1.2E-10	--	--	1.2E-10		--	0.000011	--	0.000011
		Exposure Point Total						1.2E-10					0.000011
	Exposure Medium Total							1.2E-10					0.000011
Medium Total								9.2E-06					0.043
Receptor Total							Receptor Risk Total	6.7E-04				Receptor HI Total	31.0

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Body Weight HI	0.087
Total CVS HI	7.5
Total Dermal HI	2.5
Total Developmental HI	6.0
Total Endocrine HI	11.4
Total GS HI	0.73
Total Hematologic HI	0.11
Total Hepatic HI	4.3
Total Immune HI	6.0
Total Nervous HI	2.5
Total None Specified HI	0.44
Total Reproductive HI	0.92
Total Respiratory HI	2.3
Total Thyroid HI	0.71
Total Urinary HI	0.15

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface/Subsurface Soil	Surface/Subsurface Soil	Baghusrt Drive Site	Aluminum	--	--	--	--	--					
			Arsenic	7.1E-05	--	9.9E-06	--	8.1E-05					
			Chromium	1.7E-04	--	1.7E-04	--	3.4E-04					
			Cobalt	--	--	--	--	--					
			Copper	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Manganese	--	--	--	--	--					
			Thallium	--	--	--	--	--					
			Vanadium	--	--	--	--	--					
			Chemical Total	2.4E-04	--	1.8E-04	--	4.2E-04					
		Exposure Point Total						4.2E-04					
	Exposure Medium Total							4.2E-04					
	Air	Baghusrt Drive Site	Aluminum	--	--	--	--	--					
			Arsenic	--	1.7E-08	--	--	1.7E-08					
			Chromium	--	1.1E-06	--	--	1.1E-06					
			Cobalt	--	2.0E-08	--	--	2.0E-08					
			Copper	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Manganese	--	--	--	--	--					
			Thallium	--	--	--	--	--					
			Vanadium	--	--	--	--	--					
			Chemical Total	--	1.1E-06	--	--	1.1E-06					
		Exposure Point Total						1.1E-06					
	Exposure Medium Total							1.1E-06					
Medium Total								4.2E-04					
Groundwater	Groundwater Potable Use	Baghusrt Drive Site	1,1,1-Trichloroethane	--	--	--	--	--					
			1,1,2-Trichloroethane	3.5E-07	--	2.4E-08	--	3.7E-07					
			1,1-Dichloroethane	1.4E-05	--	1.1E-06	--	1.6E-05					
			1,1-Dichloroethene	--	--	--	--	--					
			1,2-Dichloroethane	1.4E-06	--	6.6E-08	--	1.5E-06					
			2-Hexanone	--	--	--	--	--					
			Benzene	3.0E-07	--	4.3E-08	--	3.4E-07					
			Bromodichloromethane	8.8E-07	--	5.8E-08	--	9.3E-07					
			Chloroform	1.1E-06	--	8.9E-08	--	1.1E-06					
			Methyl tert-butyl ether	8.8E-08	--	1.9E-09	--	8.9E-08					
			Methylene chloride	8.6E-08	--	3.0E-09	--	8.9E-08					
			Tetrachloroethene	3.3E-08	--	1.9E-08	--	5.2E-08					
			Trichloroethene (Mutagenic)	7.2E-06	--	1.1E-06	--	8.3E-06					
			Trichloroethene (Nonmutagenic)	9.2E-06	--	1.4E-06	--	1.1E-05					
			Vinyl chloride	4.0E-05	--	2.7E-06	--	4.3E-05					
			1,4-Dioxane	9.5E-05	--	3.2E-07	--	9.6E-05					
			Dibenzo(a,h)anthracene	2.6E-06	--	--	--	2.6E-06					
			Aldrin	5.0E-06	--	--	--	5.0E-06					
			delta-BHC	7.0E-07	--	4.8E-07	--	1.2E-06					
			Dieldrin	1.3E-06	--	2.3E-06	--	3.6E-06					
			Aluminum	--	--	--	--	--					
			Antimony	--	--	--	--	--					
			Arsenic	1.5E-04	--	7.8E-07	--	1.5E-04					
			Cadmium	--	--	--	--	--					
			Chromium	2.7E-04	--	1.0E-04	--	3.7E-04					
			Cobalt	--	--	--	--	--					
			Cyanide	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Lead	--	--	--	--	--					

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA
PAGE 2 OF 4

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater Potable Use	Baghusrt Drive Site	Manganese	--	--	--	--	--					
			Nickel	--	--	--	--	--					
			Thallium	--	--	--	--	--					
			Vanadium	--	--	--	--	--					
			Chemical Total	6.0E-04	--	1.1E-04	--	7.1E-04					
		Exposure Point Total						7.1E-04					
	Exposure Medium Total							7.1E-04					
	Air Potable Use	Baghusrt Drive Site	1,1,1-Trichloroethane	--	--	--	--	--					
			1,1,2-Trichloroethane	--	1.0E-06	--	--	1.0E-06					
			1,1-Dichloroethane	--	4.3E-05	--	--	4.3E-05					
			1,1-Dichloroethene	--	--	--	--	--					
			1,2-Dichloroethane	--	4.4E-06	--	--	4.4E-06					
			2-Hexanone	--	--	--	--	--					
			Benzene	--	4.5E-07	--	--	4.5E-07					
			Bromodichloromethane	--	5.6E-06	--	--	5.6E-06					
			Chloroform	--	8.3E-06	--	--	8.3E-06					
			Methyl tert-butyl ether	--	1.3E-07	--	--	1.3E-07					
			Methylene chloride	--	3.0E-09	--	--	3.0E-09					
			Tetrachloroethene	--	4.4E-08	--	--	4.4E-08					
			Trichloroethene (Mutagenic)	--	5.3E-06	--	--	5.3E-06					
			Trichloroethene (Nonmutagenic)	--	8.2E-06	--	--	8.2E-06					
			Vinyl chloride	--	5.1E-07	--	--	5.1E-07					
			1,4-Dioxane	--	5.1E-05	--	--	5.1E-05					
			Dibenzo(a,h)anthracene	--	--	--	--	--					
			Aldrin	--	1.5E-05	--	--	1.5E-05					
			delta-BHC	--	--	--	--	--					
			Dieldrin	--	--	--	--	--					
			Aluminum	--	--	--	--	--					
			Antimony	--	--	--	--	--					
			Arsenic	--	--	--	--	--					
			Cadmium	--	--	--	--	--					
			Chromium	--	--	--	--	--					
			Cobalt	--	--	--	--	--					
			Cyanide	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Lead	--	--	--	--	--					
			Manganese	--	--	--	--	--					
			Nickel	--	--	--	--	--					
			Thallium	--	--	--	--	--					
			Vanadium	--	--	--	--	--					
			Chemical Total	--	1.4E-04	--	--	1.4E-04					
		Exposure Point Total						1.4E-04					
	Exposure Medium Total							1.4E-04					
Medium Total								8.5E-04					
Groundwater	Groundwater Irrigation	Baghusrt Drive Site	1,1,1-Trichloroethane	--	--	--	--	--					
			1,1,2-Trichloroethane	1.6E-09	--	1.8E-09	--	3.4E-09					
			1,1-Dichloroethane	6.6E-08	--	8.6E-08	--	1.5E-07					
			1,1-Dichloroethene	--	--	--	--	--					
			1,2-Dichloroethane	6.6E-09	--	5.3E-09	--	1.2E-08					
			2-Hexanone	--	--	--	--	--					
			Benzene	1.4E-09	--	3.6E-09	--	5.0E-09					
			Bromodichloromethane	4.0E-09	--	4.1E-09	--	8.1E-09					
			Chloroform	4.8E-09	--	6.9E-09	--	1.2E-08					
			Methyl tert-butyl ether	4.0E-10	--	1.6E-10	--	5.6E-10					

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater Irrigation	Baghusrt Drive Site	Methylene chloride	1.9E-10	--	1.2E-10	--	3.1E-10					
			Tetrachloroethene	1.5E-10	--	1.3E-09	--	1.5E-09					
			Trichloroethene (Mutagenic)	1.6E-08	--	4.0E-08	--	5.6E-08					
			Trichloroethene (Nonmutagenic)	4.2E-08	--	1.1E-07	--	1.5E-07					
			Vinyl chloride	3.6E-08	--	5.2E-08	--	8.8E-08					
			1,4-Dioxane	4.4E-07	--	2.7E-08	--	4.6E-07					
			Dibenzo(a,h)anthracene	5.6E-09	--	--	--	5.6E-09					
			Aldrin	2.3E-08	--	--	--	2.3E-08					
			delta-BHC	3.2E-09	--	3.4E-08	--	3.8E-08					
			Dieldrin	6.0E-09	--	1.6E-07	--	1.7E-07					
			Aluminum	--	--	--	--	--					
			Antimony	--	--	--	--	--					
			Arsenic	6.9E-07	--	9.7E-08	--	7.8E-07					
			Cadmium	--	--	--	--	--					
			Chromium	5.9E-07	--	6.6E-06	--	7.2E-06					
			Cobalt	--	--	--	--	--					
			Cyanide	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Lead	--	--	--	--	--					
			Manganese	--	--	--	--	--					
			Nickel	--	--	--	--	--					
			Thallium	--	--	--	--	--					
			Vanadium	--	--	--	--	--					
			Chemical Total	1.9E-06	--	7.2E-06	--	9.2E-06					
		Exposure Point Total						9.2E-06					
	Exposure Medium Total							9.2E-06					
	Air Irrigation	Baghusrt Drive Site	1,1,1-Trichloroethane	--	--	--	--	--					
			1,1,2-Trichloroethane	--	1.1E-12	--	--	1.1E-12					
			1,1-Dichloroethane	--	6.5E-11	--	--	6.5E-11					
			1,1-Dichloroethene	--	--	--	--	--					
			1,2-Dichloroethane	--	5.1E-12	--	--	5.1E-12					
			2-Hexanone	--	--	--	--	--					
			Benzene	--	6.7E-13	--	--	6.7E-13					
			Bromodichloromethane	--	7.2E-12	--	--	7.2E-12					
			Chloroform	--	1.2E-11	--	--	1.2E-11					
			Methyl tert-butyl ether	--	1.4E-13	--	--	1.4E-13					
			Methylene chloride	--	3.1E-15	--	--	3.1E-15					
			Tetrachloroethene	--	7.6E-14	--	--	7.6E-14					
			Trichloroethene (Mutagenic)	--	6.4E-12	--	--	6.4E-12					
			Trichloroethene (Nonmutagenic)	--	1.3E-11	--	--	1.3E-11					
			Vinyl chloride	--	9.4E-13	--	--	9.4E-13					
			1,4-Dioxane	--	4.1E-13	--	--	4.1E-13					
			Dibenzo(a,h)anthracene	--	--	--	--	--					
			Aldrin	--	7.3E-12	--	--	7.3E-12					
			delta-BHC	--	--	--	--	--					
			Dieldrin	--	--	--	--	--					
			Aluminum	--	--	--	--	--					
			Antimony	--	--	--	--	--					
			Arsenic	--	--	--	--	--					
			Cadmium	--	--	--	--	--					
			Chromium	--	--	--	--	--					
			Cobalt	--	--	--	--	--					
			Cyanide	--	--	--	--	--					
			Iron	--	--	--	--	--					

TABLE 9.8.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air Irrigation	Baghusrt Drive Site	Lead	--	--	--	--	--					
			Manganese	--	--	--	--	--					
			Nickel	--	--	--	--	--					
			Thallium	--	--	--	--	--					
			Vanadium	--	--	--	--	--					
			Chemical Total	--	1.2E-10	--	--	1.2E-10					
		Exposure Point Total						1.2E-10					
	Exposure Medium Total							1.2E-10					
Medium Total								9.2E-06					
Receptor Total							Receptor Risk Total	1.3E-03					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.9.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum	--	--	--	--	--	Nervous	0.054	--	0.0013	0.055
			Arsenic	5.2E-06	--	6.2E-07	--	5.8E-06	Dermal, CVS	0.13	--	0.016	0.15
			Chromium	1.8E-05	--	1.7E-05	--	3.5E-05	None Specified	0.026	--	0.025	0.051
			Cobalt	--	--	--	--	--	Thyroid	0.13	--	0.0031	0.13
			Copper	--	--	--	--	--	GS	0.043	--	0.0010	0.044
			Iron	--	--	--	--	--	GS	0.10	--	0.0024	0.10
			Manganese	--	--	--	--	--	Nervous	0.064	--	0.038	0.10
			Thallium	--	--	--	--	--	Dermal	0.10	--	0.0025	0.11
			Vanadium	--	--	--	--	--	Dermal	0.027	--	0.025	0.053
			Chemical Total	2.3E-05	--	1.8E-05	--	4.1E-05		0.68	--	0.11	0.80
		Exposure Point Total						4.1E-05					0.80
	Exposure Medium Total							4.1E-05					0.80
	Air	Baghurst Drive Site	Aluminum	--	--	--	--	--	Nervous	--	0.000041	--	0.000041
			Arsenic	--	9.6E-11	--	--	9.6E-11	Dermal, CVS	--	0.000017	--	0.000017
			Chromium	--	1.2E-08	--	--	1.2E-08	Respiratory	--	0.0000030	--	0.0000030
			Cobalt	--	1.2E-10	--	--	1.2E-10	Respiratory	--	0.000025	--	0.000025
			Copper	--	--	--	--	--	NA	--	--	--	--
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	Nervous	--	0.00012	--	0.00012
			Thallium	--	--	--	--	--	NA	--	--	--	--
			Vanadium	--	--	--	--	--	Respiratory	--	0.0000053	--	0.0000053
			Chemical Total	--	1.2E-08	--	--	1.2E-08		- -	0.00021	- -	0.00021
		Exposure Point Total						1.2E-08					0.00021
	Exposure Medium Total							1.2E-08					0.00021
Medium Total								4.1E-05					0.80
Surface Water	Surface Water	Intermittent Stream	1,1-Dichloroethane	5.0E-08	--	7.8E-09	--	5.8E-08	Urinary	0.00051	--	0.000080	0.00059
			Dieldrin	4.5E-07	--	1.2E-06	--	1.7E-06	Hepatic	0.0066	--	0.018	0.024
			Heptachlor Epoxide	1.3E-07	--	2.4E-07	--	3.7E-07	Hepatic	0.013	--	0.024	0.037
			Arsenic	6.0E-06	--	1.2E-07	--	6.1E-06	Dermal, CVS	0.16	--	0.0031	0.16
			Chromium	1.7E-06	--	2.6E-06	--	4.3E-06	None Specified	0.0024	--	0.0038	0.0062
			Manganese	--	--	--	--	--	Nervous	0.37	--	0.19	0.56
			Chemical Total	8.3E-06	--	4.2E-06	--	1.2E-05		0.55	--	0.23	0.78
		Exposure Point Total						1.2E-05					0.78
	Exposure Medium Total							1.2E-05					0.78
Medium Total								1.2E-05					0.78
Surface Water	Surface Water	Perkiomen Creek	Arsenic	7.6E-07	--	1.5E-08	--	7.8E-07	Dermal, CVS	0.020	--	0.00039	0.020
			Chemical Total	7.6E-07	--	1.5E-08	--	7.8E-07		0.020	--	0.00039	0.020
		Exposure Point Total						7.8E-07					0.020
	Exposure Medium Total							7.8E-07					0.020
Medium Total								7.8E-07					0.020
Sediment	Sediment	Intermittent Stream	Arsenic	2.2E-06	--	2.7E-07	--	2.5E-06	Dermal, CVS	0.058	--	0.0069	0.065
			Chromium	1.7E-05	--	1.6E-05	--	3.3E-05	None Specified	0.025	--	0.023	0.048
			Cobalt	--	--	--	--	--	Thyroid	0.12	--	0.0028	0.12
			Iron	--	--	--	--	--	GS	0.13	--	0.0030	0.13
			Chemical Total	1.9E-05	--	1.6E-05	--	3.6E-05		0.33	--	0.036	0.37
		Exposure Point Total						3.6E-05					0.37
	Exposure Medium Total							3.6E-05					0.37
Medium Total								3.6E-05					0.37

TABLE 9.9.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Perkiomen Creek	Chromium	1.9E-05	--	1.8E-05	--	3.8E-05	None Specified	0.028	--	0.027	0.055
			Chemical Total	1.9E-05	--	1.8E-05	--	3.8E-05		0.028	--	0.027	0.055
		Exposure Point Total						3.8E-05					0.055
	Exposure Medium Total							3.8E-05					0.055
Medium Total								3.8E-05					0.055
							Receptor Risk Total - Subsurface Soil and Intermittent Stream	8.9E-05				Receptor HI Total - Subsurface Soil and Intermittent Stream	1.9
							Receptor Risk Total - Subsurface Soil and Perkiomen Creek	7.9E-05				Receptor HI Total - Subsurface Soil and Perkiomen Creek	0.87

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total CVS HI	0.39
Total Dermal HI	0.55
Total GS HI	0.28
Total Hepatic HI	0.061
Total Nervous HI	0.72
Total None Specified HI	0.16
Total Respiratory HI	0.000033
Total Thyroid HI	0.25
Total Urinary HI	0.00059

TABLE 9.10.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA
PAGE 1 OF 2

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum	--	--	--	--	--	Nervous	0.0050	--	0.00021	0.0052
			Arsenic	1.6E-06	--	3.4E-07	--	2.0E-06	Dermal, CVS	0.013	--	0.0027	0.015
			Chromium	2.1E-06	--	3.5E-06	--	5.6E-06	None Specified	0.0024	--	0.0041	0.0065
			Cobalt	--	--	--	--	--	Thyroid	0.012	--	0.00051	0.013
			Copper	--	--	--	--	--	GS	0.0041	--	0.00017	0.0042
			Iron	--	--	--	--	--	GS	0.0096	--	0.00040	0.0100
			Manganese	--	--	--	--	--	Nervous	0.0060	--	0.0063	0.012
			Thallium	--	--	--	--	--	Dermal	0.0098	--	0.00041	0.010
			Vanadium	--	--	--	--	--	Dermal	0.0026	--	0.0042	0.0068
			Chemical Total	3.7E-06	--	3.9E-06	--	7.6E-06		0.064	--	0.019	0.083
		Exposure Point Total						7.6E-06					0.083
	Exposure Medium Total							7.6E-06					0.083
	Air	Baghurst Drive Site	Aluminum	--	--	--	--	--	Nervous	--	0.000041	--	0.000041
			Arsenic	--	3.2E-10	--	--	3.2E-10	Dermal, CVS	--	0.000017	--	0.000017
			Chromium	--	1.4E-08	--	--	1.4E-08	Respiratory	--	0.0000030	--	0.0000030
			Cobalt	--	3.9E-10	--	--	3.9E-10	Respiratory	--	0.000025	--	0.000025
			Copper	--	--	--	--	--	NA	--	--	--	--
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	Nervous	--	0.00012	--	0.00012
			Thallium	--	--	--	--	--	NA	--	--	--	--
			Vanadium	--	--	--	--	--	Respiratory	--	0.0000053	--	0.0000053
			Chemical Total	--	1.5E-08	--	--	1.5E-08		- -	0.00021	- -	0.00021
		Exposure Point Total						1.5E-08					0.00021
	Exposure Medium Total							1.5E-08					0.00021
Medium Total								7.6E-06					0.083
Surface Water	Surface Water	Intermittent Stream	1,1-Dichloroethane	1.8E-08	--	1.2E-08	--	3.1E-08	Urinary	0.000057	--	0.000038	0.000095
			Dieldrin	1.7E-07	--	1.9E-06	--	2.1E-06	Hepatic	0.00073	--	0.0084	0.0092
			Heptachlor Epoxide	4.9E-08	--	3.8E-07	--	4.3E-07	Hepatic	0.0014	--	0.011	0.013
			Arsenic	2.2E-06	--	1.9E-07	--	2.4E-06	Dermal, CVS	0.017	--	0.0015	0.019
			Chromium	2.3E-07	--	1.6E-06	--	1.8E-06	None Specified	0.00027	--	0.0018	0.0021
			Manganese	--	--	--	--	--	Nervous	0.042	--	0.09	0.13
			Chemical Total	2.7E-06	--	4.1E-06	--	6.7E-06		0.061	--	0.11	0.17
		Exposure Point Total						6.7E-06					0.17
	Exposure Medium Total							6.7E-06					0.17
Medium Total								6.7E-06					0.17
Surface Water	Surface Water	Perkiomen Creek	Arsenic	2.8E-07	--	2.4E-08	--	3.1E-07	Dermal, CVS	0.0022	--	0.00019	0.0024
			Chemical Total	2.8E-07	--	2.4E-08	--	3.1E-07		0.0022	--	0.00019	0.0024
		Exposure Point Total						3.1E-07					0.0024
	Exposure Medium Total							3.1E-07					0.0024
Medium Total								3.1E-07					0.0024
Sediment	Sediment	Intermittent Stream	Arsenic	7.0E-07	--	1.5E-07	--	8.5E-07	Dermal, CVS	0.0054	--	0.0012	0.0066
			Chromium	2.0E-06	--	3.4E-06	--	5.3E-06	None Specified	0.0023	--	0.0039	0.0062
			Cobalt	--	--	--	--	--	Thyroid	0.011	--	0.00047	0.012
			Iron	--	--	--	--	--	GS	0.012	--	0.00050	0.012
			Chemical Total	2.7E-06	--	3.5E-06	--	6.2E-06		0.031	--	0.0060	0.037
		Exposure Point Total						6.2E-06					0.037
	Exposure Medium Total							6.2E-06					0.037
Medium Total								6.2E-06					0.037

TABLE 9.10.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Perkiomen Creek	Chromium	2.3E-06	--	3.8E-06	--	6.1E-06	None Specified	0.0027	--	0.0045	0.0072
			Chemical Total	2.3E-06	--	3.8E-06	--	6.1E-06		0.0027	--	0.0045	0.0072
		Exposure Point Total						6.1E-06					0.0072
	Exposure Medium Total							6.1E-06					0.0072
Medium Total								6.1E-06					0.0072
Receptor Total				Receptor Risk Total - Subsurface Soil and Intermittent Stream				2.1E-05	Receptor HI Total - Subsurface Soil and Intermittent Stream				0.29
Receptor Total				Receptor Risk Total - Subsurface Soil and Perkiomen Creek				1.4E-05	Receptor HI Total - Subsurface Soil and Perkiomen Creek				0.093

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.11.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum	- -	--	- -	--	- -					
			Arsenic	6.8E-06	--	9.6E-07	--	7.8E-06					
			Chromium	2.0E-05	--	2.0E-05	--	4.0E-05					
			Cobalt	- -	--	- -	--	- -					
			Copper	- -	--	- -	--	- -					
			Iron	- -	--	- -	--	- -					
			Manganese	- -	--	- -	--	- -					
			Thallium	- -	--	- -	--	- -					
			Vanadium	- -	--	- -	--	- -					
			Chemical Total	2.7E-05	--	2.1E-05	--	4.8E-05					
		Exposure Point Total						4.8E-05					
	Exposure Medium Total							4.8E-05					
	Air	Baghurst Drive Site	Aluminum	--	- -	--	--	- -					
			Arsenic	--	4.2E-10	--	--	4.2E-10					
			Chromium	--	2.6E-08	--	--	2.6E-08					
			Cobalt	--	5.0E-10	--	--	5.0E-10					
			Copper	--	- -	--	--	- -					
			Iron	--	- -	--	--	- -					
			Manganese	--	- -	--	--	- -					
			Thallium	--	- -	--	--	- -					
			Vanadium	--	- -	--	--	- -					
			Chemical Total	--	2.7E-08	--	--	2.7E-08					
		Exposure Point Total						2.7E-08					
	Exposure Medium Total							2.7E-08					
Medium Total								4.8E-05					
Surface Water	Surface Water	Intermittent Stream	1,1-Dichloroethane	6.8E-08	--	2.0E-08	--	8.8E-08					
			Dieldrin	6.2E-07	--	3.1E-06	--	3.8E-06					
			Heptachlor Epoxide	1.8E-07	--	6.2E-07	--	8.0E-07					
			Arsenic	8.2E-06	--	3.1E-07	--	8.5E-06					
			Chromium	1.9E-06	--	4.2E-06	--	6.1E-06					
			Manganese	- -	--	- -	--	- -					
			Chemical Total	1.1E-05	--	8.3E-06	--	1.9E-05					
		Exposure Point Total						1.9E-05					
	Exposure Medium Total							1.9E-05					
Medium Total								1.9E-05					
Surface Water	Surface Water	Perkiomen Creek	Arsenic	1.0E-06	--	3.9E-08	--	1.1E-06					
			Chemical Total	1.0E-06	--	3.9E-08	--	1.1E-06					
		Exposure Point Total						1.1E-06					
	Exposure Medium Total							1.1E-06					
Medium Total								1.1E-06					
Sediment	Sediment	Intermittent Stream	Arsenic	2.9E-06	--	4.1E-07	--	3.4E-06					
			Chromium	1.9E-05	--	1.9E-05	--	3.8E-05					
			Cobalt	- -	--	- -	--	- -					
			Iron	- -	--	- -	--	- -					
			Chemical Total	2.2E-05	--	2.0E-05	--	4.2E-05					
		Exposure Point Total						4.2E-05					
	Exposure Medium Total							4.2E-05					
Medium Total								4.2E-05					

TABLE 9.11.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Perkiomen Creek	Chromium	2.2E-05	--	2.2E-05	--	4.4E-05					
			Chemical Total	2.2E-05	--	2.2E-05	--	4.4E-05					
		Exposure Point Total						4.4E-05					
	Exposure Medium Total							4.4E-05					
Medium Total								4.4E-05					
Receptor Risk Total - Subsurface Soil and Intermittent Stream								1.1E-04					
Receptor Risk Total - Subsurface Soil and Perkiomen Creek								9.3E-05					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.12 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum	--	--	--	--	--	Nervous	0.0046	--	0.00034	0.0049
			Arsenic	7.4E-07	--	2.8E-07	--	1.0E-06	Dermal, CVS	0.011	--	0.0043	0.016
			Chromium	1.4E-06	--	4.3E-06	--	5.7E-06	None Specified	0.0022	--	0.0066	0.0089
			Cobalt	--	--	--	--	--	Thyroid	0.011	--	0.00083	0.012
			Copper	--	--	--	--	--	GS	0.0037	--	0.00028	0.0040
			Iron	--	--	--	--	--	GS	0.0087	--	0.00065	0.0093
			Manganese	--	--	--	--	--	Nervous	0.0054	--	0.010	0.016
			Thallium	--	--	--	--	--	Dermal	0.0089	--	0.00067	0.0095
			Vanadium	--	--	--	--	--	Dermal	0.0023	--	0.0068	0.0091
			Chemical Total	2.2E-06	--	4.5E-06	--	6.7E-06		0.058	--	0.031	0.089
		Exposure Point Total						6.7E-06					0.089
	Exposure Medium Total							6.7E-06					0.089
	Air	Baghurst Drive Site	Aluminum	--	--	--	--	--	Nervous	--	0.000021	--	0.000021
			Arsenic	--	8.0E-11	--	--	8.0E-11	Dermal, CVS	--	0.0000087	--	0.0000087
			Chromium	--	5.4E-09	--	--	5.4E-09	Respiratory	--	0.0000015	--	0.0000015
			Cobalt	--	9.6E-11	--	--	9.6E-11	Respiratory	--	0.000012	--	0.000012
			Copper	--	--	--	--	--	NA	--	--	--	--
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	Nervous	--	0.000059	--	0.000059
			Thallium	--	--	--	--	--	NA	--	--	--	--
			Vanadium	--	--	--	--	--	Respiratory	--	0.0000027	--	0.0000027
			Chemical Total	--	5.6E-09	--	--	5.6E-09		- -	0.00011	- -	0.00011
		Exposure Point Total						5.6E-09					0.00011
	Exposure Medium Total							5.6E-09					0.00011
Medium Total								6.7E-06					0.089
Surface Water	Surface Water	Intermittent Stream	1,1-Dichloroethane	8.4E-09	--	3.5E-09	--	1.2E-08	Urinary	0.000051	--	0.000021	0.000073
			Dieldrin	7.6E-08	--	5.4E-07	--	6.2E-07	Hepatic	0.00066	--	0.0048	0.0054
			Heptachlor Epoxide	2.2E-08	--	1.1E-07	--	1.3E-07	Hepatic	0.0013	--	0.0064	0.0077
			Arsenic	1.0E-06	--	5.3E-08	--	1.1E-06	Dermal, CVS	0.016	--	0.00083	0.016
			Chromium	1.6E-07	--	6.6E-07	--	8.2E-07	None Specified	0.00024	--	0.0010	0.0013
			Manganese	--	--	--	--	--	Nervous	0.038	--	0.050	0.09
			Chemical Total	1.3E-06	--	1.4E-06	--	2.6E-06		0.056	--	0.063	0.12
		Exposure Point Total						2.6E-06					0.12
	Exposure Medium Total							2.6E-06					0.12
Medium Total								2.6E-06					0.12
Sediment	Sediment	Intermittent Stream	Arsenic	3.2E-07	--	1.2E-07	--	4.4E-07	Dermal, CVS	0.0050	--	0.0019	0.0068
			Chromium	1.4E-06	--	4.1E-06	--	5.4E-06	None Specified	0.0021	--	0.0063	0.0084
			Cobalt	--	--	--	--	--	Thyroid	0.010	--	0.00076	0.011
			Iron	--	--	--	--	--	GS	0.011	--	0.00081	0.012
			Chemical Total	1.7E-06	--	4.2E-06	--	5.8E-06		0.028	--	0.0097	0.038
		Exposure Point Total						5.8E-06					0.038
	Exposure Medium Total							5.8E-06					0.038
Medium Total								5.8E-06					0.038
Receptor Total							Receptor Risk Total	1.5E-05				Receptor HI Total	0.25

TABLE 9.12.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total CVS HI	0.039
Total Dermal HI	0.058
Total GS HI	0.025
Total Hepatic HI	0.013
Total Nervous HI	0.11
Total None Specified HI	0.019
Total Respiratory HI	0.000017
Total Thyroid HI	0.023
Total Urinary HI	0.000073

TABLE 9.13.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Baghurst Drive Site	1,1,1-Trichloroethane	See Table 9.15.RME for Cancer Risks					Body Weight	0.10	–	0.016	0.12
			1,1,2-Trichloroethane						Hematologic, Immune	0.0059	–	0.00038	0.0063
			1,1-Dichloroethane						Urinary	0.049	–	0.0034	0.053
			1,1-Dichloroethene						Hepatic	1.2	–	0.14	1.4
			1,2-Dichloroethane						Urinary	0.010	–	0.00044	0.011
			2-Hexanone						Nervous	0.12	–	0.0044	0.12
			Benzene						Immune	0.0053	–	0.00070	0.0060
			Bromodichloromethane						Urinary	0.0027	–	0.00017	0.0029
			Chloroform						Hepatic	0.013	–	0.0010	0.014
			Methyl tert-butyl ether						NA	--	–	--	–
			Methylene chloride						Hepatic	0.0090	–	0.00030	0.0093
			Tetrachloroethene						Nervous, Ocular	0.010	–	0.0053	0.016
			Trichloroethene (Mutagenic)						NA	--	–	--	–
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	1.9	–	0.28	2.2
			Vinyl chloride						Hepatic	0.014	–	0.00096	0.015
			1,4-Dioxane						Hepatic, Urinary	0.12	–	0.00039	0.12
			Dibenzo(a,h)anthracene						NA	--	–	--	–
			Aldrin						Hepatic	0.038	–	--	0.038
			delta-BHC						Hepatic	0.000054	–	0.000035	0.000088
			Dieldrin						Hepatic	0.0064	–	0.010	0.017
			Aluminum						Nervous	0.10	–	0.00046	0.10
			Antimony						Hematologic	0.16	–	0.0048	0.17
			Arsenic						Dermal, CVS	1.3	–	0.0057	1.3
			Cadmium						Urinary	0.044	–	0.0039	0.048
			Chromium						None Specified	0.22	–	0.078	0.30
			Cobalt						Thyroid	0.26	–	0.00047	0.26
			Cyanide						Reproductive	1.5	–	0.0067	1.5
			Iron						GS	0.18	–	0.00079	0.18
			Lead						NA	--	–	--	–
			Manganese						Nervous	0.20	–	0.022	0.22
			Nickel						Body Weight	0.023	–	0.00051	0.024
			Thallium						Dermal	0.47	–	0.0021	0.47
			Vanadium						Dermal	0.049	–	0.0083	0.058
			Chemical Total							8.2	–	0.60	8.8
		Exposure Point Total											8.8
	Exposure Medium Total												8.8
Medium Total													8.8
Receptor Total												Receptor HI Total	8.8

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Body Weight HI	0.14
Total CVS HI	3.5
Total Dermal HI	1.8
Total Developmental HI	2.2
Total GS HI	0.18
Total Hematologic HI	0.17
Total Hepatic HI	1.6
Total Immune HI	2.2
Total Nervous HI	0.47
Total None Specified HI	0.30
Total Reproductive HI	1.5
Total Thyroid HI	0.26
Total Urinary HI	0.24

TABLE 9.14.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Baghurst Drive Site	1,1,1-Trichloroethane	See Table 9.15.RME for Cancer Risks					Body Weight	0.061	–	0.011	0.072
			1,1,2-Trichloroethane						Hematologic, Immune	0.0036	–	0.00025	0.0038
			1,1-Dichloroethane						Urinary	0.030	–	0.0023	0.032
			1,1-Dichloroethene						Hepatic	0.74	–	0.096	0.83
			1,2-Dichloroethane						Urinary	0.0061	–	0.00029	0.0064
			2-Hexanone						Nervous	0.072	–	0.0029	0.075
			Benzene						Immune	0.0032	–	0.00048	0.0036
			Bromodichloromethane						Urinary	0.0016	–	0.00011	0.0018
			Chloroform						Hepatic	0.0079	–	0.00070	0.0086
			Methyl tert-butyl ether						NA	--	–	--	–
			Methylene chloride						Hepatic	0.0054	–	0.00020	0.0056
			Tetrachloroethene						Nervous, Ocular	0.0061	–	0.0035	0.0097
			Trichloroethene (Mutagenic)						NA	--	–	--	–
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	1.2	–	0.19	1.3
			Vinyl chloride						Hepatic	0.0085	–	0.00066	0.0092
			1,4-Dioxane						Hepatic, Urinary	0.074	–	0.00026	0.075
			Dibenzo(a,h)anthracene						NA	--	–	--	–
			Aldrin						Hepatic	0.023	–	--	0.023
			delta-BHC						Hepatic	0.000032	–	0.000023	0.000055
			Dieldrin						Hepatic	0.0038	–	0.0069	0.011
			Aluminum						Nervous	0.063	–	0.00035	0.063
			Antimony						Hematologic	0.097	–	0.0036	0.10
			Arsenic						Dermal, CVS	0.78	–	0.0043	0.78
			Cadmium						Urinary	0.026	–	0.0029	0.029
			Chromium						None Specified	0.13	–	0.059	0.19
			Cobalt						Thyroid	0.16	–	0.00035	0.16
			Cyanide						Reproductive	0.91	–	0.0051	0.91
			Iron						GS	0.11	–	0.00060	0.11
			Lead						NA	--	–	--	–
			Manganese						Nervous	0.12	–	0.017	0.14
			Nickel						Body Weight	0.014	–	0.00039	0.014
			Thallium						Dermal	0.28	–	0.0016	0.28
			Vanadium						Dermal	0.030	–	0.0064	0.036
			Chemical Total							4.9	–	0.41	5.3
		Exposure Point Total											5.3
	Exposure Medium Total												5.3
	Air	Baghurst Drive Site	1,1,1-Trichloroethane						Hepatic	--	0.39	--	0.39
			1,1,2-Trichloroethane						Respiratory	--	1.1	--	1.1
			1,1-Dichloroethane						NA	--	–	--	–
			1,1-Dichloroethene						Hepatic	--	3.0	--	3.0
			1,2-Dichloroethane						Nervous	--	0.084	--	0.084
			2-Hexanone						Nervous	--	0.19	--	0.19
			Benzene						Immune	--	0.0068	--	0.0068
			Bromodichloromethane						NA	--	–	--	–
			Chloroform						Hepatic	--	0.013	--	0.013
			Methyl tert-butyl ether						Hepatic, Urinary, Ocular	--	0.00061	--	0.00061
			Methylene chloride						Hepatic	--	0.00086	--	0.00086
			Tetrachloroethene						Nervous, Ocular	--	0.015	--	0.015
			Trichloroethene (Mutagenic)						NA	--	–	--	–
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	--	4.7	--	4.7
			Vinyl chloride						Hepatic	--	0.0041	--	0.0041
			1,4-Dioxane						Nervous, Respiratory	--	1.2	--	1.2
			Dibenzo(a,h)anthracene						NA	--	–	--	–
			Aldrin						NA	--	–	--	–
			delta-BHC						NA	--	–	--	–
			Dieldrin						NA	--	–	--	–
			Aluminum						Nervous	--	–	--	–
			Antimony						NA	--	–	--	–
			Arsenic						Dermal, CVS	--	–	--	–
			Cadmium						Urinary	--	–	--	–
			Chromium						Respiratory	--	–	--	–
			Cobalt						Respiratory	--	–	--	–
			Cyanide						Endocrine	--	11.4	--	11.4
			Iron						NA	--	–	--	–
			Lead						NA	--	–	--	–

TABLE 9.14.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Baghurst Drive Site	Manganese						Nervous	--	--	--	--
			Nickel						Respiratory	--	--	--	--
			Thallium						NA	--	--	--	--
			Vanadium						Respiratory	--	--	--	--
			Chemical Total							- -	22.1	- -	22.1
		Exposure Point Total											22.1
	Exposure Medium Total												22.1
Medium Total													27.4
Receptor Total												Receptor HI Total	27.4

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Body Weight HI	0.086
Total CVS HI	6.8
Total Dermal HI	1.1
Total Developmental HI	6.0
Total Endocrine HI	11.4
Total GS HI	0.11
Total Hematologic HI	0.10
Total Hepatic HI	4.3
Total Immune HI	6.0
Total Nervous HI	1.8
Total None Specified HI	0.19
Total Reproductive HI	0.91
Total Respiratory HI	2.3
Total Thyroid HI	0.16
Total Urinary HI	0.14

TABLE 9.15.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Baghurst Drive Site	1,1,1-Trichloroethane	- -	--	- -	--	- -	See Tables 9.13.RME and 9.14.RME for Hazard Indices				
			1,1,2-Trichloroethane	3.5E-07	--	2.4E-08	--	3.7E-07					
			1,1-Dichloroethane	1.4E-05	--	1.1E-06	--	1.6E-05					
			1,1-Dichloroethene	- -	--	- -	--	- -					
			1,2-Dichloroethane	1.4E-06	--	6.6E-08	--	1.5E-06					
			2-Hexanone	- -	--	- -	--	- -					
			Benzene	3.0E-07	--	4.3E-08	--	3.4E-07					
			Bromodichloromethane	8.8E-07	--	5.8E-08	--	9.3E-07					
			Chloroform	1.1E-06	--	8.9E-08	--	1.1E-06					
			Methyl tert-butyl ether	8.8E-08	--	1.9E-09	--	8.9E-08					
			Methylene chloride	8.6E-08	--	3.0E-09	--	8.9E-08					
			Tetrachloroethene	3.3E-08	--	1.9E-08	--	5.2E-08					
			Trichloroethene (Mutagenic)	7.2E-06	--	1.1E-06	--	8.3E-06					
			Trichloroethene (Nonmutagenic)	9.2E-06	--	1.4E-06	--	1.1E-05					
			Vinyl chloride	4.0E-05	--	2.7E-06	--	4.3E-05					
			1,4-Dioxane	9.5E-05	--	3.2E-07	--	9.6E-05					
			Dibenzo(a,h)anthracene	2.6E-06	--	- -	--	2.6E-06					
			Aldrin	5.0E-06	--	- -	--	5.0E-06					
			delta-BHC	7.0E-07	--	4.8E-07	--	1.2E-06					
			Dieldrin	1.3E-06	--	2.3E-06	--	3.6E-06					
			Aluminum	- -	--	- -	--	- -					
			Antimony	- -	--	- -	--	- -					
			Arsenic	1.5E-04	--	7.8E-07	--	1.5E-04					
			Cadmium	- -	--	- -	--	- -					
			Chromium	2.7E-04	--	1.0E-04	--	3.7E-04					
			Cobalt	- -	--	- -	--	- -					
			Cyanide	- -	--	- -	--	- -					
			Iron	- -	--	- -	--	- -					
			Lead	- -	--	- -	--	- -					
			Manganese	- -	--	- -	--	- -					
			Nickel	- -	--	- -	--	- -					
			Thallium	- -	--	- -	--	- -					
			Vanadium	- -	--	- -	--	- -					
			Chemical Total	6.0E-04	--	1.1E-04	--	7.1E-04					
		Exposure Point Total						7.1E-04					
	Exposure Medium Total							7.1E-04					
	Air	Baghurst Drive Site	1,1,1-Trichloroethane	--	- -	–	--	- -					
			1,1,2-Trichloroethane	--	1.0E-06	–	--	1.0E-06					
			1,1-Dichloroethane	--	4.3E-05	–	--	4.3E-05					
			1,1-Dichloroethene	--	- -	–	--	- -					
			1,2-Dichloroethane	--	4.4E-06	–	--	4.4E-06					
			2-Hexanone	--	- -	–	--	- -					
			Benzene	--	4.5E-07	–	--	4.5E-07					
			Bromodichloromethane	--	5.6E-06	–	--	5.6E-06					
			Chloroform	--	8.3E-06	–	--	8.3E-06					
			Methyl tert-butyl ether	--	1.3E-07	–	--	1.3E-07					
			Methylene chloride	--	3.0E-09	–	--	3.0E-09					
			Tetrachloroethene	--	4.4E-08	–	--	4.4E-08					
			Trichloroethene (Mutagenic)	--	5.3E-06	–	--	5.3E-06					
			Trichloroethene (Nonmutagenic)	--	8.2E-06	–	--	8.2E-06					
			Vinyl chloride	--	5.1E-07	–	--	5.1E-07					
			1,4-Dioxane	--	5.1E-05	–	--	5.1E-05					
			Dibenzo(a,h)anthracene	--	- -	–	--	- -					
			Aldrin	--	1.5E-05	–	--	1.5E-05					
			delta-BHC	--	- -	–	--	- -					
			Dieldrin	--	- -	–	--	- -					
			Aluminum	--	- -	–	--	- -					
			Antimony	--	- -	–	--	- -					
			Arsenic	--	- -	–	--	- -					
			Cadmium	--	- -	–	--	- -					
			Chromium	--	- -	–	--	- -					
			Cobalt	--	- -	–	--	- -					
			Cyanide	--	- -	–	--	- -					
			Iron	--	- -	–	--	- -					
			Lead	--	- -	–	--	- -					

TABLE 9.15.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Baghurst Drive Site	Manganese	--	--	--	--	--					
			Nickel	--	--	--	--	--					
			Thallium	--	--	--	--	--					
			Vanadium	--	--	--	--	--					
			Chemical Total	--	1.4E-04	--	--	1.4E-04					
		Exposure Point Total						1.4E-04					
	Exposure Medium Total							1.4E-04					
Medium Total								8.5E-04					
Receptor Total							Receptor Risk Total	8.5E-04					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.16.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

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

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum	See Table 9.18.RME for Cancer Risks					Nervous	0.36	–	0.0086	0.37
			Arsenic						Dermal, CVS	0.91	–	0.11	1.0
			Chromium						None Specified	0.17	–	0.17	0.34
			Cobalt						Thyroid	0.87	–	0.021	0.89
			Copper						GS	0.29	–	0.0069	0.30
			Iron						GS	0.69	–	0.016	0.70
			Manganese						Nervous	0.43	–	0.26	0.68
			Thallium						Dermal	0.70	–	0.017	0.72
			Vanadium						Dermal	0.18	–	0.17	0.35
			Chemical Total							4.6	–	0.77	5.4
		Exposure Point Total											5.4
	Exposure Medium Total												5.4
	Air	Baghurst Drive Site	Aluminum						Nervous	--	0.0017	--	0.0017
			Arsenic						Dermal, CVS	--	0.00070	--	0.00070
			Chromium						Respiratory	--	0.00012	--	0.00012
			Cobalt						Respiratory	--	0.0010	--	0.0010
			Copper						NA	--	–	--	–
			Iron						NA	--	–	--	–
			Manganese						Nervous	--	0.0048	--	0.0048
			Thallium						NA	--	–	--	–
			Vanadium						Respiratory	--	0.00021	--	0.00021
			Chemical Total							- -	0.0085	- -	0.0085
		Exposure Point Total											0.0085
	Exposure Medium Total												0.0085
Medium Total													5.4
Groundwater	Groundwater	Baghurst Drive Site	1,1,1-Trichloroethane						Body Weight	0.10	–	0.016	0.12
			1,1,2-Trichloroethane						Hematologic, Immune	0.0059	–	0.00038	0.0063
			1,1-Dichloroethane						Urinary	0.049	–	0.0034	0.053
			1,1-Dichloroethene						Hepatic	1.2	–	0.14	1.4
			1,2-Dichloroethane						Urinary	0.010	–	0.00044	0.011
			2-Hexanone						Nervous	0.12	–	0.0044	0.12
			Benzene						Immune	0.0053	–	0.00070	0.0060
			Bromodichloromethane						Urinary	0.0027	–	0.00017	0.0029
			Chloroform						Hepatic	0.013	–	0.0010	0.014
			Methyl tert-butyl ether						NA	--	–	--	–
			Methylene chloride						Hepatic	0.0090	–	0.00030	0.0093
			Tetrachloroethene						Nervous, Ocular	0.010	–	0.0053	0.016
			Trichloroethene (Mutagenic)						NA	--	–	--	–
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	1.9	–	0.28	2.2
			Vinyl chloride						Hepatic	0.014	–	0.00096	0.015
			1,4-Dioxane						Hepatic, Urinary	0.12	–	0.00039	0.12
			Dibenzo(a,h)anthracene						NA	--	–	--	–
			Aldrin						Hepatic	0.038	–	--	0.038
			delta-BHC						Hepatic	0.000054	–	0.000035	0.000088
			Dieldrin						Hepatic	0.0064	–	0.010	0.017
			Aluminum						Nervous	0.10	–	0.00046	0.10
			Antimony						Hematologic	0.16	–	0.0048	0.17
			Arsenic						Dermal, CVS	1.3	–	0.0057	1.3
			Cadmium						Urinary	0.044	–	0.0039	0.048
			Chromium						None Specified	0.22	–	0.078	0.30
			Cobalt						Thyroid	0.26	–	0.00047	0.26
			Cyanide						Reproductive	1.5	–	0.0067	1.5
			Iron						GS	0.18	–	0.00079	0.18
			Lead						NA	--	–	--	–
			Manganese						Nervous	0.20	–	0.022	0.22
			Nickel						Body Weight	0.023	–	0.00051	0.024
			Thallium						Dermal	0.47	–	0.0021	0.47
			Vanadium						Dermal	0.049	–	0.0083	0.058
			Chemical Total							8.2	–	0.60	8.8
		Exposure Point Total											8.8
	Exposure Medium Total												8.8
Medium Total													8.8
Receptor Total												Receptor HI Total	14.2

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.16.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

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

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
												Total Body Weight HI	0.14
												Total CVS HI	4.5
												Total Dermal HI	3.9
												Total Developmental HI	2.2
												Total GS HI	1.2
												Total Hematologic HI	0.17
												Total Hepatic HI	1.6
												Total Immune HI	2.2
												Total Nervous HI	1.5
												Total None Specified HI	0.64
												Total Reproductive HI	1.5
												Total Respiratory HI	0.0013
												Total Thyroid HI	1.2
												Total Urinary HI	0.24

TABLE 9.17.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum	See Table 9.18.RME for Cancer Risks					Nervous	0.034	–	0.0014	0.035
			Arsenic						Dermal, CVS	0.085	–	0.018	0.10
			Chromium						None Specified	0.016	–	0.028	0.044
			Cobalt						Thyroid	0.082	–	0.0034	0.085
			Copper						GS	0.027	–	0.0012	0.029
			Iron						GS	0.064	–	0.0027	0.067
			Manganese						Nervous	0.040	–	0.043	0.083
			Thallium						Dermal	0.066	–	0.0028	0.068
			Vanadium						Dermal	0.017	–	0.028	0.045
			Chemical Total							0.43	–	0.13	0.56
		Exposure Point Total											0.56
	Exposure Medium Total												0.56
	Air	Baghurst Drive Site	Aluminum						Nervous	--	0.0017	--	0.0017
			Arsenic						Dermal, CVS	--	0.00070	--	0.00070
			Chromium						Respiratory	--	0.00012	--	0.00012
			Cobalt						Respiratory	--	0.0010	--	0.0010
			Copper						NA	--	–	--	–
			Iron						NA	--	–	--	–
			Manganese						Nervous	--	0.0048	--	0.0048
			Thallium						NA	--	–	--	–
			Vanadium						Respiratory	--	0.00021	--	0.00021
			Chemical Total							- -	0.0085	- -	0.0085
		Exposure Point Total											0.0085
	Exposure Medium Total												0.0085
Medium Total													0.57
Groundwater	Groundwater	Baghurst Drive Site	1,1,1-Trichloroethane						Body Weight	0.061	–	0.011	0.072
			1,1,2-Trichloroethane						Hematologic, Immune	0.0036	–	0.00025	0.0038
			1,1-Dichloroethane						Urinary	0.030	–	0.0023	0.032
			1,1-Dichloroethene						Hepatic	0.74	–	0.096	0.83
			1,2-Dichloroethane						Urinary	0.0061	–	0.00029	0.0064
			2-Hexanone						Nervous	0.072	–	0.0029	0.075
			Benzene						Immune	0.0032	–	0.00048	0.0036
			Bromodichloromethane						Urinary	0.0016	–	0.00011	0.0018
			Chloroform						Hepatic	0.0079	–	0.00070	0.0086
			Methyl tert-butyl ether						NA	--	–	--	–
			Methylene chloride						Hepatic	0.0054	–	0.00020	0.0056
			Tetrachloroethene						Nervous, Ocular	0.0061	–	0.0035	0.0097
			Trichloroethene (Mutagenic)						NA	--	–	--	–
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	1.2	–	0.19	1.3
			Vinyl chloride						Hepatic	0.0085	–	0.00066	0.0092
			1,4-Dioxane						Hepatic, Urinary	0.074	–	0.00026	0.075
			Dibenzo(a,h)anthracene						NA	--	–	--	–
			Aldrin						Hepatic	0.023	–	--	0.023
			delta-BHC						Hepatic	0.000032	–	0.000023	0.000055
			Dieldrin						Hepatic	0.0038	–	0.0069	0.011
			Aluminum						Nervous	0.063	–	0.00035	0.063
			Antimony						Hematologic	0.097	–	0.0036	0.10
			Arsenic						Dermal, CVS	0.78	–	0.0043	0.78
			Cadmium						Urinary	0.026	–	0.0029	0.029
			Chromium						None Specified	0.13	–	0.059	0.19
			Cobalt						Thyroid	0.16	–	0.00035	0.16
			Cyanide						Reproductive	0.91	–	0.0051	0.91
			Iron						GS	0.11	–	0.00060	0.11
			Lead						NA	--	–	--	–
			Manganese						Nervous	0.12	–	0.017	0.14
			Nickel						Body Weight	0.014	–	0.00039	0.014
			Thallium						Dermal	0.28	–	0.0016	0.28
			Vanadium						Dermal	0.030	–	0.0064	0.036
			Chemical Total							4.9	–	0.41	5.3
		Exposure Point Total											5.3
	Exposure Medium Total												5.3

TABLE 9.17.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Baghurst Drive Site	1,1,1-Trichloroethane						Hepatic	--	0.39	--	0.39
			1,1,2-Trichloroethane						Respiratory	--	1.1	--	1.1
			1,1-Dichloroethane						NA	--	–	--	–
			1,1-Dichloroethene						Hepatic	--	3.0	--	3.0
			1,2-Dichloroethane						Nervous	--	0.084	--	0.084
			2-Hexanone						Nervous	--	0.19	--	0.19
			Benzene						Immune	--	0.0068	--	0.0068
			Bromodichloromethane						NA	--	–	--	–
			Chloroform						Hepatic	--	0.013	--	0.013
			Methyl tert-butyl ether						Hepatic, Urinary, Ocular	--	0.00061	--	0.00061
			Methylene chloride						Hepatic	--	0.00086	--	0.00086
			Tetrachloroethene						Nervous, Ocular	--	0.015	--	0.015
			Trichloroethene (Mutagenic)						NA	--	–	--	–
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	--	4.7	--	4.7
			Vinyl chloride						Hepatic	--	0.0041	--	0.0041
			1,4-Dioxane						Nervous, Respiratory	--	1.2	--	1.2
			Dibenzo(a,h)anthracene						NA	--	–	--	–
			Aldrin						NA	--	–	--	–
			delta-BHC						NA	--	–	--	–
			Dieldrin						NA	--	–	--	–
			Aluminum						Nervous	--	–	--	–
			Antimony						NA	--	–	--	–
			Arsenic						Dermal, CVS	--	–	--	–
			Cadmium						Urinary	--	–	--	–
			Chromium						Respiratory	--	–	--	–
			Cobalt						Respiratory	--	–	--	–
			Cyanide						Endocrine	--	11.4	--	11.4
			Iron						NA	--	–	--	–
			Lead						NA	--	–	--	–
			Manganese						Nervous	--	–	--	–
			Nickel						Respiratory	--	–	--	–
			Thallium						NA	--	–	--	–
			Vanadium						Respiratory	--	–	--	–
			Chemical Total							- -	22.1	- -	22.1
		Exposure Point Total											22.1
	Exposure Medium Total												22.1
Medium Total													27.4
Receptor Total												Receptor HI Total	28.0

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Body Weight HI	0.086
Total CVS HI	6.9
Total Dermal HI	1.3
Total Developmental HI	6.0
Total Endocrine HI	11.4
Total GS HI	0.20
Total Hematologic HI	0.10
Total Hepatic HI	4.3
Total Immune HI	6.0
Total Nervous HI	1.9
Total None Specified HI	0.24
Total Reproductive HI	0.91
Total Respiratory HI	2.3
Total Thyroid HI	0.24
Total Urinary HI	0.14

TABLE 9.18.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum	- -	--	- -	--	- -	See Tables 9.16.RME and 9.17.RME for Hazard Indices				
			Arsenic	4.6E-05	--	6.5E-06	--	5.2E-05					
			Chromium	1.3E-04	--	1.4E-04	--	2.7E-04					
			Cobalt	- -	--	- -	--	- -					
			Copper	- -	--	- -	--	- -					
			Iron	- -	--	- -	--	- -					
			Manganese	- -	--	- -	--	- -					
			Thallium	- -	--	- -	--	- -					
			Vanadium	- -	--	- -	--	- -					
			Chemical Total	1.8E-04	--	1.4E-04	--	3.2E-04					
		Exposure Point Total						3.2E-04					
	Exposure Medium Total							3.2E-04					
	Air	Baghurst Drive Site	Aluminum	--	- -	–	--	- -					
			Arsenic	--	1.7E-08	–	--	1.7E-08					
			Chromium	--	1.1E-06	–	--	1.1E-06					
			Cobalt	--	2.0E-08	–	--	2.0E-08					
			Copper	--	- -	–	--	- -					
			Iron	--	- -	–	--	- -					
			Manganese	--	- -	–	--	- -					
			Thallium	--	- -	–	--	- -					
			Vanadium	--	- -	–	--	- -					
			Chemical Total	--	1.1E-06	–	--	1.1E-06					
		Exposure Point Total						1.1E-06					
	Exposure Medium Total							1.1E-06					
Medium Total								3.2E-04					
Groundwater	Groundwater	Baghurst Drive Site	1,1,1-Trichloroethane	- -	--	- -	--	- -					
			1,1,2-Trichloroethane	3.5E-07	--	2.4E-08	--	3.7E-07					
			1,1-Dichloroethane	1.4E-05	--	1.1E-06	--	1.6E-05					
			1,1-Dichloroethene	- -	--	- -	--	- -					
			1,2-Dichloroethane	1.4E-06	--	6.6E-08	--	1.5E-06					
			2-Hexanone	- -	--	- -	--	- -					
			Benzene	3.0E-07	--	4.3E-08	--	3.4E-07					
			Bromodichloromethane	8.8E-07	--	5.8E-08	--	9.3E-07					
			Chloroform	1.1E-06	--	8.9E-08	--	1.1E-06					
			Methyl tert-butyl ether	8.8E-08	--	1.9E-09	--	8.9E-08					
			Methylene chloride	8.6E-08	--	3.0E-09	--	8.9E-08					
			Tetrachloroethene	3.3E-08	--	1.9E-08	--	5.2E-08					
			Trichloroethene (Mutagenic)	7.2E-06	--	1.1E-06	--	8.3E-06					
			Trichloroethene (Nonmutagenic)	9.2E-06	--	1.4E-06	--	1.1E-05					
			Vinyl chloride	4.0E-05	--	2.7E-06	--	4.3E-05					
			1,4-Dioxane	9.5E-05	--	3.2E-07	--	9.6E-05					
			Dibenzo(a,h)anthracene	2.6E-06	--	- -	--	2.6E-06					
			Aldrin	5.0E-06	--	- -	--	5.0E-06					
			delta-BHC	7.0E-07	--	4.8E-07	--	1.2E-06					
			Dieldrin	1.3E-06	--	2.3E-06	--	3.6E-06					
			Aluminum	- -	--	- -	--	- -					
			Antimony	- -	--	- -	--	- -					
			Arsenic	1.5E-04	--	7.8E-07	--	1.5E-04					
			Cadmium	- -	--	- -	--	- -					
			Chromium	2.7E-04	--	1.0E-04	--	3.7E-04					
			Cobalt	- -	--	- -	--	- -					
			Cyanide	- -	--	- -	--	- -					
			Iron	- -	--	- -	--	- -					
			Lead	- -	--	- -	--	- -					
			Manganese	- -	--	- -	--	- -					
			Nickel	- -	--	- -	--	- -					
			Thallium	- -	--	- -	--	- -					
			Vanadium	- -	--	- -	--	- -					
			Chemical Total	6.0E-04	--	1.1E-04	--	7.1E-04					
		Exposure Point Total						7.1E-04					
	Exposure Medium Total							7.1E-04					

TABLE 9.18.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Baghurst Drive Site	1,1,1-Trichloroethane	--	- -	–	--	- -					
			1,1,2-Trichloroethane	--	1.0E-06	–	--	1.0E-06					
			1,1-Dichloroethane	--	4.3E-05	–	--	4.3E-05					
			1,1-Dichloroethene	--	- -	–	--	- -					
			1,2-Dichloroethane	--	4.4E-06	–	--	4.4E-06					
			2-Hexanone	--	- -	–	--	- -					
			Benzene	--	4.5E-07	–	--	4.5E-07					
			Bromodichloromethane	--	5.6E-06	–	--	5.6E-06					
			Chloroform	--	8.3E-06	–	--	8.3E-06					
			Methyl tert-butyl ether	--	1.3E-07	–	--	1.3E-07					
			Methylene chloride	--	3.0E-09	–	--	3.0E-09					
			Tetrachloroethene	--	4.4E-08	–	--	4.4E-08					
			Trichloroethene (Mutagenic)	--	5.3E-06	–	--	5.3E-06					
			Trichloroethene (Nonmutagenic)	--	8.2E-06	–	--	8.2E-06					
			Vinyl chloride	--	5.1E-07	–	--	5.1E-07					
			1,4-Dioxane	--	5.1E-05	–	--	5.1E-05					
			Dibenzo(a,h)anthracene	--	- -	–	--	- -					
			Aldrin	--	1.5E-05	–	--	1.5E-05					
			delta-BHC	--	- -	–	--	- -					
			Dieldrin	--	- -	–	--	- -					
			Aluminum	--	- -	–	--	- -					
			Antimony	--	- -	–	--	- -					
			Arsenic	--	- -	–	--	- -					
			Cadmium	--	- -	–	--	- -					
			Chromium	--	- -	–	--	- -					
			Cobalt	--	- -	–	--	- -					
			Cyanide	--	- -	–	--	- -					
			Iron	--	- -	–	--	- -					
			Lead	--	- -	–	--	- -					
			Manganese	--	- -	–	--	- -					
			Nickel	--	- -	–	--	- -					
			Thallium	--	- -	–	--	- -					
			Vanadium	--	- -	–	--	- -					
			Chemical Total	--	1.4E-04	–	--	1.4E-04					
		Exposure Point Total						1.4E-04					
	Exposure Medium Total							1.4E-04					
Medium Total								8.5E-04					
Receptor Total							Receptor Risk Total	1.2E-03					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.1.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Intermittent Stream	1,1-Dichloroethane	6E-10	--	1E-09	--	2E-09	Urinary	0.000004	--	0.000006	0.00001
			Dieldrin	6E-09	--	2E-07	--	2E-07	Hepatic	0.00005	--	0.002	0.002
			Heptachlor Epoxide	2E-09	--	4E-08	--	4E-08	Hepatic	0.00010	--	0.002	0.002
			Arsenic	7E-08	--	1E-08	--	9E-08	Dermal, CVS	0.001	--	0.0002	0.001
			Chromium	1E-08	--	2E-07	--	2E-07	None Specified	0.00002	--	0.0003	0.0003
			Manganese	- -	--	- -	--	- -	Nervous	0.003	--	0.01	0.02
			Chemical Total	9E-08	--	4E-07	--	5E-07		0.004	--	0.02	0.02
		Exposure Point Total						5E-07					0.02
	Exposure Medium Total							5E-07					0.02
Medium Total								5E-07					0.02
Sediment	Sediment	Intermittent Stream	Arsenic	8E-08	--	1E-08	--	9E-08	Dermal, CVS	0.001	--	0.0002	0.001
			Chromium	3E-07	--	4E-07	--	7E-07	None Specified	0.0005	--	0.0006	0.001
			Cobalt	- -	--	- -	--	- -	Thyroid	0.003	--	0.00008	0.003
			Iron	- -	--	- -	--	- -	GS	0.003	--	0.00008	0.003
			Chemical Total	4E-07	--	4E-07	--	8E-07		0.007	--	0.0010	0.008
		Exposure Point Total						8E-07					0.008
	Exposure Medium Total							8E-07					0.008
Medium Total								8E-07					0.008
Receptor Total							Receptor Risk Total	1E-06				Receptor HI Total	0.03

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.2.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Perkiomen Creek	Arsenic	See Table 9.4.CTE for Cancer Risks					Dermal, CVS	0.0020	--	0.000098	0.0021
			Chemical Total							0.0020	--	0.000098	0.0021
		Exposure Point Total											0.0021
	Exposure Medium Total												0.0021
Medium Total													0.0021
Sediment	Sediment	Perkiomen Creek	Chromium						None Specified	0.0057	--	0.0027	0.0084
			Chemical Total							0.0057	--	0.0027	0.0084
		Exposure Point Total											0.0084
	Exposure Medium Total												0.0084
Medium Total													0.0084
Receptor Total												Receptor HI Total	0.010

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.3.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Recreational Users
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Perkiomen Creek	Arsenic	See Table 9.4.CTE for Cancer Risks					Dermal, CVS	0.00016	--	0.000047	0.00021
			Chemical Total							0.00016	--	0.000047	0.00021
		Exposure Point Total											0.00021
	Exposure Medium Total												0.00021
Medium Total													0.00021
Sediment	Sediment	Perkiomen Creek	Chromium						None Specified	0.00040	--	0.0022	0.0026
			Chemical Total							0.00040	--	0.0022	0.0026
		Exposure Point Total											0.0026
	Exposure Medium Total												0.0026
Medium Total													0.0026
Receptor Total												Receptor HI Total	0.0029

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.4.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Recreational Users
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Perkiomen Creek	Arsenic	3.3E-08	--	3.4E-09	--	3.7E-08	See Tables 9.2.CTE and 9.3.CTE for Hazard Indices				
			Chemical Total	3.3E-08	--	3.4E-09	--	3.7E-08					
		Exposure Point Total						3.7E-08					
	Exposure Medium Total							3.7E-08					
Medium Total								3.7E-08					
Sediment	Sediment	Perkiomen Creek	Chromium	1.9E-06	--	2.7E-06	--	4.6E-06					
			Chemical Total	1.9E-06	--	2.7E-06	--	4.6E-06					
		Exposure Point Total						4.6E-06					
	Exposure Medium Total							4.6E-06					
Medium Total								4.6E-06					
Receptor Total							Receptor Risk Total	4.6E-06					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.5.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghusrt Drive Site	Aluminum	--	--	--	--	--	Nervous	0.020	--	0.00043	0.020
			Arsenic	3.2E-07	--	3.4E-08	--	3.6E-07	Dermal, CVS	0.050	--	0.0054	0.056
			Chromium	2.1E-07	--	1.8E-07	--	3.8E-07	Hematologic	0.0058	--	0.0050	0.011
			Cobalt	--	--	--	--	--	Thyroid	0.0048	--	0.00010	0.0049
			Copper	--	--	--	--	--	GS	0.016	--	0.00035	0.017
			Iron	--	--	--	--	--	GS	0.038	--	0.00081	0.039
			Manganese	--	--	--	--	--	Nervous	0.024	--	0.013	0.036
			Thallium	--	--	--	--	--	Dermal	0.0097	--	0.00021	0.0099
			Vanadium	--	--	--	--	--	Hematologic	0.0051	--	0.0042	0.0093
			Chemical Total	5.3E-07	--	2.1E-07	--	7.4E-07		0.17	--	0.029	0.20
		Exposure Point Total						7.4E-07					0.20
	Exposure Medium Total							7.4E-07					0.20
	Air	Baghusrt Drive Site	Aluminum	--	--	--	--	--	Nervous	--	0.46	--	0.46
			Arsenic	--	1.8E-07	--	--	1.8E-07	Dermal, CVS	--	0.19	--	0.19
			Chromium	--	4.0E-06	--	--	4.0E-06	Respiratory	--	0.011	--	0.011
			Cobalt	--	2.1E-07	--	--	2.1E-07	Respiratory	--	0.083	--	0.083
			Copper	--	--	--	--	--	NA	--	--	--	--
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	Nervous	--	1.3	--	1.3
			Thallium	--	--	--	--	--	NA	--	--	--	--
			Vanadium	--	--	--	--	--	Respiratory	--	0.059	--	0.059
			Chemical Total	--	4.4E-06	--	--	4.4E-06		- -	2.1	- -	2.1
		Exposure Point Total						4.4E-06					2.1
	Exposure Medium Total							4.4E-06					2.1
Medium Total								5.1E-06					2.3
Receptor Total							Receptor Risk Total	5.1E-06				Receptor HI Total	2.3

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total CVS HI	0.25
Total Dermal HI	0.26
Total GS HI	0.055
Total Hematologic HI	0.020
Total Nervous HI	1.8
Total Respiratory HI	0.15
Total Thyroid HI	0.0049

TABLE 9.6.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmer
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum	See Table 9.8.CTE for Cancer Risks					Nervous	0.096	--	0.0011	0.098
			Arsenic						Dermal, CVS	0.24	--	0.014	0.26
			Chromium						None Specified	0.047	--	0.022	0.069
			Cobalt						Thyroid	0.23	--	0.0028	0.24
			Copper						GS	0.078	--	0.00093	0.079
			Iron						GS	0.18	--	0.0022	0.19
			Manganese						Nervous	0.11	--	0.034	0.15
			Thallium						Dermal	0.19	--	0.0022	0.19
			Vanadium						Dermal	0.049	--	0.023	0.072
			Chemical Total							1.2	--	0.10	1.3
		Exposure Point Total											1.3
	Exposure Medium Total												1.3
	Air	Baghurst Drive Site	Aluminum						Nervous	–	0.0011	--	0.0011
			Arsenic						Dermal, CVS	–	0.00047	--	0.00047
			Chromium						Respiratory	–	0.000081	--	0.000081
			Cobalt						Respiratory	–	0.00067	--	0.00067
			Copper						NA	–	--	--	--
			Iron						NA	–	--	--	--
			Manganese						Nervous	–	0.0032	--	0.0032
			Thallium						NA	–	--	--	--
			Vanadium						Respiratory	–	0.00014	--	0.00014
			Chemical Total							- -	0.0057	- -	0.0057
		Exposure Point Total											0.0057
	Exposure Medium Total												0.0057
Medium Total													1.3
Groundwater	Groundwater	Baghurst Drive Site	1,1,1-Trichloroethane						Body Weight	0.042	--	0.0090	0.051
			1,1,2-Trichloroethane						Hematologic, Immune	0.0024	--	0.00021	0.0027
			1,1-Dichloroethane						Urinary	0.020	--	0.0019	0.022
			1,1-Dichloroethene						Hepatic	0.51	--	0.080	0.58
			1,2-Dichloroethane						Urinary	0.0042	--	0.00024	0.0044
			2-Hexanone						Nervous	0.049	--	0.0024	0.052
			Benzene						Immune	0.0022	--	0.00039	0.0026
			Bromodichloromethane						Urinary	0.0011	--	0.000094	0.0012
			Chloroform						Hepatic	0.0054	--	0.00058	0.0060
			Methyl tert-butyl ether						NA	–	--	--	--
			Methylene chloride						Hepatic	0.0037	--	0.00016	0.0039
			Tetrachloroethene						Nervous, Ocular	0.0042	--	0.0030	0.0072
			Trichloroethene (Mutagenic)						NA	–	--	--	--
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	0.80	--	0.16	0.95
			Vinyl chloride						Hepatic	0.0058	--	0.00053	0.0064
			1,4-Dioxane						Hepatic, Urinary	0.051	--	0.00022	0.051
			Dibenzo(a,h)anthracene						NA	–	--	--	--
			Aldrin						Hepatic	0.016	--	--	0.016
			delta-BHC						Hepatic	0.000022	--	0.000019	0.000041
			Dieldrin						Hepatic	0.0026	--	0.0058	0.0084
			Aluminum						Nervous	0.043	--	0.00021	0.043
			Antimony						Hematologic	0.067	--	0.0022	0.069
			Arsenic						Dermal, CVS	0.53	--	0.0026	0.54
			Cadmium						Urinary	0.018	--	0.0018	0.020
			Chromium						None Specified	0.091	--	0.036	0.13
			Cobalt						Thyroid	0.11	--	0.00021	0.11
			Cyanide						Reproductive	0.62	--	0.0031	0.63
			Iron						GS	0.073	--	0.00036	0.074
			Lead						NA	–	--	--	--
			Manganese						Nervous	0.083	--	0.010	0.093
			Nickel						Body Weight	0.0096	--	0.00024	0.0098
			Thallium						Dermal	0.19	--	0.00095	0.19
			Vanadium						Dermal	0.020	--	0.0038	0.024
			Chemical Total							3.4	--	0.32	3.7
		Exposure Point Total											3.7
	Exposure Medium Total												3.7
Medium Total													3.7
Receptor Total												Receptor HI Total	5.0

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.6.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmer
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
												Total Body Weight HI	0.061
												Total CVS HI	1.7
												Total Dermal HI	1.3
												Total Developmental HI	0.95
												Total GS HI	0.34
												Total Hematologic HI	0.072
												Total Hepatic HI	0.68
												Total Immune HI	0.96
												Total Nervous HI	0.45
												Total None Specified HI	0.20
												Total Reproductive HI	0.63
												Total Respiratory HI	0.00090
												Total Thyroid HI	0.34
												Total Urinary HI	0.099

TABLE 9.7.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface/Subsurface Soil	Surface/Subsurface Soil	Baghusrt Drive Site	Aluminum	--	--	--	--	--	Nervous	0.075	--	0.0016	0.076
			Arsenic	1.2E-05	--	1.3E-06	--	1.3E-05	Dermal, CVS	0.19	--	0.020	0.21
			Chromium	1.5E-05	--	1.3E-05	--	2.9E-05	None Specified	0.036	--	0.031	0.067
			Cobalt	--	--	--	--	--	Thyroid	0.18	--	0.0038	0.18
			Copper	--	--	--	--	--	GS	0.060	--	0.0013	0.062
			Iron	--	--	--	--	--	GS	0.14	--	0.0030	0.15
			Manganese	--	--	--	--	--	Nervous	0.089	--	0.048	0.14
			Thallium	--	--	--	--	--	Dermal	0.14	--	0.0031	0.15
			Vanadium	--	--	--	--	--	Dermal	0.038	--	0.031	0.070
			Chemical Total	2.8E-05	--	1.5E-05	--	4.2E-05		0.95	--	0.14	1.1
		Exposure Point Total						4.2E-05					1.1
	Exposure Medium Total							4.2E-05					1.1
	Air	Baghusrt Drive Site	Aluminum	--	--	--	--	--	Nervous	--	0.00075	--	0.00075
			Arsenic	--	2.9E-09	--	--	2.9E-09	Dermal, CVS	--	0.00031	--	0.00031
			Chromium	--	1.3E-07	--	--	1.3E-07	Respiratory	--	0.000054	--	0.000054
			Cobalt	--	3.5E-09	--	--	3.5E-09	Respiratory	--	0.00045	--	0.00045
			Copper	--	--	--	--	--	NA	--	--	--	–
			Iron	--	--	--	--	--	NA	--	--	--	–
			Manganese	--	--	--	--	--	Nervous	--	0.0021	--	0.0021
			Thallium	--	--	--	--	--	NA	--	--	--	–
			Vanadium	--	--	--	--	--	Respiratory	--	0.000096	--	0.000096
			Chemical Total	--	1.4E-07	--	--	1.4E-07		- -	0.0038	- -	0.0038
		Exposure Point Total						1.4E-07					0.0038
	Exposure Medium Total							1.4E-07					0.0038
Medium Total								4.2E-05					1.1
Groundwater	Groundwater	Baghusrt Drive Site	1,1,1-Trichloroethane	--	--	--	--	--	Body Weight	0.020	--	0.0086	0.028
	Potable Use		1,1,2-Trichloroethane	7.5E-08	--	1.3E-08	--	8.8E-08	Hematologic, Immune	0.0011	--	0.00020	0.0013
			1,1-Dichloroethane	3.1E-06	--	6.0E-07	--	3.7E-06	Urinary	0.0095	--	0.0018	0.011
			1,1-Dichloroethene	--	--	--	--	--	Hepatic	0.24	--	0.078	0.31
			1,2-Dichloroethane	3.1E-07	--	3.7E-08	--	3.4E-07	Urinary	0.0020	--	0.00024	0.0022
			2-Hexanone	--	--	--	--	--	Nervous	0.023	--	0.0024	0.025
			Benzene	6.4E-08	--	2.4E-08	--	8.8E-08	Immune	0.0010	--	0.00039	0.0014
			Bromodichloromethane	1.9E-07	--	3.2E-08	--	2.2E-07	Urinary	0.00053	--	0.000090	0.00062
			Chloroform	2.3E-07	--	4.9E-08	--	2.7E-07	Hepatic	0.0025	--	0.00055	0.0031
			Methyl tert-butyl ether	1.9E-08	--	1.1E-09	--	2.0E-08	NA	--	--	--	–
			Methylene chloride	1.2E-08	--	1.1E-09	--	1.3E-08	Hepatic	0.0017	--	0.00016	0.0019
			Tetrachloroethene	7.1E-09	--	1.0E-08	--	1.7E-08	Nervous, Ocular	0.0020	--	0.0028	0.0048
			Trichloroethene (Mutagenic)	9.9E-07	--	3.9E-07	--	1.4E-06	NA	--	--	--	–
			Trichloroethene (Nonmutagenic)	2.0E-06	--	7.8E-07	--	2.8E-06	CVS, Immune, Developmental	0.37	--	0.15	0.52
			Vinyl chloride	1.7E-06	--	3.4E-07	--	2.0E-06	Hepatic	0.0027	--	0.00055	0.0033
			1,4-Dioxane	2.0E-05	--	1.8E-07	--	2.1E-05	Hepatic, Urinary	0.024	--	0.00021	0.024
			Dibenzo(a,h)anthracene	3.5E-07	--	--	--	3.5E-07	NA	--	--	--	–
			Aldrin	1.1E-06	--	--	--	1.1E-06	Hepatic	0.0074	--	--	0.0074
			delta-BHC	1.5E-07	--	2.6E-07	--	4.1E-07	Hepatic	0.000010	--	0.000018	0.000029
			Dieldrin	2.8E-07	--	1.3E-06	--	1.5E-06	Hepatic	0.0012	--	0.0055	0.0067
			Aluminum	--	--	--	--	--	Nervous	0.020	--	0.00033	0.020
			Antimony	--	--	--	--	--	Hematologic	0.031	--	0.0034	0.035
			Arsenic	3.2E-05	--	5.3E-07	--	3.3E-05	Dermal, CVS	0.25	--	0.0041	0.25
			Cadmium	--	--	--	--	--	Urinary	0.0084	--	0.0028	0.011
			Chromium	3.7E-05	--	4.8E-05	--	8.4E-05	None Specified	0.043	--	0.056	0.098
			Cobalt	--	--	--	--	--	Thyroid	0.051	--	0.00033	0.051
			Cyanide	--	--	--	--	--	Reproductive	0.29	--	0.0048	0.30
			Iron	--	--	--	--	--	GS	0.034	--	0.00056	0.035
			Lead	--	--	--	--	--	NA	--	--	--	–

TABLE 9.7.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater Potable Use	Baghusrt Drive Site	Manganese	--	--	--	--	--	Nervous	0.039	--	0.016	0.055
			Nickel	--	--	--	--	--	Body Weight	0.0045	--	0.00037	0.0049
			Thallium	--	--	--	--	--	Dermal	0.090	--	0.0015	0.092
			Vanadium	--	--	--	--	--	Dermal	0.0095	--	0.0060	0.015
			Chemical Total	1.0E-04	--	5.2E-05	--	1.5E-04		1.6	--	0.35	1.9
		Exposure Point Total						1.5E-04					1.9
	Exposure Medium Total							1.5E-04					1.9
	Air Potable Use	Baghusrt Drive Site	1,1,1-Trichloroethane	--	--	--	--	--	Hepatic	--	0.26	--	0.26
			1,1,2-Trichloroethane	--	7.0E-07	--	--	7.0E-07	Respiratory	--	0.76	--	0.76
			1,1-Dichloroethane	--	2.9E-05	--	--	2.9E-05	NA	--	--	--	–
			1,1-Dichloroethene	--	--	--	--	--	Hepatic	--	2.0	--	2.0
			1,2-Dichloroethane	--	2.9E-06	--	--	2.9E-06	Nervous	--	0.056	--	0.056
			2-Hexanone	--	--	--	--	--	Nervous	--	0.13	--	0.13
			Benzene	--	3.0E-07	--	--	3.0E-07	Immune	--	0.0045	--	0.0045
			Bromodichloromethane	--	3.7E-06	--	--	3.7E-06	NA	--	--	--	–
			Chloroform	--	5.6E-06	--	--	5.6E-06	Hepatic	--	0.0087	--	0.0087
			Methyl tert-butyl ether	--	9.0E-08	--	--	9.0E-08	Hepatic, Urinary, Ocular	--	0.00040	--	0.00040
			Methylene chloride	--	2.0E-09	--	--	2.0E-09	Hepatic	--	0.00058	--	0.00058
			Tetrachloroethene	--	2.9E-08	--	--	2.9E-08	Nervous, Ocular	--	0.0099	--	0.0099
			Trichloroethene (Mutagenic)	--	3.6E-06	--	--	3.6E-06	NA	--	--	--	–
			Trichloroethene (Nonmutagenic)	--	5.5E-06	--	--	5.5E-06	CVS, Immune, Developmental	--	3.1	--	3.1
			Vinyl chloride	--	3.4E-07	--	--	3.4E-07	Hepatic	--	0.0027	--	0.0027
			1,4-Dioxane	--	3.4E-05	--	--	3.4E-05	Nervous, Respiratory	--	0.79	--	0.79
			Dibenzo(a,h)anthracene	--	--	--	--	--	NA	--	--	--	–
			Aldrin	--	1.0E-05	--	--	1.0E-05	NA	--	--	--	–
			delta-BHC	--	--	--	--	--	NA	--	--	--	–
			Dieldrin	--	--	--	--	--	NA	--	--	--	–
			Aluminum	--	--	--	--	--	Nervous	--	--	--	–
			Antimony	--	--	--	--	--	NA	--	--	--	–
			Arsenic	--	--	--	--	--	Dermal, CVS	--	--	--	–
			Cadmium	--	--	--	--	--	Urinary	--	--	--	–
			Chromium	--	--	--	--	--	Respiratory	--	--	--	–
			Cobalt	--	--	--	--	--	Respiratory	--	--	--	–
			Cyanide	--	--	--	--	--	Endocrine	--	7.7	--	7.7
			Iron	--	--	--	--	--	NA	--	--	--	–
			Lead	--	--	--	--	--	NA	--	--	--	–
			Manganese	--	--	--	--	--	Nervous	--	--	--	–
			Nickel	--	--	--	--	--	Respiratory	--	--	--	–
			Thallium	--	--	--	--	--	NA	--	--	--	–
			Vanadium	--	--	--	--	--	Respiratory	--	--	--	–
			Chemical Total	--	9.6E-05	--	--	9.6E-05		- -	14.8	- -	14.8
		Exposure Point Total						9.6E-05					14.8
	Exposure Medium Total							9.6E-05					14.8
Medium Total								2.5E-04					16.7
Groundwater	Groundwater Irrigation	Baghusrt Drive Site	1,1,1-Trichloroethane	--	--	--	--	--	Body Weight	0.00021	--	0.00020	0.00041
			1,1,2-Trichloroethane	8.0E-10	--	3.0E-10	--	1.1E-09	Hematologic, Immune	0.000012	--	0.0000046	0.000017
			1,1-Dichloroethane	3.3E-08	--	1.3E-08	--	4.7E-08	Urinary	0.00010	--	0.000041	0.00014
			1,1-Dichloroethene	--	--	--	--	--	Hepatic	0.0025	--	0.0017	0.0043
			1,2-Dichloroethane	3.3E-09	--	8.3E-10	--	4.1E-09	Urinary	0.000021	--	0.0000053	0.000026
			2-Hexanone	--	--	--	--	--	Nervous	0.00025	--	0.000053	0.00030
			Benzene	6.8E-10	--	5.3E-10	--	1.2E-09	Immune	0.000011	--	0.0000085	0.000019
			Bromodichloromethane	2.0E-09	--	7.3E-10	--	2.7E-09	Urinary	0.0000057	--	0.0000021	0.0000077
			Chloroform	2.4E-09	--	1.1E-09	--	3.5E-09	Hepatic	0.000027	--	0.000013	0.000040
			Methyl tert-butyl ether	2.0E-10	--	2.4E-11	--	2.2E-10	NA	--	--	--	–

TABLE 9.7.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Baghusrt Drive Site	Methylene chloride	1.3E-10	--	2.5E-11	--	1.5E-10	Hepatic	0.000018	--	0.0000036	0.000022
	Irrigation		Tetrachloroethene	7.6E-11	--	2.3E-10	--	3.1E-10	Nervous, Ocular	0.000021	--	0.000065	0.000086
			Trichloroethene (Mutagenic)	1.1E-08	--	9.1E-09	--	2.0E-08	NA	--	--	--	--
			Trichloroethene (Nonmutagenic)	2.1E-08	--	1.8E-08	--	3.9E-08	CVS, Immune, Developmental	0.0040	--	0.0034	0.0074
			Vinyl chloride	1.8E-08	--	7.1E-09	--	2.5E-08	Hepatic	0.000029	--	0.000012	0.000041
			1,4-Dioxane	2.2E-07	--	4.0E-09	--	2.2E-07	Hepatic, Urinary	0.00025	--	0.0000047	0.00026
			Dibenzo(a,h)anthracene	3.8E-09	--	--	--	3.8E-09	NA	--	--	--	--
			Aldrin	1.1E-08	--	--	--	1.1E-08	Hepatic	0.000079	--	--	0.000079
			delta-BHC	1.6E-09	--	6.1E-09	--	7.7E-09	Hepatic	0.00000011	--	0.00000042	0.00000053
			Dieldrin	3.0E-09	--	2.9E-08	--	3.2E-08	Hepatic	0.000013	--	0.00013	0.00014
			Aluminum	--	--	--	--	--	Nervous	0.00021	--	0.0000038	0.00022
			Antimony	--	--	--	--	--	Hematologic	0.00033	--	0.000039	0.00037
			Arsenic	3.4E-07	--	6.1E-09	--	3.5E-07	Dermal, CVS	0.0027	--	0.000047	0.0027
			Cadmium	--	--	--	--	--	Urinary	0.000090	--	0.000032	0.00012
			Chromium	3.9E-07	--	5.5E-07	--	9.4E-07	None Specified	0.00046	--	0.00064	0.0011
			Cobalt	--	--	--	--	--	Thyroid	0.00054	--	0.0000038	0.00055
			Cyanide	--	--	--	--	--	Reproductive	0.0031	--	0.000055	0.0032
			Iron	--	--	--	--	--	GS	0.00037	--	0.0000065	0.00037
			Lead	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	Nervous	0.00042	--	0.00018	0.00060
			Nickel	--	--	--	--	--	Body Weight	0.000048	--	0.0000042	0.000052
			Thallium	--	--	--	--	--	Dermal	0.00097	--	0.000017	0.00098
			Vanadium	--	--	--	--	--	Dermal	0.00010	--	0.000069	0.00017
			Chemical Total	1.1E-06	--	6.5E-07	--	1.7E-06		0.017	--	0.0068	0.024
		Exposure Point Total						1.7E-06					0.024
	Exposure Medium Total							1.7E-06					0.024
	Air	Baghusrt Drive Site	1,1,1-Trichloroethane	--	--	--	--	--	Hepatic	--	0.00000017	--	0.00000017
	Irrigation		1,1,2-Trichloroethane	--	2.8E-13	--	--	2.8E-13	Respiratory	--	0.00000031	--	0.00000031
			1,1-Dichloroethane	--	1.6E-11	--	--	1.6E-11	NA	--	--	--	--
			1,1-Dichloroethene	--	--	--	--	--	Hepatic	--	0.0000013	--	0.0000013
			1,2-Dichloroethane	--	1.3E-12	--	--	1.3E-12	Nervous	--	2.5E-8	--	2.5E-8
			2-Hexanone	--	--	--	--	--	Nervous	--	3.0E-8	--	3.0E-8
			Benzene	--	1.7E-13	--	--	1.7E-13	Immune	--	2.5E-9	--	2.5E-9
			Bromodichloromethane	--	1.8E-12	--	--	1.8E-12	NA	--	--	--	--
			Chloroform	--	2.9E-12	--	--	2.9E-12	Hepatic	--	4.6E-9	--	4.6E-9
			Methyl tert-butyl ether	--	3.4E-14	--	--	3.4E-14	Hepatic, Urinary, Ocular	--	1.5E-10	--	1.5E-10
			Methylene chloride	--	1.0E-15	--	--	1.0E-15	Hepatic	--	3.0E-10	--	3.0E-10
			Tetrachloroethene	--	1.9E-14	--	--	1.9E-14	Nervous, Ocular	--	6.4E-9	--	6.4E-9
			Trichloroethene (Mutagenic)	--	2.1E-12	--	--	2.1E-12	NA	--	--	--	--
			Trichloroethene (Nonmutagenic)	--	3.3E-12	--	--	3.3E-12	CVS, Immune, Developmental	--	0.0000019	--	0.0000019
			Vinyl chloride	--	2.4E-13	--	--	2.4E-13	Hepatic	--	1.9E-9	--	1.9E-9
			1,4-Dioxane	--	1.0E-13	--	--	1.0E-13	Nervous, Respiratory	--	2.4E-9	--	2.4E-9
			Dibenzo(a,h)anthracene	--	--	--	--	--	NA	--	--	--	--
			Aldrin	--	1.8E-12	--	--	1.8E-12	NA	--	--	--	--
			delta-BHC	--	--	--	--	--	NA	--	--	--	--
			Dieldrin	--	--	--	--	--	NA	--	--	--	--
			Aluminum	--	--	--	--	--	Nervous	--	--	--	--
			Antimony	--	--	--	--	--	NA	--	--	--	--
			Arsenic	--	--	--	--	--	Dermal, CVS	--	--	--	--
			Cadmium	--	--	--	--	--	Urinary	--	--	--	--
			Chromium	--	--	--	--	--	Respiratory	--	--	--	--
			Cobalt	--	--	--	--	--	Respiratory	--	--	--	--
			Cyanide	--	--	--	--	--	Endocrine	--	0.0000019	--	0.0000019
			Iron	--	--	--	--	--	NA	--	--	--	--

TABLE 9.7.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Baghusrt Drive Site	Lead	--	--	--	--	--	NA	--	--	--	--
	Irrigation		Manganese	--	--	--	--	--	Nervous	--	--	--	--
			Nickel	--	--	--	--	--	Respiratory	--	--	--	--
			Thallium	--	--	--	--	--	NA	--	--	--	--
			Vanadium	--	--	--	--	--	Respiratory	--	--	--	--
			Chemical Total	--	3.0E-11	--	--	3.0E-11		--	0.0000056	--	0.0000056
		Exposure Point Total						3.0E-11					0.0000056
	Exposure Medium Total							3.0E-11					0.0000056
Medium Total								1.7E-06					0.024
Receptor Total							Receptor Risk Total	2.9E-04				Receptor HI Total	17.8

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Body Weight HI	0.034
Total CVS HI	4.1
Total Dermal HI	0.79
Total Developmental HI	3.6
Total Endocrine HI	7.7
Total GS HI	0.24
Total Hematologic HI	0.036
Total Hepatic HI	2.6
Total Immune HI	3.6
Total Nervous HI	1.3
Total None Specified HI	0.17
Total Reproductive HI	0.30
Total Respiratory HI	1.6
Total Thyroid HI	0.24
Total Urinary HI	0.050

TABLE 9.8.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface/Subsurface Soil	Surface/Subsurface Soil	Baghusrt Drive Site	Aluminum	--	--	--	--	--					
			Arsenic	1.5E-05	--	1.5E-06	--	1.7E-05					
			Chromium	2.9E-05	--	1.9E-05	--	4.8E-05					
			Cobalt	--	--	--	--	--					
			Copper	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Manganese	--	--	--	--	--					
			Thallium	--	--	--	--	--					
			Vanadium	--	--	--	--	--					
			Chemical Total	4.4E-05	--	2.1E-05	--	6.5E-05					
		Exposure Point Total						6.5E-05					
	Exposure Medium Total							6.5E-05					
	Air	Baghusrt Drive Site	Aluminum	--	--	--	--	--					
			Arsenic	--	3.8E-09	--	--	3.8E-09					
			Chromium	--	2.6E-07	--	--	2.6E-07					
			Cobalt	--	4.5E-09	--	--	4.5E-09					
			Copper	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Manganese	--	--	--	--	--					
			Thallium	--	--	--	--	--					
			Vanadium	--	--	--	--	--					
			Chemical Total	--	2.7E-07	--	--	2.7E-07					
		Exposure Point Total						2.7E-07					
	Exposure Medium Total							2.7E-07					
Medium Total								6.5E-05					
Groundwater	Groundwater Potable Use	Baghusrt Drive Site	1,1,1-Trichloroethane	--	--	--	--	--					
			1,1,2-Trichloroethane	9.0E-08	--	1.4E-08	--	1.0E-07					
			1,1-Dichloroethane	3.8E-06	--	6.6E-07	--	4.4E-06					
			1,1-Dichloroethene	--	--	--	--	--					
			1,2-Dichloroethane	3.7E-07	--	4.1E-08	--	4.1E-07					
			2-Hexanone	--	--	--	--	--					
			Benzene	7.8E-08	--	2.7E-08	--	1.0E-07					
			Bromodichloromethane	2.3E-07	--	3.5E-08	--	2.6E-07					
			Chloroform	2.7E-07	--	5.4E-08	--	3.3E-07					
			Methyl tert-butyl ether	2.3E-08	--	1.2E-09	--	2.4E-08					
			Methylene chloride	2.0E-08	--	1.5E-09	--	2.2E-08					
			Tetrachloroethene	8.6E-09	--	1.1E-08	--	2.0E-08					
			Trichloroethene (Mutagenic)	1.7E-06	--	5.3E-07	--	2.2E-06					
			Trichloroethene (Nonmutagenic)	2.4E-06	--	8.7E-07	--	3.3E-06					
			Vinyl chloride	2.2E-05	--	2.2E-06	--	2.4E-05					
			1,4-Dioxane	2.5E-05	--	2.0E-07	--	2.5E-05					
			Dibenzo(a,h)anthracene	6.0E-07	--	0.0E+00	--	6.0E-07					
			Aldrin	1.3E-06	--	0.0E+00	--	1.3E-06					
			delta-BHC	1.8E-07	--	2.9E-07	--	4.7E-07					
			Dieldrin	3.4E-07	--	1.4E-06	--	1.7E-06					
			Aluminum	--	--	--	--	--					
			Antimony	--	--	--	--	--					
			Arsenic	3.9E-05	--	5.6E-07	--	4.0E-05					
			Cadmium	--	--	--	--	--					
			Chromium	6.2E-05	--	5.8E-05	--	1.2E-04					
			Cobalt	--	--	--	--	--					
			Cyanide	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Lead	--	--	--	--	--					

TABLE 9.8.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater Potable Use	Baghusrt Drive Site	Manganese	--	--	--	--	--					
			Nickel	--	--	--	--	--					
			Thallium	--	--	--	--	--					
			Vanadium	--	--	--	--	--					
			Chemical Total	1.6E-04	--	6.5E-05	--	2.2E-04					
		Exposure Point Total						2.2E-04					
	Exposure Medium Total							2.2E-04					
	Air Potable Use	Baghusrt Drive Site	1,1,1-Trichloroethane	--	--	--	--	--					
			1,1,2-Trichloroethane	--	7.0E-07	--	--	7.0E-07					
			1,1-Dichloroethane	--	2.9E-05	--	--	2.9E-05					
			1,1-Dichloroethene	--	--	--	--	--					
			1,2-Dichloroethane	--	2.9E-06	--	--	2.9E-06					
			2-Hexanone	--	--	--	--	--					
			Benzene	--	3.0E-07	--	--	3.0E-07					
			Bromodichloromethane	--	3.7E-06	--	--	3.7E-06					
			Chloroform	--	5.6E-06	--	--	5.6E-06					
			Methyl tert-butyl ether	--	9.0E-08	--	--	9.0E-08					
			Methylene chloride	--	2.0E-09	--	--	2.0E-09					
			Tetrachloroethene	--	2.9E-08	--	--	2.9E-08					
			Trichloroethene (Mutagenic)	--	3.6E-06	--	--	3.6E-06					
			Trichloroethene (Nonmutagenic)	--	5.5E-06	--	--	5.5E-06					
			Vinyl chloride	--	3.4E-07	--	--	3.4E-07					
			1,4-Dioxane	--	3.4E-05	--	--	3.4E-05					
			Dibenzo(a,h)anthracene	--	--	--	--	--					
			Aldrin	--	1.0E-05	--	--	1.0E-05					
			delta-BHC	--	--	--	--	--					
			Dieldrin	--	--	--	--	--					
			Aluminum	--	--	--	--	--					
			Antimony	--	--	--	--	--					
			Arsenic	--	--	--	--	--					
			Cadmium	--	--	--	--	--					
			Chromium	--	--	--	--	--					
			Cobalt	--	--	--	--	--					
			Cyanide	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Lead	--	--	--	--	--					
			Manganese	--	--	--	--	--					
			Nickel	--	--	--	--	--					
			Thallium	--	--	--	--	--					
			Vanadium	--	--	--	--	--					
			Chemical Total	--	9.6E-05	--	--	9.6E-05					
		Exposure Point Total						9.6E-05					
	Exposure Medium Total							9.6E-05					
Medium Total								3.2E-04					
Groundwater	Groundwater Irrigation	Baghusrt Drive Site	1,1,1-Trichloroethane	--	--	--	--	--					
			1,1,2-Trichloroethane	8.0E-10	--	3.0E-10	--	1.1E-09					
			1,1-Dichloroethane	3.3E-08	--	1.3E-08	--	4.7E-08					
			1,1-Dichloroethene	--	--	--	--	--					
			1,2-Dichloroethane	3.3E-09	--	8.3E-10	--	4.1E-09					
			2-Hexanone	--	--	--	--	--					
			Benzene	6.8E-10	--	5.3E-10	--	1.2E-09					
			Bromodichloromethane	2.0E-09	--	7.3E-10	--	2.7E-09					
			Chloroform	2.4E-09	--	1.1E-09	--	3.5E-09					
			Methyl tert-butyl ether	2.0E-10	--	2.4E-11	--	2.2E-10					

TABLE 9.8.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater Irrigation	Baghusrt Drive Site	Methylene chloride	1.3E-10	--	2.5E-11	--	1.5E-10					
			Tetrachloroethene	7.6E-11	--	2.3E-10	--	3.1E-10					
			Trichloroethene (Mutagenic)	1.1E-08	--	9.1E-09	--	2.0E-08					
			Trichloroethene (Nonmutagenic)	2.1E-08	--	1.8E-08	--	3.9E-08					
			Vinyl chloride	1.8E-08	--	7.1E-09	--	2.5E-08					
			1,4-Dioxane	2.2E-07	--	4.0E-09	--	2.2E-07					
			Dibenzo(a,h)anthracene	3.8E-09	--	0.0E+00	--	3.8E-09					
			Aldrin	1.1E-08	--	0.0E+00	--	1.1E-08					
			delta-BHC	1.6E-09	--	6.1E-09	--	7.7E-09					
			Dieldrin	3.0E-09	--	2.9E-08	--	3.2E-08					
			Aluminum	--	--	--	--	--					
			Antimony	--	--	--	--	--					
			Arsenic	3.4E-07	--	6.1E-09	--	3.5E-07					
			Cadmium	--	--	--	--	--					
			Chromium	3.9E-07	--	5.5E-07	--	9.4E-07					
			Cobalt	--	--	--	--	--					
			Cyanide	--	--	--	--	--					
			Iron	--	--	--	--	--					
			Lead	--	--	--	--	--					
			Manganese	--	--	--	--	--					
			Nickel	--	--	--	--	--					
			Thallium	--	--	--	--	--					
			Vanadium	--	--	--	--	--					
			Chemical Total	1.1E-06	--	6.5E-07	--	1.7E-06					
		Exposure Point Total						1.7E-06					
	Exposure Medium Total							1.7E-06					
	Air Irrigation	Baghusrt Drive Site	1,1,1-Trichloroethane	--	--	--	--	--					
			1,1,2-Trichloroethane	--	2.8E-13	--	--	2.8E-13					
			1,1-Dichloroethane	--	1.6E-11	--	--	1.6E-11					
			1,1-Dichloroethene	--	--	--	--	--					
			1,2-Dichloroethane	--	1.3E-12	--	--	1.3E-12					
			2-Hexanone	--	--	--	--	--					
			Benzene	--	1.7E-13	--	--	1.7E-13					
			Bromodichloromethane	--	1.8E-12	--	--	1.8E-12					
			Chloroform	--	2.9E-12	--	--	2.9E-12					
			Methyl tert-butyl ether	--	3.4E-14	--	--	3.4E-14					
			Methylene chloride	--	1.0E-15	--	--	1.0E-15					
			Tetrachloroethene	--	1.9E-14	--	--	1.9E-14					
			Trichloroethene (Mutagenic)	--	2.1E-12	--	--	2.1E-12					
			Trichloroethene (Nonmutagenic)	--	3.3E-12	--	--	3.3E-12					
			Vinyl chloride	--	2.4E-13	--	--	2.4E-13					
			1,4-Dioxane	--	1.0E-13	--	--	1.0E-13					
			Dibenzo(a,h)anthracene	--	--	--	--	--					
			Aldrin	--	1.8E-12	--	--	1.8E-12					
			delta-BHC	--	--	--	--	--					
			Dieldrin	--	--	--	--	--					
			Aluminum	--	--	--	--	--					
			Antimony	--	--	--	--	--					
			Arsenic	--	--	--	--	--					
			Cadmium	--	--	--	--	--					
			Chromium	--	--	--	--	--					
			Cobalt	--	--	--	--	--					
			Cyanide	--	--	--	--	--					
			Iron	--	--	--	--	--					

TABLE 9.8.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Baghusrt Drive Site	Lead	--	--	--	--	--					
	Irrigation		Manganese	--	--	--	--	--					
			Nickel	--	--	--	--	--					
			Thallium	--	--	--	--	--					
			Vanadium	--	--	--	--	--					
			Chemical Total	--	3.0E-11	--	--	3.0E-11					
		Exposure Point Total						3.0E-11					
	Exposure Medium Total							3.0E-11					
Medium Total								1.7E-06					
Receptor Total							Receptor Risk Total	3.9E-04					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.9.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum	--	--	--	--	--	Nervous	0.011	--	0.00013	0.011
			Arsenic	3.5E-07	--	2.1E-08	--	3.7E-07	Dermal, CVS	0.027	--	0.0016	0.029
			Chromium	1.4E-06	--	6.9E-07	--	2.1E-06	None Specified	0.0052	--	0.0025	0.0077
			Cobalt	--	--	--	--	--	Thyroid	0.026	--	0.00031	0.026
			Copper	--	--	--	--	--	GS	0.0087	--	0.00010	0.0088
			Iron	--	--	--	--	--	GS	0.020	--	0.00024	0.021
			Manganese	--	--	--	--	--	Nervous	0.013	--	0.0038	0.017
			Thallium	--	--	--	--	--	Dermal	0.021	--	0.00025	0.021
			Vanadium	--	--	--	--	--	Dermal	0.0055	--	0.0025	0.0080
			Chemical Total	1.8E-06	--	7.1E-07	--	2.5E-06		0.14	--	0.011	0.15
		Exposure Point Total						2.5E-06					0.15
	Exposure Medium Total							2.5E-06					0.15
	Air	Baghurst Drive Site	Aluminum	--	--	--	--	--	Nervous	--	0.000010	--	0.000010
			Arsenic	--	8.0E-12	--	--	8.0E-12	Dermal, CVS	--	0.0000043	--	0.0000043
			Chromium	--	1.2E-09	--	--	1.2E-09	Respiratory	--	0.000000753	--	0.00000075
			Cobalt	--	9.6E-12	--	--	9.6E-12	Respiratory	--	0.0000062	--	0.0000062
			Copper	--	--	--	--	--	NA	--	--	--	--
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	Nervous	--	0.000030	--	0.000030
			Thallium	--	--	--	--	--	NA	--	--	--	--
			Vanadium	--	--	--	--	--	Respiratory	--	0.0000013	--	0.0000013
			Chemical Total	--	1.2E-09	--	--	1.2E-09		- -	0.000053	- -	0.000053
		Exposure Point Total						1.2E-09					0.000053
	Exposure Medium Total							1.2E-09					0.000053
Medium Total								2.5E-06					0.15
Surface Water	Surface Water	Intermittent Stream	1,1-Dichloroethane	1.7E-09	--	7.6E-10	--	2.5E-09	Urinary	0.000052	--	0.000023	0.000075
			Dieldrin	1.5E-08	--	1.4E-07	--	1.6E-07	Hepatic	0.00067	--	0.0063	0.0069
			Heptachlor Epoxide	4.5E-09	--	2.8E-08	--	3.3E-08	Hepatic	0.0013	--	0.0084	0.0097
			Arsenic	2.0E-07	--	9.9E-09	--	2.1E-07	Dermal, CVS	0.016	--	0.00077	0.017
			Chromium	6.9E-08	--	2.7E-07	--	3.3E-07	None Specified	0.00025	--	0.00096	0.0012
			Manganese	--	--	--	--	--	Nervous	0.038	--	0.046	0.08
			Chemical Total	2.9E-07	--	4.5E-07	--	7.4E-07		0.056	--	0.063	0.12
		Exposure Point Total						7.4E-07					0.12
	Exposure Medium Total							7.4E-07					0.12
Medium Total								7.4E-07					0.12
Surface Water	Surface Water	Perkiomen Creek	Arsenic	2.6E-08	--	1.3E-09	--	2.7E-08	Dermal, CVS	0.0020	--	0.000098	0.0021
			Chemical Total	2.6E-08	--	1.3E-09	--	2.7E-08		0.0020	--	0.000098	0.0021
		Exposure Point Total						2.7E-08					0.0021
	Exposure Medium Total							2.7E-08					0.0021
Medium Total								2.7E-08					0.0021
Sediment	Sediment	Intermittent Stream	Arsenic	1.5E-07	--	8.9E-09	--	1.6E-07	Dermal, CVS	0.012	--	0.00069	0.012
			Chromium	1.4E-06	--	6.5E-07	--	2.0E-06	None Specified	0.0049	--	0.0023	0.0073
			Cobalt	--	--	--	--	--	Thyroid	0.024	--	0.00028	0.024
			Iron	--	--	--	--	--	GS	0.025	--	0.00030	0.026
			Chemical Total	1.5E-06	--	6.6E-07	--	2.2E-06		0.066	--	0.0036	0.069
		Exposure Point Total						2.2E-06					0.069
	Exposure Medium Total							2.2E-06					0.069
Medium Total								2.2E-06					0.069

TABLE 9.9.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Perkiomen Creek	Chromium	1.6E-06	--	7.5E-07	--	2.3E-06	None Specified	0.0057	--	0.0027	0.0084
			Chemical Total	1.6E-06	--	7.5E-07	--	2.3E-06		0.0057	--	0.0027	0.0084
		Exposure Point Total						2.3E-06					0.0084
	Exposure Medium Total							2.3E-06					0.0084
Medium Total								2.3E-06					0.0084
Receptor Risk Total - Subsurface Soil and Intermittent Stream								5.4E-06	Receptor HI Total - Subsurface Soil and Intermittent Stream				0.34
Receptor Risk Total - Subsurface Soil and Perkiomen Creek								4.9E-06	Receptor HI Total - Subsurface Soil and Perkiomen Creek				0.16

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total CVS HI	0.060
Total Dermal HI	0.089
Total GS HI	0.055
Total Hepatic HI	0.017
Total Nervous HI	0.11
Total None Specified HI	0.025
Total Respiratory HI	0.0000083
Total Thyroid HI	0.050
Total Urinary HI	0.000075

TABLE 9.10.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA
PAGE 1 OF 2

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum	--	--	--	--	--	Nervous	0.00075	--	0.000015	0.00077
			Arsenic	8.5E-08	--	8.6E-09	--	9.4E-08	Dermal, CVS	0.0019	--	0.00019	0.0021
			Chromium	8.6E-08	--	6.9E-08	--	1.6E-07	None Specified	0.00037	--	0.00029	0.00066
			Cobalt	--	--	--	--	--	Thyroid	0.0018	--	0.000037	0.0019
			Copper	--	--	--	--	--	GS	0.00061	--	0.000012	0.00062
			Iron	--	--	--	--	--	GS	0.0014	--	0.000029	0.0015
			Manganese	--	--	--	--	--	Nervous	0.00090	--	0.00045	0.0013
			Thallium	--	--	--	--	--	Dermal	0.0015	--	0.000029	0.0015
			Vanadium	--	--	--	--	--	Dermal	0.00039	--	0.00030	0.00068
			Chemical Total	1.7E-07	--	7.8E-08	--	2.5E-07		0.0096	--	0.0014	0.011
		Exposure Point Total						2.5E-07					0.011
	Exposure Medium Total							2.5E-07					0.011
	Air	Baghurst Drive Site	Aluminum	--	--	--	--	--	Nervous	--	0.000010	--	0.000010
			Arsenic	--	2.8E-11	--	--	2.8E-11	Dermal, CVS	--	0.0000043	--	0.0000043
			Chromium	--	9.9E-10	--	--	9.9E-10	Respiratory	--	0.00000075	--	0.00000075
			Cobalt	--	3.4E-11	--	--	3.4E-11	Respiratory	--	0.0000062	--	0.0000062
			Copper	--	--	--	--	--	NA	--	--	--	--
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	Nervous	--	0.000030	--	0.000030
			Thallium	--	--	--	--	--	NA	--	--	--	--
			Vanadium	--	--	--	--	--	Respiratory	--	0.0000013	--	0.0000013
			Chemical Total	--	1.1E-09	--	--	1.1E-09		- -	0.000053	- -	0.000053
		Exposure Point Total						1.1E-09					0.000053
	Exposure Medium Total							1.1E-09					0.000053
Medium Total								2.5E-07					0.011
Surface Water	Surface Water	Intermittent Stream	1,1-Dichloroethane	4.8E-10	--	1.3E-09	--	1.7E-09	Urinary	0.0000042	--	0.000011	0.000015
			Dieldrin	4.3E-09	--	2.4E-07	--	2.4E-07	Hepatic	0.000054	--	0.0030	0.0030
			Heptachlor Epoxide	1.3E-09	--	4.7E-08	--	4.8E-08	Hepatic	0.00011	--	0.0040	0.0041
			Arsenic	5.7E-08	--	1.6E-08	--	7.4E-08	Dermal, CVS	0.0013	--	0.00037	0.0016
			Chromium	4.7E-09	--	1.1E-07	--	1.1E-07	None Specified	0.000020	--	0.00046	0.00048
			Manganese	--	--	--	--	--	Nervous	0.0031	--	0.022	0.025
			Chemical Total	6.8E-08	--	4.1E-07	--	4.8E-07		0.0045	--	0.030	0.034
		Exposure Point Total						4.8E-07					0.034
	Exposure Medium Total							4.8E-07					0.034
Medium Total								4.8E-07					0.034
Surface Water	Surface Water	Perkiomen Creek	Arsenic	7.3E-09	--	2.1E-09	--	9.4E-09	Dermal, CVS	0.00016	--	0.000047	0.00021
			Chemical Total	7.3E-09	--	2.1E-09	--	9.4E-09		0.00016	--	0.000047	0.00021
		Exposure Point Total						9.4E-09					0.00021
	Exposure Medium Total							9.4E-09					0.00021
Medium Total								9.4E-09					0.00021
Sediment	Sediment	Intermittent Stream	Arsenic	1.1E-07	--	7.4E-08	--	1.8E-07	Dermal, CVS	0.00082	--	0.00058	0.0014
			Chromium	3.0E-07	--	1.7E-06	--	2.0E-06	None Specified	0.00035	--	0.0020	0.0023
			Cobalt	--	--	--	--	--	Thyroid	0.0017	--	0.00024	0.0019
			Iron	--	--	--	--	--	GS	0.0018	--	0.00025	0.0020
			Chemical Total	4.0E-07	--	1.7E-06	--	2.2E-06		0.0046	--	0.0030	0.0076
		Exposure Point Total						2.2E-06					0.0076
	Exposure Medium Total							2.2E-06					0.0076
Medium Total								2.2E-06					0.0076

TABLE 9.10.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Perkiomen Creek	Chromium	3.4E-07	--	1.9E-06	--	2.3E-06	None Specified	0.00040	--	0.0022	0.0026
			Chemical Total	3.4E-07	--	1.9E-06	--	2.3E-06		0.00040	--	0.0022	0.0026
		Exposure Point Total						2.3E-06					0.0026
	Exposure Medium Total							2.3E-06					0.0026
Medium Total								2.3E-06					0.0026
Receptor Total				Receptor Risk Total - Subsurface Soil and Intermittent Stream				2.9E-06	Receptor HI Total - Subsurface Soil and Intermittent Stream				0.053
Receptor Total				Receptor Risk Total - Subsurface Soil and Perkiomen Creek				3E-06	Receptor HI Total - Subsurface Soil and Perkiomen Creek				0.014

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.11.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum	- -	--	- -	--	- -					
			Arsenic	4.3E-07	--	2.9E-08	--	4.6E-07					
			Chromium	1.5E-06	--	7.6E-07	--	2.3E-06					
			Cobalt	- -	--	- -	--	- -					
			Copper	- -	--	- -	--	- -					
			Iron	- -	--	- -	--	- -					
			Manganese	- -	--	- -	--	- -					
			Thallium	- -	--	- -	--	- -					
			Vanadium	- -	--	- -	--	- -					
			Chemical Total	2.0E-06	--	7.8E-07	--	2.7E-06					
		Exposure Point Total						2.7E-06					
	Exposure Medium Total							2.7E-06					
	Air	Baghurst Drive Site	Aluminum	--	- -	--	--	- -					
			Arsenic	--	3.6E-11	--	--	3.6E-11					
			Chromium	--	2.2E-09	--	--	2.2E-09					
			Cobalt	--	4.3E-11	--	--	4.3E-11					
			Copper	--	- -	--	--	- -					
			Iron	--	- -	--	--	- -					
			Manganese	--	- -	--	--	- -					
			Thallium	--	- -	--	--	- -					
			Vanadium	--	- -	--	--	- -					
			Chemical Total	--	2.2E-09	--	--	2.2E-09					
		Exposure Point Total						2.2E-09					
	Exposure Medium Total							2.2E-09					
Medium Total								2.8E-06					
Surface Water	Surface Water	Intermittent Stream	1,1-Dichloroethane	2.2E-09	--	2.0E-09	--	4.2E-09					
			Dieldrin	2.0E-08	--	3.8E-07	--	4.0E-07					
			Heptachlor Epoxide	5.7E-09	--	7.5E-08	--	8.1E-08					
			Arsenic	2.6E-07	--	2.6E-08	--	2.9E-07					
			Chromium	7.3E-08	--	3.7E-07	--	4.5E-07					
			Manganese	- -	--	- -	--	- -					
			Chemical Total	3.6E-07	--	8.6E-07	--	1.2E-06					
		Exposure Point Total						1.2E-06					
	Exposure Medium Total							1.2E-06					
Medium Total								1.2E-06					
Surface Water	Surface Water	Perkiomen Creek	Arsenic	3.3E-08	--	3.4E-09	--	3.7E-08					
			Chemical Total	3.3E-08	--	3.4E-09	--	3.7E-08					
		Exposure Point Total						3.7E-08					
	Exposure Medium Total							3.7E-08					
Medium Total								3.7E-08					
Sediment	Sediment	Intermittent Stream	Arsenic	2.5E-07	--	8.3E-08	--	3.4E-07					
			Chromium	1.7E-06	--	2.3E-06	--	4.0E-06					
			Cobalt	- -	--	- -	--	- -					
			Iron	- -	--	- -	--	- -					
			Chemical Total	1.9E-06	--	2.4E-06	--	4.3E-06					
		Exposure Point Total						4.3E-06					
	Exposure Medium Total							4.3E-06					
Medium Total								4.3E-06					

TABLE 9.11.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Perkiomen Creek	Chromium	1.9E-06	--	2.7E-06	--	4.6E-06					
			Chemical Total	1.9E-06	--	2.7E-06	--	4.6E-06					
		Exposure Point Total						4.6E-06					
	Exposure Medium Total							4.6E-06					
Medium Total								4.6E-06					
Receptor Risk Total - Subsurface Soil and Intermittent Stream								8.3E-06					
Receptor Risk Total - Subsurface Soil and Perkiomen Creek								7.4E-06					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.12.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum	--	--	--	--	--	Nervous	0.0011	--	0.000034	0.0012
			Arsenic	1.8E-07	--	2.8E-08	--	2.1E-07	Dermal, CVS	0.0029	--	0.00043	0.0033
			Chromium	3.6E-07	--	4.3E-07	--	7.8E-07	None Specified	0.00055	--	0.00066	0.0012
			Cobalt	--	--	--	--	--	Thyroid	0.0028	--	0.000083	0.0028
			Copper	--	--	--	--	--	GS	0.00093	--	0.000028	0.00095
			Iron	--	--	--	--	--	GS	0.0022	--	0.000065	0.0022
			Manganese	--	--	--	--	--	Nervous	0.0014	--	0.0010	0.0024
			Thallium	--	--	--	--	--	Dermal	0.0022	--	0.000067	0.0023
			Vanadium	--	--	--	--	--	Dermal	0.00059	--	0.00068	0.0013
			Chemical Total	5.4E-07	--	4.5E-07	--	9.9E-07		0.015	--	0.0031	0.018
		Exposure Point Total						9.9E-07					0.018
	Exposure Medium Total							9.9E-07					0.018
	Air	Baghurst Drive Site	Aluminum	--	--	--	--	--	Nervous	--	0.0000052	--	0.0000052
			Arsenic	--	2.0E-11	--	--	2.0E-11	Dermal, CVS	--	0.0000022	--	0.0000022
			Chromium	--	1.4E-09	--	--	1.4E-09	Respiratory	--	0.00000038	--	0.00000038
			Cobalt	--	2.4E-11	--	--	2.4E-11	Respiratory	--	0.0000031	--	0.0000031
			Copper	--	--	--	--	--	NA	--	--	--	--
			Iron	--	--	--	--	--	NA	--	--	--	--
			Manganese	--	--	--	--	--	Nervous	--	0.000015	--	0.000015
			Thallium	--	--	--	--	--	NA	--	--	--	--
			Vanadium	--	--	--	--	--	Respiratory	--	0.00000066	--	0.00000066
			Chemical Total	--	1.4E-09	--	--	1.4E-09		- -	0.000026	- -	0.000026
		Exposure Point Total						1.4E-09					0.000026
	Exposure Medium Total							1.4E-09					0.000026
Medium Total								1.0E-06					0.018
Surface Water	Surface Water	Intermittent Stream	1,1-Dichloroethane	6.2E-10	--	1.0E-09	--	1.6E-09	Urinary	0.0000038	--	0.0000062	0.000010
			Dieldrin	5.6E-09	--	1.9E-07	--	2.0E-07	Hepatic	0.000049	--	0.0017	0.0017
			Heptachlor Epoxide	1.6E-09	--	3.8E-08	--	4.0E-08	Hepatic	0.000097	--	0.0023	0.0023
			Arsenic	7.4E-08	--	1.3E-08	--	8.8E-08	Dermal, CVS	0.0012	--	0.00021	0.0014
			Chromium	1.2E-08	--	1.7E-07	--	1.8E-07	None Specified	0.000018	--	0.00026	0.00028
			Manganese	--	--	--	--	--	Nervous	0.0028	--	0.012	0.015
			Chemical Total	9.4E-08	--	4.1E-07	--	5.0E-07		0.0041	--	0.017	0.021
		Exposure Point Total						5.0E-07					0.021
	Exposure Medium Total							5.0E-07					0.021
Medium Total								5.0E-07					0.021
Sediment	Sediment	Intermittent Stream	Arsenic	8.0E-08	--	1.2E-08	--	9.2E-08	Dermal, CVS	0.0012	--	0.00019	0.0014
			Chromium	3.4E-07	--	4.1E-07	--	7.4E-07	None Specified	0.00053	--	0.00063	0.0012
			Cobalt	--	--	--	--	--	Thyroid	0.0025	--	0.000076	0.0026
			Iron	--	--	--	--	--	GS	0.0027	--	0.000081	0.0028
			Chemical Total	4.2E-07	--	4.2E-07	--	8.4E-07		0.0070	--	0.00097	0.0080
		Exposure Point Total						8.4E-07					0.0080
	Exposure Medium Total							8.4E-07					0.0080
Medium Total								8.4E-07					0.0080
Receptor Total							Receptor Risk Total	2.3E-06				Receptor HI Total	0.047

TABLE 9.12.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total CVS HI	0.0061
Total Dermal HI	0.0096
Total GS HI	0.0060
Total Hepatic HI	0.0041
Total Nervous HI	0.019
Total None Specified HI	0.0026
Total Respiratory HI	0.0000042
Total Thyroid HI	0.0055
Total Urinary HI	0.000010

TABLE 9.13.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Baghurst Drive Site	1,1,1-Trichloroethane	See Table 9.15.CTE for Cancer Risks					Body Weight	0.042	--	0.0090	0.051
			1,1,2-Trichloroethane						Hematologic, Immune	0.0024	--	0.00021	0.0027
			1,1-Dichloroethane						Urinary	0.020	--	0.0019	0.022
			1,1-Dichloroethene						Hepatic	0.51	--	0.080	0.58
			1,2-Dichloroethane						Urinary	0.0042	--	0.00024	0.0044
			2-Hexanone						Nervous	0.049	--	0.0024	0.052
			Benzene						Immune	0.0022	--	0.00039	0.0026
			Bromodichloromethane						Urinary	0.0011	--	0.000094	0.0012
			Chloroform						Hepatic	0.0054	--	0.00058	0.0060
			Methyl tert-butyl ether						NA	--	--	--	--
			Methylene chloride						Hepatic	0.0037	--	0.00016	0.0039
			Tetrachloroethene						Nervous, Ocular	0.0042	--	0.0030	0.0072
			Trichloroethene (Mutagenic)						NA	--	--	--	--
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	0.80	--	0.16	0.95
			Vinyl chloride						Hepatic	0.0058	--	0.00053	0.0064
			1,4-Dioxane						Hepatic, Urinary	0.051	--	0.00022	0.051
			Dibenzo(a,h)anthracene						NA	--	--	--	--
			Aldrin						Hepatic	0.016	--	--	0.016
			delta-BHC						Hepatic	0.000022	--	0.000019	0.000041
			Dieldrin						Hepatic	0.0026	--	0.0058	0.0084
			Aluminum						Nervous	0.043	--	0.00021	0.043
			Antimony						Hematologic	0.067	--	0.0022	0.069
			Arsenic						Dermal, CVS	0.53	--	0.0026	0.54
			Cadmium						Urinary	0.018	--	0.0018	0.020
			Chromium						None Specified	0.091	--	0.036	0.13
			Cobalt						Thyroid	0.11	--	0.00021	0.11
			Cyanide						Reproductive	0.62	--	0.0031	0.63
			Iron						GS	0.073	--	0.00036	0.074
			Lead						NA	--	--	--	--
			Manganese						Nervous	0.083	--	0.010	0.093
			Nickel						Body Weight	0.0096	--	0.00024	0.0098
			Thallium						Dermal	0.19	--	0.00095	0.19
			Vanadium						Dermal	0.020	--	0.0038	0.024
			Chemical Total							3.4	--	0.32	3.7
		Exposure Point Total											3.7
	Exposure Medium Total												3.7
Medium Total													3.7
Receptor Total												Receptor HI Total	3.7

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Body Weight HI	0.061
Total CVS HI	1.5
Total Dermal HI	0.75
Total Developmental HI	0.95
Total GS HI	0.074
Total Hematologic HI	0.072
Total Hepatic HI	0.68
Total Immune HI	0.96
Total Nervous HI	0.19
Total None Specified HI	0.13
Total Reproductive HI	0.63
Total Thyroid HI	0.11
Total Urinary HI	0.099

TABLE 9.14.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Baghurst Drive Site	1,1,1-Trichloroethane	See Table 9.15.CTE for Cancer Risks					Body Weight	0.020	--	0.0043	0.024
			1,1,2-Trichloroethane						Hematologic, Immune	0.0011	--	0.00010	0.0012
			1,1-Dichloroethane						Urinary	0.0095	--	0.00089	0.010
			1,1-Dichloroethene						Hepatic	0.24	--	0.038	0.27
			1,2-Dichloroethane						Urinary	0.0020	--	0.00012	0.0021
			2-Hexanone						Nervous	0.023	--	0.0011	0.024
			Benzene						Immune	0.0010	--	0.00018	0.0012
			Bromodichloromethane						Urinary	0.00053	--	0.000045	0.00057
			Chloroform						Hepatic	0.0025	--	0.00028	0.0028
			Methyl tert-butyl ether						NA	--	--	--	--
			Methylene chloride						Hepatic	0.0017	--	0.000078	0.0018
			Tetrachloroethene						Nervous, Ocular	0.0020	--	0.0014	0.0034
			Trichloroethene (Mutagenic)						NA	--	--	--	--
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	0.37	--	0.074	0.45
			Vinyl chloride						Hepatic	0.0027	--	0.00025	0.0030
			1,4-Dioxane						Hepatic, Urinary	0.024	--	0.00010	0.024
			Dibenzo(a,h)anthracene						NA	--	--	--	--
			Aldrin						Hepatic	0.0074	--	--	0.0074
			delta-BHC						Hepatic	0.000010	--	0.0000092	0.000020
			Dieldrin						Hepatic	0.0012	--	0.0027	0.0040
			Aluminum						Nervous	0.020	--	0.000082	0.020
			Antimony						Hematologic	0.031	--	0.00085	0.032
			Arsenic						Dermal, CVS	0.25	--	0.0010	0.25
			Cadmium						Urinary	0.0084	--	0.00069	0.0091
			Chromium						None Specified	0.043	--	0.014	0.057
			Cobalt						Thyroid	0.051	--	0.000083	0.051
			Cyanide						Reproductive	0.29	--	0.0012	0.29
			Iron						GS	0.034	--	0.00014	0.035
			Lead						NA	--	--	--	--
			Manganese						Nervous	0.039	--	0.0040	0.043
			Nickel						Body Weight	0.0045	--	0.000092	0.0046
			Thallium						Dermal	0.090	--	0.00037	0.091
			Vanadium						Dermal	0.0095	--	0.0015	0.011
			Chemical Total							1.6	--	0.15	1.7
		Exposure Point Total											1.7
	Exposure Medium Total												1.7
	Air	Baghurst Drive Site	1,1,1-Trichloroethane						Hepatic	--	0.26	--	0.26
			1,1,2-Trichloroethane						Respiratory	--	0.76	--	0.76
			1,1-Dichloroethane						NA	--	--	--	--
			1,1-Dichloroethene						Hepatic	--	2.0	--	2.0
			1,2-Dichloroethane						Nervous	--	0.056	--	0.056
			2-Hexanone						Nervous	--	0.13	--	0.13
			Benzene						Immune	--	0.0045	--	0.0045
			Bromodichloromethane						NA	--	--	--	--
			Chloroform						Hepatic	--	0.0087	--	0.0087
			Methyl tert-butyl ether						Hepatic, Urinary, Ocular	--	0.00040	--	0.00040
			Methylene chloride						Hepatic	--	0.00058	--	0.00058
			Tetrachloroethene						Nervous, Ocular	--	0.0099	--	0.0099
			Trichloroethene (Mutagenic)						NA	--	--	--	--
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	--	3.1	--	3.1
			Vinyl chloride						Hepatic	--	0.0027	--	0.0027
			1,4-Dioxane						Nervous, Respiratory	--	0.79	--	0.79
			Dibenzo(a,h)anthracene						NA	--	--	--	--
			Aldrin						NA	--	--	--	--
			delta-BHC						NA	--	--	--	--
			Dieldrin						NA	--	--	--	--
			Aluminum						Nervous	--	--	--	--
			Antimony						NA	--	--	--	--
			Arsenic						Dermal, CVS	--	--	--	--
			Cadmium						Urinary	--	--	--	--
			Chromium						Respiratory	--	--	--	--
			Cobalt						Respiratory	--	--	--	--
			Cyanide						Endocrine	--	7.7	--	7.7
			Iron						NA	--	--	--	--
			Lead						NA	--	--	--	--

TABLE 9.14.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Baghurst Drive Site	Manganese						Nervous	--	--	--	--
			Nickel						Respiratory	--	--	--	--
			Thallium						NA	--	--	--	--
			Vanadium						Respiratory	--	--	--	--
			Chemical Total							- -	14.8	- -	14.8
		Exposure Point Total											14.8
	Exposure Medium Total												14.8
Medium Total													16.5
Receptor Total												Receptor HI Total	16.5

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Body Weight HI	0.029
Total CVS HI	3.8
Total Dermal HI	0.35
Total Developmental HI	3.6
Total GS HI	0.035
Total Endocrine HI	7.7
Total Hematologic HI	0.033
Total Hepatic HI	2.6
Total Immune HI	3.6
Total Nervous HI	1.1
Total None Specified HI	0.057
Total Reproductive HI	0.29
Total Respiratory HI	1.6
Total Thyroid HI	0.051
Total Urinary HI	0.047

TABLE 9.15.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Baghurst Drive Site	1,1,1-Trichloroethane	- -	--	- -	–	- -	See Tables 9.13.CTE and 9.14.CTE for Hazard Indices				
			1,1,2-Trichloroethane	4.2E-08	--	3.7E-09	–	4.6E-08					
			1,1-Dichloroethane	1.7E-06	--	1.6E-07	–	1.9E-06					
			1,1-Dichloroethene	- -	--	- -	–	- -					
			1,2-Dichloroethane	1.7E-07	--	1.0E-08	–	1.8E-07					
			2-Hexanone	- -	--	- -	–	- -					
			Benzene	3.6E-08	--	6.5E-09	–	4.2E-08					
			Bromodichloromethane	1.1E-07	--	8.9E-09	–	1.1E-07					
			Chloroform	1.3E-07	--	1.4E-08	–	1.4E-07					
			Methyl tert-butyl ether	1.1E-08	--	2.9E-10	–	1.1E-08					
			Methylene chloride	1.1E-08	--	5.1E-10	–	1.2E-08					
			Tetrachloroethene	4.0E-09	--	2.8E-09	–	6.8E-09					
			Trichloroethene (Mutagenic)	9.6E-07	--	1.9E-07	–	1.1E-06					
			Trichloroethene (Nonmutagenic)	1.1E-06	--	2.2E-07	–	1.3E-06					
			Vinyl chloride	2.1E-05	--	1.9E-06	–	2.2E-05					
			1,4-Dioxane	1.2E-05	--	4.9E-08	–	1.2E-05					
			Dibenzo(a,h)anthracene	3.4E-07	--	- -	–	3.4E-07					
			Aldrin	6.1E-07	--	- -	–	6.1E-07					
			delta-BHC	8.4E-08	--	7.4E-08	–	1.6E-07					
			Dieldrin	1.6E-07	--	3.5E-07	–	5.1E-07					
			Aluminum	- -	--	- -	–	- -					
			Antimony	- -	--	- -	–	- -					
			Arsenic	1.8E-05	--	8.0E-08	–	1.8E-05					
			Cadmium	- -	--	- -	–	- -					
			Chromium	3.5E-05	--	1.3E-05	–	4.9E-05					
			Cobalt	- -	--	- -	–	- -					
			Cyanide	- -	--	- -	–	- -					
			Iron	- -	--	- -	–	- -					
			Lead	- -	--	- -	–	- -					
			Manganese	- -	--	- -	–	- -					
			Nickel	- -	--	- -	–	- -					
			Thallium	- -	--	- -	–	- -					
			Vanadium	- -	--	- -	–	- -					
			Chemical Total	9.1E-05	--	1.6E-05	–	1.1E-04					
		Exposure Point Total						1.1E-04					
	Exposure Medium Total							1.1E-04					
	Air	Baghurst Drive Site	1,1,1-Trichloroethane	–	- -	--	–	- -					
			1,1,2-Trichloroethane	–	2.4E-07	--	–	2.4E-07					
			1,1-Dichloroethane	–	1.0E-05	--	–	1.0E-05					
			1,1-Dichloroethene	–	- -	--	–	- -					
			1,2-Dichloroethane	–	1.0E-06	--	–	1.0E-06					
			2-Hexanone	–	- -	--	–	- -					
			Benzene	–	1.1E-07	--	–	1.1E-07					
			Bromodichloromethane	–	1.3E-06	--	–	1.3E-06					
			Chloroform	–	2.0E-06	--	–	2.0E-06					
			Methyl tert-butyl ether	–	3.2E-08	--	–	3.2E-08					
			Methylene chloride	–	5.4E-10	--	–	5.4E-10					
			Tetrachloroethene	–	1.0E-08	--	–	1.0E-08					
			Trichloroethene (Mutagenic)	–	9.8E-07	--	–	9.8E-07					
			Trichloroethene (Nonmutagenic)	–	1.9E-06	--	–	1.9E-06					
			Vinyl chloride	–	1.2E-07	--	–	1.2E-07					
			1,4-Dioxane	–	1.2E-05	--	–	1.2E-05					
			Dibenzo(a,h)anthracene	–	- -	--	–	- -					
			Aldrin	–	3.6E-06	--	–	3.6E-06					
			delta-BHC	–	- -	--	–	- -					
			Dieldrin	–	- -	--	–	- -					
			Aluminum	–	- -	--	–	- -					
			Antimony	–	- -	--	–	- -					
			Arsenic	–	- -	--	–	- -					
			Cadmium	–	- -	--	–	- -					
			Chromium	–	- -	--	–	- -					
			Cobalt	–	- -	--	–	- -					
			Cyanide	–	- -	--	–	- -					
			Iron	–	- -	--	–	- -					
			Lead	–	- -	--	–	- -					

TABLE 9.15.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Baghurst Drive Site	Manganese	--	- -	--	--	- -					
			Nickel	--	- -	--	--	- -					
			Thallium	--	- -	--	--	- -					
			Vanadium	--	- -	--	--	- -					
			Chemical Total	--	3.3E-05	--	--	3.3E-05					
		Exposure Point Total						3.3E-05					
	Exposure Medium Total							3.3E-05					
Medium Total								1.4E-04					
Receptor Total							Receptor Risk Total	1.4E-04					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.16.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

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

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum	See Table 9.18.CTE for Cancer Risks					Nervous	0.096	--	0.0011	0.098
			Arsenic						Dermal, CVS	0.24	--	0.014	0.26
			Chromium						None Specified	0.047	--	0.022	0.069
			Cobalt						Thyroid	0.23	--	0.0028	0.24
			Copper						GS	0.078	--	0.00093	0.079
			Iron						GS	0.18	--	0.0022	0.19
			Manganese						Nervous	0.11	--	0.034	0.15
			Thallium						Dermal	0.19	--	0.0022	0.19
			Vanadium						Dermal	0.049	--	0.023	0.072
			Chemical Total							1.2	--	0.10	1.3
		Exposure Point Total											1.3
	Exposure Medium Total												1.3
	Air	Baghurst Drive Site	Aluminum						Nervous	--	0.0011	--	0.0011
			Arsenic						Dermal, CVS	--	0.00047	--	0.00047
			Chromium						Respiratory	--	0.000081	--	0.000081
			Cobalt						Respiratory	--	0.00067	--	0.00067
			Copper						NA	--	--	--	--
			Iron						NA	--	--	--	--
			Manganese						Nervous	--	0.0032	--	0.0032
			Thallium						NA	--	--	--	--
			Vanadium						Respiratory	--	0.00014	--	0.00014
			Chemical Total							- -	0.0057	- -	0.0057
		Exposure Point Total											0.0057
	Exposure Medium Total												0.0057
Medium Total													1.3
Groundwater	Groundwater	Baghurst Drive Site	1,1,1-Trichloroethane						Body Weight	0.042	--	0.0090	0.051
			1,1,2-Trichloroethane						Hematologic, Immune	0.0024	--	0.00021	0.0027
			1,1-Dichloroethane						Urinary	0.020	--	0.0019	0.022
			1,1-Dichloroethene						Hepatic	0.51	--	0.080	0.58
			1,2-Dichloroethane						Urinary	0.0042	--	0.00024	0.0044
			2-Hexanone						Nervous	0.049	--	0.0024	0.052
			Benzene						Immune	0.0022	--	0.00039	0.0026
			Bromodichloromethane						Urinary	0.0011	--	0.000094	0.0012
			Chloroform						Hepatic	0.0054	--	0.00058	0.0060
			Methyl tert-butyl ether						NA	--	--	--	--
			Methylene chloride						Hepatic	0.0037	--	0.00016	0.0039
			Tetrachloroethene						Nervous, Ocular	0.0042	--	0.0030	0.0072
			Trichloroethene (Mutagenic)						NA	--	--	--	--
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	0.80	--	0.16	0.95
			Vinyl chloride						Hepatic	0.0058	--	0.00053	0.0064
			1,4-Dioxane						Hepatic, Urinary	0.051	--	0.00022	0.051
			Dibenzo(a,h)anthracene						NA	--	--	--	--
			Aldrin						Hepatic	0.016	--	--	0.016
			delta-BHC						Hepatic	0.000022	--	0.000019	0.000041
			Dieldrin						Hepatic	0.0026	--	0.0058	0.0084
			Aluminum						Nervous	0.043	--	0.00021	0.043
			Antimony						Hematologic	0.067	--	0.0022	0.069
			Arsenic						Dermal, CVS	0.53	--	0.0026	0.54
			Cadmium						Urinary	0.018	--	0.0018	0.020
			Chromium						None Specified	0.091	--	0.036	0.13
			Cobalt						Thyroid	0.11	--	0.00021	0.11
			Cyanide						Reproductive	0.62	--	0.0031	0.63
			Iron						GS	0.073	--	0.00036	0.074
			Lead						NA	--	--	--	--
			Manganese						Nervous	0.083	--	0.010	0.093
			Nickel						Body Weight	0.0096	--	0.00024	0.0098
			Thallium						Dermal	0.19	--	0.00095	0.19
			Vanadium						Dermal	0.020	--	0.0038	0.024
			Chemical Total							3.4	--	0.32	3.7
		Exposure Point Total											3.7
	Exposure Medium Total												3.7
Medium Total													3.7
Receptor Total												Receptor HI Total	5.0

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 9.16.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

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

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
												Total Body Weight HI	0.061
												Total CVS HI	1.7
												Total Dermal HI	1.3
												Total Developmental HI	0.95
												Total GS HI	0.34
												Total Hematologic HI	0.072
												Total Hepatic HI	0.68
												Total Immune HI	0.96
												Total Nervous HI	0.45
												Total None Specified HI	0.20
												Total Reproductive HI	0.63
												Total Respiratory HI	0.00090
												Total Thyroid HI	0.34
												Total Urinary HI	0.099

TABLE 9.17.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum	See Table 9.18.CTE for Cancer Risks					Nervous	0.0068	--	0.00014	0.0069
			Arsenic						Dermal, CVS	0.017	--	0.0017	0.019
			Chromium						None Specified	0.0033	--	0.0026	0.0059
			Cobalt						Thyroid	0.016	--	0.00033	0.017
			Copper						GS	0.0055	--	0.00011	0.0056
			Iron						GS	0.013	--	0.00026	0.013
			Manganese						Nervous	0.0081	--	0.0041	0.012
			Thallium						Dermal	0.013	--	0.00026	0.013
			Vanadium						Dermal	0.0035	--	0.0027	0.0062
			Chemical Total							0.087	--	0.012	0.099
		Exposure Point Total											0.099
	Exposure Medium Total												0.099
	Air	Baghurst Drive Site	Aluminum						Nervous	--	0.0011	--	0.0011
			Arsenic						Dermal, CVS	--	0.00047	--	0.00047
			Chromium						Respiratory	--	0.000081	--	0.000081
			Cobalt						Respiratory	--	0.00067	--	0.00067
			Copper						NA	--	--	--	--
			Iron						NA	--	--	--	--
			Manganese						Nervous	--	0.0032	--	0.0032
			Thallium						NA	--	--	--	--
			Vanadium						Respiratory	--	0.00014	--	0.00014
			Chemical Total							- -	0.0057	- -	0.0057
		Exposure Point Total											0.0057
	Exposure Medium Total												0.0057
Medium Total													0.10
Groundwater	Groundwater	Baghurst Drive Site	1,1,1-Trichloroethane						Body Weight	0.020	--	0.0043	0.024
			1,1,2-Trichloroethane						Hematologic, Immune	0.0011	--	0.00010	0.0012
			1,1-Dichloroethane						Urinary	0.0095	--	0.00089	0.010
			1,1-Dichloroethene						Hepatic	0.24	--	0.038	0.27
			1,2-Dichloroethane						Urinary	0.0020	--	0.00012	0.0021
			2-Hexanone						Nervous	0.023	--	0.0011	0.024
			Benzene						Immune	0.0010	--	0.00018	0.0012
			Bromodichloromethane						Urinary	0.00053	--	0.000045	0.00057
			Chloroform						Hepatic	0.0025	--	0.00028	0.0028
			Methyl tert-butyl ether						NA	--	--	--	--
			Methylene chloride						Hepatic	0.0017	--	0.000078	0.0018
			Tetrachloroethene						Nervous, Ocular	0.0020	--	0.0014	0.0034
			Trichloroethene (Mutagenic)						NA	--	--	--	--
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	0.37	--	0.074	0.45
			Vinyl chloride						Hepatic	0.0027	--	0.00025	0.0030
			1,4-Dioxane						Hepatic, Urinary	0.024	--	0.00010	0.024
			Dibenzo(a,h)anthracene						NA	--	--	--	--
			Aldrin						Hepatic	0.0074	--	--	0.0074
			delta-BHC						Hepatic	0.000010	--	0.0000092	0.000020
			Dieldrin						Hepatic	0.0012	--	0.0027	0.0040
			Aluminum						Nervous	0.020	--	0.000082	0.020
			Antimony						Hematologic	0.031	--	0.00085	0.032
			Arsenic						Dermal, CVS	0.25	--	0.0010	0.25
			Cadmium						Urinary	0.0084	--	0.00069	0.0091
			Chromium						None Specified	0.043	--	0.014	0.057
			Cobalt						Thyroid	0.051	--	0.000083	0.051
			Cyanide						Reproductive	0.29	--	0.0012	0.29
			Iron						GS	0.034	--	0.00014	0.035
			Lead						NA	--	--	--	--
			Manganese						Nervous	0.039	--	0.0040	0.043
			Nickel						Body Weight	0.0045	--	0.000092	0.0046
			Thallium						Dermal	0.090	--	0.00037	0.091
			Vanadium						Dermal	0.0095	--	0.0015	0.011
			Chemical Total							1.6	--	0.15	1.7
		Exposure Point Total											1.7
	Exposure Medium Total												1.7

TABLE 9.17.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Baghurst Drive Site	1,1,1-Trichloroethane						Hepatic	–	0.26	--	0.26
			1,1,2-Trichloroethane						Respiratory	–	0.76	--	0.76
			1,1-Dichloroethane						NA	–	--	--	--
			1,1-Dichloroethene						Hepatic	–	2.0	--	2.0
			1,2-Dichloroethane						Nervous	–	0.056	--	0.056
			2-Hexanone						Nervous	–	0.13	--	0.13
			Benzene						Immune	–	0.0045	--	0.0045
			Bromodichloromethane						NA	–	--	--	--
			Chloroform						Hepatic	–	0.0087	--	0.0087
			Methyl tert-butyl ether						Hepatic, Urinary, Ocular	–	0.00040	--	0.00040
			Methylene chloride						Hepatic	–	0.00058	--	0.00058
			Tetrachloroethene						Nervous, Ocular	–	0.0099	--	0.0099
			Trichloroethene (Mutagenic)						NA	–	--	--	--
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	–	3.1	--	3.1
			Vinyl chloride						Hepatic	–	0.0027	--	0.0027
			1,4-Dioxane						Nervous, Respiratory	–	0.79	--	0.79
			Dibenzo(a,h)anthracene						NA	–	--	--	--
			Aldrin						NA	–	--	--	--
			delta-BHC						NA	–	--	--	--
			Dieldrin						NA	–	--	--	--
			Aluminum						Nervous	–	--	--	--
			Antimony						NA	–	--	--	--
			Arsenic						Dermal, CVS	–	--	--	--
			Cadmium						Urinary	–	--	--	--
			Chromium						Respiratory	–	--	--	--
			Cobalt						Respiratory	–	--	--	--
			Cyanide						Endocrine	–	7.7	--	7.7
			Iron						NA	–	--	--	--
			Lead						NA	–	--	--	--
			Manganese						Nervous	–	--	--	--
			Nickel						Respiratory	–	--	--	--
			Thallium						NA	–	--	--	--
			Vanadium						Respiratory	–	--	--	--
			Chemical Total							- -	14.8	- -	14.8
		Exposure Point Total											14.8
	Exposure Medium Total												14.8
Medium Total													16.5
Receptor Total												Receptor HI Total	16.6

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

Total Body Weight HI	0.029
Total CVS HI	3.8
Total Dermal HI	0.39
Total Developmental HI	3.6
Total GS HI	0.053
Total Endocrine HI	7.7
Total Hematologic HI	0.033
Total Hepatic HI	2.6
Total Immune HI	3.6
Total Nervous HI	1.1
Total None Specified HI	0.063
Total Reproductive HI	0.29
Total Respiratory HI	1.6
Total Thyroid HI	0.068
Total Urinary HI	0.047

TABLE 9.18.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum	- -	--	- -	–	- -	See Tables 9.16.CTE and 9.17.CTE for Hazard Indices				
			Arsenic	3.9E-06	--	2.6E-07	–	4.2E-06					
			Chromium	1.4E-05	--	6.8E-06	–	2.1E-05					
			Cobalt	- -	--	- -	–	- -					
			Copper	- -	--	- -	–	- -					
			Iron	- -	--	- -	–	- -					
			Manganese	- -	--	- -	–	- -					
			Thallium	- -	--	- -	–	- -					
			Vanadium	- -	--	- -	–	- -					
			Chemical Total	1.8E-05	--	7.1E-06	–	2.5E-05					
		Exposure Point Total						2.5E-05					
	Exposure Medium Total							2.5E-05					
	Air	Baghurst Drive Site	Aluminum	–	- -	--	–	- -					
			Arsenic	–	3.9E-09	--	–	3.9E-09					
			Chromium	–	2.3E-07	--	–	2.3E-07					
			Cobalt	–	4.7E-09	--	–	4.7E-09					
			Copper	–	- -	--	–	- -					
			Iron	–	- -	--	–	- -					
			Manganese	–	- -	--	–	- -					
			Thallium	–	- -	--	–	- -					
			Vanadium	–	- -	--	–	- -					
			Chemical Total	–	2.4E-07	--	–	2.4E-07					
		Exposure Point Total						2.4E-07					
	Exposure Medium Total							2.4E-07					
Medium Total								2.5E-05					
Groundwater	Groundwater	Baghurst Drive Site	1,1,1-Trichloroethane	- -	--	- -	–	- -					
			1,1,2-Trichloroethane	4.2E-08	--	3.7E-09	–	4.6E-08					
			1,1-Dichloroethane	1.7E-06	--	1.6E-07	–	1.9E-06					
			1,1-Dichloroethene	- -	--	- -	–	- -					
			1,2-Dichloroethane	1.7E-07	--	1.0E-08	–	1.8E-07					
			2-Hexanone	- -	--	- -	–	- -					
			Benzene	3.6E-08	--	6.5E-09	–	4.2E-08					
			Bromodichloromethane	1.1E-07	--	8.9E-09	–	1.1E-07					
			Chloroform	1.3E-07	--	1.4E-08	–	1.4E-07					
			Methyl tert-butyl ether	1.1E-08	--	2.9E-10	–	1.1E-08					
			Methylene chloride	1.1E-08	--	5.1E-10	–	1.2E-08					
			Tetrachloroethene	4.0E-09	--	2.8E-09	–	6.8E-09					
			Trichloroethene (Mutagenic)	9.6E-07	--	1.9E-07	–	1.1E-06					
			Trichloroethene (Nonmutagenic)	1.1E-06	--	2.2E-07	–	1.3E-06					
			Vinyl chloride	2.1E-05	--	1.9E-06	–	2.2E-05					
			1,4-Dioxane	1.2E-05	--	4.9E-08	–	1.2E-05					
			Dibenzo(a,h)anthracene	3.4E-07	--	- -	–	3.4E-07					
			Aldrin	6.1E-07	--	- -	–	6.1E-07					
			delta-BHC	8.4E-08	--	7.4E-08	–	1.6E-07					
			Dieldrin	1.6E-07	--	3.5E-07	–	5.1E-07					
			Aluminum	- -	--	- -	–	- -					
			Antimony	- -	--	- -	–	- -					
			Arsenic	1.8E-05	--	8.0E-08	–	1.8E-05					
			Cadmium	- -	--	- -	–	- -					
			Chromium	3.5E-05	--	1.3E-05	–	4.9E-05					
			Cobalt	- -	--	- -	–	- -					
			Cyanide	- -	--	- -	–	- -					
			Iron	- -	--	- -	–	- -					
			Lead	- -	--	- -	–	- -					
			Manganese	- -	--	- -	–	- -					
			Nickel	- -	--	- -	–	- -					
			Thallium	- -	--	- -	–	- -					
			Vanadium	- -	--	- -	–	- -					
			Chemical Total	9.1E-05	--	1.6E-05	–	1.1E-04					
		Exposure Point Total						1.1E-04					
	Exposure Medium Total							1.1E-04					

TABLE 9.18.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Baghurst Drive Site	1,1,1-Trichloroethane	–	--	--	–	--					
			1,1,2-Trichloroethane	–	2.4E-07	--	–	2.4E-07					
			1,1-Dichloroethane	–	1.0E-05	--	–	1.0E-05					
			1,1-Dichloroethene	–	--	--	–	--					
			1,2-Dichloroethane	–	1.0E-06	--	–	1.0E-06					
			2-Hexanone	–	--	--	–	--					
			Benzene	–	1.1E-07	--	–	1.1E-07					
			Bromodichloromethane	–	1.3E-06	--	–	1.3E-06					
			Chloroform	–	2.0E-06	--	–	2.0E-06					
			Methyl tert-butyl ether	–	3.2E-08	--	–	3.2E-08					
			Methylene chloride	–	5.4E-10	--	–	5.4E-10					
			Tetrachloroethene	–	1.0E-08	--	–	1.0E-08					
			Trichloroethene (Mutagenic)	–	9.8E-07	--	–	9.8E-07					
			Trichloroethene (Nonmutagenic)	–	1.9E-06	--	–	1.9E-06					
			Vinyl chloride	–	1.2E-07	--	–	1.2E-07					
			1,4-Dioxane	–	1.2E-05	--	–	1.2E-05					
			Dibenzo(a,h)anthracene	–	--	--	–	--					
			Aldrin	–	3.6E-06	--	–	3.6E-06					
			delta-BHC	–	--	--	–	--					
			Dieldrin	–	--	--	–	--					
			Aluminum	–	--	--	–	--					
			Antimony	–	--	--	–	--					
			Arsenic	–	--	--	–	--					
			Cadmium	–	--	--	–	--					
			Chromium	–	--	--	–	--					
			Cobalt	–	--	--	–	--					
			Cyanide	–	--	--	–	--					
			Iron	–	--	--	–	--					
			Lead	–	--	--	–	--					
			Manganese	–	--	--	–	--					
			Nickel	–	--	--	–	--					
			Thallium	–	--	--	–	--					
			Vanadium	–	--	--	–	--					
			Chemical Total	–	3.3E-05	--	–	3.3E-05					
		Exposure Point Total						3.3E-05					
	Exposure Medium Total							3.3E-05					
Medium Total								1.4E-04					
Receptor Total							Receptor Risk Total	1.7E-04					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

RAGS Part D Table 10

Risk Summary

LIST OF TABLES

RAGS PART D TABLE 10

RISK SUMMARY

TABLE 10.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Intermittent Stream		All Cancer Risks Within Acceptable Levels					All Hazard Quotients Within Acceptable Levels				
			Chemical Total	--	--	--	--	--		--	--	--	--
		Exposure Point Total						--					--
	Exposure Medium Total							--					--
Medium Total								--					--
Sediment	Sediment	Intermittent Stream		All Cancer Risks Within Acceptable Levels					All Hazard Quotients Within Acceptable Levels				
			Chemical Total	--	--	--	--	--		--	--	--	--
		Exposure Point Total						--					--
	Exposure Medium Total							--					--
Medium Total								--					--
Receptor Total							Receptor Risk Total	--				Receptor HI Total	--

TABLE 10.2.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Perkiomen Creek		See Table 10.4.RME for Cancer Risks					All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Sediment	Sediment	Perkiomen Creek							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Receptor Total												Receptor HI Total	--

TABLE 10.3.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

PAGE 1 OF 1

Scenario Timeframe: Current
Receptor Population: Recreational Users
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Perkiomen Creek		See Table 10.4.RME for Cancer Risks					All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Sediment	Sediment	Perkiomen Creek							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Receptor Total												Receptor HI Total	--

TABLE 10.4.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Recreational Users
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Perkiomen Creek		All Cancer Risks Within Acceptable Levels					See Tables 10.2.RME and 10.3.RME for Hazard Indices				
			Chemical Total	--	--	--	--	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
Medium Total								--					
Sediment	Sediment	Perkiomen Creek		All Cancer Risks Within Acceptable Levels									
			Chemical Total	--	--	--	--	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
Medium Total								--					
Receptor Total							Receptor Risk Total	- -					

TABLE 10.5.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghusrt Drive Site	Manganese	--	--	--	--	--	Nervous	0.10	--	0.08	0.2
			Chemical Total	--	--	--	--	--		0.2	--	0.08	0.3
		Exposure Point Total						--					0.3
	Exposure Medium Total							--					0.3
	Air	Baghusrt Drive Site	Manganese	--	--	--	--	--	Nervous	--	3	--	3
			Chemical Total	--	--	--	--	--		--	3	--	3
		Exposure Point Total						--					3
	Exposure Medium Total							--					3
Medium Total								--					3
Receptor Total							Receptor Risk Total	--				Receptor HI Total	3

TABLE 10.6.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA
PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Farmer
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum						Nervous	0.4	--	0.009	0.4
			Arsenic	See Table 10.8.RME for Cancer Risks					Dermal, CVS	0.9	--	0.1	1
			Manganese						Nervous	0.4		0.3	0.7
			Thallium						Dermal	0.7	--	0.02	0.7
			Vanadium						Dermal	0.2	--	0.2	0.4
			Chemical Total							2	--	0.5	3
		Exposure Point Total											3
	Exposure Medium Total												3
Medium Total													3
Groundwater	Groundwater	Baghurst Drive Site	1,1-Dichloroethene						Hepatic	1	--	0.1	1
			Trichloroethene						CVS, Immune, Developmental	2	--	0.3	2
			Aluminum						Nervous	0.1	--	0.0005	0.1
			Arsenic						Dermal, CVS	1	--	0.006	1
			Cyanide						Reproductive	2	--	0.007	2
			Manganese						Nervous	0.2	--	0.02	0.2
			Thallium						Dermal	0.5	--	0.002	0.5
			Chemical Total							6	--	0.4	7
		Exposure Point Total											7
	Exposure Medium Total												7
Medium Total													7
Receptor Total												Receptor HI Total	10

TABLE 10.7.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA
PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface/Subsurface Soil	Surface/Subsurface Soil	Baghusrt Drive Site	Aluminum	See Table 10.8.RME for Cancer Risks					Nervous	0.2	--	0.007	0.2
			Arsenic						Dermal, CVS	0.6	--	0.09	0.7
			Manganbese						Nervous	0.3		0.2	0.5
			Thallium						Dermal	0.4	--	0.014	0.4
			Vanadium						Dermal	0.11	--	0.14	0.3
			Chemical Total							1	--	0.5	2
		Exposure Point Total											2
	Exposure Medium Total												2
Medium Total													0.9
Groundwater	Groundwater Potable Use	Baghusrt Drive Site	1,1,1-Trichloroethane						Body Weight	0.06	--	0.01	0.07
			1,1,2-Trichloroethane						Hematologic, Immune	0.004	--	0.0003	0.004
			1,1-Dichloroethene						Hepatic	0.7	--	0.10	0.8
			2-Hexanone						Nervous	0.07	--	0.003	0.07
			Trichloroethene						CVS, Immune, Developmental	1	--	0.2	1
			1,4-Dioxane						Hepatic, Urinary	0.07	--	0.0003	0.07
			Arsenic						Dermal, CVS	0.8	--	0.004	0.8
			Thallium						Dermal	0.3	--	0.002	0.3
			Cyanide						Reproductive	0.9	--	0.005	1
			Chemical Total							4	--	0.3	4
		Exposure Point Total											4
	Exposure Medium Total												4
Groundwater	Air Potable Use	Baghusrt Drive Site	1,1,1-Trichloroethane						Hepatic	--	0.4	--	0.4
			1,1,2-Trichloroethane						Respiratory	--	1	--	1
			1,1-Dichloroethene						Hepatic	--	3	--	3
			2-Hexanone						Nervous	--	0.2	--	0.2
			Trichloroethene						CVS, Immune, Developmental	--	5	--	5
			1,4-Dioxane						Nervous, Respiratory	--	1	--	1
			Arsenic						Dermal, CVS	--	--	--	--
			Thallium						NA	--	--	--	--
			Cyanide						Endocrine	--	11	--	11
			Chemical Total							--	22	--	22
		Exposure Point Total											22
	Exposure Medium Total												22
Medium Total													26
Groundwater	Groundwater - Irrigation	Baghusrt Drive Site							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
	Air - Irrigation	Baghusrt Drive Site							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Receptor Total												Receptor HI Total	27

TABLE 10.8.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface/Subsurface Soil	Surface/Subsurface Soil	Baghusrt Drive Site	Arsenic	7E-05	–	1E-05	–	8E-05	See Tables 10.6.RME and 10.7.RME for Hazard Indices				
			Chromium	2E-04	–	2E-04	–	3E-04					
			Chemical Total	2E-04	–	2E-04	–	4E-04					
		Exposure Point Total						4E-04					
	Exposure Medium Total							4E-04					
	Air	Baghusrt Drive Site	Arsenic	–	2E-08	–	–	2E-08					
			Chromium	–	1E-06	–	–	1E-06					
			Chemical Total	–	1E-06	–	–	1E-06					
		Exposure Point Total						1E-06					
	Exposure Medium Total							1E-06					
Medium Total								4E-04					
Groundwater	Groundwater Potable Use	Baghusrt Drive Site	1,1,2-Trichloroethane	3E-07	–	2E-08	–	4E-07					
			1,1-Dichloroethane	1E-05	–	1E-06	–	2E-05					
			1,2-Dichloroethane	1E-06	–	7E-08	–	2E-06					
			Bromodichloromethane	9E-07	–	6E-08	–	9E-07					
			Chloroform	1E-06	–	9E-08	–	1E-06					
			Trichloroethene (Mutagenic)	7E-06	–	1E-06	–	8E-06					
			Trichloroethene (Nonmutagenic)	9E-06	–	1E-06	–	1E-05					
			Vinyl chloride	4E-05	–	3E-06	–	4E-05					
			Dibenzo(a,h)anthracene	3E-06	–	–	–	3E-06					
			Aldrin	5E-06	–	–	–	5E-06					
			delta-BHC	7E-07	–	5E-07	–	1E-06					
			Dieldrin	1E-06	–	2E-06	–	4E-06					
			Arsenic	2E-04	–	8E-07	–	2E-04					
			Chromium	3E-04	–	1E-04	–	4E-04					
			Chemical Total	5E-04	–	1E-04	–	6E-04					
		Exposure Point Total						6E-04					
	Exposure Medium Total							6E-04					
Groundwater	Air Potable Use	Baghusrt Drive Site	1,1,2-Trichloroethane	–	1E-06	–	–	1E-06					
			1,1-Dichloroethane	–	4E-05	–	–	4E-05					
			1,2-Dichloroethane	–	4E-06	–	–	4E-06					
			Bromodichloromethane	–	6E-06	–	–	6E-06					
			Chloroform	–	8E-06	–	–	8E-06					
			Trichloroethene (Mutagenic)	–	5E-06	–	–	5E-06					
			Trichloroethene (Nonmutagenic)	–	8E-06	–	–	8E-06					
			Vinyl chloride	–	5E-07	–	–	5E-07					
			Dibenzo(a,h)anthracene	–	–	–	–	–					
			Aldrin	–	2E-05	–	–	2E-05					
			delta-BHC	–	–	–	–	–					
			Dieldrin	–	–	–	–	–					
			Arsenic	–	–	–	–	–					
			Chromium	–	–	–	–	–					
			Chemical Total	–	9E-05	–	–	9E-05					
		Exposure Point Total						9E-05					
	Exposure Medium Total							9E-05					
Medium Total								7E-04					
Groundwater	Groundwater - Irrigation	Baghusrt Drive Site	Chromium	6E-07	–	7E-06	–	7E-06					
			Chemical Total	6E-07	–	7E-06	–	7E-06					
		Exposure Point Total						7E-06					
	Exposure Medium Total							7E-06					

TABLE 10.8.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air - Irrigation	Baghusrt Drive Site	Chromium	–	–	–	–	–					
			Chemical Total	–	–	–	–	–					
		Exposure Point Total						–					
	Exposure Medium Total							–					
Medium Total								7E-06					
Receptor Total							Receptor Risk Total	2E-03					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 10.9.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site		See Table 10.11.RME for Cancer Risks					All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
	Air	Baghurst Drive Site							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							- -	--	- -	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Surface Water	Surface Water	Intermittent Stream							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Surface Water	Surface Water	Perkiomen Creek							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Sediment	Sediment	Intermittent Stream							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Sediment	Sediment	Perkiomen Creek							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
									Receptor HI Total - Subsurface Soil and Intermittent Stream				--
									Receptor HI Total - Subsurface Soil and Perkiomen Creek				--

TABLE 10.10 RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site		See Table 10.11.RME for Cancer Risks					All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
	Air	Baghurst Drive Site							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							- -	--	- -	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Surface Water	Surface Water	Intermittent Stream							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Surface Water	Surface Water	Perkiomen Creek							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Sediment	Sediment	Intermittent Stream							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Sediment	Sediment	Perkiomen Creek							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Receptor Total									Receptor HI Total - Subsurface Soil and Intermittent Stream				--
Receptor Total									Receptor HI Total - Subsurface Soil and Perkiomen Creek				--

TABLE 10.11 RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site		All Cancer Risks Within Acceptable Levels					See Tables 10.9 RME and 10.10 RME for Hazard Indices				
			Chemical Total	--	--	--	--	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
	Air	Baghurst Drive Site		All Cancer Risks Within Acceptable Levels									
			Chemical Total	--	--	--	--	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
Medium Total								--					
Surface Water	Surface Water	Intermittent Stream		All Cancer Risks Within Acceptable Levels									
			Chemical Total	--	--	--	--	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
Medium Total								--					
Surface Water	Surface Water	Perkiomen Creek		All Cancer Risks Within Acceptable Levels									
			Chemical Total	--	--	--	--	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
Medium Total								--					
Sediment	Sediment	Intermittent Stream		All Cancer Risks Within Acceptable Levels									
			Chemical Total	--	--	--	--	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
Medium Total								--					
Sediment	Sediment	Perkiomen Creek		All Cancer Risks Within Acceptable Levels									
			Chemical Total	--	--	--	--	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
Medium Total								--					
Receptor Total				Receptor Risk Total - Subsurface Soil and Intermittent Stream				--					
Receptor Total				Receptor Risk Total - Subsurface Soil and Perkiomen Creek				--					

TABLE 10.12 RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site		All Cancer Risks Within Acceptable Levels					All Hazard Quotients Within Acceptable Levels				
			Chemical Total	--	--	--	--	--		--	--	--	--
		Exposure Point Total						--					--
	Exposure Medium Total							--					--
	Air	Baghurst Drive Site		All Cancer Risks Within Acceptable Levels					All Hazard Quotients Within Acceptable Levels				
			Chemical Total	--	--	--	--	--		--	--	--	--
		Exposure Point Total						--					--
	Exposure Medium Total							--					--
Medium Total								--					--
Surface Water	Surface Water	Intermittent Stream		All Cancer Risks Within Acceptable Levels					All Hazard Quotients Within Acceptable Levels				
			Chemical Total	--	--	--	--	--		--	--	--	--
		Exposure Point Total						--					--
	Exposure Medium Total							--					--
Medium Total								--					--
Sediment	Sediment	Intermittent Stream		All Cancer Risks Within Acceptable Levels					All Hazard Quotients Within Acceptable Levels				
			Chemical Total	--	--	--	--	--		--	--	--	--
		Exposure Point Total						--					--
	Exposure Medium Total							--					--
Medium Total								--					--
Receptor Total							Receptor Risk Total	--				Receptor HI Total	--

TABLE 10.13.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Baghurst Drive Site	1,1-Dichloroethene	See Table 10.15.RME for Cancer Risks					Hepatic	1	--	0.1	1
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	2	--	0.3	2
			Arsenic						Dermal, CVS	1	--	0.006	1
			Cyanide						Reproductive	2	--	0.007	2
			Thallium						Dermal	0.5	--	0.002	0.5
			Chemical Total							6	--	0.4	7
		Exposure Point Total											7
	Exposure Medium Total												7
Medium Total													7
Receptor Total												Receptor HI Total	7

TABLE 10.14.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Baghurst Drive Site	1,1,1-Trichloroethane	See Table 10.15.RME for Cancer Risks					Body Weight	0.06	–	0.01	0.07
			1,1,2-Trichloroethane						Hematologic, Immune	0.004	–	0.0003	0.004
			1,1-Dichloroethene						Hepatic	0.7	–	0.10	0.8
			2-Hexanone						Nervous	0.07	–	0.003	0.07
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	1	–	0.2	1
			1,4-Dioxane						Hepatic	0.07	–	0.0003	0.07
			Arsenic						Dermal, CVS	0.8	–	0.004	0.8
			Cyanide						Reproductive	0.9	–	0.005	0.9
			Chemical Total							4	–	0.3	4
		Exposure Point Total											4
	Exposure Medium Total												4
	Air	Baghurst Drive Site	1,1,1-Trichloroethane						Hepatic	--	0.4	--	0.4
			1,1,2-Trichloroethane						Respiratory	--	1	--	1
			1,1-Dichloroethene						Hepatic	--	3	--	3
			2-Hexanone						Nervous	--	0.2	--	0.2
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	--	5	--	5
			1,4-Dioxane						Respiratory	--	1	--	1
			Arsenic						Dermal, CVS	--	--	--	--
			Cyanide						Endocrine	--	11	--	11
			Chemical Total							- -	22	- -	22
		Exposure Point Total											22
	Exposure Medium Total												22
Medium Total													26
Receptor Total												Receptor HI Total	26

TABLE 10.15.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Baghurst Drive Site	1,1-Dichloroethane	1.4E-05	--	1.1E-06	--	1.6E-05	See Tables 10.13.RME and 10.14.RME for Hazard Indices				
			1,2-Dichloroethane	1.4E-06	--	6.6E-08	--	1.5E-06					
			Bromodichloromethane	8.8E-07	--	5.8E-08	--	9.3E-07					
			Chloroform	1.1E-06	--	8.9E-08	--	1.1E-06					
			Trichloroethene (Mutagenic)	7.2E-06	--	1.1E-06	--	8.3E-06					
			Trichloroethene (Nonmutagenic)	9.2E-06	--	1.4E-06	--	1.1E-05					
			Vinyl chloride	4.0E-05	--	2.7E-06	--	4.3E-05					
			1,4-Dioxane	9.5E-05	--	3.2E-07	--	9.6E-05					
			Dibenzo(a,h)anthracene	2.6E-06	--	- -	--	2.6E-06					
			Aldrin	5.0E-06	--	- -	--	5.0E-06					
			Dieldrin	1.3E-06	--	2.3E-06	--	3.6E-06					
			Arsenic	1.5E-04	--	7.8E-07	--	1.5E-04					
			Chromium	2.7E-04	--	1.0E-04	--	3.7E-04					
			Chemical Total	5.9E-04	--	1.1E-04	--	7.1E-04					
		Exposure Point Total						7.1E-04					
	Exposure Medium Total							7.1E-04					
	Air	Baghurst Drive Site	1,1-Dichloroethane	--	4.3E-05	--	--	4.3E-05					
			1,2-Dichloroethane	--	4.4E-06	--	--	4.4E-06					
			Bromodichloromethane	--	5.6E-06	--	--	5.6E-06					
			Chloroform	--	8.3E-06	--	--	8.3E-06					
			Trichloroethene (Mutagenic)	--	5.3E-06	--	--	5.3E-06					
			Trichloroethene (Nonmutagenic)	--	8.2E-06	--	--	8.2E-06					
			Vinyl chloride	--	5.1E-07	--	--	5.1E-07					
			1,4-Dioxane	--	5.1E-05	--	--	5.1E-05					
			Dibenzo(a,h)anthracene	--	- -	--	--	- -					
			Aldrin	--	1.5E-05	--	--	1.5E-05					
			Dieldrin	--	- -	--	--	- -					
			Arsenic	--	- -	--	--	- -					
			Chromium	--	- -	--	--	- -					
			Chemical Total	--	1.4E-04	--	--	1.4E-04					
		Exposure Point Total						1.4E-04					
	Exposure Medium Total							1.4E-04					
Medium Total								8.5E-04					
Receptor Total							Receptor Risk Total	8.5E-04					

TABLE 10.16.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA
PAGE 1 OF 1

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

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum	See Table 10.18.RME for Cancer Risks					Nervous	0.4	--	0.009	0.4
			Arsenic						Dermal, CVS	0.9	--	0.1	1
			Manganese						Nervous	0.4	--	0.3	0.7
			Thallium						Dermal	0.7	--	0.02	0.7
			Vanadium						Dermal	0.2	--	0.2	0.4
			Chemical Total							3	--	0.6	3
		Exposure Point Total											3
	Exposure Medium Total												3
Medium Total													3
Groundwater	Groundwater	Baghurst Drive Site	1,1-Dichloroethene						Hepatic	1	--	0.1	1
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	2	--	0.3	2
			Arsenic						Dermal, CVS	1	--	0.006	1
			Cyanide						Reproductive	2	--	0.007	2
			Manganese						Nervous	0.2	--	0.02	0.2
			Thallium						Dermal	0.5	--	0.002	0.5
			Chemical Total							7	--	0.5	7
		Exposure Point Total											7
	Exposure Medium Total												7
Medium Total													7
Receptor Total									Receptor HI Total				10

TABLE 10.17.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site		See Table 10.18.RME for Cancer Risks					All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	–	--	–
		Exposure Point Total											–
	Exposure Medium Total												–
	Air	Baghurst Drive Site							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	–	--	–
		Exposure Point Total											–
	Exposure Medium Total												–
Medium Total													–
Groundwater	Groundwater	Baghurst Drive Site	1,1,1-Trichloroethane						Body Weight	0.06	–	0.01	0.07
			1,1,2-Trichloroethane						Hematologic, Immune	0.004	–	0.0003	0.004
			1,1-Dichloroethene						Hepatic	0.7	–	0.10	0.8
			2-Hexanone						Nervous	0.07	–	0.003	0.07
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	1	–	0.2	1
			1,4-Dioxane						Hepatic, Urinary	0.07	–	0.0003	0.07
			Arsenic						Dermal, CVS	0.8	–	0.004	0.8
			Cyanide						Reproductive	0.9	–	0.005	0.9
			Chemical Total							4	–	0.3	4
		Exposure Point Total											4
	Exposure Medium Total												4
Groundwater	Air	Baghurst Drive Site	1,1,1-Trichloroethane						Hepatic	--	0.4	--	0.4
			1,1,2-Trichloroethane						Respiratory	--	1	--	1
			1,1-Dichloroethene						Hepatic	--	3	--	3
			2-Hexanone						Nervous	--	0.2	--	0.2
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	--	5	--	5
			1,4-Dioxane						Nervous, Respiratory	--	1	--	1
			Arsenic						Dermal, CVS	--	–	--	–
			Cyanide						Endocrine	--	11	--	11
			Chemical Total							--	22	--	22
		Exposure Point Total											22
	Exposure Medium Total												22
Medium Total													26
Receptor Total												Receptor HI Total	26

TABLE 10.18.RME
RISK SUMMARY
REASONABLE MAXIMUM EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Arsenic	5E-05	--	6.5E-06	--	5E-05	See Tables 10.16.RME and 10.17.RME for Hazard Indices				
			Chromium	1E-04	--	1E-04	--	3E-04					
			Chemical Total	2E-04	--	1E-04	--	3E-04					
		Exposure Point Total						3E-04					
	Exposure Medium Total							3E-04					
	Air	Baghurst Drive Site	Arsenic	--	2E-08	--	--	2E-08					
			Chromium	--	1E-06	--	--	1E-06					
			Chemical Total	--	1E-06	--	--	1E-06					
		Exposure Point Total						1E-06					
	Exposure Medium Total							1E-06					
Medium Total								3E-04					
Groundwater	Groundwater	Baghurst Drive Site	1,1-Dichloroethane	1E-05	--	1E-06	--	2E-05					
			1,2-Dichloroethane	1E-06	--	7E-08	--	2E-06					
			Bromodichloromethane	9E-07	--	6E-08	--	9E-07					
			Chloroform	1E-06	--	9E-08	--	1E-06					
			Trichloroethene (Mutagenic)	7E-06	--	1E-06	--	8E-06					
			Trichloroethene (Nonmutagenic)	9E-06	--	1E-06	--	1E-05					
			Vinyl chloride	4E-05	--	3E-06	--	4E-05					
			1,4-Dioxane	1E-04	--	3E-07	--	1E-04					
			Dibenzo(a,h)anthracene	3E-06	--	- -	--	3E-06					
			Aldrin	5E-06	--	- -	--	5E-06					
			Dieldrin	1E-06	--	2E-06	--	4E-06					
			Arsenic	2E-04	--	8E-07	--	2E-04					
			Chromium	3E-04	--	1E-04	--	4E-04					
			Chemical Total	6E-04	--	1E-04	--	7E-04					
		Exposure Point Total						7E-04					
	Exposure Medium Total							7E-04					
Groundwater	Air	Baghurst Drive Site	1,1-Dichloroethane	--	4E-05	--	--	4E-05					
			1,2-Dichloroethane	--	4E-06	--	--	4E-06					
			Bromodichloromethane	--	6E-06	--	--	6E-06					
			Chloroform	--	8E-06	--	--	8E-06					
			Trichloroethene (Mutagenic)	--	5E-06	--	--	5E-06					
			Trichloroethene (Nonmutagenic)	--	8E-06	--	--	8E-06					
			Vinyl chloride	--	5E-07	--	--	5E-07					
			1,4-Dioxane	--	5E-05	--	--	5E-05					
			Dibenzo(a,h)anthracene	--	- -	--	--	- -					
			Aldrin	--	2E-05	--	--	2E-05					
			Dieldrin	--	- -	--	--	- -					
			Arsenic	--	- -	--	--	- -					
			Chromium	--	- -	--	--	- -					
			Chemical Total	--	1E-04	--	--	1E-04					
		Exposure Point Total						1E-04					
	Exposure Medium Total							1E-04					
Medium Total								9E-04					
Receptor Total							Receptor Risk Total	1E-03					

TABLE 10.1.CTE
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Intermittent Stream		All Cancer Risks Within Acceptable Levels					All Hazard Quotients Within Acceptable Levels				
			Chemical Total	--	--	--	--	--		--	--	--	--
		Exposure Point Total						--					--
	Exposure Medium Total							--					--
Medium Total								--					--
Sediment	Sediment	Intermittent Stream		All Cancer Risks Within Acceptable Levels					All Hazard Quotients Within Acceptable Levels				
			Chemical Total	--	--	--	--	--		--	--	--	--
		Exposure Point Total						--					--
	Exposure Medium Total							--					--
Medium Total								--					--
Receptor Total							Receptor Risk Total	--				Receptor HI Total	--

TABLE 10.2 CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Perkiomen Creek		See Table 10.2 CTE for Cancer Risks					All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Sediment	Sediment	Perkiomen Creek							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Receptor Total												Receptor HI Total	--

TABLE 10.3.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Recreational Users
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Perkiomen Creek		See Table 10.2 CTE for Cancer Risks					All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Sediment	Sediment	Perkiomen Creek							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Receptor Total												Receptor HI Total	--

TABLE 10.4.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Current
Receptor Population: Recreational Users
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	Perkiomen Creek		All Cancer Risks Within Acceptable Levels					See Tables 10.2.CTE and 10.3.CTE for Hazard Indices				
			Chemical Total	--	--	--	--	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
Medium Total								--					
Sediment	Sediment	Perkiomen Creek		All Cancer Risks Within Acceptable Levels									
			Chemical Total	--	--	--	--	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
Medium Total								--					
Receptor Total							Receptor Risk Total	- -					

TABLE 10.5 CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghusrt Drive Site	Aluminum	--	--	--	--	--	Nervous	0.02	--	0.0004	0.02
			Manganese	--	--	--	--	--	Nervous	0.02	--	0.01	0.04
			Chemical Total	--	--	--	--	--		0.04	--	0.01	0.06
		Exposure Point Total						--					0.06
	Exposure Medium Total							--					0.06
	Air	Baghusrt Drive Site	Aluminum	--	--	--	--	--	Nervous	--	0.5	--	0.5
			Manganese	--	--	--	--	--	Nervous	--	1	--	1
			Chemical Total	--	--	--	--	--		- -	2	- -	2
		Exposure Point Total						--					2
	Exposure Medium Total							--					2
Medium Total								--					2
Receptor Total							Receptor Risk Total	--				Receptor HI Total	2

TABLE 10.6.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmer
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Arsenic	See Table 10.8.CTE for Cancer Risks					Dermal, CVS	0.2	--	0.01	0.3
			Chemical Total							0.2	--	0.01	0.3
		Exposure Point Total											0.3
	Exposure Medium Total												0.3
	Air	Baghurst Drive Site	Arsenic						Dermal, CVS	--	0.0005	--	0.0005
			Chemical Total							--	0.0005	--	0.0005
		Exposure Point Total											0.0005
	Exposure Medium Total												0.0005
Medium Total													0.3
Groundwater	Groundwater	Baghurst Drive Site	Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	0.8	--	0.2	1
			Arsenic						Dermal, CVS	0.5	--	0.003	0.5
			Chemical Total							1	--	0.2	1
		Exposure Point Total											1
	Exposure Medium Total												1
Medium Total													1
Receptor Total									Receptor HI Total				2

TABLE 10.7.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface/Subsurface Soil	Surface/Subsurface Soil	Baghusrt Drive Site	Arsenic	See Table 10.8.CTE for Cancer Risks					Dermal, CVS	0.2	--	0.02	0.2
			Chemical Total							0.2	--	0.02	0.2
		Exposure Point Total											0.2
	Exposure Medium Total												0.2
	Air	Baghusrt Drive Site	Arsenic						Dermal, CVS	--	0.0003	--	0.0003
			Chemical Total							- -	0.0003	- -	0.0003
		Exposure Point Total											0.0003
	Exposure Medium Total												0.0003
Medium Total													0.2
Groundwater	Groundwater Potable Use	Baghusrt Drive Site	1,1,1-Trichloroethane						Body Weight	0.02	--	0.009	0.03
			1,1,2-Trichloroethane						Hematologic, Immune	0.001	--	0.0002	0.001
			1,1-Dichloroethene						Hepatic	0.2	--	0.08	0.3
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	0.4	--	0.1	0.5
			1,4-Dioxane						Hepatic, Urinary	0.02	--	0.0002	0.02
			Arsenic						Dermal, CVS	0.3	--	0.004	0.3
			Cyanide						Reproductive	0.3	--	0.005	0.3
			Chemical Total							1	--	0.2	1
		Exposure Point Total											1
	Exposure Medium Total												1
Groundwater	Air Potable Use	Baghusrt Drive Site	1,1,1-Trichloroethane						Hepatic	--	0.3	--	0.3
			1,1,2-Trichloroethane						Respiratory	--	0.8	--	0.8
			1,1-Dichloroethene						Hepatic	--	2	--	2
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	--	3	--	3
			1,4-Dioxane						Nervous, Respiratory	--	0.8	--	0.8
			Arsenic						Dermal, CVS	--	--	--	--
			Cyanide						Endocrine	--	8	--	8
			Chemical Total							- -	15	- -	15
		Exposure Point Total											15
	Exposure Medium Total												15
Medium Total													16
Groundwater	Groundwater - Irrigation	Baghusrt Drive Site							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
	Air - Irrigation	Baghusrt Drive Site							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							- -	--	- -	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Receptor Total												Receptor HI Total	8

TABLE 10.8.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Farmers
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface/Subsurface Soil	Surface/Subsurface Soil	Baghusrt Drive Site	Arsenic	2E-05	--	1E-06	–	2E-05	See Tables 10.6.CTE and 10.7.CTE for Hazard Indices				
			Chromium	3E-05	--	2E-05	–	5E-05					
			Chemical Total	4E-05	--	2E-05	–	6E-05					
		Exposure Point Total						6E-05					
	Exposure Medium Total							6E-05					
	Air	Baghusrt Drive Site	Arsenic	–	4E-09	--	–	4E-09					
			Chromium	–	3E-07	--	–	3E-07					
			Chemical Total	–	3E-07	--	–	3E-07					
		Exposure Point Total						3E-07					
	Exposure Medium Total							3E-07					
Medium Total								6E-05					
Groundwater	Groundwater Potable Use	Baghusrt Drive Site	1,1-Dichloroethane	4E-06	--	7E-07	–	4E-06					
			1,2-Dichloroethane	4E-07	--	4E-08	–	4E-07					
			Bromodichloromethane	2E-07	--	4E-08	–	3E-07					
			Chloroform	3E-07	--	5E-08	–	3E-07					
			Trichloroethene (Mutagenic)	2E-06	--	5E-07	–	2E-06					
			Trichloroethene (Nonmutagenic)	2E-06	--	9E-07	–	3E-06					
			Vinyl chloride	2E-05	--	2E-06	–	2E-05					
			1,4-Dioxane	2E-05	--	2E-07	–	3E-05					
			Aldrin	1E-06	--	0E+00	–	1E-06					
			Dieldrin	3E-07	--	1E-06	–	2E-06					
			Arsenic	4E-05	--	6E-07	–	4E-05					
			Chromium	6E-05	--	6E-05	–	1E-04					
			Chemical Total	2E-04	--	6E-05	–	2E-04					
		Exposure Point Total						2E-04					
	Exposure Medium Total							2E-04					
Groundwater	Air Potable Use	Baghusrt Drive Site	1,1-Dichloroethane	–	3E-05	--	–	3E-05					
			1,2-Dichloroethane	–	3E-06	--	–	3E-06					
			Bromodichloromethane	–	4E-06	--	–	4E-06					
			Chloroform	–	6E-06	--	–	6E-06					
			Trichloroethene (Mutagenic)	–	4E-06	--	–	4E-06					
			Trichloroethene (Nonmutagenic)	–	6E-06	--	–	6E-06					
			Vinyl chloride	–	3E-07	--	–	3E-07					
			1,4-Dioxane	–	3E-05	--	–	3E-05					
			Aldrin	–	1E-05	--	–	1E-05					
			Dieldrin	–	--	--	–	--					
			Arsenic	–	--	--	–	--					
			Chromium	–	--	--	–	--					
			Chemical Total	–	1E-04	--	–	1E-04					
		Exposure Point Total						1E-04					
	Exposure Medium Total							1E-04					
Medium Total								3E-04					
Groundwater	Groundwater - Irrigation	Baghusrt Drive Site		All Cancer Risks Within Acceptable Levels									
			Chemical Total	–	--	--	–	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
	Air - Air	Baghusrt Drive Site		All Cancer Risks Within Acceptable Levels									
			Chemical Total	–	--	--	–	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
Medium Total								--					
Receptor Total							Receptor Risk Total	4E-04					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

TABLE 10.9 CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site		See Table 10.11.CTE for Cancer Risks					All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
	Air	Baghurst Drive Site							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Surface Water	Surface Water	Intermittent Stream							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Surface Water	Surface Water	Perkiomen Creek							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Sediment	Sediment	Intermittent Stream							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Sediment	Sediment	Perkiomen Creek							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
									Receptor HI Total - Subsurface Soil and Intermittent Stream				--
									Receptor HI Total - Subsurface Soil and Perkiomen Creek				--

TABLE 10.10.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site		See Table 10.11.CTE for Cancer Risks					All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
	Air	Baghurst Drive Site							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Surface Water	Surface Water	Intermittent Stream							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Surface Water	Surface Water	Perkiomen Creek							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Sediment	Sediment	Intermittent Stream							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Sediment	Sediment	Perkiomen Creek							All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Receptor Total									Receptor HI Total - Subsurface Soil and Intermittent Stream				--
Receptor Total									Receptor HI Total - Subsurface Soil and Perkiomen Creek				--

TABLE 10.11.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

PAGE 1 OF 1

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site		All Cancer Risks Within Acceptable Levels					See Tables 10.9.CTE and 10.10.CTE for Hazard Indices				
			Chemical Total	--	--	--	--	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
	Air	Baghurst Drive Site		All Cancer Risks Within Acceptable Levels									
			Chemical Total	--	--	--	--	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
Medium Total								--					
Surface Water	Surface Water	Intermittent Stream		All Cancer Risks Within Acceptable Levels									
			Chemical Total	--	--	--	--	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
Medium Total								--					
Surface Water	Surface Water	Perkiomen Creek		All Cancer Risks Within Acceptable Levels									
			Chemical Total	--	--	--	--	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
Medium Total								--					
Sediment	Sediment	Intermittent Stream		All Cancer Risks Within Acceptable Levels									
			Chemical Total	--	--	--	--	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
Medium Total								--					
Sediment	Sediment	Perkiomen Creek		All Cancer Risks Within Acceptable Levels									
			Chemical Total	--	--	--	--	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
Medium Total								--					
Receptor Total				Receptor Risk Total - Subsurface Soil and Intermittent Stream				--					
Receptor Total				Receptor Risk Total - Subsurface Soil and Perkiomen Creek				--					

TABLE 10.12.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site		All Cancer Risks Within Acceptable Levels					All Hazard Quotients Within Acceptable Levels				
			Chemical Total	--	--	--	--	--		--	--	--	--
		Exposure Point Total						--					--
	Exposure Medium Total							--					--
	Air	Baghurst Drive Site		All Cancer Risks Within Acceptable Levels					All Hazard Quotients Within Acceptable Levels				
			Chemical Total	--	--	--	--	--		- -	--	- -	--
		Exposure Point Total						--					--
	Exposure Medium Total							--					--
Medium Total								--					--
Surface Water	Surface Water	Intermittent Stream		All Cancer Risks Within Acceptable Levels					All Hazard Quotients Within Acceptable Levels				
			Chemical Total	--	--	--	--	--		--	--	--	--
		Exposure Point Total						--					--
	Exposure Medium Total							--					--
Medium Total								--					--
Sediment	Sediment	Intermittent Stream		All Cancer Risks Within Acceptable Levels					All Hazard Quotients Within Acceptable Levels				
			Chemical Total	--	--	--	--	--		--	--	--	--
		Exposure Point Total						--					--
	Exposure Medium Total							--					--
Medium Total								--					--
Receptor Total							Receptor Risk Total	--				Receptor HI Total	--

TABLE 10.13.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Baghurst Drive Site		See Table 10.15.CTE for Cancer Risks					All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Receptor Total												Receptor HI Total	--

TABLE 10.14.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk: Ingestion	Carcinogenic Risk: Inhalation	Carcinogenic Risk: Dermal	Carcinogenic Risk: External (Radiation)	Carcinogenic Risk: Exposure Routes Total	Non-Carcinogenic Hazard Quotient: Primary Target Organ(s)	Non-Carcinogenic Hazard Quotient: Ingestion	Non-Carcinogenic Hazard Quotient: Inhalation	Non-Carcinogenic Hazard Quotient: Dermal	Non-Carcinogenic Hazard Quotient: Exposure Routes Total
Groundwater	Groundwater	Baghurst Drive Site	1,1,1-Trichloroethane	See Table 10.15.CTE for Cancer Risks					Body Weight	0.02	--	0.004	0.02
			1,1,2-Trichloroethane						Hematologic, Immune	0.001	--	0.0001	0.001
			1,1-Dichloroethene						Hepatic	0.2	--	0.04	0.3
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	0.4	--	0.07	0.4
			1,4-Dioxane						Hepatic, Urinary	0.02	--	0.0001	0.02
			Arsenic						Dermal, CVS	0.3	--	0.001	0.3
			Chemical Total							0.9	--	0.1	1
		Exposure Point Total											1
	Exposure Medium Total												1
	Air	Baghurst Drive Site	1,1,1-Trichloroethane						Hepatic	--	0.3	--	0.3
			1,1,2-Trichloroethane						Respiratory	--	0.8	--	0.8
			1,1-Dichloroethene						Hepatic	--	2	--	2
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	--	3	--	3
			1,4-Dioxane						Nervous, Respiratory	--	0.8	--	0.8
			Arsenic						Dermal, CVS	--	--	--	--
			Chemical Total							--	7	--	7
		Exposure Point Total											7
	Exposure Medium Total												7
Medium Total													8
Receptor Total												Receptor HI Total	8

TABLE 10.15.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: Off-Site Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Baghurst Drive Site		All Cancer Risks Within Acceptable Levels					See Tables 10.13.CTE and 10.14.CTE for Hazard Indices				
			Chemical Total	--	--	--	--	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
	Air	Baghurst Drive Site		All Cancer Risks Within Acceptable Levels									
			Chemical Total	--	--	--	--	--					
		Exposure Point Total						--					
	Exposure Medium Total							--					
Medium Total								--					
Receptor Total							Receptor Risk Total	--					

TABLE 10.16.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

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

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Arsenic	See Table 10.18.CTE for Cancer Risks					Dermal, CVS	0.2	--	0.01	0.3
			Chemical Total							0.2	--	0.01	0.3
		Exposure Point Total											0.3
	Exposure Medium Total												0.3
	Air	Baghurst Drive Site	Arsenic						Dermal, CVS	--	0.0005	--	0.0005
			Chemical Total							--	0.0005	--	0.0005
		Exposure Point Total											0.0005
	Exposure Medium Total												0.0005
Medium Total													0.3
Groundwater	Groundwater	Baghurst Drive Site	Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	0.8	--	0.2	1
			Arsenic						Dermal, CVS	0.5	--	0.003	0.5
			Chemical Total							1	--	0.2	1
		Exposure Point Total											1
	Exposure Medium Total												1
Medium Total													1
Receptor Total												Receptor HI Total	2

TABLE 10.17.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Aluminum	See Table 10.18.CTE for Cancer Risks					All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
	Air	Baghurst Drive Site	Aluminum						All Hazard Quotients Within Acceptable Levels				
			Chemical Total							--	--	--	--
		Exposure Point Total											--
	Exposure Medium Total												--
Medium Total													--
Groundwater	Groundwater	Baghurst Drive Site	1,1,1-Trichloroethane						Body Weight	0.02	--	0.004	0.02
			1,1,2-Trichloroethane						Hematologic, Immune	0.001	--	0.0001	0.001
			1,1-Dichloroethene						Hepatic	0.2	--	0.04	0.3
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	0.4	--	0.07	0.4
			1,4-Dioxane						Hepatic, Urinary	0.02	--	0.0001	0.02
			Arsenic						Dermal, CVS	0.3	--	0.001	0.3
			Chemical Total							0.9	--	0.1	1
		Exposure Point Total											1
	Exposure Medium Total												1
Groundwater	Air	Baghurst Drive Site	1,1,1-Trichloroethane						Hepatic	--	0.3	--	0.3
			1,1,2-Trichloroethane						Respiratory	--	0.8	--	0.8
			1,1-Dichloroethene						Hepatic	--	2	--	2
			Trichloroethene (Nonmutagenic)						CVS, Immune, Developmental	--	3	--	3
			1,4-Dioxane						Nervous, Respiratory	--	0.8	--	0.8
			Arsenic						Dermal, CVS	--	--	--	--
			Chemical Total							--	7	--	7
		Exposure Point Total											7
	Exposure Medium Total												7
Medium Total													8
Receptor Total												Receptor HI Total	8

TABLE 10.18.CTE
RISK SUMMARY
CENTRAL TENDENCY EXPOSURES
BAGHURST DRIVE SITE, HARLEYSVILLE, MONTGOMERY COUNTY, PENNSYLVANIA

Scenario Timeframe: Future
Receptor Population: On-Site Residents
Receptor Age: Lifelong (Child and Adult)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Baghurst Drive Site	Arsenic	4E-06	--	3E-07	–	4E-06	See Tables 10.16.CTE and 10.17.CTE for Hazard Indices				
			Chromium	1E-05	--	7E-06	–	2E-05					
			Chemical Total	2E-05	--	7E-06	–	2E-05					
		Exposure Point Total						2E-05					
	Exposure Medium Total							2E-05					
	Air	Baghurst Drive Site	Arsenic	–	4E-09	--	–	4E-09					
			Chromium	–	2E-07	--	–	2E-07					
			Chemical Total	–	2E-07	--	–	2E-07					
		Exposure Point Total						2E-07					
	Exposure Medium Total							2E-07					
Medium Total								2E-05					
Groundwater	Groundwater	Baghurst Drive Site	1,1-Dichloroethane	2E-06	--	2E-07	–	2E-06					
			Chloroform	1E-07	--	1E-08	–	1E-07					
			Trichloroethene (Mutagenic)	1E-06	--	2E-07	–	1E-06					
			Trichloroethene (Nonmutagenic)	1E-06	--	2E-07	–	1E-06					
			Vinyl chloride	2E-05	--	2E-06	–	2E-05					
			1,4-Dioxane	1E-05	--	5E-08	–	1E-05					
			Aldrin	6E-07	--	- -	–	6E-07					
			Arsenic	2E-05	--	8E-08	–	2E-05					
			Chromium	4E-05	--	1E-05	–	5E-05					
			Chemical Total	9E-05	--	2E-05	–	1E-04					
		Exposure Point Total						1E-04					
	Exposure Medium Total							1E-04					
Groundwater	Air	Baghurst Drive Site	1,1-Dichloroethane	–	1E-05	--	–	1E-05					
			Chloroform	–	2E-06	--	–	2E-06					
			Trichloroethene (Mutagenic)	–	1E-06	--	–	1E-06					
			Trichloroethene (Nonmutagenic)	–	2E-06	--	–	2E-06					
			Vinyl chloride	–	1E-07	--	–	1E-07					
			1,4-Dioxane	–	1E-05	--	–	1E-05					
			Aldrin	–	4E-06	--	–	4E-06					
			Arsenic	–	- -	--	–	- -					
			Chromium	–	- -	--	–	- -					
			Chemical Total	–	3E-05	--	–	3E-05					
		Exposure Point Total						3E-05					
	Exposure Medium Total							3E-05					
Medium Total								1E-04					
Receptor Total							Receptor Risk Total	2E-04					

Notes:
1 - Mutagenic chemicals were evaluated in accordance with USEPA's Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (2005).

APPENDIX D – PADEP Concurrence Letter

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

May 11, 2022

Mr. Paul Leonard, Director
Superfund & Emergency Management Division
United States Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Re: Record of Decision (ROD) Concurrence Clarification
Baghurst Superfund Site
Upper Salford Township, Montgomery County

Dear Mr. Leonard:

The Pennsylvania Department of Environmental Protection (DEP) has received and reviewed the Record of Decision (ROD) for the Baghurst Superfund Site (Site) in Upper Salford Township, Montgomery County. This ROD presents the selected remedial action to prevent future potential human exposure to volatile organic compounds (VOCs) in the groundwater, soil, and soil gas and to prevent future release of VOCs to the environment from the impacted soil that would result in groundwater contamination in excess of the cleanup standards.

The selected remedy for the Site includes the following major components:

- In Situ Thermal Remediation (ISTR) to treat sub-surface soils and groundwater within the Source Area;
- In Situ Chemical Oxidation (ISCO) to treat groundwater Hot-Spot areas;
- Groundwater and vapor intrusion monitoring; and
- Institutional Controls (ICs) to prohibit the installation of new groundwater wells at the Site, to prevent disturbance of any component of the Remedial Action, and to require that new residential construction at the Site receive prior written approval from EPA, in consultation with PADEP.

This letter clarifies the previous concurrence issued on April 12, 2022. DEP hereby concurs with EPA's proposed remedy with the following conditions:

- DEP will be given the opportunity to review and comment on documents and provide meaningful input regarding decisions related to the design and implementation of the remedial action, to assure compliance with Pennsylvania's Applicable, Relevant and Appropriate Requirements (ARARs) and to be considered requirements (TBCs).

- ICs that implement the Activity and Use Limitations (AULs) may be in the form of Environmental Covenants (ECs), pursuant the Section 6517(a)(1) of the Pennsylvania Uniform Environmental Covenants Act (UECA), 27 Pa.C.S. § 6517(a)(1) or Administrative Orders issued under Section 512(a) of HSCA. When ECs are implemented, they will need to comply with Section 6517(a)(1) of the UECA, 27 Pa.C.S. § 6517(a)(1). In cases where property owners refuse to execute an EC, at EPA's request, DEP may issue an Administrative Order under Section 512(a) of HSCA, to implement such restrictions directly. Section 512(a) states that "[a] site at which hazardous substances remain after completion of a response action shall not be put to a use which would disturb or be inconsistent with the response action implemented." .

- DEP will have the opportunity to review and comment before any modification to the ROD and the issuance of an Explanation of Significant Difference (ESD).

- State cost share and O&M obligations will be further clarified during design of the remedy and the completion of a Superfund State Contract.

- EPA will assure that the DEP is provided an opportunity to fully participate in any negotiations with responsible parties.

- DEP reserves the right and responsibility to take independent enforcement actions pursuant to state law.

Thank you for the opportunity to comment and concur on this EPA Record of Decision. If you have any questions regarding this matter, please do not hesitate to contact me.

Sincerely,

Patrick L. Patterson
Regional Director
Southeast Regional Office

cc: Mr. Hanieko, EPA Region III
Mr. R. Patel
Ms. Wagner
Ms. McClennen
Mr. Crooks
Mr. Armstrong
Ms. Thomas, Esq.
File