TECHNICAL MEMORANDUM

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks—Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

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This technical memorandum (TM) presents an expedited evaluation of the vapor intrusion (VI) exposure pathway and estimation of potential human health risks for commercial and residential properties within the Keystone Corridor Groundwater Contamination Site in Marion County, Indiana. The purpose of this expedited evaluation is to support an interim remedy document being prepared by EPA Region 5, to mitigate VI concerns at occupied buildings within the soil vapor plume identified at the site.

The approach for the expedited VI evaluation consists of the following steps:

1) Compare shallow groundwater, subslab soil vapor, crawlspace air, and indoor air concentrations against VI screening levels (VISLs).
2) For chemicals exceeding VISLs, prepare a VI multiple-lines-of-evidence (MLE) evaluation.
3) Calculate risk estimates for VI-related chemicals of potential concern (COPCs) that are determined by the MLE evaluation, for applicable properties.

1.0 Data Used in the Vapor Intrusion Evaluation

A soil vapor investigation was conducted at the site in 2016 using a portable gas chromatograph/mass spectrometer (GC/MS) instrument (HAPSITE). Soil vapor plume maps were generated for the two primary chemicals of concern (tetrachloroethene [PCE] and trichloroethene [TCE]) (see Figures 1 and 2, respectively). The PCE and TCE plumes defined by soil vapor concentrations exceeding EPA's Removal Management Levels (RMLs) for a residential scenario were evaluated, and buildings within the area exceeding RMLs were identified. Property owners were contacted to request access for sampling, and based on property owner responses, properties were grouped into the following categories (Figure 3):

- No response - 20 properties
- Access granted - 23 properties
- VI mitigation system (VIMS) present – 9 properties[1]
- Vacant property - 13 properties
- Access denied - 3 properties

[1] One of the 9 properties (CP-010) has a VIMS system on a portion of the property; access was granted to perform sampling where the VIMS is not present.

Analytical results for groundwater samples were collected from the shallow aquifer (i.e., first observed groundwater generally above the intermediate silt clay unit and generally shallower than 40 feet below ground surface [bgs]) in June 2016, and subslab soil vapor, indoor air, and outdoor air samples were collected in January, February, and March 2017. These results were used in the VI evaluation.

A summary of the data groupings used in the VI evaluation is presented in Attachment 1, Table 1-1; the table indicates the number of samples collected from each environmental medium at each commercial and residential property. The specific sample IDs associated with each data grouping are presented in Attachment 1, Table 1-2 (indoor air, crawlspace air, and subslab soil vapor) and Table 1-3 (shallow groundwater). The number of samples collected from each property and used in the VI evaluation is summarized in Table 1:

Table 1. Sample count by property

Property ID	Indoor Air	Crawlspace Air	Subslab Soil Vapor
CP-002	1	NA	NS
CP-003	1	NA	1
CP-008	NS	1	1
CP-010	2	1	9
CP-011	NS	NA	2
CP-013	2	1	3
CP-016	3	NA	12
CP-017	1	NA	6
CP-018	NS	NA	3
CP-019	1	NA	1
CP-023	4	NA	10
CP-024	1	NA	3
CP-027	NS	NA	2
CP-051	2	NA	NS
CP-053	NS	NA	1
CP-056	1	NA	2
CP-064	2	1	1
CP-067	1	NA	2
RP-039	1	1	1
RP-041	1	1	NA
RP-042	1	1	1
RP-047	1	NA	1
RP-062	2	NS	1

Notes:
NA – not applicable (since crawlspace or slab not present, as indicated)
NS – not sampled, but present (for indoor air samples, due to subslab vapor sample being below screening levels)

2.0 Selection of Vapor Intrusion Chemicals of Potential Concern

The maximum detected concentration of each chemical in the shallow groundwater (the source medium), subslab soil vapor, crawlspace air, and indoor data grouping was compared to its VISL based on the current property use (commercial/industrial or residential). For purposes of this evaluation, it was assumed that the future building use is the same as the current use.

If the maximum detected concentration exceeded its VISL, an MLE evaluation was performed to determine if the chemical is related to VI or potentially present because of background sources. If a chemical is related to VI, it was selected as a COPC.

Chemicals present because of background sources and chemicals not related to site contamination were eliminated as VI COPCs. Examples of chemicals exceeding VISLs but unrelated to VI from the source medium are 1,2-dibromoethane, bromodichloromethane, and chloroform. Data screening and the MLE evaluation are discussed in the following sections.

2.1 Data Screening

The shallow groundwater, subslab soil vapor, indoor air, and crawlspace air data were compared to VISLs developed by EPA for evaluation of the inhalation pathway via VI migration. Other potential exposure pathways (e.g., groundwater ingestion) were not considered in this VI evaluation. Because most[2] sampled buildings are currently occupied, the inhalation pathway is applicable to both current and future exposure scenarios at these buildings.

Shallow Groundwater

Groundwater at the site, in the strata above bedrock, is present in three water-bearing zones. The shallow groundwater zone is encountered from the static water level to approximately 40 ft bgs. The intermediate zone generally extends from 40 feet bgs to approximately 60 ft bgs, and the deep zone extends to the bedrock surface at approximately 90 ft bgs. The shallow groundwater zone is of interest in VI evaluations since it is the upper-most zone reflecting volatilization impacts by underlying (intermediate and deep) zones, and is the zone which has the potential to impact indoor air via VI.

The shallow groundwater screening levels for VI were calculated using EPA's VISL calculator (EPA, 2016). EPA's default groundwater-to-indoor air attenuation factor (AF) of 0.001 and average site-specific groundwater temperature of 16.5 degrees Celsius (as determined during groundwater sampling in June 2016) were used in the VISL calculations. Groundwater VISLs were calculated based on a target excess lifetime cancer risk (ELCR) of $1x10^{-6}$ and target non-carcinogenic hazard quotient (HQ) of 1 because of the conservatism incorporated into the default AF between groundwater and indoor air.

Seven chemicals were detected in shallow groundwater at concentrations above residential VISLs: PCE, TCE, vinyl chloride, 1,1,2-trichloroethane, benzene, bromodichloromethane, and chloroform. PCE, TCE, and vinyl chloride are site-related, whereas 1,1,2-trichloroethane, benzene, bromodichloromethane, and chloroform are not (i.e., are not detected or known to have been released in the source areas). Because shallow groundwater is the source medium for contamination at the site, shallow groundwater data were used in the VI evaluation as part of the MLE evaluation when interpreting subslab soil vapor and indoor air data.

Subslab Soil Vapor

Subslab soil vapor screening levels were calculated using EPA's VISL calculator (EPA, 2016). EPA's default soil vapor-to-indoor AF of 0.03 and the residential and industrial air Regional Screening Levels

[2] CP-027 and one unit at CP-023 were vacant during sampling.

(RSLs) were used in the VISL calculations. The soil vapor VISLs were based on a target ELCR of 1×10^{-6} and a target HQ of 1.[3]

Indoor Air and Crawlspace Air

The screening levels used for indoor air and crawlspace air are EPA's residential and industrial air RSLs (EPA, 2017). The RSLs were based on a target ELCR of 1×10^{-6} and a target HQ of 0.1 to account for the potential presence of multiple chemicals affecting the same target organ. For chemicals with more than one RSL (for example, carcinogenic-based RSL and noncarcinogenic-based RSL), the lowest value was selected as the final screening level for that chemical.

The results of the shallow groundwater, subslab soil vapor, indoor air, and crawlspace air screening are presented in Attachment 2, Table 2-1 through Table 2-7. Each property and environmental medium was screened separately. Chemicals exceeding screening levels were evaluated further in the MLE evaluation (Section 2.2).

2.2 Multiple-Lines-of-Evidence Evaluation of Vapor Intrusion at Each Property

An MLE evaluation was performed for each commercial and residential property where chemicals exceeded screening levels in shallow groundwater, subslab soil vapor, indoor air, or crawlspace air to determine if these chemicals are related to VI or potentially present because of background sources. As a conservative approach, for properties where multiple tenants or buildings are present (i.e., CP-010, CP-011, CP-013, CP-016, CP-017, CP-023), all data collected on the property were merged in the evaluation. The following lines of evidence were considered:

- Do the measured volatile organic compound (VOC) concentrations in shallow groundwater, subslab soil vapor, crawlspace air, and/or indoor air exceed VISLs and Removal Management Levels (RMLs)?
- Is the building located within the PCE or TCE soil vapor plume area[4]? If the building is not located within the PCE and/or TCE soil vapor plume area (that is, where PCE and/or TCE soil vapor concentrations exceeded the VISLs), then it is unlikely that the VI pathway will be complete.
- Do nearby soil vapor results indicate a sufficient source strength to pose a concern for potential VI if preferential pathways such as utility conduits are present? Even if subslab soil vapor and/or crawlspace air VOC concentrations are below VISLs at a building, there is a potential for VI through other pathways such as utility conduits if there are nearby concentrations of VOCs in soil vapor that exceed VISLs.
- Is outdoor air (sitewide) similar or greater than indoor air concentrations, indicating background VOCs? Indoor air VOC concentrations are compared to the sitewide outdoor air VOC concentrations to determine if they are similar (that is, within a factor of 3), indicating that measured indoor air concentrations are not likely because of VI but from an outdoor air source.
- Were potential indoor VOC sources identified during the building survey? If potential indoor VOC sources were identified, especially those that could contain PCE and/or TCE (such as air fresheners and cigarette smoke), then this may indicate that measured indoor air concentrations of PCE and/or TCE are not related to VI, but are from an indoor air source.
- Are there building construction features or conditions that could increase the likelihood of VI? Such building features or conditions may include the following:

[3] A target HQ of 1 is used for soil vapor VISLs because of the conservatism in the AF used for cross-media transfer from soil vapor to indoor air, and the lack of direct exposure to soil vapor.

[4] The soil vapor plume was defined by the area exceeding the soil vapor VISLs based on an ELCR of 1×10^{-6} and HI of 1, including a 100-ft buffer zone.

  - The interior volume of the building and/or if it is divided into multiple small compartments, which affects dilution of vapor concentrations once they enter the building.
  - The presence of cracks in the slab or foundation walls, which could allow vapors into the building.
  - The age of the building because older buildings may have more cracks in the slab or foundation walls from settling over time.
  - The presence of a sump pump because vapors can off-gas directly from groundwater in the sump.
  - The presence of a basement, which indicates that the building is closer vertically to the source of VOCs in groundwater, or the presence of a crawlspace with a dirt floor through which vapors may enter the building.

- Are the measured indoor air concentrations greater than the measured crawlspace air and/or subslab soil vapor concentrations? If indoor air VOC concentrations are greater than crawlspace air and/or subslab soil vapor concentrations, then indoor VOC sources (rather than VI) may be causing the measured indoor air VOC concentrations.
- Are there mismatched ratios between crawlspace air, subslab soil vapor, and/or indoor air for different VOCs? If PCE is measured in subslab soil vapor at much greater concentrations than TCE, but TCE is measured at higher concentrations in indoor air, then this indicates that indoor VOC sources may be causing the measured indoor air TCE concentrations.

The detailed MLE evaluation for each building is presented in Attachment 3, Table 3-1 (Commercial Properties) and Table 3-2 (Residential Properties). The MLE evaluation was used to determine if chemicals detected in indoor air, crawlspace air, or subslab vapor data are site-related for current and future VI scenarios. At the request of EPA, because only one round of VI sampling was available, conclusions based on subslab soil vapor data were considered to be applicable to potential current VI scenarios. If the chemicals were concluded to be potentially site-related, they were selected as COPCs. The conclusions of the MLE evaluation and identification of COPCs for the properties are summarized in Table 2 below:

Table 2. Results of MLE Evaluation

VI CSM Category	Property ID	Identified COPCs for Current VI Scenario
Property likely currently has complete VI pathway that is causing IA and/or CS > VISLs, and has potential for this in the future	CP-002	PCE, TCE
	CP-013	PCE, TCE
	CP-016	PCE, TCE
	CP-017	PCE, TCE
	CP-023	PCE, TCE
	CP-024	PCE, TCE
	RP-039	PCE, TCE
	RP-042	PCE, TCE
	RP-047	PCE, TCE
Property possibly currently has complete VI pathway that is causing IA and/or CS > VISLs, and has potential for this in the future	CP-010	PCE
	CP-018	PCE, TCE
	CP-027	PCE, TCE
	CP-056	PCE, TCE
	RP-041	PCE, TCE
Property unlikely currently has complete VI pathway that is causing IA and/or CS > VISLs, but has potential for this in the future	CP-003	PCE, TCE
	CP-008	TCE
	CP-011	PCE, TCE
	CP-019	PCE, TCE
	CP-051	PCE, TCE
	CP-053	PCE, TCE
	CP-064	PCE, TCE
	CP-067	PCE, TCE
	RP-062	PCE, TCE
Property unlikely currently has complete VI pathway causing IA and/or CS > VISLs, and unlikely has potential for this in the future	None	NA

Notes:

CP = Commercial Property

CS = Crawlspace Air

CSM = Conceptual Site Model

IA = Indoor Air

ID = identification

NA = Not applicable

RP = Residential Property

3.0 Vapor Intrusion Risk Estimates

Indoor air and subslab soil vapor risk estimates were calculated for COPCs identified at each property using maximum detected concentrations and EPA's VISL calculator (EPA, 2016). If all samples from an environmental medium collected from a property were less than or equal to VISLs, risk estimates were not calculated for that property. The VISL risk calculator worksheets are provided in Attachment 4, Tables 4-1 through 4-22. Because only one round of indoor/crawlspace air samples were collected and because indoor air concentration can vary temporally, both indoor air/crawlspace air and subslab soil vapor results were used to estimate potential indoor air risk estimates. The risk estimates are summarized below in Table 3.

Table 3. Summary of risk estimates

	Based on Indoor Air & Crawlspace Air		**Based on Subslab Soil Vapor**	
Property ID	**ELCR**	**HI (PCE/TCE)**	**ELCR**	**HI (PCE/TCE)**
CP-2	$2x10^{-5}$	4/1		
CP-10	$7x10^{-7}$	0.2/-		
CP-13	$8x10^{-6}$	2/0.5	$7x10^{-5}$	17/4
CP-16	$1x10^{-5}$	1/3	$2x10^{-4}$	16/38
CP-17	$2x10^{-6}$	0.5/0.1	$1x10^{-4}$	26/15
CP-18			$9x10^{-5}$	21/6
CP-23	$4x10^{-6}$	1/-	$6x10^{-5}$	15/1
CP-24	$1x10^{-5}$	3/0.8	$4x10^{-5}$	9/1
CP-27			$3x10^{-5}$	4/5
CP-56	$5x10^{-7}$	-/0.2		
RP-39	$3x10^{-5}$	5/3	$4x10^{-5}$	6/4
RP-41	$2x10^{-6}$	0.2/0.2		
RP-42	$3x10^{-6}$	0.2/0.2	$1x10^{-5}$	0.5/1
RP-47	$1x10^{-5}$	0.1/2	$2x10^{-6}$	-/0.5

Notes:
ELCR – excess lifetime cancer risk
HI – hazard index
Multiple buildings or tenants are present at CP-010, CP-013, CP-016, CP-017, and CP-023; maximum detected concentrations on the property were used in the risk estimates.

4.0 Chemicals of Concern

In general, chemicals of concern (COCs) are identified when the potential ELCR or HI for a receptor group exceeds EPA threshold values (a total ELCR of $1x10^{-4}$ or a target organ-specific HI of 1) and concentrations are site-related and above background levels. When a potential ELCR of $1x10^{-4}$ is exceeded for an exposure medium for a receptor group, the site-related COPCs posing an individual ELCR greater than $1x10^{-6}$ in the environmental medium responsible for the unacceptable risks are identified as COCs. When a potential target organ-specific HI exceeds 1 for an exposure medium for a receptor group, the site-related COPCs posing a HQ greater than 1 for that target organ in the environmental medium responsible for the unacceptable HI are identified as COCs. Factors such as nature of contamination source and laboratory contamination are typically considered when identifying COCs.

Risk estimates were less than or within EPA's target risk for potential current and future receptors at many properties sampled. That is, the potential cumulative ELCRs for VI exposure scenarios evaluated at the buildings were less than or within the target ELCR range of $1x10^{-6}$ to $1x10^{-4}$ and the estimated target organ-specific HIs did not exceed the threshold of 1.

A summary of the risk estimates for commercial and residential properties, color-coded based on risk estimates, is provided in Table 4 and Table 5, respectively. The property risk estimates were grouped as shown below in Table 6. A total ELCR was calculated for each property. The HQ was presented for each COPC; however, a total HI was not calculated because the COPCs (i.e., PCE and TCE) have different target organs. The total ELCR and the individual HQs were color-coded based on the key provided in Table 4 and Table 5. The property risk estimates were grouped as shown below in Table 6.

Table 6. Summary of property risk estimates

	Number of Commercial properties[5]		Number of Residential properties[5]	
ELCR and HQ Comparison[6]	**Based on indoor air/crawlspace data**	**Based on subslab soil vapor data**	**Based on indoor air/crawlspace data**	**Based on subslab soil vapor data**
ELCR ≤ $1x10^{-5}$ and HQ ≤1	4	0	2	2
ELCR >$1x10^{-5}$ or HQ >1	4	7	2	1
ELCR >$1x10^{-4}$, or HQ >3 (PCE), or HQ>1 (TCE)	2	7	2	1

Notes:
ELCR – excess lifetime cancer risk
HQ – hazard quotient
PCE – tetrachloroethene
TCE – trichloroethene
≤ - less than or equal to
>- greater than

Multiple buildings or tenants are present at CP-010, CP-013, CP-016, CP-017, and CP-023. At these properties, the risk estimates presented were based on maximum detected indoor air, crawlspace air, and subslab soil vapor concentrations at the property. A further evaluation was conducted on the COC

[5] If site-related COPCs were identified in both indoor air and subslab soil vapor at a property, risk estimates were calculated based on both media, and the risk estimates are categorized in both columns.

concentrations detected in each tenant space on these properties whereby detected concentrations were compared to VISLs at varying target ELCR and HQ levels for use by EPA's risk manager (Table 7). Results of the evaluation are summarized in Table 8 below:

Table 8. Summary of commercial tenant space evaluation

Commercial property & number of tenant units	Number of Tenant Spaces with ELCR >1x10^{-5} or HQ >1 [7]			Number of Tenant Spaces with ELCR >1x10^{-4}, or HQ >3 (PCE), or HQ>1 (TCE)[7]		
	Based on indoor air/crawlspace data	Based on subslab soil vapor data	Specific units in the risk category based on indoor air, crawlspace, or subslab soil vapor	Based on indoor air/crawlspace data	Based on subslab soil vapor data	Specific units in the risk category based on indoor air, crawlspace, or subslab soil vapor
CP-010 – 6 units	0	0	None	0	0	None
CP-013 – 3 units	1	2	Units 2, 3	0	1	Unit 2
CP-016 – 6 units	1	5	Units 2, 3, 4, 5, 6	1	5	Units 2, 3, 4, 5, 6
CP-017 – 3 units	0	3	Units 1, 2, 3	0	3	Units 1, 2, 3
CP-023 – 5 units	0	5	Units 1, 2, 3, 4, 5	0	5	Units 1, 2, 3, 4, 5

Notes:
ELCR – excess lifetime cancer risk
HQ – hazard quotient
PCE – tetrachloroethene
TCE – trichloroethene
≤ - less than or equal to
>- greater than

In summary, sampled collected from commercial and residential properties were screened against USEPA screening levels. An MLE evaluation was performed for each commercial and residential property where chemicals exceeded screening levels in shallow groundwater, subslab soil vapor, indoor air, or crawlspace air to determine if these chemicals are related to VI or potentially present because of background sources. The conclusions of the MLE evaluation and identification of COPCs for the properties are summarized in Table 2. Indoor air/crawlspace air (if available) and subslab soil vapor data (if available) were used to estimate indoor air risks on each property; if both types of data were available for a property, both types were used to calculate indoor air risk estimates. A summary of the risk estimates for properties with COPCs is presented in Table 3 (with backup for the risk estimates provided in Table 4 [for commercial properties] and Table 5 [for residential properties]).

The ELCR and HQ estimates for each property (based on both indoor air/crawlspace data and subslab soil vapor data) were compared to various target ELCR and HQ levels. Because target levels are based on acceptable risk levels, only those buildings exceeding target levels were flagged as buildings of potential concern. ELCR and HQ estimates based on indoor air/crawlspace data and subslab soil vapor data were considered separately.

[7] If site-related COCs were identified in both indoor air and subslab soil vapor at a property, comparisons were made based on both media, and the VISL exceedances are categorized in both columns.

The number of properties exceeding each target ELCR and HQ are indicated in the table below, with the specific property locations identified and the number of units exceeding target levels for those properties with multiple buildings or tenants. As indicated, eight properties exceed an ELCR of $1x10^{-5}$ or an HQ of 1, and the same eight properties exceed an ELCR of $1x10^{-4}$, an HQ of 3 (for PCE), or an HQ of 1 (for TCE). Multiple units are present at some of the properties, and are indicated where applicable.

Table 9. Properties exceeding target risk levels

	Based on indoor air/crawlspace data		**Based on subslab soil vapor data**	
ELCR and HQ Comparison[8]	**# of properties**	**Locations**	**# of properties**	**Locations**
ELCR >$1x10^{-5}$ or HQ >1	6	CP-2, CP-13 (1 unit), CP-16 (1 unit), CP-24, RP-39, RP-47	8	CP-13 (2 units), CP-16 (5 units), CP-17 (3 units), CP-18, CP-23 (5 units), CP-24, CP-27, RP-39
ELCR >$1x10^{-4}$, or HQ >3 (PCE), or HQ>1 (TCE)	4	CP-2, CP-16 (1 unit), RP-39, RP-47	8	CP-13 (1 unit), CP-16 (5 units), CP-17 (3 units), CP-18, CP-23 (5 units), CP-24, CP-27, RP-39

Notes:
ELCR – excess lifetime cancer risk
HQ – hazard quotient
PCE – tetrachloroethene
TCE – trichloroethene
≤ - less than or equal to
>- greater than

As indicated in Section 1.0, buildings within the area exceeding soil vapor RMLs for PCE and TCE were identified and property owners were contacted to request access for sampling. Although owners of 23 properties granted access, additional buildings on properties[9] without VI mitigation systems are present that were not sampled:

- No response - 20 properties
- Vacant property - 13 properties
- Access denied - 3 properties

Based on the location of these properties within the soil vapor plume, there is the potential for a complete VI pathway exceeding EPA-acceptable levels at current or future buildings on these 36 properties (in addition to the 8 properties identified in Table 9).

The COPCs in site groundwater are PCE, TCE, and vinyl chloride. Based on results of the VI evaluation and risk estimates, the VI-related COCs in indoor air, crawlspace air, and subslab soil vapor are PCE and TCE.

[9] Some properties may have more than one building present.

5.0 Technical Exceptions for Vapor Intrusion Investigations

This VI evaluation provides results regarding the potential occurrence and significance of VI based on reasonably obtainable sampling data and observations.

This VI evaluation does not address indoor air quality problems including mold or mildew, radon, building air quality unrelated to subsurface contaminants or general indoor ventilation issues. In addition, the VI investigation and evaluation do not address landfill gas or explosive atmospheres.

The VI evaluation provides comparison of indoor air quality with applicable regulatory screening levels. These comparisons are not intended to imply the presence or absence of healthful or safe indoor air quality, and do not represent any medical opinion.

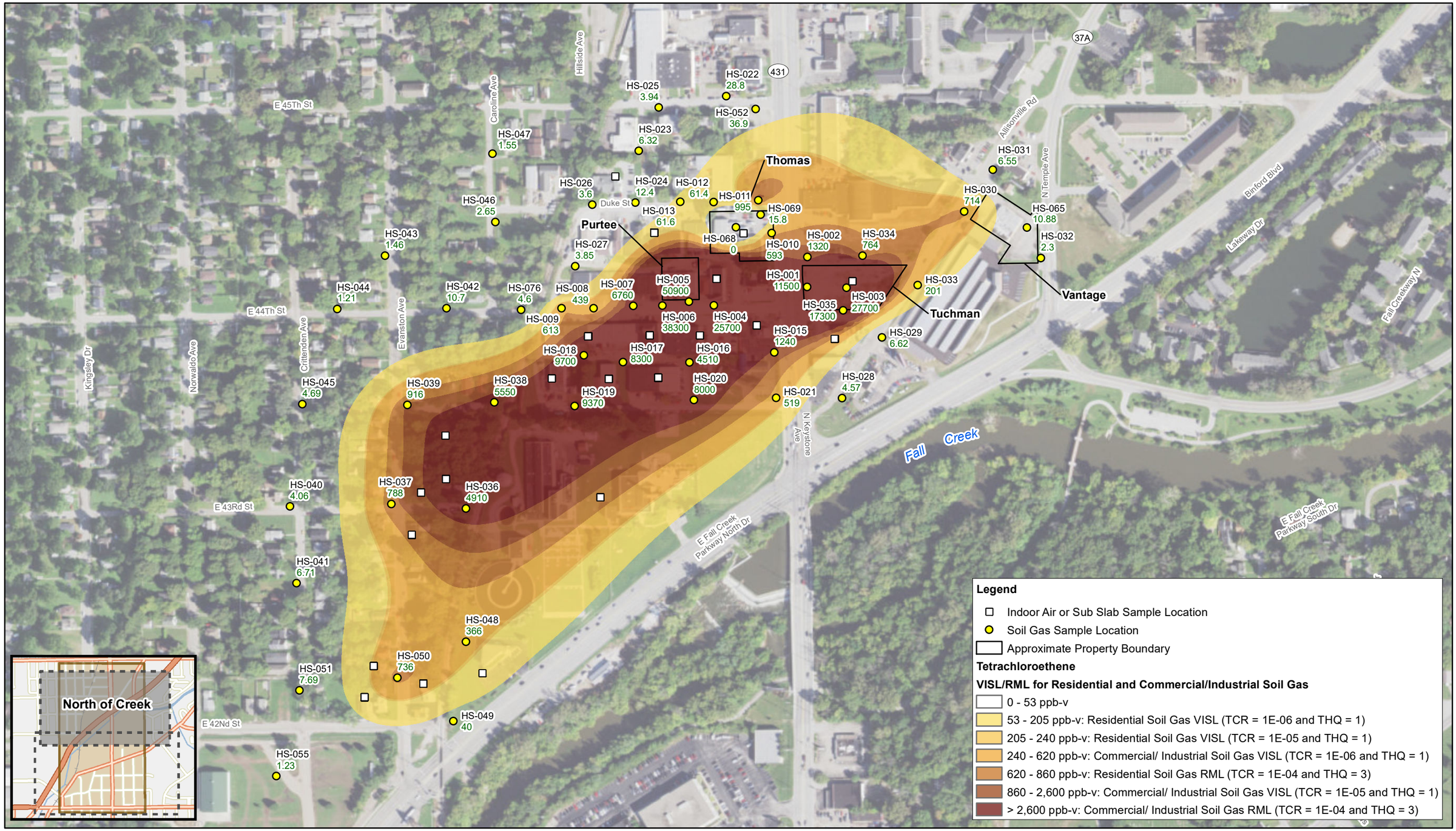
The results and conclusions presented in this VI evaluation were developed for land uses and site conditions as characterized by the available data. Any changes in land use or site conditions based on additional information may warrant reevaluation of the results and conclusions of the VI evaluation.

6.0 References

U.S. Environmental Protection Agency (EPA). 2016. *OSWER Vapor Intrusion Assessment. Vapor Intrusion Screening Level (VISL) Calculator Version 3.5.1.* May (https://www.epa.gov/vaporintrusion).

U.S. Environmental Protection Agency (EPA). 2017. *Regional Screening Levels for Chemical Contaminants at Superfund Sites*. June.

Figures



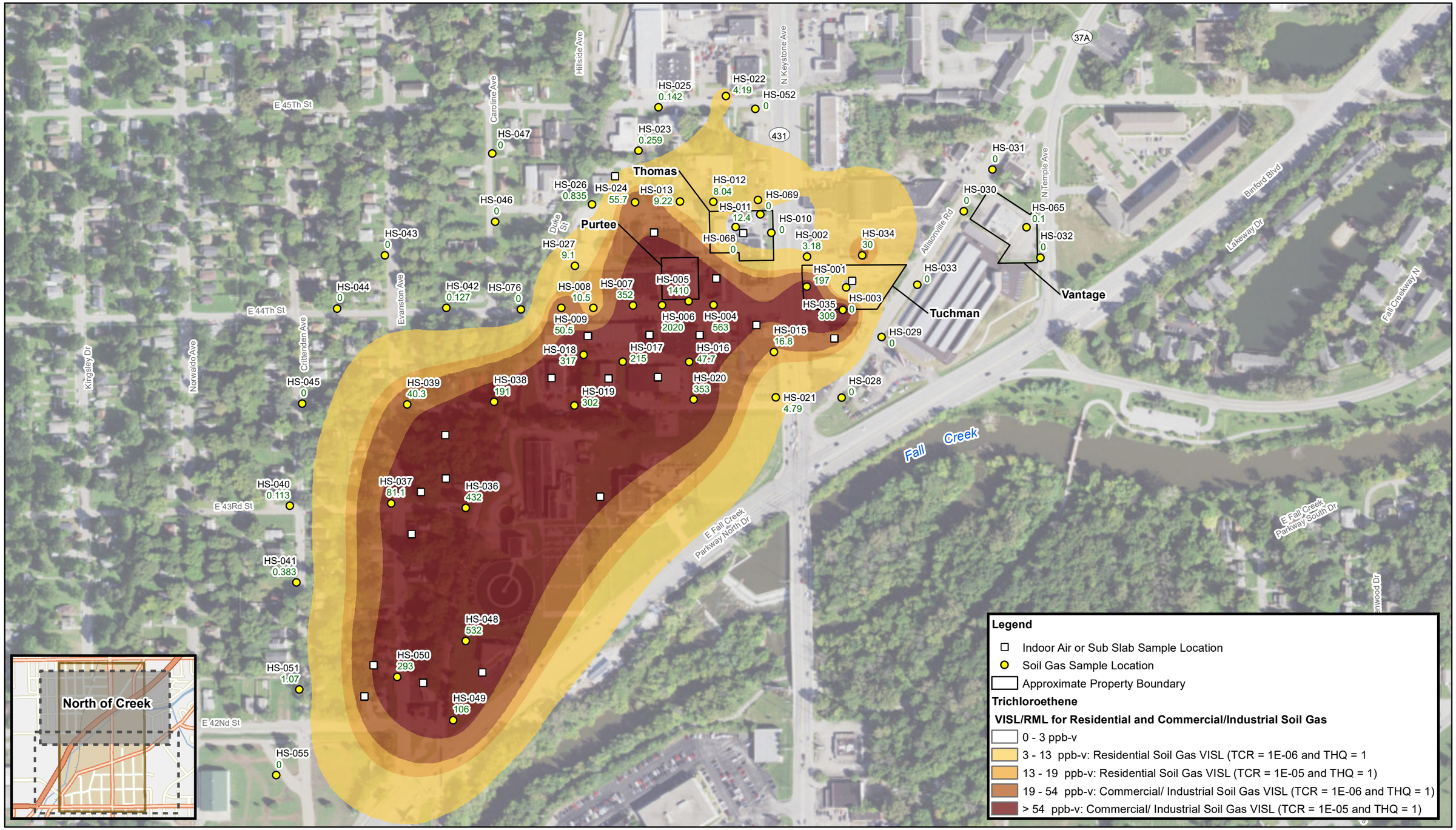
N

0 250 500 Feet

Imagery: USDA FSA NAIP, October 2014

Notes: Results presented in "units" (acronym for unit)
TCR = Target Risk for Carcinogens
THQ = Target Hazard Quotient for Non-Carcinogens
VISL = Vapor Intrusion Screening Level
RML = Removal Management Level
ppb - v = parts per billion by volume

Figure 1
Tetrachloroethene Vapor Concentrations
Keystone Corridor Groundwater Contamination Site
Marion County, Indiana



N

0 250 500 Feet

Imagery: USDA FSA NAIP, October 2014

Notes: Results presented in "units" (acronym for unit)
TCR = Target Risk for Carcinogens
THQ = Target Hazard Quotient for Non-Carcinogens
VISL = Vapor Intrusion Screening Level
RML = Removal Management Level
ppb - v = parts per billion by volume

Figure 2
Trichloroethene Vapor Concentrations
Keystone Corridor Groundwater Contamination Site
Marion County, Indiana

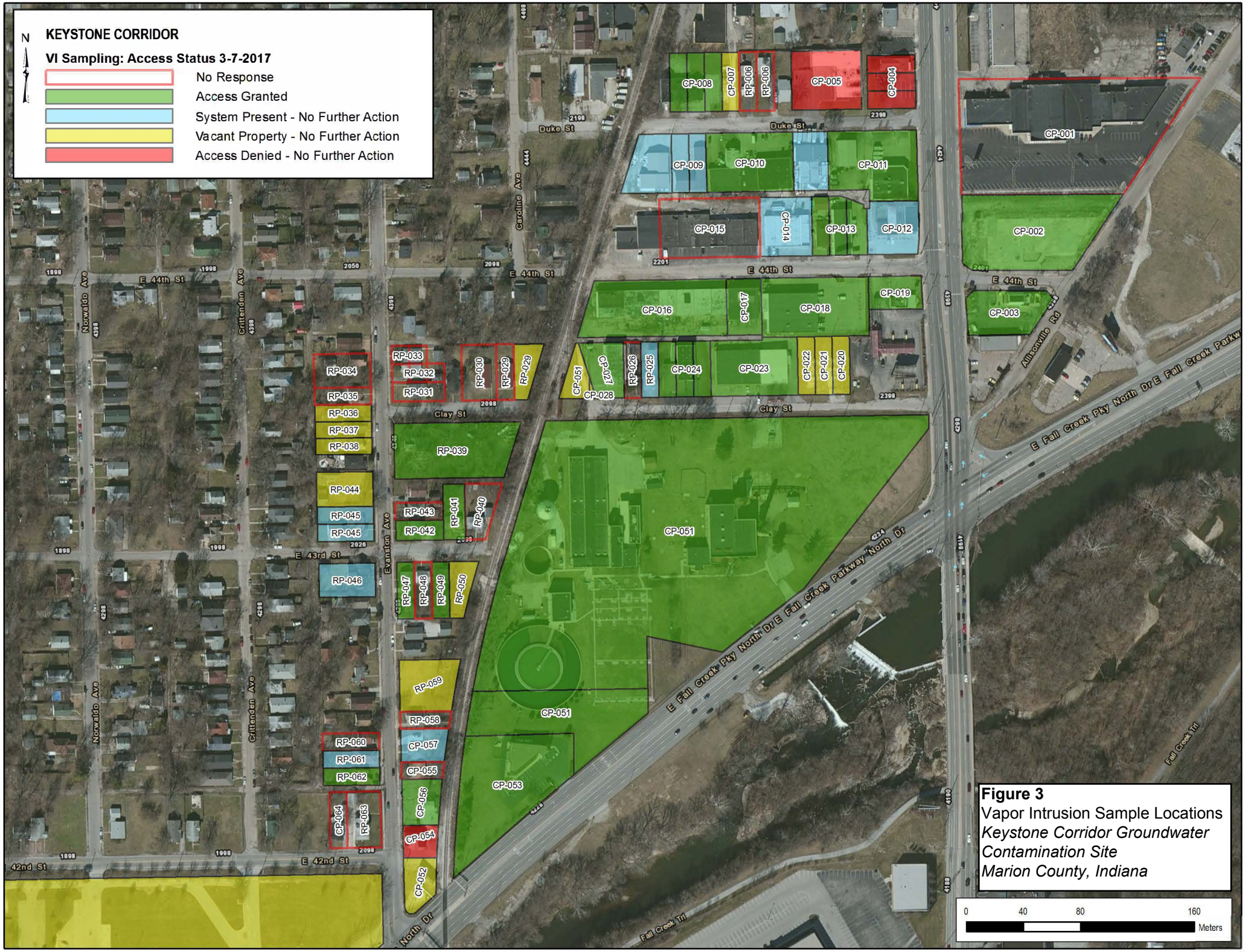


Figure 3
Vapor Intrusion Sample Locations
Keystone Corridor Groundwater Contamination Site
Marion County, Indiana

Tables

Table 4. Estimated Risks and Hazards for Vapor Intrusion Pathway - Commercial Properties

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Medium	Location	Sample ID	Analyte	Indoor Air Concentration [a] (µg/m³)	Commercial Scenario [b]	
					ELCR	HQ
Indoor Air	CP-002	KC-CP-002-IA-01-022717	Tetrachloroethene	660	1E-05	**4**
		KC-CP-002-IA-01-022717	Trichloroethene	12 J	4E-06	1
				Total ELCR (CP-002)	2E-05	-
	CP-010	KC-CP-010-IA-02-022217	Tetrachloroethene	33	7E-07	0.2
				Total ELCR (CP-010)	7E-07	-
	CP-013	KC-CP-013-IA-02-022417	Tetrachloroethene	310 J	7E-06	2
		KC-CP-013-IA-02-022417	Trichloroethene	4.5 J	2E-06	0.5
				Total ELCR (CP-013)	8E-06	-
	CP-016	KC-CP-016-IA-04-022717	Tetrachloroethene	200 J	4E-06	1
		KC-CP-016-IA-04-022717	Trichloroethene	22 J	7E-06	**3**
				Total ELCR (CP-016)	1E-05	-
	CP-017	KC-CP-017-IA-01-022317	Tetrachloroethene	84	2E-06	0.5
		KC-CP-017-IA-01-022317	Trichloroethene	0.95	3E-07	0.1
				Total ELCR (CP-017)	2E-06	-
	CP-023	KC-CP-023-IA-03-022217	Tetrachloroethene	200 J	4E-06	1
				Total ELCR (CP-023)	4E-06	-
	CP-024	KC-CP-024-IA-01-022317	Tetrachloroethene	570	1E-05	3
		KC-CP-024-IA-01-022317	Trichloroethene	7.3	2E-06	0.8
				Total ELCR (CP-024)	1E-05	-
	CP-056	KC-CP-056-IA-01-022517	Trichloroethene	1.6 J	5E-07	0.2
				Total ELCR (CP-056)	5E-07	-
Subslab Soil Vapor-to-Indoor Air	CP-013	KC-CP-013-SS-02-022417	Tetrachloroethene	2970	6E-05	**17**
		KC-CP-013-SS-02-022417	Trichloroethene	33	1E-05	**4**
				Total ELCR (CP-013)	7E-05	-
	CP-016	KC-CP-016-SS-09-022317	Tetrachloroethene	2760	6E-05	**16**
		KC-CP-016-SS-06-022417	Trichloroethene	330	1E-04	**38**
				Total ELCR (CP-016)	2E-04	-
	CP-017	KC-CP-017-SS-03-022217	Tetrachloroethene	4500	1E-04	**26**
		KC-CP-017-SS-03-022217	Trichloroethene	129	4E-05	**15**
				Total ELCR (CP-017)	1E-04	-
	CP-018	KC-CP-018-SS-02-022817	Tetrachloroethene	3600	8E-05	**21**
		KC-CP-018-SS-02-022817	Trichloroethene	51	2E-05	**6**
				Total ELCR (CP-018)	9E-05	-
	CP-023	KC-CP-023-SS-08-022217	Tetrachloroethene	2700	6E-05	**15**
		KC-CP-023-SS-06-022217	Trichloroethene	11.7	4E-06	1
				Total ELCR (CP-023)	6E-05	-

Table 4. Estimated Risks and Hazards for Vapor Intrusion Pathway - Commercial Properties

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Medium	Location	Sample ID	Analyte	Indoor Air Concentration [a] ($\mu g/m^3$)	Commercial Scenario [b]	
					ELCR	HQ
Subslab Soil Vapor-to-Indoor Air	CP-024	KC-CP-024-SS-02-022217	Tetrachloroethene	1500	3E-05	9
		KC-CP-024-SS-03-022217	Trichloroethene	9.6	3E-06	1
				Total ELCR (CP-024)	**4E-05**	**-**
	CP-027	KC-CP-027-SS-02-022317	Tetrachloroethene	780	2E-05	4
		KC-CP-027-SS-02-022317	Trichloroethene	42	1E-05	5
				Total ELCR (CP-027)	**3E-05**	**-**

Notes:

a. The indoor air concentrations for soil vapor-to-indoor air were estimated using the EPA's VISL Calculator, Version 3.5.1 (EPA, updated June 2017 RSLs)

b. ELCRs, and HQs were estimated using the EPA's VISL Calculator, Version 3.5.1 (EPA, updated June 2017 RSLs)

CP = Commercial Property

ELCR = Excess Lifetime Cancer Risk

EPA = U.S. Environmental Protection Agency

HQ = Hazard Quotient

PCE = Tetrachloroethene

RSL = Regional Screening Level

TCE = Trichloroethene

$\mu g/m^3$ = micrograms per cubic meter

VISL = Vapor Intrusion Screening Level

ELCR $\leq 1x10^{-5}$ or HQ ≤ 1
ELCR $>1x10^{-5}$ or HQ >1
ELCR $>1x10^{-4}$, or HQ >3 (PCE), or HQ>1 (TCE)

Table 5. Estimated Risks and Hazards for Vapor Intrusion Pathway - Residential Properties

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Medium	Location	Sample ID	Analyte	Indoor Air Concentration [a] ($\mu g/m^3$)	Residential Scenario [b]	
					ELCR	HQ
Indoor Air	RP-039	KC-RP-039-IA-01-022217	Tetrachloroethene	190	2E-05	**5**
		KC-RP-039-IA-01-022217	Trichloroethene	6.3	1E-05	**3**
				Total ELCR (RP-039)	**3E-05**	**-**
	RP-041	KC-RP-041-CS-01-022517	Tetrachloroethene	8.8 J	8E-07	0.2
		KC-RP-041-CS-01-022517	Trichloroethene	0.4 J	8E-07	0.2
				Total ELCR (RP-041)	**2E-06**	**-**
	RP-042	KC-RP-042-CS-01-022517	Tetrachloroethene	7.8	7E-07	0.2
		KC-RP-042-CS-01-022517	Trichloroethene	0.5 J	1E-06	0.2
				Total ELCR (RP-042)	**3E-06**	**-**
	RP-047	KC-RP-047-IA-01-022217	Tetrachloroethene	5.4	5E-07	0.1
		KC-RP-047-IA-01-022217	Trichloroethene	4.5	9E-06	**2**
				Total ELCR (RP-047)	**1E-05**	**-**
Subslab Soil Vapor-to-indoor air	RP-039	KC-RP-039-SS-01-022117	Tetrachloroethene	231	2E-05	**6**
		KC-RP-039-SS-01-022117	Trichloroethene	7.8	2E-05	**4**
				Total ELCR (RP-039)	**4E-05**	**-**
	RP-042	KC-RP-042-SS-01-022417	Tetrachloroethene	22.8	2E-06	0.5
		KC-RP-042-SS-01-022417	Trichloroethene	2.61	5E-06	1
				Total ELCR (RP-042)	**1E-05**	**-**
	RP-047	KC-RP-047-SS-01-022117	Trichloroethene	0.99	2E-06	0.5
				Total ELCR (RP-047)	**2E-06**	**-**

Notes:

a. The indoor air concentrations for soil vapor-to-indoor air were estimated using the EPA's VISL Calculator, Version 3.5.1 (EPA, updated June 2017 RSLs).

b. ELCRs, and HQs were estimated using the EPA's VISL Calculator, Version 3.5.1 (EPA, updated June 2017 RSLs).

ELCR = Excess Lifetime Cancer Risk
EPA = U.S. Environmental Protection Agency
HQ = Hazard Quotient
PCE = Tetrachloroethene
RP = Residential Property
RSL = Regional Screening Level
TCE = Trichloroethene
$\mu g/m^3$ = microgram(s) per cubic meter
VISL = vapor intrusion screen level

ELCR $\leq 1x10^{-5}$ or HQ ≤ 1
ELCR $>1x10^{-5}$ or HQ >1
ELCR $>1x10^{-4}$, or HQ >3 (PCE), or HQ>1 (TCE)

Table 7. COC Evaluation for Commercial Properties with Multiple Tenants

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

						PCE VISLs (µg/m^3)			TCE VISLs (µg/m^3)		
						IA	CS	SS	IA	CS	SS
			Based on lower of ELCR=10^{-5} & HQ=1			**180**	**180**	**5800**	**8.8**	**8.8**	**290**
			Based on lower of ELCR=10^{-4}, HQ=3 (PCE), & HQ=1 (TCE)			**530**	**530**	**18000**	**8.8**	**8.8**	**290**
			Samples available			**PCE Concentrations Detected (µg/m^3)**			**TCE Concentrations Detected (µg/m^3)**		
CP	**Space**	**Tenant**	**IA**	**CS**	**SS**	**IA**	**CS**	**SS**	**IA**	**CS**	**SS**
CP-010	1	split garage/auto repair			SS-01, 02			1300			
	2	2217B (offices)	IA-01, 02	CS-01	SS-03	33	8.5	11			
	3	2221 (multi-use, storage)			SS-04, 05			31			
	4	2223 (multi-use, garage)			SS-06			130			
	5	2225 (multi-use, boat repair)			SS-07			66			
	6	2217 (multi-use, cleaning prod stg)			SS-08, 09			690			
CP-013	1	barber shop	IA-01	CS-01		0.63	0.44		0.054	0.059	
	2	gym	IA-02		SS-01, 02	**310**		**99000**	4.5		**1100**
	3	storage room			SS-03			**11000**			22
CP-016	1	woodshop	IA-01		SS-01, 02	36		84	3.9		180
	2	metal shop	IA-02		SS-03, 04	34		**6200**	4.9		**3000**
	3	auto body shop			SS-05, 06			**14000**			**11000**
	4	glass shop	IA-04		SS-07, 08	**200**		**67000**	**22**		**5400**
	5	multi-use			SS-09, 10			**92000**			**2900**
	6	lawn care garage			SS-11, 12			**26000**			44
CP-017	1	multi-use			SS-01, 02			**65000**			210
	2	not available			SS-03, 04			**150000**			**4300**

Table 7. COC Evaluation for Commercial Properties with Multiple Tenants

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

						PCE VISLs (µg/m^3)			TCE VISLs (µg/m^3)		
						IA	CS	SS	IA	CS	SS
			Based on lower of ELCR=10^{-5} & HQ=1			**180**	**180**	**5800**	**8.8**	**8.8**	**290**
			Based on lower of ELCR=10^{-4}, HQ=3 (PCE), & HQ=1 (TCE)			**530**	**530**	**18000**	**8.8**	**8.8**	**290**
			Samples available			**PCE Concentrations Detected (µg/m^3)**			**TCE Concentrations Detected (µg/m^3)**		
CP	**Space**	**Tenant**	**IA**	**CS**	**SS**	**IA**	**CS**	**SS**	**IA**	**CS**	**SS**
	3	construction shop	IA-01		SS-05, 06	84		**50000**	0.95		<260
CP-023	1	unoccupied			SS-01, 02			**65000**			220
	2	irrigation company	IA-01		SS-03, 04	34		**70000**	0.22		210
	3	landscaping company	IA-02		SS-05, 06	130		**71000**	0.57		**390**
	4	asphalt sealing company	IA-03		SS-07, 08	**200**		**90000**	0.46		<700
	5	auto body shop	IA-04		SS-09, 10	85		**78000**	0.29		20

Notes:

COC = chemical of concern

CP = commercial property

CS = crawlspace

ELCR = excess lifetime cancer risk

HQ = hazard quotient

IA = indoor air

PCE = tetrachloroethene

SS = subslab soil vapor

TCE = trichloroethene

VISL = vapor intrusion screening level

Brown font indicates that the concentration exceeds the VISL based on the lower of ELCR=10^{-5} & HQ=1

Red font indicates that the concentration exceeds the VISL based on the lower of ELCR=10^{-4}, HQ=3 (PCE), & HQ=1 (TCE)

COCs identified on Table 2 are presented in this table.

Attachment 1
Data Grouping and Sample List Tables

Table 1-1
Data Groupings for the Vapor Intrusion Evaluation
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

AOC_ID	Description	Count
AOC_GA_GW_Shallow	Shallow groundwater aquifer in general site area	43
AOC_CP-10_CS	Crawlspace air at Commercial Property 10	1
AOC_CP-10_IA	Indoor air at Commercial Property 10	2
AOC_CP-10_OA	Outdoor air at Commercial Property 10	1
AOC_CP-10_Subslab	Subslab soil gas at Commercial Property 10	9
AOC_CP-11_Subslab	Subslab soil gas at Commercial Property 11	2
AOC_CP-13_CS	Crawlspace air at Commercial Property 13	1
AOC_CP-13_IA	Indoor air at Commercial Property 13	3
AOC_CP-13_Subslab	Subslab soil gas at Commercial Property 13	3
AOC_CP-16_IA	Indoor air at Commercial Property 16	3
AOC_CP-16_Subslab	Subslab soil gas at Commercial Property 16	13
AOC_CP-17_IA	Indoor air at Commercial Property 17	1
AOC_CP-17_OA	Outdoor air at Commercial Property 17	1
AOC_CP-17_Subslab	Subslab soil gas at Commercial Property 17	6
AOC_CP-18_Subslab	Subslab soil gas at Commercial Property 18	3
AOC_CP-19_IA	Indoor air at Commercial Property 19	1
AOC_CP-19_Subslab	Subslab soil gas at Commercial Property 19	1
AOC_CP-2_IA	Indoor air at Commercial Property 2	2
AOC_CP-23_IA	Indoor air at Commercial Property 23	5
AOC_CP-23_Subslab	Subslab soil gas at Commercial Property 23	12
AOC_CP-24_IA	Indoor air at Commercial Property 24	1
AOC_CP-24_Subslab	Subslab soil gas at Commercial Property 24	4
AOC_CP-27_Subslab	Subslab soil gas at Commercial Property 27	3
AOC_CP-3_IA	Indoor air at Commercial Property 3	2
AOC_CP-3_Subslab	Subslab soil gas at Commercial Property 3	1
AOC_CP-51_IA	Indoor air at Commercial Property 51	2
AOC_CP-53_Subslab	Subslab soil gas at Commercial Property 53	1
AOC_CP-56_IA	Indoor air at Commercial Property 56	1
AOC_CP-56_OA	Outdoor air at Commercial Property 56	2
AOC_CP-56_Subslab	Subslab soil gas at Commercial Property 56	3
AOC_CP-64_CS	Crawlspace air at Commercial Property 64	1
AOC_CP-64_IA	Indoor air at Commercial Property 64	2
AOC_CP-64_OA	Outdoor air at Commercial Property 64	1
AOC_CP-64_Subslab	Subslab soil gas at Commercial Property 64	2
AOC_CP-67_IA	Indoor air at Commercial Property 67	1
AOC_CP-67_OA	Outdoor air at Commercial Property 67	1
AOC_CP-67_Subslab	Subslab soil gas at Commercial Property 67	2
AOC_CP-8_CS	Crawlspace air at Commercial Property 8	1
AOC_CP-8_Subslab	Subslab soil gas at Commercial Property 8	1
AOC_RP-39_CS	Crawlspace air at Residential Property 39	1
AOC_RP-39_IA	Indoor air at Residential Property 39	1
AOC_RP-39_Subslab	Subslab soil gas at Residential Property 39	1
AOC_RP-41_CS	Crawlspace air at Residential Property 41	2
AOC_RP-41_IA	Indoor air at Residential Property 41	1
AOC_RP-42_CS	Crawlspace air at Residential Property 42	1
AOC_RP-42_IA	Indoor air at Residential Property 42	1
AOC_RP-42_Subslab	Subslab soil gas at Residential Property 42	1
AOC_RP-47_IA	Indoor air at Residential Property 47	1
AOC_RP-47_Subslab	Subslab soil gas at Residential Property 47	1
AOC_RP-62_IA	Indoor air at Residential Property 62	2
AOC_RP-62_Subslab	Subslab soil gas at Residential Property 62	1

Notes:
AOC = area of concern
CS = crawlspace
IA = indoor air
ID = identification
OA = outdoor air
RP = residential property

Table 1-2
Indoor Air, Crawlspace Air, and Subslab Soil Vapor Samples Used in the Vapor Intrusion Evaluation
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Sample Group	StationID	SampleID	Date Collected	Sample Type
AOC_CP-10_CS	KC-CP-010	KC-CP-010-CS-01-022117	2/21/2017	N
AOC_CP-10_IA	KC-CP-010	KC-CP-010-IA-01-022217	2/22/2017	N
AOC_CP-10_IA	KC-CP-010	KC-CP-010-IA-02-022217	2/22/2017	N
AOC_CP-10_OA	KC-CP-010	KC-CP-010-OA-001-022217	2/21/2017	N
AOC_CP-10_Subslab	KC-CP-010	KC-CP-010-SS-01-022117	2/21/2017	N
AOC_CP-10_Subslab	KC-CP-010	KC-CP-010-SS-02-022117	2/21/2017	N
AOC_CP-10_Subslab	KC-CP-010	KC-CP-010-SS-03-022117	2/21/2017	N
AOC_CP-10_Subslab	KC-CP-010	KC-CP-010-SS-04-022117	2/21/2017	N
AOC_CP-10_Subslab	KC-CP-010	KC-CP-010-SS-05-022117	2/21/2017	N
AOC_CP-10_Subslab	KC-CP-010	KC-CP-010-SS-06-022117	2/21/2017	N
AOC_CP-10_Subslab	KC-CP-010	KC-CP-010-SS-07-022117	2/21/2017	N
AOC_CP-10_Subslab	KC-CP-010	KC-CP-010-SS-08-022117	2/21/2017	N
AOC_CP-10_Subslab	KC-CP-010	KC-CP-010-SS-09-022117	2/21/2017	N
AOC_CP-11_Subslab	KC-CP-011	KC-CP-011-SS-01-022317	2/23/2017	N
AOC_CP-11_Subslab	KC-CP-011	KC-CP-011-SS-02-022317	2/23/2017	N
AOC_CP-13_CS	KC-CP-013	KC-CP-013-CS-01-022317	2/23/2017	N
AOC_CP-13_IA	KC-CP-013	KC-CP-013-IA-01-022317	2/23/2017	N
AOC_CP-13_IA	KC-CP-013	KC-CP-013-IA-02-022417	2/24/2017	N
AOC_CP-13_IA	KC-CP-013	KC-IA-FD-002-022417	2/24/2017	FD
AOC_CP-13_Subslab	KC-CP-013	KC-CP-013-SS-01-022417	2/24/2017	N
AOC_CP-13_Subslab	KC-CP-013	KC-CP-013-SS-02-022417	2/24/2017	N
AOC_CP-13_Subslab	KC-CP-013	KC-CP-013-SS-03-022317	2/23/2017	N
AOC_CP-16_IA	KC-CP-016	KC-CP-016-IA-01-022717	2/27/2017	N
AOC_CP-16_IA	KC-CP-016	KC-CP-016-IA-02-022417	2/24/2017	N
AOC_CP-16_IA	KC-CP-016	KC-CP-016-IA-04-022717	2/27/2017	N
AOC_CP-16_Subslab	KC-CP-016	KC-CP-016-SS-01-022717	2/27/2017	N
AOC_CP-16_Subslab	KC-CP-016	KC-CP-016-SS-02-022717	2/27/2017	N
AOC_CP-16_Subslab	KC-CP-016	KC-CP-016-SS-03-022417	2/24/2017	N
AOC_CP-16_Subslab	KC-CP-016	KC-CP-016-SS-04-022417	2/24/2017	N
AOC_CP-16_Subslab	KC-CP-016	KC-CP-016-SS-05-022417	2/24/2017	N
AOC_CP-16_Subslab	KC-CP-016	KC-CP-016-SS-06-022417	2/24/2017	N
AOC_CP-16_Subslab	KC-CP-016	KC-CP-016-SS-07-022717	2/27/2017	N
AOC_CP-16_Subslab	KC-CP-016	KC-CP-016-SS-08-022717	2/27/2017	N
AOC_CP-16_Subslab	KC-CP-016	KC-CP-016-SS-09-022317	2/23/2017	N
AOC_CP-16_Subslab	KC-CP-016	KC-CP-016-SS-10-022317	2/23/2017	N
AOC_CP-16_Subslab	KC-CP-016	KC-CP-016-SS-11-022217	2/22/2017	N
AOC_CP-16_Subslab	KC-CP-016	KC-CP-016-SS-12-022217	2/22/2017	N
AOC_CP-16_Subslab	KC-CP-016	KC-SS-FD-005-022417	2/24/2017	FD
AOC_CP-17_IA	KC-CP-017	KC-CP-017-IA-01-022317	2/23/2017	N
AOC_CP-17_OA	KC-CP-017	KC-CP-017-OA-01-022317	2/23/2017	N
AOC_CP-17_Subslab	KC-CP-017	KC-CP-017-SS-01-022217	2/22/2017	N
AOC_CP-17_Subslab	KC-CP-017	KC-CP-017-SS-02-022217	2/22/2017	N
AOC_CP-17_Subslab	KC-CP-017	KC-CP-017-SS-03-022217	2/22/2017	N
AOC_CP-17_Subslab	KC-CP-017	KC-CP-017-SS-04-022217	2/22/2017	N
AOC_CP-17_Subslab	KC-CP-017	KC-CP-017-SS-05-022317	2/23/2017	N
AOC_CP-17_Subslab	KC-CP-017	KC-CP-017-SS-06-022317	2/23/2017	N
AOC_CP-18_Subslab	KC-CP-018	KC-CP-018-SS-01-022817	2/28/2017	N
AOC_CP-18_Subslab	KC-CP-018	KC-CP-018-SS-02-022817	2/28/2017	N
AOC_CP-18_Subslab	KC-CP-018	KC-CP-018-SS-03-022817	2/28/2017	N
AOC_CP-19_IA	KC-CP-019	KC-CP-019-IA-01-022717	2/27/2017	N
AOC_CP-19_Subslab	KC-CP-019	KC-CP-019-SS-01-022717	2/27/2017	N
AOC_CP-2_IA	KC-CP-002	KC-CP-002-IA-01-022717	1/1/2017	N
AOC_CP-2_IA	KC-CP-002	KC-IA-FD-004-022717	2/27/2017	FD
AOC_CP-23_IA	KC-CP-023	KC-CP-023-IA-01-022217	2/22/2017	N
AOC_CP-23_IA	KC-CP-023	KC-CP-023-IA-02-022217	2/22/2017	N
AOC_CP-23_IA	KC-CP-023	KC-CP-023-IA-03-022217	2/22/2017	N
AOC_CP-23_IA	KC-CP-023	KC-CP-023-IA-04-022217	2/22/2017	N
AOC_CP-23_IA	KC-CP-023	KC-IA-FD-001-022217	2/22/2017	FD
AOC_CP-23_Subslab	KC-CP-023	KC-CP-023-SS-01-022217	2/22/2017	N
AOC_CP-23_Subslab	KC-CP-023	KC-CP-023-SS-02-022217	2/22/2017	N
AOC_CP-23_Subslab	KC-CP-023	KC-CP-023-SS-03-022217	2/22/2017	N

Table 1-2
Indoor Air, Crawlspace Air, and Subslab Soil Vapor Samples Used in the Vapor Intrusion Evaluation
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Sample Group	StationID	SampleID	Date Collected	Sample Type
AOC_CP-23_Subslab	KC-CP-023	KC-CP-023-SS-04-022217	2/22/2017	N
AOC_CP-23_Subslab	KC-CP-023	KC-CP-023-SS-05-022217	2/22/2017	N
AOC_CP-23_Subslab	KC-CP-023	KC-CP-023-SS-06-022217	2/22/2017	N
AOC_CP-23_Subslab	KC-CP-023	KC-CP-023-SS-07-022217	2/22/2017	N
AOC_CP-23_Subslab	KC-CP-023	KC-CP-023-SS-08-022217	2/22/2017	N
AOC_CP-23_Subslab	KC-CP-023	KC-CP-023-SS-09-022217	2/22/2017	N
AOC_CP-23_Subslab	KC-CP-023	KC-CP-023-SS-10-022217	2/22/2017	N
AOC_CP-23_Subslab	KC-CP-023	KC-SS-FD-002-022217	2/22/2017	FD
AOC_CP-23_Subslab	KC-CP-023	KC-SS-FD-003-022217	2/22/2017	FD
AOC_CP-24_IA	KC-CP-024	KC-CP-024-IA-01-022317	2/23/2017	N
AOC_CP-24_Subslab	KC-CP-024	KC-CP-024-SS-01-022217	2/22/2017	N
AOC_CP-24_Subslab	KC-CP-024	KC-CP-024-SS-02-022217	2/22/2017	N
AOC_CP-24_Subslab	KC-CP-024	KC-CP-024-SS-03-022217	1/1/2017	N
AOC_CP-24_Subslab	KC-CP-024	KC-SS-FD-001-022217	2/22/2017	FD
AOC_CP-27_Subslab	KC-CP-027	KC-CP-027-SS-01-022317	2/23/2017	N
AOC_CP-27_Subslab	KC-CP-027	KC-CP-027-SS-02-022317	2/23/2017	N
AOC_CP-27_Subslab	KC-CP-027	KC-SS-FD-004-022317	2/23/2017	FD
AOC_CP-3_IA	KC-CP-003	KC-CP-003-IA-01-022417	2/24/2017	N
AOC_CP-3_IA	KC-CP-003	KC-IA-FD-003-022417	2/24/2017	FD
AOC_CP-3_Subslab	KC-CP-003	KC-CP-003-SS-01-022417	2/24/2017	N
AOC_CP-51_IA	KC-CP-051	KC-CP-051-IA-01-022617	2/26/2017	N
AOC_CP-51_IA	KC-CP-051	KC-CP-051-IA-02-022617	2/26/2017	N
AOC_CP-53_Subslab	KC-CP-053	KC-CP-053-SS-01-022417	2/24/2017	N
AOC_CP-56_IA	KC-CP-056	KC-CP-056-IA-01-022517	2/25/2017	N
AOC_CP-56_OA	KC-CP-056	KC-CP-056-OA-01-022517	2/25/2017	N
AOC_CP-56_OA	KC-CP-056	KC-OA-FD-001-022517	2/25/2017	FD
AOC_CP-56_Subslab	KC-CP-056	KC-CP-056-SS-01-022517	2/25/2017	N
AOC_CP-56_Subslab	KC-CP-056	KC-CP-056-SS-02-022517	2/25/2017	N
AOC_CP-56_Subslab	KC-CP-056	KC-SS-FD-006-022517	2/25/2017	FD
AOC_CP-64_CS	KC-CP-064	KC-CP-064-CS-01-032417	3/24/2017	N
AOC_CP-64_IA	KC-CP-064	KC-CP-064-IA-01-032417	3/24/2017	N
AOC_CP-64_IA	KC-CP-064	KC-CP-064-IA-02-032417	3/24/2017	N
AOC_CP-64_OA	KC-CP-064	KC-CP-064-OA-01-032417	3/24/2017	N
AOC_CP-64_Subslab	KC-CP-064	KC-CP-064-SS-01-032317	3/23/2017	N
AOC_CP-64_Subslab	KC-CP-064	KC-SS-FD-007-032317	3/23/2017	FD
AOC_CP-67_IA	KC-CP-067	KC-CP-067-IA-01-022717	2/27/2017	N
AOC_CP-67_OA	KC-CP-067	KC-CP-067-OA-01-022717	2/27/2017	N
AOC_CP-67_Subslab	KC-CP-067	KC-CP-067-SS-01-022717	2/27/2017	N
AOC_CP-67_Subslab	KC-CP-067	KC-CP-067-SS-02-022717	2/27/2017	N
AOC_CP-8_CS	KC-CP-008	KC-CP-008-CS-01-022117	2/21/2017	N
AOC_CP-8_Subslab	KC-CP-008	KC-CP-008-SS-01-022117	2/21/2017	N
AOC_RP-39_CS	KC-RP-039	KC-RP-039-CS-01-022217	2/22/2017	N
AOC_RP-39_IA	KC-RP-039	KC-RP-039-IA-01-022217	2/22/2017	N
AOC_RP-39_Subslab	KC-RP-039	KC-RP-039-SS-01-022117	2/21/2017	N
AOC_RP-41_CS	KC-RP-041	KC-CS-FD-001-022517	2/25/2017	FD
AOC_RP-41_CS	KC-RP-041	KC-RP-041-CS-01-022517	2/25/2017	N
AOC_RP-41_IA	KC-RP-041	KC-RP-041-IA-01-022517	2/25/2017	N
AOC_RP-42_CS	KC-RP-042	KC-RP-042-CS-01-022517	2/25/2017	N
AOC_RP-42_IA	KC-RP-042	KC-RP-042-IA-01-022817	2/28/2017	N
AOC_RP-42_Subslab	KC-RP-042	KC-RP-042-SS-01-022417	2/24/2017	N
AOC_RP-47_IA	KC-RP-047	KC-RP-047-IA-01-022217	2/22/2017	N
AOC_RP-47_Subslab	KC-RP-047	KC-RP-047-SS-01-022117	2/21/2017	N
AOC_RP-62_IA	KC-RP-062	KC-RP-062-IA-01-022517	2/25/2017	N
AOC_RP-62_IA	KC-RP-062	KC-RP-062-IA-02-022517	2/25/2017	N
AOC_RP-62_Subslab	KC-RP-062	KC-RP-062-SS-01-022417	2/24/2017	N
AOC_GA_GW_Shallow	KC-GA-GW-045	KC-FD-001-060716	6/7/2016	FD
AOC_GA_GW_Shallow	KC-GA-GW-007	KC-GA-GW-007-15-20-043016	4/30/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-008	KC-GA-GW-008-14-19-051015	5/10/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-012	KC-GA-GW-012-15-20-050216	5/2/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-013	KC-GA-GW-013-18-23-041816	4/18/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-014	KC-GA-GW-014-21-26-041216	4/12/2016	N

Table 1-2
Indoor Air, Crawlspace Air, and Subslab Soil Vapor Samples Used in the Vapor Intrusion Evaluation
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Sample Group	StationID	SampleID	Date Collected	Sample Type
AOC_GA_GW_Shallow	KC-GA-GW-015	KC-GA-GW-015-26-31-040516	4/5/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-016	KC-GA-GW-016-15-20-033016	3/30/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-017	KC-GA-GW-017-17-22-051716	5/17/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-018	KC-GA-GW-018-30-35-051916	5/19/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-019	KC-GA-GW-019-28-33-050416	5/4/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-020	KC-GA-GW-020-33-38-043016	4/30/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-024	KC-GA-GW-024-34-39-052016	5/20/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-025	KC-GA-GW-025-33-38-050916	5/9/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-026	KC-GA-GW-026-27-32-042916	4/29/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-027	KC-GA-GW-027-35-40-042716	4/27/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-028	KC-GA-GW-028-31-36-042716	4/27/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-029	KC-GA-GW-029-15-20-042616	4/26/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-030	KC-GA-GW-030-8-13-051616	5/16/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-031	KC-GA-GW-031-19-24-042516	4/25/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-036	KC-GA-GW-036-19-24-051616	5/16/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-037	KC-GA-GW-037-30-35-051816	5/18/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-038	KC-GA-GW-038-29-34-051916	5/19/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-045	KC-GA-GW-045-37-42-060716	6/7/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-047	KC-GA-GW-047-5-10-061016	6/10/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-048	KC-GA-GW-048-18-23-060916	6/9/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-049	KC-GA-GW-049-17-22-061616	6/16/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-050	KC-GA-GW-050-24-29-060716	6/7/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-051	KC-GA-GW-051-10-15-061516	6/15/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-052	KC-GA-GW-052- 12-17-061716	6/17/2016	N
AOC_GA_GW_Shallow	KC-GA-GW-015	KC-GW-FD-001-040516	4/5/2016	FD
AOC_GA_GW_Shallow	KC-GA-GW-025	KC-GW-FD-001-051016	5/10/2016	FD
AOC_GA_GW_Shallow	KC-GA-GW-017	KC-GW-FD-001-051716	5/17/2016	FD
AOC_GA_GW_Shallow	KC-MW-106-S	KC-FD-001-062216	6/22/2016	FD
AOC_GA_GW_Shallow	KC-MW-101-S	KC-MW-101-S-062116	6/21/2016	N
AOC_GA_GW_Shallow	KC-MW-102-S	KC-MW-102-S-062216	6/22/2016	N
AOC_GA_GW_Shallow	KC-MW-104-S	KC-MW-104-S-062216	6/22/2016	N
AOC_GA_GW_Shallow	KC-MW-105-S	KC-MW-105-S-062216	6/22/2016	N
AOC_GA_GW_Shallow	KC-MW-106-S	KC-MW-106-S-062216	6/22/2016	N
AOC_GA_GW_Shallow	KC-MW-107-S	KC-MW-107-S-062216	6/22/2016	N
AOC_GA_GW_Shallow	KC-MW-109-S	KC-MW-109-S-062316	6/23/2016	N
AOC_GA_GW_Shallow	KC-MW-110-S	KC-MW-110-S-062316	6/23/2016	N
AOC_GA_GW_Shallow	KC-MW-111-S	KC-MW-111-S-062316	6/23/2016	N

Notes:
AOC = area of concern
CS = crawlspace
FD = field duplicate
GA = general area
GW = groundwater
IA = indoor air
ID = identification
N = normal sample
OA = outdoor air
RP = residential property

Table 1-3
Shallow Groundwater Samples used in the Vapor Intrusion Evaluation
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Building	Shallow Wells Used for MLE
CP-002	KC-TC-GW-001-17-22-040516
	KC-TC-GW-002-18-23-041216
	KC-TC-GW-003-19-24-041416
	KC-TC-MW-11-022916
	KC-TC-MW-12-062416
	KC-TC-MW-13-030216
	KC-TC-MW-14-030216
	KC-TC-MW-16-062416
	KC-TC-MW-3-030216
	KC-TC-MW-6-030216
	KC-TC-MW-9-022916
CP-003	KC-TC-GW-001-17-22-040516
	KC-TC-GW-002-18-23-041216
	KC-TC-GW-003-19-24-041416
	KC-TC-MW-11-022916
	KC-TC-MW-12-062416
	KC-TC-MW-13-030216
	KC-TC-MW-14-030216
	KC-TC-MW-16-062416
	KC-TC-MW-3-030216
	KC-TC-MW-6-030216
	KC-TC-MW-9-022916
CP-008	KC-GA-GW-045-37-42-060716
CP-010	KC-GA-GW-013-18-23-041816
	KC-GA-GW-045-37-42-060716
	KC-PP-MW-5-030316
CP-011	KC-TT-GW-004-21-26-040316
	KC-TT-GW-005-23-28-041716
	KC-TT-GW-006-23-28-040316
	KC-TT-MW-1-062116
	KC-TT-MW-2R-022916
	KC-TT-MW-4-022916
	KC-TT-MW-5-022916
CP-013	KC-PP-GW-011-18-23-043016
	KC-PP-GW-010-21-26-041616
	KC-PP-MW-2-030316
	KC-PP-MW-4-062416
	KC-TT-MW-5-022916
	KC-GA-GW-007-15-20-043016
CP-016	KC-MW-106-S-062216
	KC-GA-GW-015-26-31-040516
	KC-PP-GW-009-19-24-042916

Table 1-3
Shallow Groundwater Samples used in the Vapor Intrusion Evaluation
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Building	Shallow Wells Used for MLE
CP-017	KC-GA-GW-014-21-26-041216
CP-018	KC-GA-GW-014-21-26-041216
	KC-PP-MW-4-062416
CP-019	KC-TC-MW-13-030216
	KC-TC-MW-14-030216
	KC-GA-GW-012-15-20-050216
CP-023	KC-GA-GW-014-21-26-041216
CP-024	KC-MW-106-S-062216
	KC-GA-GW-015-26-31-040516
CP-027	KC-GA-GW-019-28-33-050416
	KC-GA-GW-020-33-38-043016
CP-051	KC-GA-GW-019-28-33-050416
	KC-GA-GW-020-33-38-043016
CP-053	KC-GA-GW-026-27-32-042916
CP-056	KC-GA-GW-026-27-32-042916
CP-064	KC-GA-GW-026-27-32-042916
	KC-GA-GW-038-29-34-051916
CP-067	KC-IC-GW-035-19-24-051216
RP-039	KC-GA-GW-020-33-38-043016
	KC-MW-102-S-062216
RP-041	KC-GA-GW-036-19-24-051616
RP-042	KC-GA-GW-036-19-24-051616
RP-047	KC-GA-GW-036-19-24-051616
RP-062	KC-GA-GW-026-27-32-042916
	KC-GA-GW-038-29-34-051916

Notes:
CP = Commercial Property
MLE = Multiple Lines of Evidence
RP = Residential Property

Attachment 2
Data Screening Tables

TABLE 2-1
COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Scenario Timeframe: Current
Medium: Indoor Air (Commercial Properties)
Exposure Medium: Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier		Maximum Concentration Qualifier		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Screening Toxicity Value (2)		Exceedance Flag	Rationale for Selection or Deletion (3)
Indoor Air (CP-2)	74-87-3	Chloromethane	2.60E+00	J	2.60E+00	J	µg/m^3	KC-CP-002	1 / 1	-	2.60E+00	3.90E+01	n	NO	BSL
	75-71-8	Dichlorodifluoromethane	3.10E+00	J	3.10E+00	J	µg/m^3	KC-CP-002	1 / 1	-	3.10E+00	4.40E+01	n	NO	BSL
	127-18-4	Tetrachloroethene	6.60E+02		6.60E+02		µg/m^3	KC-CP-002	1 / 1	-	6.60E+02	1.80E+01	n	YES	ASL
	79-01-6	Trichloroethene	1.20E+01	J	1.20E+01	J	µg/m^3	KC-CP-002	1 / 1	-	1.20E+01	8.80E-01	n	YES	ASL
Indoor Air (CP-3)	71-55-6	1,1,1-Trichloroethane	2.30E-02	J	2.30E-02	J	µg/m^3	KC-CP-003	1 / 1	-	2.30E-02	2.20E+03	n	NO	BSL
	75-34-3	1,1-Dichloroethane	1.30E-02	J	1.30E-02	J	µg/m^3	KC-CP-003	1 / 1	-	1.30E-02	7.70E+00	c	NO	BSL
	75-35-4	1,1-Dichloroethene	5.50E-02	J	5.50E-02	J	µg/m^3	KC-CP-003	1 / 1	-	5.50E-02	8.80E+01	n	NO	BSL
	107-06-2	1,2-Dichloroethane	1.00E-01	J	1.00E-01	J	µg/m^3	KC-CP-003	1 / 1	-	1.00E-01	4.70E-01	c	NO	BSL
	78-87-5	1,2-Dichloropropane	2.10E-02	J	2.10E-02	J	µg/m^3	KC-CP-003	1 / 1	-	2.10E-02	3.30E-01	c	NO	BSL
	75-27-4	Bromodichloromethane	9.90E-01		9.90E-01		µg/m^3	KC-CP-003	1 / 1	-	9.90E-01	3.30E-01	c	YES	ASL
	74-83-9	Bromomethane	4.40E-02	J	4.40E-02	J	µg/m^3	KC-CP-003	1 / 1	-	4.40E-02	2.20E+00	n	NO	BSL
	56-23-5	Carbon tetrachloride	6.90E-01	J	6.90E-01	J	µg/m^3	KC-CP-003	1 / 1	-	6.90E-01	2.00E+00	c	NO	BSL
	124-48-1	Chlorodibromomethane	1.20E-01	J	1.20E-01	J	µg/m^3	KC-CP-003	1 / 1	-	1.20E-01	NA		NO	NTX
	75-00-3	Chloroethane	1.30E-01	J	1.30E-01	J	µg/m^3	KC-CP-003	1 / 1	-	1.30E-01	4.40E+03	n	NO	BSL
	67-66-3	Chloroform	1.80E+01	J	1.80E+01	J	µg/m^3	KC-CP-003	1 / 1	-	1.80E+01	5.30E-01	c	YES	ASL
	74-87-3	Chloromethane	7.70E-01	J	7.70E-01	J	µg/m^3	KC-CP-003	1 / 1	-	7.70E-01	3.90E+01	n	NO	BSL
	156-59-2	cis-1,2-Dichloroethene	1.40E-01	J	1.40E-01	J	µg/m^3	KC-CP-003	1 / 1	-	1.40E-01	NA		NO	NTX
	75-71-8	Dichlorodifluoromethane	3.50E+00	J	3.50E+00	J	µg/m^3	KC-CP-003	1 / 1	-	3.50E+00	4.40E+01	n	NO	BSL
	75-09-2	Dichloromethane	5.60E-01	J	5.60E-01	J	µg/m^3	KC-CP-003	1 / 1	-	5.60E-01	2.60E+02	n	NO	BSL
	127-18-4	Tetrachloroethene	9.50E+00	J	9.50E+00	J	µg/m^3	KC-CP-003	1 / 1	-	9.50E+00	1.80E+01	n	NO	BSL
	156-60-5	trans-1,2-Dichloroethene	1.50E-02	J	1.50E-02	J	µg/m^3	KC-CP-003	1 / 1	-	1.50E-02	NA		NO	NTX
	79-01-6	Trichloroethene	2.50E-01	J	2.50E-01	J	µg/m^3	KC-CP-003	1 / 1	-	2.50E-01	8.80E-01	n	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	5.80E-01	J	5.80E-01	J	µg/m^3	KC-CP-003	1 / 1	-	5.80E-01	2.20E+03	n	NO	BSL
	75-01-4	Vinyl Chloride	2.70E-02	J	2.70E-02	J	µg/m^3	KC-CP-003	1 / 1	-	2.70E-02	2.80E+00	c	NO	BSL
Indoor Air (CP-10)	71-55-6	1,1,1-Trichloroethane	4.20E-02		1.40E-01		µg/m^3	KC-CP-010	2 / 2	-	1.40E-01	2.20E+03	n	NO	BSL
	75-34-3	1,1-Dichloroethane	2.00E-02	J	2.00E-02	J	µg/m^3	KC-CP-010	1 / 2	0.037 - 0.037	2.00E-02	7.70E+00	c	NO	BSL
	107-06-2	1,2-Dichloroethane	1.30E-01		1.70E-01		µg/m^3	KC-CP-010	2 / 2	-	1.70E-01	4.70E-01	c	NO	BSL
	78-87-5	1,2-Dichloropropane	1.80E-02	J	2.10E-02	J	µg/m^3	KC-CP-010	2 / 2	-	2.10E-02	3.30E-01	c	NO	BSL
	74-83-9	Bromomethane	3.60E-02		3.70E-02	J	µg/m^3	KC-CP-010	2 / 2	-	3.70E-02	2.20E+00	n	NO	BSL
	56-23-5	Carbon tetrachloride	4.60E-01		5.00E-01		µg/m^3	KC-CP-010	2 / 2	-	5.00E-01	2.00E+00	c	NO	BSL
	124-48-1	Chlorodibromomethane	1.60E-02	J	1.60E-02	J	µg/m^3	KC-CP-010	1 / 2	0.037 - 0.037	1.60E-02	NA		NO	NTX
	75-00-3	Chloroethane	2.00E-02	J	2.30E-02	J	µg/m^3	KC-CP-010	2 / 2	-	2.30E-02	4.40E+03	n	NO	BSL
	67-66-3	Chloroform	1.70E-01		3.20E-01		µg/m^3	KC-CP-010	2 / 2	-	3.20E-01	5.30E-01	c	NO	BSL
	74-87-3	Chloromethane	4.10E-01		5.30E-01	J	µg/m^3	KC-CP-010	2 / 2	-	5.30E-01	3.90E+01	n	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.50E+00		2.80E+00		µg/m^3	KC-CP-010	2 / 2	-	2.80E+00	4.40E+01	n	NO	BSL
	75-09-2	Dichloromethane	1.10E+00		1.30E+00		µg/m^3	KC-CP-010	2 / 2	-	1.30E+00	2.60E+02	n	NO	BSL
	127-18-4	Tetrachloroethene	8.80E+00		3.30E+01		µg/m^3	KC-CP-010	2 / 2	-	3.30E+01	1.80E+01	n	YES	ASL
	156-60-5	trans-1,2-Dichloroethene	1.80E-02	J	1.80E-02	J	µg/m^3	KC-CP-010	1 / 2	0.032 - 0.032	1.80E-02	NA		NO	NTX
	79-01-6	Trichloroethene	8.10E-02		1.30E-01		µg/m^3	KC-CP-010	2 / 2	-	1.30E-01	8.80E-01	n	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	4.90E-01		5.10E-01		µg/m^3	KC-CP-010	2 / 2	-	5.10E-01	2.20E+03	n	NO	BSL

TABLE 2-1
COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Scenario Timeframe: Current
Medium: Indoor Air (Commercial Properties)
Exposure Medium: Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration	Qualifier	Maximum Concentration	Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Screening Toxicity Value (2)		Exceedance Flag	Rationale for Selection or Deletion (3)
Indoor Air (CP-13)	71-55-6	1,1,1-Trichloroethane	4.90E-02	J	6.50E-02	J	µg/m^3	KC-CP-013	2 / 2	-	6.50E-02	2.20E+03	n	NO	BSL
	107-06-2	1,2-Dichloroethane	8.10E-02	J	8.20E-02		µg/m^3	KC-CP-013	2 / 2	-	8.20E-02	4.70E-01	c	NO	BSL
	78-87-5	1,2-Dichloropropane	2.40E-02	J	2.40E-02	J	µg/m^3	KC-CP-013	1 / 2	0.081 - 0.081	2.40E-02	3.30E-01	c	NO	BSL
	75-27-4	Bromodichloromethane	4.90E-01		9.20E-01		µg/m^3	KC-CP-013	2 / 2	-	9.20E-01	3.30E-01	c	YES	ASL
	74-83-9	Bromomethane	3.50E-02	J	1.10E-01	J	µg/m^3	KC-CP-013	2 / 2	-	1.10E-01	2.20E+00	n	NO	BSL
	56-23-5	Carbon tetrachloride	5.50E-01		5.50E-01		µg/m^3	KC-CP-013	2 / 2	-	5.50E-01	2.00E+00	c	NO	BSL
	124-48-1	Chlorodibromomethane	1.10E-01		1.80E-01	J	µg/m^3	KC-CP-013	2 / 2	-	1.80E-01	NA		NO	NTX
	75-00-3	Chloroethane	4.60E-02	J	4.70E-02	J	µg/m^3	KC-CP-013	2 / 2	-	4.70E-02	4.40E+03	n	NO	BSL
	67-66-3	Chloroform	2.20E+00		2.80E+00	J	µg/m^3	KC-CP-013	2 / 2	-	2.80E+00	5.30E-01	c	YES	ASL
	74-87-3	Chloromethane	5.00E-01	J	8.00E-01	J	µg/m^3	KC-CP-013	2 / 2	-	8.00E-01	3.90E+01	n	NO	BSL
	156-59-2	cis-1,2-Dichloroethene	1.80E+00	J	1.80E+00	J	µg/m^3	KC-CP-013	1 / 2	0.081 - 0.081	1.80E+00	NA		NO	NTX
	75-71-8	Dichlorodifluoromethane	2.40E+00		2.80E+00	J	µg/m^3	KC-CP-013	2 / 2	-	2.80E+00	4.40E+01	n	NO	BSL
	75-09-2	Dichloromethane	4.60E-01	J	8.40E+01		µg/m^3	KC-CP-013	2 / 2	-	8.40E+01	2.60E+02	n	NO	BSL
	127-18-4	Tetrachloroethene	6.30E-01		3.10E+02	J	µg/m^3	KC-CP-013	2 / 2	-	3.10E+02	1.80E+01	n	YES	ASL
	156-60-5	trans-1,2-Dichloroethene	3.10E-02	J	2.60E+00		µg/m^3	KC-CP-013	2 / 2	-	2.60E+00	NA		NO	NTX
	79-01-6	Trichloroethene	5.40E-02	J	4.50E+00	J	µg/m^3	KC-CP-013	2 / 2	-	4.50E+00	8.80E-01	n	YES	ASL
	26523-64-8	Trichlorotrifluoroethane	5.80E-01		6.00E-01	J	µg/m^3	KC-CP-013	2 / 2	-	6.00E-01	2.20E+03	n	NO	BSL
	75-01-4	Vinyl Chloride	8.70E-02	J	8.70E-02	J	µg/m^3	KC-CP-013	1 / 2	0.081 - 0.081	8.70E-02	2.80E+00	c	NO	BSL
Indoor Air (CP-16)	71-55-6	1,1,1-Trichloroethane	3.30E+00	J	5.50E+00	J	µg/m^3	KC-CP-016	3 / 3	-	5.50E+00	2.20E+03	n	NO	BSL
	75-35-4	1,1-Dichloroethene	3.30E-02	J	1.90E-01	J	µg/m^3	KC-CP-016	2 / 3	0.062 - 0.062	1.90E-01	8.80E+01	n	NO	BSL
	107-06-2	1,2-Dichloroethane	1.20E-01	J	2.50E-01	J	µg/m^3	KC-CP-016	3 / 3	-	2.50E-01	4.70E-01	c	NO	BSL
	78-87-5	1,2-Dichloropropane	3.60E-02	J	1.40E-01	J	µg/m^3	KC-CP-016	3 / 3	-	1.40E-01	3.30E-01	c	NO	BSL
	74-83-9	Bromomethane	3.60E-02	J	4.10E-02	J	µg/m^3	KC-CP-016	3 / 3	-	4.10E-02	2.20E+00	n	NO	BSL
	56-23-5	Carbon tetrachloride	5.50E-01	J	6.40E-01	J	µg/m^3	KC-CP-016	3 / 3	-	6.40E-01	2.00E+00	c	NO	BSL
	124-48-1	Chlorodibromomethane	2.40E-02	J	2.40E-02	J	µg/m^3	KC-CP-016	1 / 3	0.062 - 0.085	2.40E-02	NA		NO	NTX
	75-00-3	Chloroethane	3.10E-02	J	5.10E-02	J	µg/m^3	KC-CP-016	2 / 3	0.085 - 0.085	5.10E-02	4.40E+03	n	NO	BSL
	67-66-3	Chloroform	2.60E-01	J	3.70E-01	J	µg/m^3	KC-CP-016	3 / 3	-	3.70E-01	5.30E-01	c	NO	BSL
	74-87-3	Chloromethane	5.50E-01	J	9.90E-01	J	µg/m^3	KC-CP-016	3 / 3	-	9.90E-01	3.90E+01	n	NO	BSL
	75-71-8	Dichlorodifluoromethane	3.20E+00	J	3.90E+00	J	µg/m^3	KC-CP-016	3 / 3	-	3.90E+00	4.40E+01	n	NO	BSL
	75-09-2	Dichloromethane	1.70E+00	J	1.70E+01	J	µg/m^3	KC-CP-016	3 / 3	-	1.70E+01	2.60E+02	n	NO	BSL
	127-18-4	Tetrachloroethene	3.40E+01	J	2.00E+02	J	µg/m^3	KC-CP-016	3 / 3	-	2.00E+02	1.80E+01	n	YES	ASL
	79-01-6	Trichloroethene	3.90E+00	J	2.20E+01	J	µg/m^3	KC-CP-016	3 / 3	-	2.20E+01	8.80E-01	n	YES	ASL
	26523-64-8	Trichlorotrifluoroethane	6.10E-01	J	6.70E-01	J	µg/m^3	KC-CP-016	3 / 3	-	6.70E-01	2.20E+03	n	NO	BSL

TABLE 2-1
COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Scenario Timeframe: Current
Medium: Indoor Air (Commercial Properties)
Exposure Medium: Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier		Maximum Concentration Qualifier		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Screening Toxicity Value (2)		Exceedance Flag	Rationale for Selection or Deletion (3)
Indoor Air (CP-17)	71-55-6	1,1,1-Trichloroethane	9.00E-02	J	9.00E-02	J	µg/m^3	KC-CP-017	1 / 1	-	9.00E-02	2.20E+03	n	NO	BSL
	107-06-2	1,2-Dichloroethane	1.70E-01		1.70E-01		µg/m^3	KC-CP-017	1 / 1	-	1.70E-01	4.70E-01	c	NO	BSL
	78-87-5	1,2-Dichloropropane	6.40E-02	J	6.40E-02	J	µg/m^3	KC-CP-017	1 / 1	-	6.40E-02	3.30E-01	c	NO	BSL
	74-83-9	Bromomethane	6.60E-02	J	6.60E-02	J	µg/m^3	KC-CP-017	1 / 1	-	6.60E-02	2.20E+00	n	NO	BSL
	56-23-5	Carbon tetrachloride	5.20E-01		5.20E-01		µg/m^3	KC-CP-017	1 / 1	-	5.20E-01	2.00E+00	c	NO	BSL
	75-00-3	Chloroethane	6.10E-02	J	6.10E-02	J	µg/m^3	KC-CP-017	1 / 1	-	6.10E-02	4.40E+03	n	NO	BSL
	67-66-3	Chloroform	1.90E+00		1.90E+00		µg/m^3	KC-CP-017	1 / 1	-	1.90E+00	5.30E-01	c	YES	ASL
	74-87-3	Chloromethane	1.90E+00	J	1.90E+00	J	µg/m^3	KC-CP-017	1 / 1	-	1.90E+00	3.90E+01	n	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.80E+00		2.80E+00		µg/m^3	KC-CP-017	1 / 1	-	2.80E+00	4.40E+01	n	NO	BSL
	75-09-2	Dichloromethane	6.60E-01	J	6.60E-01	J	µg/m^3	KC-CP-017	1 / 1	-	6.60E-01	2.60E+02	n	NO	BSL
	127-18-4	Tetrachloroethene	8.40E+01		8.40E+01		µg/m^3	KC-CP-017	1 / 1	-	8.40E+01	1.80E+01	n	YES	ASL
	79-01-6	Trichloroethene	9.50E-01		9.50E-01		µg/m^3	KC-CP-017	1 / 1	-	9.50E-01	8.80E-01	n	YES	ASL
	26523-64-8	Trichlorotrifluoroethane	5.50E-01		5.50E-01		µg/m^3	KC-CP-017	1 / 1	-	5.50E-01	2.20E+03	n	NO	BSL
Indoor Air (CP-19)	107-06-2	1,2-Dichloroethane	6.40E-02	J	6.40E-02	J	µg/m^3	KC-CP-019	1 / 1	-	6.40E-02	4.70E-01	c	NO	BSL
	75-27-4	Bromodichloromethane	6.50E-01		6.50E-01		µg/m^3	KC-CP-019	1 / 1	-	6.50E-01	3.30E-01	c	YES	ASL
	56-23-5	Carbon tetrachloride	5.00E-01	J	5.00E-01	J	µg/m^3	KC-CP-019	1 / 1	-	5.00E-01	2.00E+00	c	NO	BSL
	124-48-1	Chlorodibromomethane	9.40E-02	J	9.40E-02	J	µg/m^3	KC-CP-019	1 / 1	-	9.40E-02	NA		NO	NTX
	75-00-3	Chloroethane	4.20E-02		4.20E-02		µg/m^3	KC-CP-019	1 / 1	-	4.20E-02	4.40E+03	n	NO	BSL
	67-66-3	Chloroform	8.70E+00	J	8.70E+00	J	µg/m^3	KC-CP-019	1 / 1	-	8.70E+00	5.30E-01	c	YES	ASL
	74-87-3	Chloromethane	5.50E-01	J	5.50E-01	J	µg/m^3	KC-CP-019	1 / 1	-	5.50E-01	3.90E+01	n	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.20E+00	J	2.20E+00	J	µg/m^3	KC-CP-019	1 / 1	-	2.20E+00	4.40E+01	n	NO	BSL
	75-09-2	Dichloromethane	6.10E-01	J	6.10E-01	J	µg/m^3	KC-CP-019	1 / 1	-	6.10E-01	2.60E+02	n	NO	BSL
	127-18-4	Tetrachloroethene	1.80E+00		1.80E+00		µg/m^3	KC-CP-019	1 / 1	-	1.80E+00	1.80E+01	n	NO	BSL
	79-01-6	Trichloroethene	1.60E-01	J	1.60E-01	J	µg/m^3	KC-CP-019	1 / 1	-	1.60E-01	8.80E-01	n	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	5.60E-01	J	5.60E-01	J	µg/m^3	KC-CP-019	1 / 1	-	5.60E-01	2.20E+03	n	NO	BSL
Indoor Air (CP-23)	71-55-6	1,1,1-Trichloroethane	2.70E-02	J	8.40E-02		µg/m^3	KC-CP-023	3 / 4	0.19 - 0.19	8.40E-02	2.20E+03	n	NO	BSL
	107-06-2	1,2-Dichloroethane	3.20E-01	J	3.20E-01	J	µg/m^3	KC-CP-023	1 / 4	0.04 - 0.19	3.20E-01	4.70E-01	c	NO	BSL
	78-87-5	1,2-Dichloropropane	3.00E-02	J	6.40E-02	J	µg/m^3	KC-CP-023	3 / 4	0.19 - 0.19	6.40E-02	3.30E-01	c	NO	BSL
	74-83-9	Bromomethane	4.70E-02	J	6.00E-02		µg/m^3	KC-CP-023	3 / 4	0.19 - 0.19	6.00E-02	2.20E+00	n	NO	BSL
	56-23-5	Carbon tetrachloride	4.70E-01		6.30E-01	J	µg/m^3	KC-CP-023	4 / 4	-	6.30E-01	2.00E+00	c	NO	BSL
	124-48-1	Chlorodibromomethane	3.30E-02	J	3.50E-02	J	µg/m^3	KC-CP-023	2 / 4	0.038 - 0.19	3.50E-02	NA		NO	NTX
	75-00-3	Chloroethane	3.70E-02	J	6.10E-02		µg/m^3	KC-CP-023	3 / 4	0.19 - 0.19	6.10E-02	4.40E+03	n	NO	BSL
	67-66-3	Chloroform	2.60E-01	J	6.00E-01		µg/m^3	KC-CP-023	2 / 4	0.16 - 0.75	6.00E-01	5.30E-01	c	YES	ASL
	74-87-3	Chloromethane	5.30E-01	J	1.10E+00	J	µg/m^3	KC-CP-023	4 / 4	-	1.10E+00	3.90E+01	n	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.80E+00		5.70E+00		µg/m^3	KC-CP-023	4 / 4	-	5.70E+00	4.40E+01	n	NO	BSL
	75-09-2	Dichloromethane	6.20E-01	J	2.00E+01		µg/m^3	KC-CP-023	4 / 4	-	2.00E+01	2.60E+02	n	NO	BSL
	127-18-4	Tetrachloroethene	3.40E+01	J	2.00E+02	J	µg/m^3	KC-CP-023	4 / 4	-	2.00E+02	1.80E+01	n	YES	ASL
	156-60-5	trans-1,2-Dichloroethene	1.20E-02	J	1.30E-02	J	µg/m^3	KC-CP-023	2 / 4	0.04 - 0.19	1.30E-02	NA		NO	NTX
	79-01-6	Trichloroethene	2.20E-01	J	5.70E-01	J	µg/m^3	KC-CP-023	4 / 4	-	5.70E-01	8.80E-01	n	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	6.20E-01	J	6.70E-01		µg/m^3	KC-CP-023	4 / 4	-	6.70E-01	2.20E+03	n	NO	BSL
	75-01-4	Vinyl Chloride	3.60E-02	J	3.60E-02	J	µg/m^3	KC-CP-023	1 / 4	0.038 - 0.19	3.60E-02	2.80E+00	c	NO	BSL

TABLE 2-1
COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Scenario Timeframe: Current
Medium: Indoor Air (Commercial Properties)
Exposure Medium: Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration	Qualifier	Maximum Concentration	Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Screening Toxicity Value (2)		Exceedance Flag	Rationale for Selection or Deletion (3)
Indoor Air (CP-24)	71-55-6	1,1,1-Trichloroethane	7.20E-01		7.20E-01		µg/m^3	KC-CP-024	1 / 1	-	7.20E-01	2.20E+03	n	NO	BSL
	107-06-2	1,2-Dichloroethane	2.40E-01		2.40E-01		µg/m^3	KC-CP-024	1 / 1	-	2.40E-01	4.70E-01	c	NO	BSL
	78-87-5	1,2-Dichloropropane	5.50E-02		5.50E-02		µg/m^3	KC-CP-024	1 / 1	-	5.50E-02	3.30E-01	c	NO	BSL
	74-83-9	Bromomethane	3.00E-02	J	3.00E-02	J	µg/m^3	KC-CP-024	1 / 1	-	3.00E-02	2.20E+00	n	NO	BSL
	56-23-5	Carbon tetrachloride	5.30E-01		5.30E-01		µg/m^3	KC-CP-024	1 / 1	-	5.30E-01	2.00E+00	c	NO	BSL
	124-48-1	Chlorodibromomethane	2.00E-02	J	2.00E-02	J	µg/m^3	KC-CP-024	1 / 1	-	2.00E-02	NA		NO	NTX
	75-00-3	Chloroethane	3.90E-02	J	3.90E-02	J	µg/m^3	KC-CP-024	1 / 1	-	3.90E-02	4.40E+03	n	NO	BSL
	67-66-3	Chloroform	5.00E-01		5.00E-01		µg/m^3	KC-CP-024	1 / 1	-	5.00E-01	5.30E-01	c	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.20E+00		2.20E+00		µg/m^3	KC-CP-024	1 / 1	-	2.20E+00	4.40E+01	n	NO	BSL
	75-09-2	Dichloromethane	2.10E+00		2.10E+00		µg/m^3	KC-CP-024	1 / 1	-	2.10E+00	2.60E+02	n	NO	BSL
	127-18-4	Tetrachloroethene	5.70E+02		5.70E+02		µg/m^3	KC-CP-024	1 / 1	-	5.70E+02	1.80E+01	n	YES	ASL
	156-60-5	trans-1,2-Dichloroethene	1.40E-02	J	1.40E-02	J	µg/m^3	KC-CP-024	1 / 1	-	1.40E-02	NA		NO	NTX
	79-01-6	Trichloroethene	7.30E+00		7.30E+00		µg/m^3	KC-CP-024	1 / 1	-	7.30E+00	8.80E-01	n	YES	ASL
	26523-64-8	Trichlorotrifluoroethane	5.20E-01		5.20E-01		µg/m^3	KC-CP-024	1 / 1	-	5.20E-01	2.20E+03	n	NO	BSL
Indoor Air (CP-51)	71-55-6	1,1,1-Trichloroethane	3.70E-02	J	2.20E-01	J	µg/m^3	KC-CP-051	2 / 2	-	2.20E-01	2.20E+03	n	NO	BSL
	75-34-3	1,1-Dichloroethane	1.30E-02	J	1.30E-02	J	µg/m^3	KC-CP-051	1 / 2	0.047 - 0.047	1.30E-02	7.70E+00	c	NO	BSL
	75-35-4	1,1-Dichloroethene	3.50E-02	J	3.50E-02	J	µg/m^3	KC-CP-051	1 / 2	0.047 - 0.047	3.50E-02	8.80E+01	n	NO	BSL
	107-06-2	1,2-Dichloroethane	7.40E-02	J	7.60E-02	J	µg/m^3	KC-CP-051	2 / 2	-	7.60E-02	4.70E-01	c	NO	BSL
	78-87-5	1,2-Dichloropropane	2.10E-01	J	2.10E-01	J	µg/m^3	KC-CP-051	2 / 2	-	2.10E-01	3.30E-01	c	NO	BSL
	75-27-4	Bromodichloromethane	8.50E-01	J	3.60E+00	J	µg/m^3	KC-CP-051	2 / 2	-	3.60E+00	3.30E-01	c	YES	ASL
	74-83-9	Bromomethane	2.20E-02	J	2.80E-02	J	µg/m^3	KC-CP-051	2 / 2	-	2.80E-02	2.20E+00	n	NO	BSL
	56-23-5	Carbon tetrachloride	5.20E-01	J	1.00E+00	J	µg/m^3	KC-CP-051	2 / 2	-	1.00E+00	2.00E+00	c	NO	BSL
	124-48-1	Chlorodibromomethane	1.40E-01	J	6.40E-01	J	µg/m^3	KC-CP-051	2 / 2	-	6.40E-01	NA		NO	NTX
	75-00-3	Chloroethane	3.80E-02	J	4.40E-02	J	µg/m^3	KC-CP-051	2 / 2	-	4.40E-02	4.40E+03	n	NO	BSL
	67-66-3	Chloroform	3.70E+00	J	2.00E+01	J	µg/m^3	KC-CP-051	2 / 2	-	2.00E+01	5.30E-01	c	YES	ASL
	74-87-3	Chloromethane	5.00E-01	J	5.40E-01	J	µg/m^3	KC-CP-051	2 / 2	-	5.40E-01	3.90E+01	n	NO	BSL
	156-59-2	cis-1,2-Dichloroethene	6.30E-02	J	6.30E-02	J	µg/m^3	KC-CP-051	1 / 2	0.047 - 0.047	6.30E-02	NA		NO	NTX
	75-71-8	Dichlorodifluoromethane	2.70E+00	J	3.00E+00	J	µg/m^3	KC-CP-051	2 / 2	-	3.00E+00	4.40E+01	n	NO	BSL
	75-09-2	Dichloromethane	6.20E-01	J	4.10E+00	J	µg/m^3	KC-CP-051	2 / 2	-	4.10E+00	2.60E+02	n	NO	BSL
	127-18-4	Tetrachloroethene	9.20E-01	J	8.50E+00	J	µg/m^3	KC-CP-051	2 / 2	-	8.50E+00	1.80E+01	n	NO	BSL
	156-60-5	trans-1,2-Dichloroethene	5.50E-02	J	2.50E-01	J	µg/m^3	KC-CP-051	2 / 2	-	2.50E-01	NA		NO	NTX
	79-01-6	Trichloroethene	6.60E-02	J	4.80E-01	J	µg/m^3	KC-CP-051	2 / 2	-	4.80E-01	8.80E-01	n	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	6.00E-01	J	6.20E-01	J	µg/m^3	KC-CP-051	2 / 2	-	6.20E-01	2.20E+03	n	NO	BSL

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COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Scenario Timeframe: Current
Medium: Indoor Air (Commercial Properties)
Exposure Medium: Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier		Maximum Concentration Qualifier		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Screening Toxicity Value (2)		Exceedance Flag	Rationale for Selection or Deletion (3)
Indoor Air (CP-56)	71-55-6	1,1,1-Trichloroethane	3.70E+00		3.70E+00		µg/m^3	KC-CP-056	1 / 1	-	3.70E+00	2.20E+03	n	NO	BSL
	75-34-3	1,1-Dichloroethane	1.80E-02	J	1.80E-02	J	µg/m^3	KC-CP-056	1 / 1	-	1.80E-02	7.70E+00	c	NO	BSL
	75-35-4	1,1-Dichloroethene	2.00E-02	J	2.00E-02	J	µg/m^3	KC-CP-056	1 / 1	-	2.00E-02	8.80E+01	n	NO	BSL
	107-06-2	1,2-Dichloroethane	7.00E-02		7.00E-02		µg/m^3	KC-CP-056	1 / 1	-	7.00E-02	4.70E-01	c	NO	BSL
	78-87-5	1,2-Dichloropropane	3.20E-02	J	3.20E-02	J	µg/m^3	KC-CP-056	1 / 1	-	3.20E-02	3.30E-01	c	NO	BSL
	75-27-4	Bromodichloromethane	1.80E-01		1.80E-01		µg/m^3	KC-CP-056	1 / 1	-	1.80E-01	3.30E-01	c	NO	BSL
	74-83-9	Bromomethane	3.50E-02	J	3.50E-02	J	µg/m^3	KC-CP-056	1 / 1	-	3.50E-02	2.20E+00	n	NO	BSL
	56-23-5	Carbon tetrachloride	4.80E-01	J	4.80E-01	J	µg/m^3	KC-CP-056	1 / 1	-	4.80E-01	2.00E+00	c	NO	BSL
	124-48-1	Chlorodibromomethane	3.10E-02	J	3.10E-02	J	µg/m^3	KC-CP-056	1 / 1	-	3.10E-02	NA		NO	NTX
	75-00-3	Chloroethane	1.70E-02	J	1.70E-02	J	µg/m^3	KC-CP-056	1 / 1	-	1.70E-02	4.40E+03	n	NO	BSL
	67-66-3	Chloroform	1.10E+00		1.10E+00		µg/m^3	KC-CP-056	1 / 1	-	1.10E+00	5.30E-01	c	YES	ASL
	74-87-3	Chloromethane	5.60E-01	J	5.60E-01	J	µg/m^3	KC-CP-056	1 / 1	-	5.60E-01	3.90E+01	n	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.60E+00		2.60E+00		µg/m^3	KC-CP-056	1 / 1	-	2.60E+00	4.40E+01	n	NO	BSL
	75-09-2	Dichloromethane	2.90E-01		2.90E-01		µg/m^3	KC-CP-056	1 / 1	-	2.90E-01	2.60E+02	n	NO	BSL
	127-18-4	Tetrachloroethene	2.10E+00		2.10E+00		µg/m^3	KC-CP-056	1 / 1	-	2.10E+00	1.80E+01	n	NO	BSL
	79-01-6	Trichloroethene	1.60E+00	J	1.60E+00	J	µg/m^3	KC-CP-056	1 / 1	-	1.60E+00	8.80E-01	n	YES	ASL
	26523-64-8	Trichlorotrifluoroethane	5.60E-01		5.60E-01		µg/m^3	KC-CP-056	1 / 1	-	5.60E-01	2.20E+03	n	NO	BSL
Indoor Air (CP-64)	71-55-6	1,1,1-Trichloroethane	5.80E-02		1.20E-01		µg/m^3	KC-CP-064	2 / 2	-	1.20E-01	2.20E+03	n	NO	BSL
	75-34-3	1,1-Dichloroethane	2.80E-02	J	2.80E-02	J	µg/m^3	KC-CP-064	1 / 2	0.013 - 0.013	2.80E-02	7.70E+00	c	NO	BSL
	75-35-4	1,1-Dichloroethene	7.10E-02		7.10E-02		µg/m^3	KC-CP-064	1 / 2	0.018 - 0.018	7.10E-02	8.80E+01	n	NO	BSL
	107-06-2	1,2-Dichloroethane	6.40E-02		2.10E-01		µg/m^3	KC-CP-064	2 / 2	-	2.10E-01	4.70E-01	c	NO	BSL
	78-87-5	1,2-Dichloropropane	2.50E-02	J	2.50E-02	J	µg/m^3	KC-CP-064	2 / 2	-	2.50E-02	3.30E-01	c	NO	BSL
	75-27-4	Bromodichloromethane	7.50E-02		2.90E-01		µg/m^3	KC-CP-064	2 / 2	-	2.90E-01	3.30E-01	c	NO	BSL
	74-83-9	Bromomethane	2.40E-02	J	3.20E-02	J	µg/m^3	KC-CP-064	2 / 2	-	3.20E-02	2.20E+00	n	NO	BSL
	56-23-5	Carbon tetrachloride	5.00E-01		5.50E-01		µg/m^3	KC-CP-064	2 / 2	-	5.50E-01	2.00E+00	c	NO	BSL
	124-48-1	Chlorodibromomethane	5.50E-02		5.50E-02		µg/m^3	KC-CP-064	1 / 2	0.018 - 0.018	5.50E-02	NA		NO	NTX
	75-00-3	Chloroethane	2.70E-02	J	9.80E-02		µg/m^3	KC-CP-064	2 / 2	-	9.80E-02	4.40E+03	n	NO	BSL
	67-66-3	Chloroform	3.10E+00		1.50E+01		µg/m^3	KC-CP-064	2 / 2	-	1.50E+01	5.30E-01	c	YES	ASL
	74-87-3	Chloromethane	3.70E-01		4.60E-01		µg/m^3	KC-CP-064	2 / 2	-	4.60E-01	3.90E+01	n	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.90E+00		3.40E+00		µg/m^3	KC-CP-064	2 / 2	-	3.40E+00	4.40E+01	n	NO	BSL
	75-09-2	Dichloromethane	6.30E-01		1.20E+00		µg/m^3	KC-CP-064	2 / 2	-	1.20E+00	2.60E+02	n	NO	BSL
	127-18-4	Tetrachloroethene	9.30E-02		2.50E-01		µg/m^3	KC-CP-064	2 / 2	-	2.50E-01	1.80E+01	n	NO	BSL
	79-01-6	Trichloroethene	2.40E-02	J	3.30E-02	J	µg/m^3	KC-CP-064	2 / 2	-	3.30E-02	8.80E-01	n	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	5.10E-01		7.40E-01		µg/m^3	KC-CP-064	2 / 2	-	7.40E-01	2.20E+03	n	NO	BSL
	75-01-4	Vinyl Chloride	3.10E-02	J	3.10E-02	J	µg/m^3	KC-CP-064	1 / 2	0.016 - 0.016	3.10E-02	2.80E+00	c	NO	BSL

TABLE 2-1
COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Scenario Timeframe: Current
Medium: Indoor Air (Commercial Properties)
Exposure Medium: Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier		Maximum Concentration Qualifier		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Screening Toxicity Value (2)		Exceedance Flag	Rationale for Selection or Deletion (3)
Indoor Air (CP-67)	71-55-6	1,1,1-Trichloroethane	1.80E-02	J	1.80E-02	J	µg/m^3	KC-CP-067	1 / 1	-	1.80E-02	2.20E+03	n	NO	BSL
	75-35-4	1,1-Dichloroethene	1.20E-01	J	1.20E-01	J	µg/m^3	KC-CP-067	1 / 1	-	1.20E-01	8.80E+01	n	NO	BSL
	107-06-2	1,2-Dichloroethane	7.60E-02	J	7.60E-02	J	µg/m^3	KC-CP-067	1 / 1	-	7.60E-02	4.70E-01	c	NO	BSL
	78-87-5	1,2-Dichloropropane	2.70E-02	J	2.70E-02	J	µg/m^3	KC-CP-067	1 / 1	-	2.70E-02	3.30E-01	c	NO	BSL
	75-27-4	Bromodichloromethane	2.40E+00		2.40E+00		µg/m^3	KC-CP-067	1 / 1	-	2.40E+00	3.30E-01	c	YES	ASL
	74-83-9	Bromomethane	3.60E-02	J	3.60E-02	J	µg/m^3	KC-CP-067	1 / 1	-	3.60E-02	2.20E+00	n	NO	BSL
	56-23-5	Carbon tetrachloride	6.80E-01	J	6.80E-01	J	µg/m^3	KC-CP-067	1 / 1	-	6.80E-01	2.00E+00	c	NO	BSL
	124-48-1	Chlorodibromomethane	3.70E-01		3.70E-01		µg/m^3	KC-CP-067	1 / 1	-	3.70E-01	NA		NO	NTX
	75-00-3	Chloroethane	8.30E-02		8.30E-02		µg/m^3	KC-CP-067	1 / 1	-	8.30E-02	4.40E+03	n	NO	BSL
	67-66-3	Chloroform	2.60E+01	J	2.60E+01	J	µg/m^3	KC-CP-067	1 / 1	-	2.60E+01	5.30E-01	c	YES	ASL
	74-87-3	Chloromethane	8.10E-01	J	8.10E-01	J	µg/m^3	KC-CP-067	1 / 1	-	8.10E-01	3.90E+01	n	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.80E+00	J	2.80E+00	J	µg/m^3	KC-CP-067	1 / 1	-	2.80E+00	4.40E+01	n	NO	BSL
	75-09-2	Dichloromethane	4.20E-01	J	4.20E-01	J	µg/m^3	KC-CP-067	1 / 1	-	4.20E-01	2.60E+02	n	NO	BSL
	127-18-4	Tetrachloroethene	7.40E-01		7.40E-01		µg/m^3	KC-CP-067	1 / 1	-	7.40E-01	1.80E+01	n	NO	BSL
	79-01-6	Trichloroethene	6.90E-02	J	6.90E-02	J	µg/m^3	KC-CP-067	1 / 1	-	6.90E-02	8.80E-01	n	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	5.90E-01	J	5.90E-01	J	µg/m^3	KC-CP-067	1 / 1	-	5.90E-01	2.20E+03	n	NO	BSL
	75-01-4	Vinyl Chloride	6.40E-02	J	6.40E-02	J	µg/m^3	KC-CP-067	1 / 1	-	6.40E-02	2.80E+00	c	NO	BSL

Notes:

(1) Maximum concentration is used for screening.

(2) Regional Screening Levels for Industrial Air (June 2017). Concentrations based on non-carcinogenic health effects are based on HQ=0.1.
RSL for 1,1,2-trichloro-1,2,2-trifluoroethane used as a surrogate for trichlorotrifluoroethane.

(3) Rationale Codes:
Above Screening Levels (ASL)
Below Screening Level (BSL)
No Toxicity Value Available (NTX)

CP = Commercial Property
HQ = hazard quotient
c = carcinogenic
J = compound was detected below the reporting limit in the sample
n = noncarcinogenic
NA = not available
µg/m^3 = microgram per cubic meter

TABLE 2-2
COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Scenario Timeframe: Current
Medium: Crawl Space Air (Commercial Properties)
Exposure Medium: Indoor Air (Crawl Space)

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier		Maximum Concentration Qualifier		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Screening Toxicity Value (2)		Exceedance Flag	Rationale for Selection or Deletion (3)
Indoor Air (Crawl Space) (CP-8)	107-06-2	1,2-Dichloroethane	2.90E-01	J	2.90E-01	J	µg/m^3	KC-CP-008	1 / 1	-	2.90E-01	4.70E-01	c	NO	BSL
	56-23-5	Carbon tetrachloride	3.70E-01	J	3.70E-01	J	µg/m^3	KC-CP-008	1 / 1	-	3.70E-01	2.00E+00	c	NO	BSL
	74-87-3	Chloromethane	3.70E-01	J	3.70E-01	J	µg/m^3	KC-CP-008	1 / 1	-	3.70E-01	3.90E+01	n	NO	BSL
	75-71-8	Dichlorodifluoromethane	1.20E+01		1.20E+01		µg/m^3	KC-CP-008	1 / 1	-	1.20E+01	4.40E+01	n	NO	BSL
	75-09-2	Dichloromethane	1.70E+00		1.70E+00		µg/m^3	KC-CP-008	1 / 1	-	1.70E+00	2.60E+02	n	NO	BSL
	127-18-4	Tetrachloroethene	4.00E-01	J	4.00E-01	J	µg/m^3	KC-CP-008	1 / 1	-	4.00E-01	1.80E+01	n	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	1.40E+00		1.40E+00		µg/m^3	KC-CP-008	1 / 1	-	1.40E+00	2.20E+03	n	NO	BSL
Indoor Air (Crawl Space) (CP-10)	107-06-2	1,2-Dichloroethane	2.70E-01	J	2.70E-01	J	µg/m^3	KC-CP-010	1 / 1	-	2.70E-01	4.70E-01	c	NO	BSL
	56-23-5	Carbon tetrachloride	3.60E-01	J	3.60E-01	J	µg/m^3	KC-CP-010	1 / 1	-	3.60E-01	2.00E+00	c	NO	BSL
	74-87-3	Chloromethane	3.80E-01	J	3.80E-01	J	µg/m^3	KC-CP-010	1 / 1	-	3.80E-01	3.90E+01	n	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.60E+00		2.60E+00		µg/m^3	KC-CP-010	1 / 1	-	2.60E+00	4.40E+01	n	NO	BSL
	75-09-2	Dichloromethane	2.40E+00		2.40E+00		µg/m^3	KC-CP-010	1 / 1	-	2.40E+00	2.60E+02	n	NO	BSL
	127-18-4	Tetrachloroethene	8.50E+00		8.50E+00		µg/m^3	KC-CP-010	1 / 1	-	8.50E+00	1.80E+01	n	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	1.10E+00		1.10E+00		µg/m^3	KC-CP-010	1 / 1	-	1.10E+00	2.20E+03	n	NO	BSL
Indoor Air (Crawl Space) (CP-13)	71-55-6	1,1,1-Trichloroethane	6.20E-02		6.20E-02		µg/m^3	KC-CP-013	1 / 1	-	6.20E-02	2.20E+03	n	NO	BSL
	107-06-2	1,2-Dichloroethane	1.30E-01		1.30E-01		µg/m^3	KC-CP-013	1 / 1	-	1.30E-01	4.70E-01	c	NO	BSL
	78-87-5	1,2-Dichloropropane	1.30E-02	J	1.30E-02	J	µg/m^3	KC-CP-013	1 / 1	-	1.30E-02	3.30E-01	c	NO	BSL
	56-23-5	Carbon tetrachloride	6.60E-01		6.60E-01		µg/m^3	KC-CP-013	1 / 1	-	6.60E-01	2.00E+00	c	NO	BSL
	124-48-1	Chlorodibromomethane	1.70E-02	J	1.70E-02	J	µg/m^3	KC-CP-013	1 / 1	-	1.70E-02	NA		NO	NTX
	75-00-3	Chloroethane	2.40E-02	J	2.40E-02	J	µg/m^3	KC-CP-013	1 / 1	-	2.40E-02	4.40E+03	n	NO	BSL
	67-66-3	Chloroform	4.60E-01		4.60E-01		µg/m^3	KC-CP-013	1 / 1	-	4.60E-01	5.30E-01	c	NO	BSL
	74-87-3	Chloromethane	3.00E-01	J	3.00E-01	J	µg/m^3	KC-CP-013	1 / 1	-	3.00E-01	3.90E+01	n	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.50E+00		2.50E+00		µg/m^3	KC-CP-013	1 / 1	-	2.50E+00	4.40E+01	n	NO	BSL
	75-09-2	Dichloromethane	1.10E+01		1.10E+01		µg/m^3	KC-CP-013	1 / 1	-	1.10E+01	2.60E+02	n	NO	BSL
	127-18-4	Tetrachloroethene	4.40E-01		4.40E-01		µg/m^3	KC-CP-013	1 / 1	-	4.40E-01	1.80E+01	n	NO	BSL
	156-60-5	trans-1,2-Dichloroethene	4.20E-01		4.20E-01		µg/m^3	KC-CP-013	1 / 1	-	4.20E-01	NA		NO	NTX
	79-01-6	Trichloroethene	5.90E-02		5.90E-02		µg/m^3	KC-CP-013	1 / 1	-	5.90E-02	8.80E-01	n	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	7.40E-01		7.40E-01		µg/m^3	KC-CP-013	1 / 1	-	7.40E-01	2.20E+03	n	NO	BSL

TABLE 2-2
COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Scenario Timeframe: Current
Medium: Crawl Space Air (Commercial Properties)
Exposure Medium: Indoor Air (Crawl Space)

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier	Maximum Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Screening Toxicity Value (2)	Exceedance Flag	Rationale for Selection or Deletion (3)
Indoor Air (Crawl Space) (CP-64)	71-55-6	1,1,1-Trichloroethane	1.80E-01	1.80E-01	$\mu g/m^3$	KC-CP-064	1 / 1	-	1.80E-01	2.20E+03 n	NO	BSL
	107-06-2	1,2-Dichloroethane	1.50E-01	1.50E-01	$\mu g/m^3$	KC-CP-064	1 / 1	0.013 - 0.013	1.50E-01	4.70E-01 c	NO	BSL
	78-87-5	1,2-Dichloropropane	2.30E-02 J	2.30E-02 J	$\mu g/m^3$	KC-CP-064	1 / 1	0.018 - 0.018	2.30E-02	3.30E-01 c	NO	BSL
	75-27-4	Bromodichloromethane	5.90E-02	5.90E-02	$\mu g/m^3$	KC-CP-064	1 / 1	-	5.90E-02	3.30E-01 c	NO	BSL
	74-83-9	Bromomethane	2.70E-02 J	2.70E-02 J	$\mu g/m^3$	KC-CP-064	1 / 1	-	2.70E-02	2.20E+00 n	NO	BSL
	56-23-5	Carbon tetrachloride	4.80E-01	4.80E-01	$\mu g/m^3$	KC-CP-064	1 / 1	-	4.80E-01	2.00E+00 c	NO	BSL
	75-00-3	Chloroethane	2.90E-02 J	2.90E-02 J	$\mu g/m^3$	KC-CP-064	1 / 1	-	2.90E-02	4.40E+03 n	NO	BSL
	67-66-3	Chloroform	2.30E+00	2.30E+00	$\mu g/m^3$	KC-CP-064	1 / 1	-	2.30E+00	5.30E-01 c	YES	ASL
	74-87-3	Chloromethane	3.40E-01	3.40E-01	$\mu g/m^3$	KC-CP-064	1 / 1	0.018 - 0.018	3.40E-01	3.90E+01 n	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.90E+00	2.90E+00	$\mu g/m^3$	KC-CP-064	1 / 1	-	2.90E+00	4.40E+01 n	NO	BSL
	75-09-2	Dichloromethane	1.00E+00	1.00E+00	$\mu g/m^3$	KC-CP-064	1 / 1	-	1.00E+00	2.60E+02 n	NO	BSL
	127-18-4	Tetrachloroethene	1.70E-01	1.70E-01	$\mu g/m^3$	KC-CP-064	1 / 1	-	1.70E-01	1.80E+01 n	NO	BSL
	79-01-6	Trichloroethene	1.90E-02 J	1.90E-02 J	$\mu g/m^3$	KC-CP-064	1 / 1	-	1.90E-02	8.80E-01 n	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	7.00E-01	7.00E-01	$\mu g/m^3$	KC-CP-064	1 / 1	-	7.00E-01	2.20E+03 n	NO	BSL

Notes:

(1) Maximum concentration is used for screening.

(2) Regional Screening Levels for Industrial Air (June 2017). Concentrations based on non-carcinogenic health effects are based on HQ=0.1.
RSL for 1,1,2-trichloro-1,2,2-trifluoroethane used as a surrogate for trichlorotrifluoroethane.

(3) Rationale Codes:
Above Screening Levels (ASL)
Below Screening Level (BSL)
No Toxicity Value Available (NTX)

CP = Commercial Property
HQ = hazard quotient
c = carcinogenic
J = compound was detected below the reporting limit in the sample
n = noncarcinogenic
NA = not available
$\mu g/m^3$ = microgram per cubic meter

TABLE 2-3
COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Scenario Timeframe: Current/Future
Medium: Subslab soil vapor (Commercial Properties)
Exposure Medium: Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration	Qualifier	Maximum Concentration	Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Screening Toxicity Value (2)		Exceedance Flag	Rationale for Selection or Deletion (3)
Indoor Air (CP-3)	71-55-6	1,1,1-Trichloroethane	4.70E-01	J	4.70E-01	J	µg/m^3	KC-CP-003	1 / 1	-	4.70E-01	7.30E+05	n	NO	BSL
	75-25-2	Bromoform	3.40E-01	J	3.40E-01	J	µg/m^3	KC-CP-003	1 / 1	-	3.40E-01	3.72E+02	c	NO	BSL
	56-23-5	Carbon tetrachloride	2.50E-01	J	2.50E-01	J	µg/m^3	KC-CP-003	1 / 1	-	2.50E-01	6.81E+01	c	NO	BSL
	67-66-3	Chloroform	6.40E-01	J	6.40E-01	J	µg/m^3	KC-CP-003	1 / 1	-	6.40E-01	1.78E+01	c	NO	BSL
	75-71-8	Dichlorodifluoromethane	4.00E+03		4.00E+03		µg/m^3	KC-CP-003	1 / 1	-	4.00E+03	1.46E+04	n	NO	BSL
	127-18-4	Tetrachloroethene	4.80E+01		4.80E+01		µg/m^3	KC-CP-003	1 / 1	-	4.80E+01	1.57E+03	c	NO	BSL
	79-01-6	Trichloroethene	2.30E-01	J	2.30E-01	J	µg/m^3	KC-CP-003	1 / 1	-	2.30E-01	9.97E+01	c	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	4.30E-01	J	4.30E-01	J	µg/m^3	KC-CP-003	1 / 1	-	4.30E-01	7.30E+05	n	NO	BSL
Indoor Air (CP-8)	71-55-6	1,1,1-Trichloroethane	7.80E-01		7.80E-01		µg/m^3	KC-CP-008	1 / 1	-	7.80E-01	7.30E+05	n	NO	BSL
	75-71-8	Dichlorodifluoromethane	7.60E+01		7.60E+01		µg/m^3	KC-CP-008	1 / 1	-	7.60E+01	1.46E+04	n	NO	BSL
	127-18-4	Tetrachloroethene	6.40E-01	J	6.40E-01	J	µg/m^3	KC-CP-008	1 / 1	-	6.40E-01	1.57E+03	c	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	4.00E-01	J	4.00E-01	J	µg/m^3	KC-CP-008	1 / 1	-	4.00E-01	7.30E+05	n	NO	BSL
Indoor Air (CP-10)	71-55-6	1,1,1-Trichloroethane	4.80E-01	J	2.30E+00	J	µg/m^3	KC-CP-010	4 / 9	0.71 - 8.2	2.30E+00	7.30E+05	n	NO	BSL
	75-25-2	Bromoform	2.70E-01	J	3.20E-01	J	µg/m^3	KC-CP-010	3 / 9	0.7 - 8.2	3.20E-01	3.72E+02	c	NO	BSL
	56-23-5	Carbon tetrachloride	3.10E-01	J	4.10E-01	J	µg/m^3	KC-CP-010	2 / 9	0.7 - 8.2	4.10E-01	6.81E+01	c	NO	BSL
	67-66-3	Chloroform	1.90E+01		1.90E+01		µg/m^3	KC-CP-010	1 / 9	0.7 - 8.2	1.90E+01	1.78E+01	c	YES	ASL
	75-71-8	Dichlorodifluoromethane	2.50E+00		3.10E+02		µg/m^3	KC-CP-010	9 / 9	-	3.10E+02	1.46E+04	n	NO	BSL
	75-09-2	Dichloromethane	3.20E-01	J	7.50E-01		µg/m^3	KC-CP-010	4 / 9	0.7 - 8.2	7.50E-01	4.09E+04	c	NO	BSL
	127-18-4	Tetrachloroethene	1.10E+01		1.30E+03		µg/m^3	KC-CP-010	9 / 9	-	1.30E+03	1.57E+03	c	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	3.80E-01	J	4.50E-01	J	µg/m^3	KC-CP-010	7 / 9	2.5 - 8.2	4.50E-01	7.30E+05	n	NO	BSL
Indoor Air (CP-11)	75-25-2	Bromoform	2.90E-01	J	3.10E-01	J	µg/m^3	KC-CP-011	2 / 2	-	3.10E-01	3.72E+02	c	NO	BSL
	56-23-5	Carbon tetrachloride	2.70E-01	J	3.50E-01	J	µg/m^3	KC-CP-011	2 / 2	-	3.50E-01	6.81E+01	c	NO	BSL
	67-66-3	Chloroform	5.30E-01	J	1.00E+01		µg/m^3	KC-CP-011	2 / 2	-	1.00E+01	1.78E+01	c	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.00E+00		3.20E+00	J	µg/m^3	KC-CP-011	2 / 2	-	3.20E+00	1.46E+04	n	NO	BSL
	127-18-4	Tetrachloroethene	1.10E+02		2.50E+02		µg/m^3	KC-CP-011	2 / 2	-	2.50E+02	1.57E+03	c	NO	BSL
	79-01-6	Trichloroethene	1.40E+00		1.40E+00		µg/m^3	KC-CP-011	1 / 2	0.72 - 0.72	1.40E+00	9.97E+01	c	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	4.20E-01	J	4.40E-01	J	µg/m^3	KC-CP-011	2 / 2	-	4.40E-01	7.30E+05	n	NO	BSL
Indoor Air (CP-13)	127-18-4	Tetrachloroethene	1.10E+04		9.90E+04		µg/m^3	KC-CP-013	3 / 3	-	9.90E+04	1.57E+03	c	YES	ASL
	79-01-6	Trichloroethene	2.20E+01	J	1.10E+03		µg/m^3	KC-CP-013	3 / 3	-	1.10E+03	9.97E+01	c	YES	ASL

TABLE 2-3
COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Scenario Timeframe: Current/Future
Medium: Subslab soil vapor (Commercial Properties)
Exposure Medium: Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier		Maximum Concentration Qualifier		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Screening Toxicity Value (2)		Exceedance Flag	Rationale for Selection or Deletion (3)
Indoor Air (CP-16)	71-55-6	1,1,1-Trichloroethane	1.00E+02	J	2.60E+03		µg/m^3	KC-CP-016	12 / 12	-	2.60E+03	7.30E+05	n	NO	BSL
	75-35-4	1,1-Dichloroethene	8.50E+00		1.00E+01		µg/m^3	KC-CP-016	2 / 12	3.8 - 540	1.00E+01	2.92E+04	n	NO	BSL
	75-25-2	Bromoform	2.80E-01	J	2.80E-01	J	µg/m^3	KC-CP-016	1 / 12	0.73 - 540	2.80E-01	3.72E+02	c	NO	BSL
	56-23-5	Carbon tetrachloride	2.80E+00	J	5.80E+00		µg/m^3	KC-CP-016	3 / 12	15 - 540	5.80E+00	6.81E+01	c	NO	BSL
	67-66-3	Chloroform	3.30E-01	J	2.90E+00		µg/m^3	KC-CP-016	2 / 12	3.8 - 540	2.90E+00	1.78E+01	c	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.40E+00		2.60E+00	J	µg/m^3	KC-CP-016	3 / 12	15 - 540	2.60E+00	1.46E+04	n	NO	BSL
	75-09-2	Dichloromethane	1.60E+00		1.90E+02	J	µg/m^3	KC-CP-016	3 / 12	3.8 - 540	1.90E+02	4.09E+04	c	NO	BSL
	127-18-4	Tetrachloroethene	3.10E+01		9.20E+04		µg/m^3	KC-CP-016	12 / 12	-	9.20E+04	1.57E+03	c	YES	ASL
	79-01-6	Trichloroethene	4.40E+01	J	1.10E+04		µg/m^3	KC-CP-016	11 / 12	130 - 130	1.10E+04	9.97E+01	c	YES	ASL
	26523-64-8	Trichlorotrifluoroethane	2.00E+00		1.10E+01	J	µg/m^3	KC-CP-016	4 / 12	37 - 540	1.10E+01	7.30E+05	n	NO	BSL
Indoor Air (CP-17)	71-55-6	1,1,1-Trichloroethane	1.60E+02		7.40E+02		µg/m^3	KC-CP-017	3 / 6	68 - 350	7.40E+02	7.30E+05	n	NO	BSL
	127-18-4	Tetrachloroethene	7.60E+03		1.50E+05		µg/m^3	KC-CP-017	6 / 6	-	1.50E+05	1.57E+03	c	YES	ASL
	79-01-6	Trichloroethene	9.00E+01		4.30E+03		µg/m^3	KC-CP-017	3 / 6	68 - 350	4.30E+03	9.97E+01	c	YES	ASL
Indoor Air (CP-18)	71-55-6	1,1,1-Trichloroethane	2.40E+02	J	2.40E+02	J	µg/m^3	KC-CP-018	1 / 3	250 - 380	2.40E+02	7.30E+05	n	NO	BSL
	75-09-2	Dichloromethane	1.30E+02	J	3.50E+02	J	µg/m^3	KC-CP-018	2 / 3	250 - 250	3.50E+02	4.09E+04	c	NO	BSL
	127-18-4	Tetrachloroethene	3.60E+04		1.20E+05		µg/m^3	KC-CP-018	3 / 3	-	1.20E+05	1.57E+03	c	YES	ASL
	79-01-6	Trichloroethene	1.80E+02	J	1.70E+03		µg/m^3	KC-CP-018	3 / 3	-	1.70E+03	9.97E+01	c	YES	ASL
Indoor Air (CP-19)	75-27-4	Bromodichloromethane	3.50E+01		3.50E+01		µg/m^3	KC-CP-019	1 / 1	-	3.50E+01	1.10E+01	c	YES	ASL
	56-23-5	Carbon tetrachloride	7.80E+00		7.80E+00		µg/m^3	KC-CP-019	1 / 1	-	7.80E+00	6.81E+01	c	NO	BSL
	67-66-3	Chloroform	1.80E+03		1.80E+03		µg/m^3	KC-CP-019	1 / 1	-	1.80E+03	1.78E+01	c	YES	ASL
	75-71-8	Dichlorodifluoromethane	2.90E+00	J	2.90E+00	J	µg/m^3	KC-CP-019	1 / 1	-	2.90E+00	1.46E+04	n	NO	BSL
	127-18-4	Tetrachloroethene	9.90E+02		9.90E+02		µg/m^3	KC-CP-019	1 / 1	-	9.90E+02	1.57E+03	c	NO	BSL
	79-01-6	Trichloroethene	3.20E+01		3.20E+01		µg/m^3	KC-CP-019	1 / 1	-	3.20E+01	9.97E+01	c	NO	BSL
Indoor Air (CP-23)	71-55-6	1,1,1-Trichloroethane	3.30E+01	J	5.40E+01	J	µg/m^3	KC-CP-023	2 / 10	15 - 700	5.40E+01	7.30E+05	n	NO	BSL
	127-18-4	Tetrachloroethene	4.70E+03		9.00E+04		µg/m^3	KC-CP-023	10 / 10	-	9.00E+04	1.57E+03	c	YES	ASL
	79-01-6	Trichloroethene	2.00E+01		3.90E+02		µg/m^3	KC-CP-023	7 / 10	510 - 700	3.90E+02	9.97E+01	c	YES	ASL
Indoor Air (CP-24)	71-55-6	1,1,1-Trichloroethane	1.50E+02	J	1.50E+02	J	µg/m^3	KC-CP-024	1 / 3	89 - 340	1.50E+02	7.30E+05	n	NO	BSL
	127-18-4	Tetrachloroethene	1.40E+04		5.00E+04		µg/m^3	KC-CP-024	3 / 3	-	5.00E+04	1.57E+03	c	YES	ASL
	79-01-6	Trichloroethene	9.10E+01		3.20E+02		µg/m^3	KC-CP-024	3 / 3	-	3.20E+02	9.97E+01	c	YES	ASL
Indoor Air (CP-27)	71-55-6	1,1,1-Trichloroethane	4.20E+02		5.50E+02		µg/m^3	KC-CP-027	2 / 2	-	5.50E+02	7.30E+05	n	NO	BSL
	56-23-5	Carbon tetrachloride	2.50E+02		5.00E+02		µg/m^3	KC-CP-027	2 / 2	-	5.00E+02	6.81E+01	c	YES	ASL
	67-66-3	Chloroform	3.10E+02		3.00E+03		µg/m^3	KC-CP-027	2 / 2	-	3.00E+03	1.78E+01	c	YES	ASL
	127-18-4	Tetrachloroethene	2.00E+04		2.60E+04		µg/m^3	KC-CP-027	2 / 2	-	2.60E+04	1.57E+03	c	YES	ASL
	79-01-6	Trichloroethene	1.10E+03		1.40E+03		µg/m^3	KC-CP-027	2 / 2	-	1.40E+03	9.97E+01	c	YES	ASL

TABLE 2-3
COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Scenario Timeframe: Current/Future
Medium: Subslab soil vapor (Commercial Properties)
Exposure Medium: Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier	Maximum Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Screening Toxicity Value (2)	Exceedance Flag	Rationale for Selection or Deletion (3)
Indoor Air (CP-53)	71-55-6	1,1,1-Trichloroethane	2.30E+03	2.30E+03	µg/m^3	KC-CP-053	1 / 1	-	2.30E+03	7.30E+05 n	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.40E+02	2.40E+02	µg/m^3	KC-CP-053	1 / 1	-	2.40E+02	1.46E+04 n	NO	BSL
	127-18-4	Tetrachloroethene	9.80E+00 J	9.80E+00 J	µg/m^3	KC-CP-053	1 / 1	-	9.80E+00	1.57E+03 c	NO	BSL
	79-01-6	Trichloroethene	4.90E+00 J	4.90E+00 J	µg/m^3	KC-CP-053	1 / 1	-	4.90E+00	9.97E+01 c	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	1.90E+01	1.90E+01	µg/m^3	KC-CP-053	1 / 1	-	1.90E+01	7.30E+05 n	NO	BSL
Indoor Air (CP-56)	71-55-6	1,1,1-Trichloroethane	3.90E+02	5.30E+02	µg/m^3	KC-CP-056	2 / 2	-	5.30E+02	7.30E+05 n	NO	BSL
	75-34-3	1,1-Dichloroethane	3.50E-01 J	3.50E-01 J	µg/m^3	KC-CP-056	1 / 2	0.78 - 0.78	3.50E-01	2.56E+02 c	NO	BSL
	75-35-4	1,1-Dichloroethene	1.70E+00	7.60E+00	µg/m^3	KC-CP-056	2 / 2	-	7.60E+00	2.92E+04 n	NO	BSL
	56-23-5	Carbon tetrachloride	2.60E+00	4.20E+00	µg/m^3	KC-CP-056	2 / 2	-	4.20E+00	6.81E+01 c	NO	BSL
	67-66-3	Chloroform	7.80E+00	7.50E+01	µg/m^3	KC-CP-056	2 / 2	-	7.50E+01	1.78E+01 c	YES	ASL
	75-71-8	Dichlorodifluoromethane	2.70E+00	3.10E+00	µg/m^3	KC-CP-056	2 / 2	-	3.10E+00	1.46E+04 n	NO	BSL
	127-18-4	Tetrachloroethene	7.70E+01	2.30E+02	µg/m^3	KC-CP-056	2 / 2	-	2.30E+02	1.57E+03 c	NO	BSL
	79-01-6	Trichloroethene	7.60E+01	9.80E+01	µg/m^3	KC-CP-056	2 / 2	-	9.80E+01	9.97E+01 c	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	4.00E+00	6.30E+00	µg/m^3	KC-CP-056	2 / 2	-	6.30E+00	7.30E+05 n	NO	BSL
Indoor Air (CP-64)	71-55-6	1,1,1-Trichloroethane	7.90E+01	7.90E+01	µg/m^3	KC-CP-064	1 / 1	-	7.90E+01	7.30E+05 n	NO	BSL
	67-66-3	Chloroform	1.30E+00	1.30E+00	µg/m^3	KC-CP-064	1 / 1	-	1.30E+00	1.78E+01 c	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.30E+00	2.30E+00	µg/m^3	KC-CP-064	1 / 1	-	2.30E+00	1.46E+04 n	NO	BSL
	127-18-4	Tetrachloroethene	8.70E-01	8.70E-01	µg/m^3	KC-CP-064	1 / 1	-	8.70E-01	1.57E+03 c	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	4.50E-01 J	4.50E-01 J	µg/m^3	KC-CP-064	1 / 1	-	4.50E-01	7.30E+05 n	NO	BSL
Indoor Air (CP-67)	71-55-6	1,1,1-Trichloroethane	1.20E+00	2.30E+00	µg/m^3	KC-CP-067	2 / 2	-	2.30E+00	7.30E+05 n	NO	BSL
	56-23-5	Carbon tetrachloride	2.40E-01 J	4.30E-01 J	µg/m^3	KC-CP-067	2 / 2	-	4.30E-01	6.81E+01 c	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.30E+00	2.40E+00	µg/m^3	KC-CP-067	2 / 2	-	2.40E+00	1.46E+04 n	NO	BSL
	127-18-4	Tetrachloroethene	7.10E+01	1.50E+02	µg/m^3	KC-CP-067	2 / 2	-	1.50E+02	1.57E+03 c	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	3.90E-01 J	4.20E-01 J	µg/m^3	KC-CP-067	2 / 2	-	4.20E-01	7.30E+05 n	NO	BSL

Notes:

(1) Maximum concentration is used for screening.

(2) Industrial soil vapor Vapor Intrusion Screening Level (June 2017). Concentrations based on non-carcinogenic health effects are based on HQ=1.
RSL for 1,1,2-trichloro-1,2,2-trifluoroethane used as a surrogate for trichlorotrifluoroethane.

(3) Rationale Codes:
Above Screening Levels (ASL)
Below Screening Level (BSL)
No Toxicity Value Available (NTX)

CP = Commercial Property
HQ = hazard quotient
J = compound was detected below the reporting limit in the sample
c = carcinogenic
n = noncarcinogenic
NA = not available
µg/m^3 = microgram per cubic meter

TABLE 2-4
COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Scenario Timeframe: Current
Medium: Indoor Air (Residential Properties)
Exposure Medium: Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration	Minimum Concentration Qualifier	Maximum Concentration	Maximum Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Screening Toxicity Value (2)		Exceedance Flag	Rationale for Selection or Deletion (3)
Indoor Air (RP-39)	71-55-6	1,1,1-Trichloroethane	3.30E+00		3.30E+00		µg/m^3	KC-RP-039	1 / 1	-	3.30E+00	5.20E+02	n	NO	BSL
	75-34-3	1,1-Dichloroethane	1.90E-02	J	1.90E-02	J	µg/m^3	KC-RP-039	1 / 1	-	1.90E-02	1.80E+00	c	NO	BSL
	75-35-4	1,1-Dichloroethene	1.70E-02	J	1.70E-02	J	µg/m^3	KC-RP-039	1 / 1	-	1.70E-02	2.10E+01	n	NO	BSL
	107-06-2	1,2-Dichloroethane	2.20E-01		2.20E-01		µg/m^3	KC-RP-039	1 / 1	-	2.20E-01	1.10E-01	c	YES	ASL
	78-87-5	1,2-Dichloropropane	3.40E-02	J	3.40E-02	J	µg/m^3	KC-RP-039	1 / 1	-	3.40E-02	7.60E-02	c	NO	BSL
	75-27-4	Bromodichloromethane	1.80E+00		1.80E+00		µg/m^3	KC-RP-039	1 / 1	-	1.80E+00	7.60E-02	c	YES	ASL
	74-83-9	Bromomethane	3.20E-02	J	3.20E-02	J	µg/m^3	KC-RP-039	1 / 1	-	3.20E-02	5.20E-01	n	NO	BSL
	56-23-5	Carbon tetrachloride	1.20E+00		1.20E+00		µg/m^3	KC-RP-039	1 / 1	-	1.20E+00	4.70E-01	c	YES	ASL
	124-48-1	Chlorodibromomethane	2.80E-01		2.80E-01		µg/m^3	KC-RP-039	1 / 1	-	2.80E-01	NA		NO	NTX
	75-00-3	Chloroethane	2.90E-02	J	2.90E-02	J	µg/m^3	KC-RP-039	1 / 1	-	2.90E-02	1.00E+03	n	NO	BSL
	67-66-3	Chloroform	5.20E+00		5.20E+00		µg/m^3	KC-RP-039	1 / 1	-	5.20E+00	1.20E-01	c	YES	ASL
	74-87-3	Chloromethane	4.00E-01		4.00E-01		µg/m^3	KC-RP-039	1 / 1	-	4.00E-01	9.40E+00	n	NO	BSL
	156-59-2	cis-1,2-Dichloroethene	2.50E-02	J	2.50E-02	J	µg/m^3	KC-RP-039	1 / 1	-	2.50E-02	NA		NO	NTX
	75-71-8	Dichlorodifluoromethane	2.70E+00		2.70E+00		µg/m^3	KC-RP-039	1 / 1	-	2.70E+00	1.00E+01	n	NO	BSL
	75-09-2	Dichloromethane	1.30E+00		1.30E+00		µg/m^3	KC-RP-039	1 / 1	-	1.30E+00	6.30E+01	n	NO	BSL
	127-18-4	Tetrachloroethene	1.90E+02		1.90E+02		µg/m^3	KC-RP-039	1 / 1	-	1.90E+02	4.20E+00	n	YES	ASL
	156-60-5	trans-1,2-Dichloroethene	2.00E-02	J	2.00E-02	J	µg/m^3	KC-RP-039	1 / 1	-	2.00E-02	NA		NO	NTX
	79-01-6	Trichloroethene	6.30E+00		6.30E+00		µg/m^3	KC-RP-039	1 / 1	-	6.30E+00	2.10E-01	n	YES	ASL
	26523-64-8	Trichlorotrifluoroethane	5.40E-01		5.40E-01		µg/m^3	KC-RP-039	1 / 1	-	5.40E-01	5.20E+02	n	NO	BSL
Indoor Air (RP-41)	71-55-6	1,1,1-Trichloroethane	3.60E-01	J	3.60E-01	J	µg/m^3	KC-RP-041	1 / 1	-	3.60E-01	5.20E+02	n	NO	BSL
	79-34-5	1,1,2,2-Tetrachloroethane	6.00E-02		6.00E-02		µg/m^3	KC-RP-041	1 / 1	-	6.00E-02	4.80E-02	c	YES	ASL
	75-34-3	1,1-Dichloroethane	4.20E-01	J	4.20E-01	J	µg/m^3	KC-RP-041	1 / 1	-	4.20E-01	1.80E+00	c	NO	BSL
	107-06-2	1,2-Dichloroethane	1.10E+01	J	1.10E+01	J	µg/m^3	KC-RP-041	1 / 1	-	1.10E+01	1.10E-01	c	YES	ASL
	78-87-5	1,2-Dichloropropane	4.00E-02	J	4.00E-02	J	µg/m^3	KC-RP-041	1 / 1	-	4.00E-02	7.60E-02	c	NO	BSL
	75-27-4	Bromodichloromethane	4.70E-01	J	4.70E-01	J	µg/m^3	KC-RP-041	1 / 1	-	4.70E-01	7.60E-02	c	YES	ASL
	74-83-9	Bromomethane	4.90E-02	J	4.90E-02	J	µg/m^3	KC-RP-041	1 / 1	-	4.90E-02	5.20E-01	n	NO	BSL
	56-23-5	Carbon tetrachloride	8.60E-01	J	8.60E-01	J	µg/m^3	KC-RP-041	1 / 1	-	8.60E-01	4.70E-01	c	YES	ASL
	124-48-1	Chlorodibromomethane	1.00E-01	J	1.00E-01	J	µg/m^3	KC-RP-041	1 / 1	-	1.00E-01	NA		NO	NTX
	75-00-3	Chloroethane	9.20E-02	J	9.20E-02	J	µg/m^3	KC-RP-041	1 / 1	-	9.20E-02	1.00E+03	n	NO	BSL
	67-66-3	Chloroform	2.40E+00	J	2.40E+00	J	µg/m^3	KC-RP-041	1 / 1	-	2.40E+00	1.20E-01	c	YES	ASL
	74-87-3	Chloromethane	2.30E+00	J	2.30E+00	J	µg/m^3	KC-RP-041	1 / 1	-	2.30E+00	9.40E+00	n	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.30E+00	J	2.30E+00	J	µg/m^3	KC-RP-041	1 / 1	-	2.30E+00	1.00E+01	n	NO	BSL
	75-09-2	Dichloromethane	1.10E+00	J	1.10E+00	J	µg/m^3	KC-RP-041	1 / 1	-	1.10E+00	6.30E+01	n	NO	BSL
	127-18-4	Tetrachloroethene	6.40E+00	J	6.40E+00	J	µg/m^3	KC-RP-041	1 / 1	-	6.40E+00	4.20E+00	n	YES	ASL
	79-01-6	Trichloroethene	2.80E-01	J	2.80E-01	J	µg/m^3	KC-RP-041	1 / 1	-	2.80E-01	2.10E-01	n	YES	ASL
	26523-64-8	Trichlorotrifluoroethane	5.60E-01	J	5.60E-01	J	µg/m^3	KC-RP-041	1 / 1	-	5.60E-01	5.20E+02	n	NO	BSL

TABLE 2-4
COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Scenario Timeframe: Current
Medium: Indoor Air (Residential Properties)
Exposure Medium: Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration	Qualifier	Maximum Concentration	Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Screening Toxicity Value (2)		Exceedance Flag	Rationale for Selection or Deletion (3)
Indoor Air (RP-42)	71-55-6	1,1,1-Trichloroethane	3.90E-01	J	3.90E-01	J	µg/m^3	KC-RP-042	1 / 1	-	3.90E-01	5.20E+02	n	NO	BSL
	107-06-2	1,2-Dichloroethane	1.30E-01	J	1.30E-01	J	µg/m^3	KC-RP-042	1 / 1	-	1.30E-01	1.10E-01	c	YES	ASL
	78-87-5	1,2-Dichloropropane	2.90E-02	J	2.90E-02	J	µg/m^3	KC-RP-042	1 / 1	-	2.90E-02	7.60E-02	c	NO	BSL
	74-83-9	Bromomethane	3.60E-02	J	3.60E-02	J	µg/m^3	KC-RP-042	1 / 1	-	3.60E-02	5.20E-01	n	NO	BSL
	56-23-5	Carbon tetrachloride	7.40E-01	J	7.40E-01	J	µg/m^3	KC-RP-042	1 / 1	-	7.40E-01	4.70E-01	c	YES	ASL
	75-00-3	Chloroethane	1.90E-02	J	1.90E-02	J	µg/m^3	KC-RP-042	1 / 1	-	1.90E-02	1.00E+03	n	NO	BSL
	67-66-3	Chloroform	6.60E-01	J	6.60E-01	J	µg/m^3	KC-RP-042	1 / 1	-	6.60E-01	1.20E-01	c	YES	ASL
	74-87-3	Chloromethane	6.90E-01	J	6.90E-01	J	µg/m^3	KC-RP-042	1 / 1	-	6.90E-01	9.40E+00	n	NO	BSL
	75-71-8	Dichlorodifluoromethane	3.20E+00	J	3.20E+00	J	µg/m^3	KC-RP-042	1 / 1	-	3.20E+00	1.00E+01	n	NO	BSL
	75-09-2	Dichloromethane	4.70E-01	J	4.70E-01	J	µg/m^3	KC-RP-042	1 / 1	-	4.70E-01	6.30E+01	n	NO	BSL
	127-18-4	Tetrachloroethene	3.20E+00	J	3.20E+00	J	µg/m^3	KC-RP-042	1 / 1	-	3.20E+00	4.20E+00	n	NO	BSL
	156-60-5	trans-1,2-Dichloroethene	1.00E-02	J	1.00E-02	J	µg/m^3	KC-RP-042	1 / 1	-	1.00E-02	NA		NO	NTX
	79-01-6	Trichloroethene	2.30E-01	J	2.30E-01	J	µg/m^3	KC-RP-042	1 / 1	-	2.30E-01	2.10E-01	n	YES	ASL
	26523-64-8	Trichlorotrifluoroethane	6.50E-01	J	6.50E-01	J	µg/m^3	KC-RP-042	1 / 1	-	6.50E-01	5.20E+02	n	NO	BSL
Indoor Air (RP-47)	71-55-6	1,1,1-Trichloroethane	2.00E+00		2.00E+00		µg/m^3	KC-RP-047	1 / 1	-	2.00E+00	5.20E+02	n	NO	BSL
	75-34-3	1,1-Dichloroethane	4.30E-02		4.30E-02		µg/m^3	KC-RP-047	1 / 1	-	4.30E-02	1.80E+00	c	NO	BSL
	75-35-4	1,1-Dichloroethene	1.90E-02	J	1.90E-02	J	µg/m^3	KC-RP-047	1 / 1	-	1.90E-02	2.10E+01	n	NO	BSL
	107-06-2	1,2-Dichloroethane	3.70E+00		3.70E+00		µg/m^3	KC-RP-047	1 / 1	-	3.70E+00	1.10E-01	c	YES	ASL
	78-87-5	1,2-Dichloropropane	3.20E-02	J	3.20E-02	J	µg/m^3	KC-RP-047	1 / 1	-	3.20E-02	7.60E-02	c	NO	BSL
	75-27-4	Bromodichloromethane	1.80E+00		1.80E+00		µg/m^3	KC-RP-047	1 / 1	-	1.80E+00	7.60E-02	c	YES	ASL
	74-83-9	Bromomethane	3.90E-02	J	3.90E-02	J	µg/m^3	KC-RP-047	1 / 1	-	3.90E-02	5.20E-01	n	NO	BSL
	56-23-5	Carbon tetrachloride	5.90E-01		5.90E-01		µg/m^3	KC-RP-047	1 / 1	-	5.90E-01	4.70E-01	c	YES	ASL
	124-48-1	Chlorodibromomethane	3.40E-01		3.40E-01		µg/m^3	KC-RP-047	1 / 1	-	3.40E-01	NA		NO	NTX
	75-00-3	Chloroethane	6.80E-02		6.80E-02		µg/m^3	KC-RP-047	1 / 1	-	6.80E-02	1.00E+03	n	NO	BSL
	67-66-3	Chloroform	5.30E+00		5.30E+00		µg/m^3	KC-RP-047	1 / 1	-	5.30E+00	1.20E-01	c	YES	ASL
	74-87-3	Chloromethane	5.70E-01		5.70E-01		µg/m^3	KC-RP-047	1 / 1	-	5.70E-01	9.40E+00	n	NO	BSL
	156-59-2	cis-1,2-Dichloroethene	1.90E-02	J	1.90E-02	J	µg/m^3	KC-RP-047	1 / 1	-	1.90E-02	NA		NO	NTX
	75-71-8	Dichlorodifluoromethane	2.30E+00		2.30E+00		µg/m^3	KC-RP-047	1 / 1	-	2.30E+00	1.00E+01	n	NO	BSL
	75-09-2	Dichloromethane	3.30E+01		3.30E+01		µg/m^3	KC-RP-047	1 / 1	-	3.30E+01	6.30E+01	n	NO	BSL
	127-18-4	Tetrachloroethene	5.40E+00		5.40E+00		µg/m^3	KC-RP-047	1 / 1	-	5.40E+00	4.20E+00	n	YES	ASL
	156-60-5	trans-1,2-Dichloroethene	1.60E-02	J	1.60E-02	J	µg/m^3	KC-RP-047	1 / 1	-	1.60E-02	NA		NO	NTX
	79-01-6	Trichloroethene	4.50E+00		4.50E+00		µg/m^3	KC-RP-047	1 / 1	-	4.50E+00	2.10E-01	n	YES	ASL
	26523-64-8	Trichlorotrifluoroethane	5.30E-01		5.30E-01		µg/m^3	KC-RP-047	1 / 1	-	5.30E-01	5.20E+02	n	NO	BSL

TABLE 2-4
COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Scenario Timeframe: Current
Medium: Indoor Air (Residential Properties)
Exposure Medium: Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier		Maximum Concentration Qualifier		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Screening Toxicity Value (2)		Exceedance Flag	Rationale for Selection or Deletion (3)
Indoor Air (RP-62)	71-55-6	1,1,1-Trichloroethane	6.90E-02	J	8.00E-02	J	µg/m^3	KC-RP-062	2 / 2	-	8.00E-02	5.20E+02	n	NO	BSL
	75-34-3	1,1-Dichloroethane	1.90E-02	J	1.90E-02	J	µg/m^3	KC-RP-062	1 / 2	0.032 - 0.032	1.90E-02	1.80E+00	c	NO	BSL
	106-93-4	1,2-Dibromoethane	4.60E-02	J	4.60E-02	J	µg/m^3	KC-RP-062	1 / 2	0.032 - 0.032	4.60E-02	4.70E-03	c	YES	ASL
	107-06-2	1,2-Dichloroethane	9.30E-02	J	1.10E-01	J	µg/m^3	KC-RP-062	2 / 2	-	1.10E-01	1.10E-01	c	NO	BSL
	78-87-5	1,2-Dichloropropane	3.20E-02	J	3.60E-02	J	µg/m^3	KC-RP-062	2 / 2	-	3.60E-02	7.60E-02	c	NO	BSL
	75-27-4	Bromodichloromethane	3.70E-02	J	2.30E-01	J	µg/m^3	KC-RP-062	2 / 2	-	2.30E-01	7.60E-02	c	YES	ASL
	74-83-9	Bromomethane	2.60E-02	J	3.30E-02	J	µg/m^3	KC-RP-062	2 / 2	-	3.30E-02	5.20E-01	n	NO	BSL
	56-23-5	Carbon tetrachloride	5.00E-01	J	5.10E-01	J	µg/m^3	KC-RP-062	2 / 2	-	5.10E-01	4.70E-01	c	YES	ASL
	124-48-1	Chlorodibromomethane	2.70E-02	J	4.20E-02	J	µg/m^3	KC-RP-062	2 / 2	-	4.20E-02	NA		NO	NTX
	75-00-3	Chloroethane	2.50E-02	J	2.90E-02	J	µg/m^3	KC-RP-062	2 / 2	-	2.90E-02	1.00E+03	n	NO	BSL
	67-66-3	Chloroform	2.00E-01	J	1.00E+00	J	µg/m^3	KC-RP-062	2 / 2	-	1.00E+00	1.20E-01	c	YES	ASL
	74-87-3	Chloromethane	4.20E-01	J	4.40E-01	J	µg/m^3	KC-RP-062	2 / 2	-	4.40E-01	9.40E+00	n	NO	BSL
	156-59-2	cis-1,2-Dichloroethene	3.80E-02	J	3.80E-02	J	µg/m^3	KC-RP-062	1 / 2	0.032 - 0.032	3.80E-02	NA		NO	NTX
	75-71-8	Dichlorodifluoromethane	2.80E+00	J	2.90E+00	J	µg/m^3	KC-RP-062	2 / 2	-	2.90E+00	1.00E+01	n	NO	BSL
	75-09-2	Dichloromethane	3.40E-01	J	5.10E-01	J	µg/m^3	KC-RP-062	2 / 2	-	5.10E-01	6.30E+01	n	NO	BSL
	127-18-4	Tetrachloroethene	2.70E-01	J	2.80E-01	J	µg/m^3	KC-RP-062	2 / 2	-	2.80E-01	4.20E+00	n	NO	BSL
	156-60-5	trans-1,2-Dichloroethene	4.20E-02	J	4.20E-02	J	µg/m^3	KC-RP-062	1 / 2	0.032 - 0.032	4.20E-02	NA		NO	NTX
	79-01-6	Trichloroethene	2.20E-02	J	6.00E-02	J	µg/m^3	KC-RP-062	2 / 2	-	6.00E-02	2.10E-01	n	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	5.70E-01	J	5.80E-01	J	µg/m^3	KC-RP-062	2 / 2	-	5.80E-01	5.20E+02	n	NO	BSL
	75-01-4	Vinyl Chloride	1.20E-02	J	1.20E-02	J	µg/m^3	KC-RP-062	1 / 2	0.032 - 0.032	1.20E-02	1.70E-01	c	NO	BSL

Notes:

(1) Maximum concentration is used for screening.

(2) Regional Screening Levels for Residential Air (June 2017). Concentrations based on non-carcinogenic health effects are based on HQ=0.1.
RSL for 1,1,2-trichloro-1,2,2-trifluoroethane used as a surrogate for trichlorotrifluoroethane.

(3) Rationale Codes:
Above Screening Levels (ASL)
Below Screening Level (BSL)
No Toxicity Value Available (NTX)

RP = Residential Property
c = carcinogenic
HQ = hazard quotient
J = compound was detected below the reporting limit in the sample
n = noncarcinogenic
NA = not available
µg/m^3 = microgram per cubic meter

TABLE 2-5
COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Scenario Timeframe: Current
Medium: Crawl Space Air (Residential Properties)
Exposure Medium: Indoor Air (Crawl Space)

Exposure Point	CAS Number	Chemical	Minimum Concentration	Qualifier	Maximum Concentration	Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Screening Toxicity Value (2)		Exceedance Flag	Rationale for Selection or Deletion (3)
Indoor Air (Crawl Space) (RP-39)	71-55-6	1,1,1-Trichloroethane	1.80E+00		1.80E+00		µg/m^3	KC-RP-039	1 / 1	-	1.80E+00	5.20E+02	n	NO	BSL
	107-06-2	1,2-Dichloroethane	5.00E-01		5.00E-01		µg/m^3	KC-RP-039	1 / 1	-	5.00E-01	1.10E-01	c	YES	ASL
	78-87-5	1,2-Dichloropropane	1.70E-02	J	1.70E-02	J	µg/m^3	KC-RP-039	1 / 1	-	1.70E-02	7.60E-02	c	NO	BSL
	75-27-4	Bromodichloromethane	2.80E-01		2.80E-01		µg/m^3	KC-RP-039	1 / 1	-	2.80E-01	7.60E-02	c	YES	ASL
	56-23-5	Carbon tetrachloride	1.00E+00		1.00E+00		µg/m^3	KC-RP-039	1 / 1	-	1.00E+00	4.70E-01	c	YES	ASL
	124-48-1	Chlorodibromomethane	4.20E-02	J	4.20E-02	J	µg/m^3	KC-RP-039	1 / 1	-	4.20E-02	NA		NO	NTX
	67-66-3	Chloroform	1.20E+00		1.20E+00		µg/m^3	KC-RP-039	1 / 1	-	1.20E+00	1.20E-01	c	YES	ASL
	74-87-3	Chloromethane	3.50E-01		3.50E-01		µg/m^3	KC-RP-039	1 / 1	-	3.50E-01	9.40E+00	n	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.50E+00		2.50E+00		µg/m^3	KC-RP-039	1 / 1	-	2.50E+00	1.00E+01	n	NO	BSL
	75-09-2	Dichloromethane	2.50E+00		2.50E+00		µg/m^3	KC-RP-039	1 / 1	-	2.50E+00	6.30E+01	n	NO	BSL
	127-18-4	Tetrachloroethene	6.70E+01		6.70E+01		µg/m^3	KC-RP-039	1 / 1	-	6.70E+01	4.20E+00	n	YES	ASL
	79-01-6	Trichloroethene	2.20E+00		2.20E+00		µg/m^3	KC-RP-039	1 / 1	-	2.20E+00	2.10E-01	n	YES	ASL
	26523-64-8	Trichlorotrifluoroethane	2.20E+00		2.20E+00		µg/m^3	KC-RP-039	1 / 1	-	2.20E+00	5.20E+02	n	NO	BSL
Indoor Air (Crawl Space) (RP-41)	71-55-6	1,1,1-Trichloroethane	6.20E-01	J	6.20E-01	J	µg/m^3	KC-RP-041	1 / 1	-	6.20E-01	5.20E+02	n	NO	BSL
	79-00-5	1,1,2-Trichloroethane	1.30E-02	J	1.30E-02	J	µg/m^3	KC-RP-041	1 / 1	-	1.30E-02	2.10E-02	n	NO	BSL
	75-34-3	1,1-Dichloroethane	5.10E-02	J	5.10E-02	J	µg/m^3	KC-RP-041	1 / 1	-	5.10E-02	1.80E+00	c	NO	BSL
	96-12-8	1,2-Dibromo-3-chloropropane	1.90E-02	J	1.90E-02	J	µg/m^3	KC-RP-041	1 / 1	-	1.90E-02	1.70E-04	c	YES	ASL
	106-93-4	1,2-Dibromoethane	3.80E-02	J	3.80E-02	J	µg/m^3	KC-RP-041	1 / 1	-	3.80E-02	4.70E-03	c	YES	ASL
	107-06-2	1,2-Dichloroethane	2.10E-01	J	2.10E-01	J	µg/m^3	KC-RP-041	1 / 1	-	2.10E-01	1.10E-01	c	YES	ASL
	78-87-5	1,2-Dichloropropane	2.60E-02	J	2.60E-02	J	µg/m^3	KC-RP-041	1 / 1	-	2.60E-02	7.60E-02	c	NO	BSL
	74-83-9	Bromomethane	5.60E-02	J	5.60E-02	J	µg/m^3	KC-RP-041	1 / 1	-	5.60E-02	5.20E-01	n	NO	BSL
	56-23-5	Carbon tetrachloride	7.50E-01	J	7.50E-01	J	µg/m^3	KC-RP-041	1 / 1	-	7.50E-01	4.70E-01	c	YES	ASL
	124-48-1	Chlorodibromomethane	1.50E-02	J	1.50E-02	J	µg/m^3	KC-RP-041	1 / 1	-	1.50E-02	NA		NO	NTX
	67-66-3	Chloroform	5.40E-01	J	5.40E-01	J	µg/m^3	KC-RP-041	1 / 1	-	5.40E-01	1.20E-01	c	YES	ASL
	74-87-3	Chloromethane	8.10E-01	J	8.10E-01	J	µg/m^3	KC-RP-041	1 / 1	-	8.10E-01	9.40E+00	n	NO	BSL
	156-59-2	cis-1,2-Dichloroethene	3.50E-02	J	3.50E-02	J	µg/m^3	KC-RP-041	1 / 1	-	3.50E-02	NA		NO	NTX
	75-71-8	Dichlorodifluoromethane	3.80E+00	J	3.80E+00	J	µg/m^3	KC-RP-041	1 / 1	-	3.80E+00	1.00E+01	n	NO	BSL
	75-09-2	Dichloromethane	8.40E-01	J	8.40E-01	J	µg/m^3	KC-RP-041	1 / 1	-	8.40E-01	6.30E+01	n	NO	BSL
	127-18-4	Tetrachloroethene	8.80E+00	J	8.80E+00	J	µg/m^3	KC-RP-041	1 / 1	-	8.80E+00	4.20E+00	n	YES	ASL
	156-60-5	trans-1,2-Dichloroethene	3.60E-02	J	3.60E-02	J	µg/m^3	KC-RP-041	1 / 1	-	3.60E-02	NA		NO	NTX
	79-01-6	Trichloroethene	4.00E-01	J	4.00E-01	J	µg/m^3	KC-RP-041	1 / 1	-	4.00E-01	2.10E-01	n	YES	ASL
	26523-64-8	Trichlorotrifluoroethane	8.70E-01	J	8.70E-01	J	µg/m^3	KC-RP-041	1 / 1	-	8.70E-01	5.20E+02	n	NO	BSL

TABLE 2-5
COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS
Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks
Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Scenario Timeframe: Current
Medium: Crawl Space Air (Residential Properties)
Exposure Medium: Indoor Air (Crawl Space)

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier		Maximum Concentration Qualifier		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Screening Toxicity Value (2)		Exceedance Flag	Rationale for Selection or Deletion (3)
Indoor Air (Crawl Space) (RP-42)	71-55-6	1,1,1-Trichloroethane	8.20E-01		8.20E-01		µg/m^3	KC-RP-042	1 / 1	-	8.20E-01	5.20E+02	n	NO	BSL
	107-06-2	1,2-Dichloroethane	9.30E-02		9.30E-02		µg/m^3	KC-RP-042	1 / 1	-	9.30E-02	1.10E-01	c	NO	BSL
	78-87-5	1,2-Dichloropropane	2.10E-02	J	2.10E-02	J	µg/m^3	KC-RP-042	1 / 1	-	2.10E-02	7.60E-02	c	NO	BSL
	56-23-5	Carbon tetrachloride	8.00E-01	J	8.00E-01	J	µg/m^3	KC-RP-042	1 / 1	-	8.00E-01	4.70E-01	c	YES	ASL
	67-66-3	Chloroform	1.10E+00		1.10E+00		µg/m^3	KC-RP-042	1 / 1	-	1.10E+00	1.20E-01	c	YES	ASL
	74-87-3	Chloromethane	4.60E-01	J	4.60E-01	J	µg/m^3	KC-RP-042	1 / 1	-	4.60E-01	9.40E+00	n	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.70E+00		2.70E+00		µg/m^3	KC-RP-042	1 / 1	-	2.70E+00	1.00E+01	n	NO	BSL
	75-09-2	Dichloromethane	4.30E-01		4.30E-01		µg/m^3	KC-RP-042	1 / 1	-	4.30E-01	6.30E+01	n	NO	BSL
	127-18-4	Tetrachloroethene	7.80E+00		7.80E+00		µg/m^3	KC-RP-042	1 / 1	-	7.80E+00	4.20E+00	n	YES	ASL
	79-01-6	Trichloroethene	5.00E-01	J	5.00E-01	J	µg/m^3	KC-RP-042	1 / 1	-	5.00E-01	2.10E-01	n	YES	ASL
	26523-64-8	Trichlorotrifluoroethane	5.70E-01		5.70E-01		µg/m^3	KC-RP-042	1 / 1	-	5.70E-01	5.20E+02	n	NO	BSL

Notes:

(1) Maximum concentration is used for screening.

(2) Regional Screening Levels for Residential Air (June 2017). Concentrations based on non-carcinogenic health effects are based on HQ=0.1.
RSL for 1,1,2-trichloro-1,2,2-trifluoroethane used as a surrogate for trichlorotrifluoroethane.

(3) Rationale Codes:
Above Screening Levels (ASL)
Below Screening Level (BSL)
No Toxicity Value Available (NTX)

RP = Residential Property
c = carcinogenic
HQ = hazard quotient
J = compound was detected below the reporting limit in the sample
n = noncarcinogenic
NA = not available
µg/m^3 = microgram per cubic meter

TABLE 2-6

COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Scenario Timeframe: Current/Future
Medium: Subslab soil vapor (Residential Properties)
Exposure Medium: Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration Qualifier		Maximum Concentration Qualifier		Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (1)	Background Value	Screening Toxicity Value (2)		Exceedance Flag	Rationale for Selection or Deletion (3)
Indoor Air (RP-39)	71-55-6	1,1,1-Trichloroethane	1.70E+02		1.70E+02		µg/m^3	KC-RP-039	1 / 1	-	1.70E+02	NA	1.74E+05	n	NO	BSL
	56-23-5	Carbon tetrachloride	3.70E+01	J	3.70E+01	J	µg/m^3	KC-RP-039	1 / 1	-	3.70E+01	NA	1.56E+01	c	YES	ASL
	67-66-3	Chloroform	5.50E+01		5.50E+01		µg/m^3	KC-RP-039	1 / 1	-	5.50E+01	NA	4.07E+00	c	YES	ASL
	127-18-4	Tetrachloroethene	7.70E+03		7.70E+03		µg/m^3	KC-RP-039	1 / 1	-	7.70E+03	NA	3.60E+02	c	YES	ASL
	79-01-6	Trichloroethene	2.60E+02		2.60E+02		µg/m^3	KC-RP-039	1 / 1	-	2.60E+02	NA	1.59E+01	c	YES	ASL
Indoor Air (RP-42)	71-55-6	1,1,1-Trichloroethane	1.30E+02		1.30E+02		µg/m^3	KC-RP-042	1 / 1	-	1.30E+02	NA	1.74E+05	n	NO	BSL
	75-35-4	1,1-Dichloroethene	5.40E-01	J	5.40E-01	J	µg/m^3	KC-RP-042	1 / 1	-	5.40E-01	NA	6.95E+03	n	NO	BSL
	75-27-4	Bromodichloromethane	3.20E-01	J	3.20E-01	J	µg/m^3	KC-RP-042	1 / 1	-	3.20E-01	NA	2.53E+00	c	NO	BSL
	74-83-9	Bromomethane	5.50E-01	J	5.50E-01	J	µg/m^3	KC-RP-042	1 / 1	-	5.50E-01	NA	1.74E+02	n	NO	BSL
	56-23-5	Carbon tetrachloride	4.90E+01		4.90E+01		µg/m^3	KC-RP-042	1 / 1	-	4.90E+01	NA	1.56E+01	c	YES	ASL
	67-66-3	Chloroform	1.50E+02		1.50E+02		µg/m^3	KC-RP-042	1 / 1	-	1.50E+02	NA	4.07E+00	c	YES	ASL
	74-87-3	Chloromethane	4.40E-01	J	4.40E-01	J	µg/m^3	KC-RP-042	1 / 1	-	4.40E-01	NA	3.13E+03	n	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.00E+00		2.00E+00		µg/m^3	KC-RP-042	1 / 1	-	2.00E+00	NA	3.48E+03	n	NO	BSL
	127-18-4	Tetrachloroethene	7.60E+02		7.60E+02		µg/m^3	KC-RP-042	1 / 1	-	7.60E+02	NA	3.60E+02	c	YES	ASL
	79-01-6	Trichloroethene	8.70E+01		8.70E+01		µg/m^3	KC-RP-042	1 / 1	-	8.70E+01	NA	1.59E+01	c	YES	ASL
	26523-64-8	Trichlorotrifluoroethane	4.60E-01	J	4.60E-01	J	µg/m^3	KC-RP-042	1 / 1	-	4.60E-01	NA	1.74E+05	n	NO	BSL
Indoor Air (RP-47)	71-55-6	1,1,1-Trichloroethane	3.90E+01		3.90E+01		µg/m^3	KC-RP-047	1 / 1	-	3.90E+01	NA	1.74E+05	n	NO	BSL
	56-23-5	Carbon tetrachloride	6.60E-01	J	6.60E-01	J	µg/m^3	KC-RP-047	1 / 1	-	6.60E-01	NA	1.56E+01	c	NO	BSL
	67-66-3	Chloroform	4.90E+00		4.90E+00		µg/m^3	KC-RP-047	1 / 1	-	4.90E+00	NA	4.07E+00	c	YES	ASL
	75-71-8	Dichlorodifluoromethane	2.10E+00		2.10E+00		µg/m^3	KC-RP-047	1 / 1	-	2.10E+00	NA	3.48E+03	n	NO	BSL
	75-09-2	Dichloromethane	1.20E+00		1.20E+00		µg/m^3	KC-RP-047	1 / 1	-	1.20E+00	NA	3.38E+03	c	NO	BSL
	127-18-4	Tetrachloroethene	9.50E+01		9.50E+01		µg/m^3	KC-RP-047	1 / 1	-	9.50E+01	NA	3.60E+02	c	NO	BSL
	79-01-6	Trichloroethene	3.30E+01		3.30E+01		µg/m^3	KC-RP-047	1 / 1	-	3.30E+01	NA	1.59E+01	c	YES	ASL
	26523-64-8	Trichlorotrifluoroethane	4.00E-01	J	4.00E-01	J	µg/m^3	KC-RP-047	1 / 1	-	4.00E-01	NA	1.74E+05	n	NO	BSL
Indoor Air (RP-62)	71-55-6	1,1,1-Trichloroethane	3.00E+01		3.00E+01		µg/m^3	KC-RP-062	1 / 1	-	3.00E+01	NA	1.74E+05	n	NO	BSL
	67-66-3	Chloroform	1.50E+00		1.50E+00		µg/m^3	KC-RP-062	1 / 1	-	1.50E+00	NA	4.07E+00	c	NO	BSL
	75-71-8	Dichlorodifluoromethane	2.20E+00		2.20E+00		µg/m^3	KC-RP-062	1 / 1	-	2.20E+00	NA	3.48E+03	n	NO	BSL
	127-18-4	Tetrachloroethene	3.10E+02		3.10E+02		µg/m^3	KC-RP-062	1 / 1	-	3.10E+02	NA	3.60E+02	c	NO	BSL
	79-01-6	Trichloroethene	9.20E+00		9.20E+00		µg/m^3	KC-RP-062	1 / 1	-	9.20E+00	NA	1.59E+01	c	NO	BSL
	26523-64-8	Trichlorotrifluoroethane	4.30E-01	J	4.30E-01	J	µg/m^3	KC-RP-062	1 / 1	-	4.30E-01	NA	1.74E+05	n	NO	BSL

Notes:

(1) Maximum concentration is used for screening.

(2) Residential soil vapor Vapor Intrusion Screening Level (June 2017). Concentrations based on non-carcinogenic health effects are based on HQ=1.
RSL for 1,1,2-trichloro-1,2,2-trifluoroethane used as a surrogate for trichlorotrifluoroethane.

(3) Rationale Codes:
Above Screening Levels (ASL)
Below Screening Level (BSL)
No Toxicity Value Available (NTX)

RP = Residential Property
HQ = hazard quotient
J = compound was detected below the reporting limit in the sample
c = carcinogenic
n = noncarcinogenic
NA = not available
µg/m^3 = microgram per cubic meter

TABLE 2-7

COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Shallow Groundwater Sample ID	Chemical	Result	Qualifier	Units	Commercial GW VISLs	Exceedance Flag	Residential GW VISLs	Exceedance Flag
KC-GA-GW-007-15-20-043016	Benzene	4.10E-01	J	µg/L	1.03E+01	NO	2.36E+00	NO
KC-GA-GW-007-15-20-043016	cis-1,2-Dichloroethene	4.40E+01	=	µg/L	NA	NO	NA	NO
KC-GA-GW-007-15-20-043016	Tetrachloroethene	9.90E+02	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-GA-GW-007-15-20-043016	Toluene	9.00E-01	J	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-007-15-20-043016	Trichloroethene	7.00E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-GA-GW-008-14-19-051015	cis-1,2-Dichloroethene	2.20E+02	=	µg/L	NA	NO	NA	NO
KC-GA-GW-008-14-19-051015	Tetrachloroethene	8.90E+03	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-GA-GW-008-14-19-051015	Trichloroethene	4.80E+02	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-GA-GW-012-15-20-050216	1,1-Dichloroethene	1.70E+00	=	µg/L	1.12E+03	NO	2.68E+02	NO
KC-GA-GW-012-15-20-050216	cis-1,2-Dichloroethene	4.90E+02	=	µg/L	NA	NO	NA	NO
KC-GA-GW-012-15-20-050216	Tetrachloroethene	2.50E+02	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-GA-GW-012-15-20-050216	Toluene	1.00E+00	=	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-012-15-20-050216	trans-1,2-Dichloroethene	2.80E+00	=	µg/L	NA	NO	NA	NO
KC-GA-GW-012-15-20-050216	Trichloroethene	1.10E+02	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-GA-GW-012-15-20-050216	Vinyl Chloride	1.40E+00	=	µg/L	3.13E+00	NO	1.88E-01	YES
KC-GA-GW-013-18-23-041816	cis-1,2-Dichloroethene	6.90E+02	=	µg/L	NA	NO	NA	NO
KC-GA-GW-013-18-23-041816	Tetrachloroethene	1.80E+03	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-GA-GW-013-18-23-041816	Trichloroethene	5.30E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-GA-GW-014-21-26-041216	Chloroform	6.00E+00	=	µg/L	5.15E+00	YES	1.18E+00	YES
KC-GA-GW-014-21-26-041216	Tetrachloroethene	7.70E+02	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-GA-GW-014-21-26-041216	Trichloroethene	3.80E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-GA-GW-015-26-31-040516	1,1,1-Trichloroethane	3.10E+00	J	µg/L	4.59E+04	NO	1.09E+04	NO
KC-GA-GW-015-26-31-040516	Chloroform	1.30E+01	=	µg/L	5.15E+00	YES	1.18E+00	YES
KC-GA-GW-015-26-31-040516	Tetrachloroethene	1.10E+03	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-GA-GW-015-26-31-040516	Trichloroethene	2.60E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-GA-GW-016-15-20-033016	Tetrachloroethene	2.60E+01	=	µg/L	1.04E+02	NO	2.39E+01	YES
KC-GA-GW-016-15-20-033016	Toluene	3.50E-01	J	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-017-17-22-051716	Chloroform	2.70E+00	=	µg/L	5.15E+00	NO	1.18E+00	YES
KC-GA-GW-017-17-22-051716	cis-1,2-Dichloroethene	3.90E+00	=	µg/L	NA	NO	NA	NO
KC-GA-GW-017-17-22-051716	Tetrachloroethene	2.20E+02	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-GA-GW-017-17-22-051716	Toluene	2.80E+00	=	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-017-17-22-051716	Trichloroethene	2.30E+00	=	µg/L	1.13E+01	NO	1.81E+00	YES
KC-GA-GW-018-30-35-051916	Chloroform	3.30E+00	=	µg/L	5.15E+00	NO	1.18E+00	YES
KC-GA-GW-018-30-35-051916	Toluene	1.30E+00	=	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-019-28-33-050416	Chloroform	1.70E+00	=	µg/L	5.15E+00	NO	1.18E+00	YES
KC-GA-GW-019-28-33-050416	cis-1,2-Dichloroethene	9.20E-01	J	µg/L	NA	NO	NA	NO
KC-GA-GW-019-28-33-050416	Tetrachloroethene	3.30E+02	=	µg/L	1.04E+02	YES	2.39E+01	YES

TABLE 2-7

COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Shallow Groundwater Sample ID	Chemical	Result	Qualifier	Units	Commercial GW VISLs	Exceedance Flag	Residential GW VISLs	Exceedance Flag
KC-GA-GW-019-28-33-050416	Toluene	5.40E-01	J	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-019-28-33-050416	Trichloroethene	2.10E+00	=	µg/L	1.13E+01	NO	1.81E+00	YES
KC-GA-GW-020-33-38-043016	1,1,1-Trichloroethane	5.80E+00	=	µg/L	4.59E+04	NO	1.09E+04	NO
KC-GA-GW-020-33-38-043016	Bromodichloromethane	2.00E+00	=	µg/L	5.86E+00	NO	1.34E+00	YES
KC-GA-GW-020-33-38-043016	Chloroform	1.00E+01	=	µg/L	5.15E+00	YES	1.18E+00	YES
KC-GA-GW-020-33-38-043016	cis-1,2-Dichloroethene	2.90E+00	=	µg/L	NA	NO	NA	NO
KC-GA-GW-020-33-38-043016	Tetrachloroethene	5.10E+02	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-GA-GW-020-33-38-043016	Toluene	1.20E+00	=	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-020-33-38-043016	Trichloroethene	2.10E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-GA-GW-024-34-39-052016	Benzene	3.60E-01	J	µg/L	1.03E+01	NO	2.36E+00	NO
KC-GA-GW-024-34-39-052016	Toluene	1.30E+00	=	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-025-33-38-050916	1,1,1-Trichloroethane	2.10E+01	=	µg/L	4.59E+04	NO	1.09E+04	NO
KC-GA-GW-025-33-38-050916	1,1-Dichloroethane	2.30E+00	=	µg/L	4.81E+01	NO	1.10E+01	NO
KC-GA-GW-025-33-38-050916	Chloroform	3.70E+00	=	µg/L	5.15E+00	NO	1.18E+00	YES
KC-GA-GW-025-33-38-050916	cis-1,2-Dichloroethene	3.30E+00	=	µg/L	NA	NO	NA	NO
KC-GA-GW-025-33-38-050916	Tetrachloroethene	6.00E+01	=	µg/L	1.04E+02	NO	2.39E+01	YES
KC-GA-GW-025-33-38-050916	Toluene	1.20E+00	=	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-025-33-38-050916	Trichloroethene	7.70E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-GA-GW-026-27-32-042916	1,1,1-Trichloroethane	1.10E+01	=	µg/L	4.59E+04	NO	1.09E+04	NO
KC-GA-GW-026-27-32-042916	1,1-Dichloroethane	1.00E+00	=	µg/L	4.81E+01	NO	1.10E+01	NO
KC-GA-GW-026-27-32-042916	Chloroform	9.20E+00	=	µg/L	5.15E+00	YES	1.18E+00	YES
KC-GA-GW-026-27-32-042916	cis-1,2-Dichloroethene	1.10E+00	=	µg/L	NA	NO	NA	NO
KC-GA-GW-026-27-32-042916	Tetrachloroethene	1.80E+01	=	µg/L	1.04E+02	NO	2.39E+01	NO
KC-GA-GW-026-27-32-042916	Toluene	2.90E-01	J	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-026-27-32-042916	Trichloroethene	2.30E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-GA-GW-027-35-40-042716	Benzene	2.80E-01	J	µg/L	1.03E+01	NO	2.36E+00	NO
KC-GA-GW-027-35-40-042716	cis-1,2-Dichloroethene	1.00E+00	=	µg/L	NA	NO	NA	NO
KC-GA-GW-027-35-40-042716	Ethylbenzene	2.30E-01	J	µg/L	2.51E+01	NO	5.75E+00	NO
KC-GA-GW-027-35-40-042716	Toluene	8.20E-01	J	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-028-31-36-042716	Bromodichloromethane	1.10E+00	=	µg/L	5.86E+00	NO	1.34E+00	NO
KC-GA-GW-028-31-36-042716	Chloroform	6.30E+00	=	µg/L	5.15E+00	YES	1.18E+00	YES
KC-GA-GW-028-31-36-042716	Toluene	5.00E+00	=	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-030-8-13-051616	Benzene	2.60E-01	J	µg/L	1.03E+01	NO	2.36E+00	NO
KC-GA-GW-030-8-13-051616	Chloroform	2.90E+00	=	µg/L	5.15E+00	NO	1.18E+00	YES
KC-GA-GW-030-8-13-051616	cis-1,2-Dichloroethene	6.70E+00	=	µg/L	NA	NO	NA	NO
KC-GA-GW-030-8-13-051616	Tetrachloroethene	5.10E+01	=	µg/L	1.04E+02	NO	2.39E+01	YES
KC-GA-GW-030-8-13-051616	Toluene	9.20E-01	J	µg/L	1.27E+05	NO	3.01E+04	NO

TABLE 2-7

COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Shallow Groundwater Sample ID	Chemical	Result	Qualifier	Units	Commercial GW VISLs	Exceedance Flag	Residential GW VISLs	Exceedance Flag
KC-GA-GW-030-8-13-051616	Trichloroethene	3.40E+00	=	µg/L	1.13E+01	NO	1.81E+00	YES
KC-GA-GW-031-19-24-042516	Bromodichloromethane	1.10E+00	=	µg/L	5.86E+00	NO	1.34E+00	NO
KC-GA-GW-031-19-24-042516	Chloroform	5.40E+00	=	µg/L	5.15E+00	YES	1.18E+00	YES
KC-GA-GW-031-19-24-042516	Toluene	1.00E+00	=	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-036-19-24-051616	cis-1,2-Dichloroethene	2.00E+00	=	µg/L	NA	NO	NA	NO
KC-GA-GW-036-19-24-051616	Tetrachloroethene	1.40E+02	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-GA-GW-036-19-24-051616	Toluene	5.50E-01	J	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-036-19-24-051616	Trichloroethene	1.90E+00	=	µg/L	1.13E+01	NO	1.81E+00	YES
KC-GA-GW-037-30-35-051816	Carbon Disulfide	3.90E-01	J	µg/L	7.24E+03	NO	1.72E+03	NO
KC-GA-GW-037-30-35-051816	Toluene	6.50E-01	J	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-038-29-34-051916	Toluene	6.60E-01	J	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-045-37-42-060716	cis-1,2-Dichloroethene	6.50E+00	=	µg/L	NA	NO	NA	NO
KC-GA-GW-045-37-42-060716	Toluene	4.70E-01	J	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-045-37-42-060716	Trichloroethene	3.40E+00	J	µg/L	1.13E+01	NO	1.81E+00	YES
KC-GA-GW-048-18-23-060916	Ethylbenzene	2.80E-01	J	µg/L	2.51E+01	NO	5.75E+00	NO
KC-GA-GW-048-18-23-060916	Toluene	8.40E-01	J	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-049-17-22-061616	Benzene	3.40E-01	J	µg/L	1.03E+01	NO	2.36E+00	NO
KC-GA-GW-049-17-22-061616	Chloroform	7.10E-01	J	µg/L	5.15E+00	NO	1.18E+00	NO
KC-GA-GW-049-17-22-061616	Tetrachloroethene	8.50E+00	=	µg/L	1.04E+02	NO	2.39E+01	NO
KC-GA-GW-049-17-22-061616	Toluene	7.50E-01	J	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-050-24-29-060716	Tetrachloroethene	1.00E+00	=	µg/L	1.04E+02	NO	2.39E+01	NO
KC-GA-GW-050-24-29-060716	Toluene	4.90E-01	J	µg/L	1.27E+05	NO	3.01E+04	NO
KC-GA-GW-051-10-15-061516	1,2,4-Trimethylbenzene	1.10E+00	=	µg/L	1.86E+03	NO	4.42E+02	NO
KC-GA-GW-051-10-15-061516	1,2-Dichlorobenzene	3.70E-01	J	µg/L	1.98E+04	NO	4.73E+03	NO
KC-GA-GW-051-10-15-061516	1,3,5-Trimethylbenzene	1.40E-01	J	µg/L	NA	NO	NA	NO
KC-GA-GW-051-10-15-061516	cis-1,2-Dichloroethene	1.90E+00	=	µg/L	NA	NO	NA	NO
KC-GA-GW-051-10-15-061516	Ethylbenzene	4.50E-01	J	µg/L	2.51E+01	NO	5.75E+00	NO
KC-GA-GW-051-10-15-061516	Isopropylbenzene	3.60E-01	J	µg/L	6.94E+03	NO	1.65E+03	NO
KC-GA-GW-051-10-15-061516	Tetrachloroethene	9.40E+01	=	µg/L	1.04E+02	NO	2.39E+01	YES
KC-GA-GW-051-10-15-061516	Trichloroethylene	1.70E+00	=	µg/L	1.13E+01	NO	1.81E+00	NO
KC-GA-GW-052- 12-17-061716	Bromodichloromethane	1.20E+00	=	µg/L	5.86E+00	NO	1.34E+00	NO
KC-GA-GW-052- 12-17-061716	Chloroform	4.80E+00	=	µg/L	5.15E+00	NO	1.18E+00	YES
KC-GA-GW-052- 12-17-061716	Toluene	6.10E-01	J	µg/L	1.27E+05	NO	3.01E+04	NO
KC-IC-GW-035-19-24-051216	Tetrachloroethene	9.60E+00	=	µg/L	1.04E+02	NO	2.39E+01	NO
KC-IC-GW-035-19-24-051216	Toluene	7.90E-01	J	µg/L	1.27E+05	NO	3.01E+04	NO
KC-LW-GW-032-12-17-041916	Acetone	5.40E+00	J	µg/L	1.37E+08	NO	3.27E+07	NO
KC-LW-GW-032-12-17-041916	Benzene	4.30E-01	J	µg/L	1.03E+01	NO	2.36E+00	NO

TABLE 2-7

COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Shallow Groundwater Sample ID	Chemical	Result	Qualifier	Units	Commercial GW VISLs	Exceedance Flag	Residential GW VISLs	Exceedance Flag
KC-LW-GW-032-12-17-041916	Cyclohexane	4.80E-01	J	µg/L	6.34E+03	NO	1.51E+03	NO
KC-LW-GW-032-12-17-041916	Ethylbenzene	3.60E-01	J	µg/L	2.51E+01	NO	5.75E+00	NO
KC-LW-GW-032-12-17-041916	Methylcyclohexane	6.80E-01	J	µg/L	6.09E+01	NO	1.45E+01	NO
KC-LW-GW-032-12-17-041916	Toluene	1.20E+00	=	µg/L	1.27E+05	NO	3.01E+04	NO
KC-LW-GW-032-12-17-041916	Xylenes, Total	8.60E-01	J	µg/L	2.68E+03	NO	6.37E+02	NO
KC-LW-GW-032-19-24-041916	Chloroform	9.70E-01	J	µg/L	5.15E+00	NO	1.18E+00	NO
KC-LW-GW-033-13-18-042516	Tetrachloroethene	2.40E+01	J-	µg/L	1.04E+02	NO	2.39E+01	YES
KC-LW-GW-033-13-18-042516	Toluene	7.00E-01	J-	µg/L	1.27E+05	NO	3.01E+04	NO
KC-LW-GW-034-20-25-042016	Benzene	3.00E-01	J	µg/L	1.03E+01	NO	2.36E+00	NO
KC-LW-GW-034-20-25-042016	Methylcyclohexane	4.90E-01	J	µg/L	6.09E+01	NO	1.45E+01	NO
KC-LW-GW-034-20-25-042016	Tetrachloroethene	3.20E+00	=	µg/L	1.04E+02	NO	2.39E+01	NO
KC-LW-GW-034-20-25-042016	Toluene	7.70E-01	J	µg/L	1.27E+05	NO	3.01E+04	NO
KC-LW-MW-1-062116	Chloride (Cl)	6.80E+04	=	µg/L	NA	NO	NA	NO
KC-LW-MW-12-062116	Chloroform	5.00E-01	J	µg/L	5.15E+00	NO	1.18E+00	NO
KC-LW-MW-12-062116	Tetrachloroethene	1.80E+00	=	µg/L	1.04E+02	NO	2.39E+01	NO
KC-LW-MW-3-030116	Tetrachloroethene	8.80E+02	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-LW-MW-4-062116	Tetrachloroethene	4.10E+00	=	µg/L	1.04E+02	NO	2.39E+01	NO
KC-LW-MW-6-062216	cis-1,2-Dichloroethene	3.00E+00	=	µg/L	NA	NO	NA	NO
KC-LW-MW-6-062216	Tetrachloroethene	2.70E+02	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-LW-MW-6-062216	Trichloroethene	1.60E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-LW-MW-7-030116	Tetrachloroethene	4.10E+00	=	µg/L	1.04E+02	NO	2.39E+01	NO
KC-LW-MW-8R-062316	Chloride (Cl)	2.50E+04	=	µg/L	NA	NO	NA	NO
KC-LW-MW-8R-062316	Tetrachloroethene	1.30E+01	=	µg/L	1.04E+02	NO	2.39E+01	NO
KC-LW-MW-9-062316	Chloride (Cl)	3.50E+04	=	µg/L	NA	NO	NA	NO
KC-MW-101-S-062116	Chloride (Cl)	2.00E+05	=	µg/L	NA	NO	NA	NO
KC-MW-102-S-062216	Chloride (Cl)	1.30E+05	=	µg/L	NA	NO	NA	NO
KC-MW-102-S-062216	cis-1,2-Dichloroethene	1.40E+00	=	µg/L	NA	NO	NA	NO
KC-MW-104-S-062216	Chloride (Cl)	7.40E+04	=	µg/L	NA	NO	NA	NO
KC-MW-104-S-062216	cis-1,2-Dichloroethene	7.70E+00	=	µg/L	NA	NO	NA	NO
KC-MW-104-S-062216	Tetrachloroethene	1.40E+01	=	µg/L	1.04E+02	NO	2.39E+01	NO
KC-MW-104-S-062216	Trichloroethene	3.10E+00	=	µg/L	1.13E+01	NO	1.81E+00	YES
KC-MW-105-S-062216	Chloride (Cl)	2.00E+05	=	µg/L	NA	NO	NA	NO
KC-MW-106-S-062216	1,1,1-Trichloroethane	5.10E+00	=	µg/L	4.59E+04	NO	1.09E+04	NO
KC-MW-106-S-062216	Chloride (Cl)	1.50E+05	=	µg/L	NA	NO	NA	NO
KC-MW-106-S-062216	Chloroform	8.40E-01	J	µg/L	5.15E+00	NO	1.18E+00	NO
KC-MW-106-S-062216	cis-1,2-Dichloroethene	5.10E+00	=	µg/L	NA	NO	NA	NO
KC-MW-106-S-062216	Tetrachloroethene	1.90E+03	=	µg/L	1.04E+02	YES	2.39E+01	YES

TABLE 2-7

COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Shallow Groundwater Sample ID	Chemical	Result	Qualifier	Units	Commercial GW VISLs	Exceedance Flag	Residential GW VISLs	Exceedance Flag
KC-MW-106-S-062216	Trichloroethene	7.30E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-MW-107-S-062216	Chloride (Cl)	1.50E+05	=	µg/L	NA	NO	NA	NO
KC-MW-109-S-062316	Chloride (Cl)	6.80E+04	=	µg/L	NA	NO	NA	NO
KC-MW-109-S-062316	Chloroform	3.20E+00	=	µg/L	5.15E+00	NO	1.18E+00	YES
KC-MW-109-S-062316	Trichloroethene	2.00E+00	=	µg/L	1.13E+01	NO	1.81E+00	YES
KC-MW-110-S-062316	Chloride (Cl)	2.00E+04	=	µg/L	NA	NO	NA	NO
KC-MW-111-S-062316	Chloride (Cl)	2.40E+05	=	µg/L	NA	NO	NA	NO
KC-PP-GW-009-19-24-042916	1,1,1-Trichloroethane	1.40E+01	J	µg/L	4.59E+04	NO	1.09E+04	NO
KC-PP-GW-009-19-24-042916	Chloroform	2.90E+00	=	µg/L	5.15E+00	NO	1.18E+00	YES
KC-PP-GW-009-19-24-042916	cis-1,2-Dichloroethene	3.90E+00	=	µg/L	NA	NO	NA	NO
KC-PP-GW-009-19-24-042916	Tetrachloroethene	1.20E+03	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-PP-GW-009-19-24-042916	Trichloroethene	9.00E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-PP-GW-010-21-26-041616	cis-1,2-Dichloroethene	1.40E+02	=	µg/L	NA	NO	NA	NO
KC-PP-GW-010-21-26-041616	Tetrachloroethene	4.10E+03	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-PP-GW-010-21-26-041616	Trichloroethene	2.50E+02	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-PP-GW-011-18-23-043016	Benzene	3.40E-01	J	µg/L	1.03E+01	NO	2.36E+00	NO
KC-PP-GW-011-18-23-043016	Chloroform	1.00E+00	=	µg/L	5.15E+00	NO	1.18E+00	NO
KC-PP-GW-011-18-23-043016	cis-1,2-Dichloroethene	4.10E+00	=	µg/L	NA	NO	NA	NO
KC-PP-GW-011-18-23-043016	Tetrachloroethene	2.00E+03	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-PP-GW-011-18-23-043016	Toluene	1.10E+00	=	µg/L	1.27E+05	NO	3.01E+04	NO
KC-PP-GW-011-18-23-043016	Trichloroethene	5.60E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-PP-MW-1-030316	1,1,1-Trichloroethane	1.80E+01	=	µg/L	4.59E+04	NO	1.09E+04	NO
KC-PP-MW-1-030316	cis-1,2-Dichloroethene	1.40E+01	=	µg/L	NA	NO	NA	NO
KC-PP-MW-1-030316	Tetrachloroethene	1.50E+03	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-PP-MW-1-030316	Trichloroethene	9.70E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-PP-MW-2-030316	cis-1,2-Dichloroethene	3.40E+02	=	µg/L	NA	NO	NA	NO
KC-PP-MW-2-030316	Tetrachloroethene	5.90E+03	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-PP-MW-2-030316	Trichloroethene	6.40E+02	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-PP-MW-3-062416	1,1,1-Trichloroethane	6.50E+00	=	µg/L	4.59E+04	NO	1.09E+04	NO
KC-PP-MW-3-062416	cis-1,2-Dichloroethene	1.30E+01	=	µg/L	NA	NO	NA	NO
KC-PP-MW-3-062416	Tetrachloroethene	7.70E+02	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-PP-MW-3-062416	Trichloroethene	5.70E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-PP-MW-4-062416	cis-1,2-Dichloroethene	5.20E+00	=	µg/L	NA	NO	NA	NO
KC-PP-MW-4-062416	Tetrachloroethene	6.00E+02	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-PP-MW-4-062416	Trichloroethene	2.10E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-PP-MW-5-030316	cis-1,2-Dichloroethene	7.10E+00	=	µg/L	NA	NO	NA	NO
KC-PP-MW-5-030316	Tetrachloroethene	5.10E+02	=	µg/L	1.04E+02	YES	2.39E+01	YES

TABLE 2-7

COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Shallow Groundwater Sample ID	Chemical	Result	Qualifier	Units	Commercial GW VISLs	Exceedance Flag	Residential GW VISLs	Exceedance Flag
KC-PP-MW-5-030316	Trichloroethene	3.60E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-TC-GW-001-17-22-040516	Tetrachloroethene	6.30E+03	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-TC-GW-002-18-23-041216	Benzene	3.70E+00	J	µg/L	1.03E+01	NO	2.36E+00	YES
KC-TC-GW-002-18-23-041216	Ethylbenzene	4.70E+00	J	µg/L	2.51E+01	NO	5.75E+00	NO
KC-TC-GW-002-18-23-041216	Tetrachloroethene	2.30E+03	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-TC-GW-002-18-23-041216	Trichloroethene	8.90E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-TC-GW-002-18-23-041216	Xylenes, Total	9.30E+00	J	µg/L	2.68E+03	NO	6.37E+02	NO
KC-TC-GW-003-19-24-041416	Acetone	6.60E+00	J	µg/L	1.37E+08	NO	3.27E+07	NO
KC-TC-GW-003-19-24-041416	Benzene	1.10E+00	=	µg/L	1.03E+01	NO	2.36E+00	NO
KC-TC-GW-003-19-24-041416	Chloroform	6.60E-01	J	µg/L	5.15E+00	NO	1.18E+00	NO
KC-TC-GW-003-19-24-041416	Ethylbenzene	4.20E-01	J	µg/L	2.51E+01	NO	5.75E+00	NO
KC-TC-GW-003-19-24-041416	Tetrachloroethene	1.60E+01	=	µg/L	1.04E+02	NO	2.39E+01	NO
KC-TC-GW-003-19-24-041416	Toluene	2.00E+00	=	µg/L	1.27E+05	NO	3.01E+04	NO
KC-TC-GW-003-19-24-041416	Xylenes, Total	1.20E+00	J	µg/L	2.68E+03	NO	6.37E+02	NO
KC-TC-MW-11-022916	1,1,2-Trichloroethane	9.00E+00	=	µg/L	3.65E+01	NO	8.35E+00	YES
KC-TC-MW-11-022916	1,2-Dichlorobenzene	4.00E-01	J	µg/L	1.98E+04	NO	4.73E+03	NO
KC-TC-MW-11-022916	cis-1,2-Dichloroethene	8.80E+01	=	µg/L	NA	NO	NA	NO
KC-TC-MW-11-022916	Tetrachloroethene	7.50E+01	=	µg/L	1.04E+02	NO	2.39E+01	YES
KC-TC-MW-11-022916	Trichloroethene	1.20E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-TC-MW-11-022916	Vinyl Chloride	8.60E-01	J	µg/L	3.13E+00	NO	1.88E-01	YES
KC-TC-MW-12-062416	Tetrachloroethene	1.90E+01	=	µg/L	1.04E+02	NO	2.39E+01	NO
KC-TC-MW-13-030216	cis-1,2-Dichloroethene	1.70E+02	=	µg/L	NA	NO	NA	NO
KC-TC-MW-13-030216	Tetrachloroethene	3.80E+03	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-TC-MW-13-030216	Trichloroethene	3.20E+02	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-TC-MW-14-030216	1,1-Dichloroethene	2.50E+00	=	µg/L	1.12E+03	NO	2.68E+02	NO
KC-TC-MW-14-030216	cis-1,2-Dichloroethene	5.70E+02	=	µg/L	NA	NO	NA	NO
KC-TC-MW-14-030216	Tetrachloroethene	4.30E+02	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-TC-MW-14-030216	trans-1,2-Dichloroethene	2.70E+00	=	µg/L	NA	NO	NA	NO
KC-TC-MW-14-030216	Trichloroethene	2.10E+02	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-TC-MW-14-030216	Vinyl Chloride	6.80E+00	=	µg/L	3.13E+00	YES	1.88E-01	YES
KC-TC-MW-16-062416	Tetrachloroethene	2.80E+00	=	µg/L	1.04E+02	NO	2.39E+01	NO
KC-TC-MW-3-030216	cis-1,2-Dichloroethene	1.60E+00	=	µg/L	NA	NO	NA	NO
KC-TC-MW-3-030216	Tetrachloroethene	9.60E+01	=	µg/L	1.04E+02	NO	2.39E+01	YES
KC-TC-MW-3-030216	Trichloroethylene	1.10E+00	=	µg/L	1.13E+01	NO	1.81E+00	NO
KC-TC-MW-6-030216	Tetrachloroethene	1.70E+01	=	µg/L	1.04E+02	NO	2.39E+01	NO
KC-TC-MW-9-022916	1,1-Dichloroethene	7.20E+00	=	µg/L	1.12E+03	NO	2.68E+02	NO
KC-TC-MW-9-022916	1,2-Dichlorobenzene	3.80E-01	J	µg/L	1.98E+04	NO	4.73E+03	NO

TABLE 2-7

COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Shallow Groundwater Sample ID	Chemical	Result	Qualifier	Units	Commercial GW VISLs	Exceedance Flag	Residential GW VISLs	Exceedance Flag
KC-TC-MW-9-022916	Chlorobenzene	3.40E-01	J	µg/L	2.79E+03	NO	6.65E+02	NO
KC-TC-MW-9-022916	cis-1,2-Dichloroethene	1.00E+03	=	µg/L	NA	NO	NA	NO
KC-TC-MW-9-022916	Tetrachloroethene	3.50E+02	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-TC-MW-9-022916	trans-1,2-Dichloroethene	5.00E+00	=	µg/L	NA	NO	NA	NO
KC-TC-MW-9-022916	Trichloroethene	2.70E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-TC-MW-9-022916	Vinyl Chloride	7.80E+01	=	µg/L	3.13E+00	YES	1.88E-01	YES
KC-TT-GW-004-21-26-040316	Benzene	3.20E-01	J	µg/L	1.03E+01	NO	2.36E+00	NO
KC-TT-GW-004-21-26-040316	cis-1,2-Dichloroethene	3.40E+01	=	µg/L	NA	NO	NA	NO
KC-TT-GW-004-21-26-040316	Tetrachloroethene	1.10E+03	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-TT-GW-004-21-26-040316	Toluene	5.00E-01	J	µg/L	1.27E+05	NO	3.01E+04	NO
KC-TT-GW-004-21-26-040316	Trichloroethene	7.90E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-TT-GW-004-21-26-040316	Vinyl Chloride	2.70E+00	=	µg/L	3.13E+00	NO	1.88E-01	YES
KC-TT-GW-005-23-28-041716	cis-1,2-Dichloroethene	2.70E+02	=	µg/L	NA	NO	NA	NO
KC-TT-GW-005-23-28-041716	Tetrachloroethene	3.30E+03	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-TT-GW-005-23-28-041716	Trichloroethene	3.50E+02	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-TT-GW-006-23-28-040316	Bromodichloromethane	1.20E+00	=	µg/L	5.86E+00	NO	1.34E+00	NO
KC-TT-GW-006-23-28-040316	Chloroform	5.10E+00	J	µg/L	5.15E+00	NO	1.18E+00	YES
KC-TT-GW-006-23-28-040316	cis-1,2-Dichloroethene	2.30E+02	J	µg/L	NA	NO	NA	NO
KC-TT-GW-006-23-28-040316	Tetrachloroethene	1.70E+03	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-TT-GW-006-23-28-040316	Toluene	8.50E-01	J	µg/L	1.27E+05	NO	3.01E+04	NO
KC-TT-GW-006-23-28-040316	trans-1,2-Dichloroethene	2.40E+00	J	µg/L	NA	NO	NA	NO
KC-TT-GW-006-23-28-040316	Trichloroethene	1.40E+02	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-TT-GW-006-23-28-040316	Vinyl Chloride	7.50E-01	J	µg/L	3.13E+00	NO	1.88E-01	YES
KC-TT-MW-1-062116	Chloride (Cl)	1.80E+05	=	µg/L	NA	NO	NA	NO
KC-TT-MW-1-062116	Chloroform	1.80E+00	=	µg/L	5.15E+00	NO	1.18E+00	YES
KC-TT-MW-1-062116	cis-1,2-Dichloroethene	1.30E+01	=	µg/L	NA	NO	NA	NO
KC-TT-MW-1-062116	Tetrachloroethene	1.10E+02	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-TT-MW-1-062116	Trichloroethene	1.00E+01	=	µg/L	1.13E+01	NO	1.81E+00	YES
KC-TT-MW-2R-022916	Bromodichloromethane	9.80E-01	J	µg/L	5.86E+00	NO	1.34E+00	NO
KC-TT-MW-2R-022916	Chloroform	2.60E+00	=	µg/L	5.15E+00	NO	1.18E+00	YES
KC-TT-MW-2R-022916	cis-1,2-Dichloroethene	1.30E+01	=	µg/L	NA	NO	NA	NO
KC-TT-MW-2R-022916	Tetrachloroethene	3.10E+02	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-TT-MW-2R-022916	Trichloroethene	9.40E+00	=	µg/L	1.13E+01	NO	1.81E+00	YES
KC-TT-MW-4-022916	cis-1,2-Dichloroethene	1.60E+01	=	µg/L	NA	NO	NA	NO
KC-TT-MW-4-022916	Tetrachloroethene	1.60E+02	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-TT-MW-4-022916	Trichloroethene	1.50E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-TT-MW-5-022916	Chloroform	1.20E+00	=	µg/L	5.15E+00	NO	1.18E+00	YES

TABLE 2-7

COMPARISON OF DETECTED CHEMICALS TO SCREENING LEVELS

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Shallow Groundwater Sample ID	Chemical	Result	Qualifier	Units	Commercial GW VISLs	Exceedance Flag	Residential GW VISLs	Exceedance Flag
KC-TT-MW-5-022916	cis-1,2-Dichloroethene	1.20E+01	=	µg/L	NA	NO	NA	NO
KC-TT-MW-5-022916	Tetrachloroethene	3.50E+02	=	µg/L	1.04E+02	YES	2.39E+01	YES
KC-TT-MW-5-022916	Trichloroethene	1.20E+01	=	µg/L	1.13E+01	YES	1.81E+00	YES
KC-VP-GW-021-25-30-041416	Chloroform	1.80E+00	=	µg/L	5.15E+00	NO	1.18E+00	YES
KC-VP-GW-021-25-30-041416	Toluene	1.40E+00	=	µg/L	1.27E+05	NO	3.01E+04	NO
KC-VP-GW-022-25-30-041516	Chloroform	3.80E+00	=	µg/L	5.15E+00	NO	1.18E+00	YES
KC-VP-GW-022-25-30-041516	Toluene	2.00E+00	=	µg/L	1.27E+05	NO	3.01E+04	NO
KC-VP-MW-1-062316	Chloride (Cl)	1.20E+05	=	µg/L	NA	NO	NA	NO
KC-VP-MW-2-030216	Tetrachloroethene	1.80E+01	=	µg/L	1.04E+02	NO	2.39E+01	NO
KC-VP-MW-4-030216	Tetrachloroethene	1.10E+01	J	µg/L	1.04E+02	NO	2.39E+01	NO
KC-VP-MW-5-062316	Chloride (Cl)	1.40E+05	=	µg/L	NA	NO	NA	NO
KC-VP-MW-6-062316	Chloride (Cl)	1.40E+05	=	µg/L	NA	NO	NA	NO
KC-VP-MW-7-062316	Chloride (Cl)	1.60E+05	=	µg/L	NA	NO	NA	NO
KC-VP-SO-023-25-30-042016	Bromodichloromethane	1.00E+00	=	µg/L	5.86E+00	NO	1.34E+00	NO
KC-VP-SO-023-25-30-042016	Chloroform	5.10E+00	=	µg/L	5.15E+00	NO	1.18E+00	YES
KC-VP-SO-023-25-30-042016	Toluene	2.70E+00	=	µg/L	1.27E+05	NO	3.01E+04	NO
KC-MW-101-S-062116	1,4-Dioxane	2.50E-02	J	µg/L	2.03E+04	NO	4.65E+03	NO
KC-MW-102-S-062216	1,4-Dioxane	2.10E-02	J	µg/L	2.03E+04	NO	4.65E+03	NO
KC-MW-104-S-062216	1,4-Dioxane	2.00E-02	J	µg/L	2.03E+04	NO	4.65E+03	NO
KC-MW-106-S-062216	1,4-Dioxane	5.60E-02	=	µg/L	2.03E+04	NO	4.65E+03	NO
KC-MW-107-S-062216	1,4-Dioxane	2.80E-02	J	µg/L	2.03E+04	NO	4.65E+03	NO
KC-LW-MW-6-062216	1,4-Dioxane	1.80E-02	J	µg/L	2.03E+04	NO	4.65E+03	NO
KC-TT-MW-1-062116	1,4-Dioxane	3.70E-02	J	µg/L	2.03E+04	NO	4.65E+03	NO
KC-VP-MW-5-062316	1,4-Dioxane	3.40E-02	J	µg/L	2.03E+04	NO	4.65E+03	NO

Notes:

µg/L = micrograms per liter

VISL = vapor intrusion screening level

VISLs (June 2017) based on target risk of 1E-6, target hazard quotient of 1, and site-specific groundwater temperature (16.5 ˚C).

Attachment 3
Multiple Lines of Evidence Evaluation Table

Table 3-1

Summary of Vapor Intrusion Multiple Lines of Evidence (MLE) Evaluation - Commercial Properties

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Lines of Evidence	CP-002 [redacted]	CP-003 [redacted]	CP-008 [redacted]	CP-010 [redacted]	CP-011 [redacted]
Comparison to Screening Levels					
Shallow GW concentrations > VISL?	**PCE, TCE, and VC >VISL**	**PCE, TCE, and VC >VISL**	Shallow GW < VISL	**PCE, TCE > VISL**	**PCE, TCE > VISL**
SS VOC concentrations > VISL and/or RML?	NS	SS < VISL	SS < VISL	**Chloroform > VISL (in 1 of 9 SS samples)**	SS < VISL
CS VOC concentrations > VISL and/or RML?	NA	NA	CS < VISL	CS < VISL	NA
IA (basement) VOC concentrations > VISL and/or RML?	NA	NA	NS	NS (partial basement)	NA
IA (ground floor) VOC concentrations > VISL and/or RML?	**TCE, PCE > VISL and RML**	**Bromodichloromethane, Chloroform > VISL**	NS	**PCE > VISL**	NS
Lines of Evidence Used to Evaluate IA Data					
Building located within the soil vapor plume area?	PCE, TCE	PCE, TCE	TCE	TCE	PCE, TCE
Nearby soil vapor results indicate sufficient source strength for potential VI if preferential pathways (such as utility conduits) are present?	Yes, located within 100-ft of 1.91 x 10^5 µg/m3 PCE and 1.70 x 10^3 µg/m3 TCE soil gas results.	Yes, located within 100-ft of 1.19 x 10^5 µg/m3 PCE and 1.70 x 10^3 µg/m3 TCE soil gas results.	Yes, located within 100-ft of 3.04 x 10^2 µg/m3 TCE soil gas result.	Yes, located within 100-ft of 3.04 x 10^2 µg/m3 TCE soil gas result.	Yes, located within 100-ft of 5.16 x 10^4 µg/m3 PCE and 4.08 x 10^2 µg/m3 TCE soil gas results.
OA (site-wide) similar or greater than IA concentrations, indicating background VOCs?	No (based on CP-017 OA results)	No (based on CP-017 OA results)	No (based on CP-010 OA results)	IA < OA for most target analytes	No (based on CP-017 OA results)
Potential indoor VOC sources identified during building survey?	Yes (car cleaning products)	Yes (cleaning supplies)	No	Yes (Based on bldg surveys)	No
Building construction/conditions that could increase or decrease liklihood of VI?	Small commercial building, slab-on-grade. Relatively new (2016) construction.	Small commercial building, slab-on-grade.	Small commercial building with partial crawlspace and partial basement.	Set of commercial buildings, some with partial basements and crawlspace; observable cracks in older sections of building	Large commercial building with warehouse space and offices, slab-on-grade
IA ≥ CS or SS concentration?	NA	Bromodichloromethane, Chloroform IA > SS (may indicate interior background source)	No	No	NA
Mismatched ratios between SS, CS and IA concentrations for different VOCs?	NA	NA	No	NA	NA
VI CSM Category					
Property likely currently has complete VI pathway that is causing IA and/or CS > VISLs, and has potential for this in the future	X				
Property possibly currently has complete VI pathway that is causing IA and/or CS > VISLs, and has potential for this in the future				X	
Property unlikely currently has complete VI pathway that is causing IA and/or CS > VISLs, but has potential for this in the future		X	X		X
Property unlikely currently has complete VI pathway causing IA and/or CS > VISLs, and unlikely has potential for this in the future					
Analytes that exceeded VISLs/RMLs w/ additional notes to facilitate HHRA (internal use only)	TCE, PCE IA TCE, PCE > RML IA TCE, PCE likely due to VI	Bromodichloromethane, Chloroform IA Bromodichloromethane, Chloroform > VISL Bromodichloromethane, Chloroform are commonly associated with background source(s).	SS, CS < VISL	Chloroform SS Chloroform > VISL (in 1 of 9 SS samples) Chloroform commonly associated with background source(s). PCE > IA VISL 30/1300 (IA/SS)	SS < VISL
Current Scenario: Site-related VI COPCs	PCE, TCE	None	None	PCE	None
Future Scenario: Site-related VI COPCs	PCE, TCE	PCE, TCE	TCE	PCE, TCE	PCE, TCE

Table 3-1

Summary of Vapor Intrusion Multiple Lines of Evidence (MLE) Evaluation - Commercial Properties

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Lines of Evidence	CP-013 [redacted]	CP-016 [redacted]	CP-017 [redacted]	CP-018 [redacted]	CP-019 [redacted]
Comparison to Screening Levels					
Shallow GW concentrations > VISL?	**PCE, TCE > VISL**	**Chloroform, PCE, TCE > VISL**	**Chloroform, PCE, TCE > VISL**	**Chloroform, PCE, TCE > VISL**	**PCE, TCE, and VC >VISL**
SS VOC concentrations > VISL and/or RML?	**PCE, TCE > VISL, RML**	**PCE, TCE > VISL, RML**	**PCE, TCE > VISL, RML**	**PCE, TCE > VISL, RML**	**Chloroform > VISL, = RML Bromodichloromethane > VISL, RML**
CS VOC concentrations > VISL and/or RML?	CS < VISL	NA	NA	NA	NA
IA (basement) VOC concentrations > VISL and/or RML?	NA	NA	NS (partial basement)	NA	NA
IA (ground floor) VOC concentrations > VISL and/or RML?	**TCE, PCE, Bromodichloromethane, Chloroform > VISL**	**TCE > VISL, RML PCE > VISL**	**Chloroform, PCE, TCE > VISL**	NS	**Bromodichloromethane, Chloroform > VISL**
Lines of Evidence Used to Evaluate IA Data					
Building located within the soil vapor plume area?	PCE, TCE	PCE, TCE	PCE, TCE	PCE, TCE	PCE, TCE
Nearby soil vapor results indicate sufficient source strength for potential VI if preferential pathways (such as utility conduits) are present?	Yes, located within 100-ft of 1.77×10^5 µg/m3 PCE and 3.08×10^3 µg/m3 TCE soil gas results.	Yes, located within 100-ft of 6.69×10^4 µg/m3 PCE and 1.73×10^4 µg/m3 TCE soil gas results.	Yes, located within 100-ft of 5.72×10^4 µg/m3 PCE and 1.11×10^4 µg/m3 TCE soil gas results.	Yes, located within 100-ft of 3.51×10^5 µg/m3 PCE and 1.11×10^4 µg/m3 TCE soil gas results.	Yes, located within 100-ft of 8.90×10^3 µg/m3 PCE and 7.97×10^2 µg/m3 TCE soil gas results.
OA (site-wide) similar or greater than IA concentrations, indicating background VOCs?	No (based on CP-017 OA results)	No (based on CP-017 OA results)	No	No (based on CP-017 OA results)	No (based on CP-017 OA results)
Potential indoor VOC sources identified during building survey?	No	Yes	No	Yes[a]	No
Building construction/conditions that could increase or decrease liklihood of VI?	Set of commercial buildings, one with crawlspace and others slab-on-grade	Set of commercial buildings, slab-on-grade	Set of commercial building, one with partial basement and others slab-on-grade	Large commercial building, slab-on-grade	Small commercial building, slab-on-grade
IA ≥ CS or SS concentration?	Bromodichloromethane, Chloroform IA > SS (may indicate interior background source)	No	Chloroform IA > SS (ND) (may indicate interior background source)	NA	No
Mismatched ratios between SS, CS and IA concentrations for different VOCs?	PCE/TCE Ratio for IA differs from SS	PCE/TCE Ratio varies significantly in SS samples	No	NA	NA
VI CSM Category					
Property likely currently has complete VI pathway that is causing IA and/or CS > VISLs, and has potential for this in the future	X	X	X		
Property possibly currently has complete VI pathway that is causing IA and/or CS > VISLs, and has potential for this in the future				X	
Property unlikely currently has complete VI pathway that is causing IA and/or CS > VISLs, but has potential for this in the future					X
Property unlikely currently has complete VI pathway causing IA and/or CS > VISLs, and unlikely has potential for this in the future					
Analytes that exceeded VISLs/RMLs w/ additional notes to facilitate HHRA (internal use only)	Bromodichloromethane, Chloroform, TCE, PCE SS TCE, PCE > RML IA Bromodichloromethane, Chloroform > VISL IA Bromodichloromethane, Chloroform were not detected in SS; detection likely interior background source(s)	TCE, PCE SS TCE, PCE > RML IA TCE > RML IA PCE > VISL IA TCE, PCE detections likely due to VI	Chloroform, TCE, PCE SS TCE, PCE > RML IA PCE, Chloroform > VISL Chloroform was not detected in SS; IA Chloroform detections often due to background source(s)	TCE, PCE SS TCE, PCE > VISL, RML	Bromodichloromethane, Chloroform SS Bromodichloromethane > RML SS Chloroform = RML IA Bromodichloromethane, Chloroform > VISL IA Bromodichloromethane, Chloroform detections often due background source(s)
Current Scenario: Site-related VI COPCs	PCE, TCE	PCE, TCE	PCE, TCE	PCE, TCE	None
Future Scenario: Site-related VI COPCs	PCE, TCE	PCE, TCE	PCE, TCE	PCE, TCE	PCE, TCE

Table 3-1

Summary of Vapor Intrusion Multiple Lines of Evidence (MLE) Evaluation - Commercial Properties

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Lines of Evidence	CP-023 [redacted]	CP-024 [redacted]	CP-027 [redacted]	CP-051 [redacted]	CP-053 [redacted]
Comparison to Screening Levels					
Shallow GW concentrations > VISL?	**Chloroform, PCE, TCE > VISL**	**Chloroform, PCE, TCE > VISL**	**Chloroform, PCE, TCE > VISL**	**Chloroform, PCE, TCE > VISL**	**Chloroform, TCE > VISL**
SS VOC concentrations > VISL and/or RML?	**TCE, PCE > VISL, RML**	**TCE, PCE > VISL, RML**	**Chlroroform, TCE, PCE > VISL, RML CCl4 > VISL**	NS	SS < VISL
CS VOC concentrations > VISL and/or RML?	NA	NA	NA	NA	NA
IA (basement) VOC concentrations > VISL and/or RML?	NA	NA	NA	Bromodichloromethane, Chloroform > VISL	NA
IA (ground floor) VOC concentrations > VISL and/or RML?	**Chloroform, PCE > VISL**	**PCE > VISL, RML TCE > VISL**	NS	**Bromodichloromethane, Chloroform > VISL**	NS
Lines of Evidence Used to Evaluate IA Data					
Building located within the soil vapor plume area?	PCE, TCE	PCE, TCE	PCE, TCE	Soil gas not delineated on property; however, soil gas results along perimeter indicate the soil gas plume likely extends onto the property.	PCE, TCE
Nearby soil vapor results indicate sufficient source strength for potential VI if preferential pathways (such as utility conduits) are present?	Yes, located within 100-ft of 5.72×10^4 µg/m3 PCE and 1.93×10^3 µg/m3 TCE soil gas results.	Yes, located within 100-ft of 5.72×10^4 µg/m3 PCE and 1.65×10^3 µg/m3 TCE soil gas results.	Yes, located within 100-ft of 6.46×10^4 µg/m3 PCE and 1.65×10^3 µg/m3 TCE soil gas results.		Yes, located within 100-ft of 2.52×10^3 µg/m3 PCE and 2.93×10^3 µg/m3 TCE soil gas results.
OA (site-wide) similar or greater than IA concentrations, indicating background VOCs?	No (based on CP-017 OA results)	No (based on CP-017 OA results)	NA	No (based on CP-017 OA results)	NA
Potential indoor VOC sources identified during building survey?	Yes	Not likely	No	No	No
Building construction/conditions that could increase or decrease liklihood of VI?	Large commerical building with multiple tenants/usages, slab-on-grade	Large commercial building, slab-on-grade	Large commercial building, slab-on-grade	Waste treatment plant, set of large commercial buildings, with partial basements	Large commecial building, slab-on-grade
IA ≥ CS or SS concentration?	No	No	CCl4 not detected in groundwater	NA	NA
Mismatched ratios between SS, CS and IA concentrations for different VOCs?	No	No	NA	NA	NA
VI CSM Category					
Property likely currently has complete VI pathway that is causing IA and/or CS > VISLs, and has potential for this in the future	X	X			
Property possibly currently has complete VI pathway that is causing IA and/or CS > VISLs, and has potential for this in the future			X		
Property unlikely currently has complete VI pathway that is causing IA and/or CS > VISLs, but has potential for this in the future				X	X
Property unlikely currently has complete VI pathway causing IA and/or CS > VISLs, and unlikely has potential for this in the future					
Analytes that exceeded VISLs/RMLs w/ additional notes to facilitate HHRA (internal use only)	TCE, PCE, Chloroform SS TCE, PCE > RML IA Chloroform, PCE > VISL Chloroform detection often due to background source(s) IA Chloroform detections often due background source(s)	TCE, PCE SS TCE, PCE > RML IA PCE > RML IA TCE > VISL TCE, PCE detects likely due to VI IA TCE, PCE detections likely due to VI	Chloroform, CCl4, TCE, PCE SS Chloroform, TCE, PCE > RML CCl4 > VISL Chloroform, CCl4 detections often due to background source(s)	Bromodichloromethane, Chloroform IA Bromodichloromethane, Chloroform > VISL IA Bromodichloromethane, Chloroform detections often due background source(s)	--
Current Scenario: Site-related VI COPCs	PCE, TCE	PCE, TCE	PCE, TCE	None	None
Future Scenario: Site-related VI COPCs	PCE, TCE	PCE, TCE	PCE, TCE	PCE, TCE	PCE, TCE

Table 3-1

Summary of Vapor Intrusion Multiple Lines of Evidence (MLE) Evaluation - Commercial Properties

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Lines of Evidence	CP-056 [redacted]	CP-064 [redacted]	CP-067 [redacted]
Comparison to Screening Levels			
Shallow GW concentrations > VISL?	**Chloroform, TCE > VISL**	**Chloroform, TCE > VISL**	Shallow GW < VISL
SS VOC concentrations > VISL and/or RML?	**Chloroform > VISL**	SS < VISL	SS < VISL
CS VOC concentrations > VISL and/or RML?	NA	**Chloroform > VISL**	NA
IA (basement) VOC concentrations > VISL and/or RML?	NA	Chloroform > VISL	NA
IA (ground floor) VOC concentrations > VISL and/or RML?	**Chloroform, TCE > VISL**	**Chloroform > VISL**	**Chloroform, Bromodichloromethane > VISL**
Lines of Evidence Used to Evaluate IA Data			
Building located within the soil vapor plume area?	PCE, TCE	PCE, TCE	PCE, TCE
Nearby soil vapor results indicate sufficient source strength for potential VI if preferential pathways (such as utility conduits) are present?	Yes, located within 100-ft of 6.11×10^3 µg/m3 PCE and 1.93×10^3 µg/m3 TCE soil gas results.	Yes, located within 100-ft of 6.11×10^3 µg/m3 PCE and 1.93×10^3 µg/m3 TCE soil gas results.	Yes, located within 100-ft of 7.18×10^4 µg/m3 PCE and 5.42×10^3 µg/m3 TCE soil gas results.
OA (site-wide) similar or greater than IA concentrations, indicating background VOCs?	OA & IA results similar	OA & IA results similar	No
Potential indoor VOC sources identified during building survey?	No	No bldg survery	No
Building construction/conditions that could increase or decrease liklihood of VI?	Small commercial building, slab-on-grade	Small commercial building, with partial basement and partial crawlspace	Small commercial building, slab-on-grade
IA ≥ CS or SS concentration?	No	Chloroform IA > CS & SS (may indicate interior background source)	Bromochloromethane & Chloroform IA > SS (may indicate interior background source)
Mismatched ratios between SS, CS and IA concentrations for different VOCs?	No	No	No
VI CSM Category			
Property likely currently has complete VI pathway that is causing IA and/or CS > VISLs, and has potential for this in the future			
Property possibly currently has complete VI pathway that is causing IA and/or CS > VISLs, and has potential for this in the future	X		
Property unlikely currently has complete VI pathway that is causing IA and/or CS > VISLs, but has potential for this in the future		X	X
Property unlikely currently has complete VI pathway causing IA and/or CS > VISLs, and unlikely has potential for this in the future			
Analytes that exceeded VISLs/RMLs w/ additional notes to facilitate HHRA (internal use only)	Chloroform, TCE SS, IA Chloroform > VISL Chloroform detections often due to background source(s) TCE IA/SV is 1.6/98	Chloroform CS, IA Chloroform > VISL Chloroform detections often due to background source(s) Chloroform not detected in SS	Bromodichloromethane, Chloroform IA Bromodichloromethane, Chloroform > VISL Neither compounds detected in SS Bromodichloromethane, Chloroform detections often due background source(s)
Current Scenario: Site-related VI COPCs	TCE	None	None
Future Scenario: Site-related VI COPCs	PCE, TCE	PCE, TCE	PCE, TCE

Table 3-1

Summary of Vapor Intrusion Multiple Lines of Evidence (MLE) Evaluation - Commercial Properties

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Notes:

a. CP-018 has a known historical release (i.e., PCE spill) that was cleaned up in the past. The building has heavy usage of chemicals indoors. Although there is ongoing use of chemicals indoor, this property will remain under evaluation because of the historical release.

MLE evaluation is based on a single round of sampling

IA results were considered to be similar to OA results if they were within a factor of 3.

The bolded text and shaded cells as applied to the rows under the "Comparison to Screening Levels" section of the table, indicate that one or more sample results exceed the indicated screening level.

Groundwater and soil vapor VISLs are based on United States Environmental Protection Agency (USEPA) VISL target groundwater and target subslab vapor concentrations at a target risk for carcinogens (TCR) = 10-6 and target hazard quotient for non-carcinogens (THQ) = 1.

Indoor air VISLs are based on USEPA Regional Screening Levels (RSLs) at a TCR = 10-6 andTHQ = 0.1

Removal Management Level = RML

RMLs are based on USEPA RSLs at a TCR = 10-4 and THQ = 3.0, except for trichloroethene (TCE), THQ = 1.0

$\mu g/m^3$ = micrograms per cubic meter

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

CS = crawlspace air

CCl4 = Carbon Tetrachloride

IA = indoor air

NA = not applicable

ND = not detected

NS = not sampled

OA = outdoor air

PCE = perchloroethene

SS = subslab soil vapor

TCE = trichloroethene

VISL = Vapor Intrusion Screening Level

VI = vapor intrusion

Table 3-2

Summary of Vapor Intrusion Multiple Lines of Evidence (MLE) Evaluation - Residential Properties

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Lines of Evidence	RP-039	RP-041	RP-042	RP-047	RP-062
Comparison to Screening Levels					
Shallow GW concentrations > VISL?	**Bromodichloromethane, Chloroform, PCE, TCE > VISL**	**PCE, TCE > VISL**	**PCE, TCE > VISL**	**PCE, TCE > VISL**	**Chloroform, TCE > VISL**
SS VOC concentrations > VISL and/or RML?	**CCl4, Chloroform > VISL TCE, PCE > RML**	NA	**CCl4, Chloroform, PCE > VISL TCE > VISL, RML**	**Chloroform, TCE > VISL**	SS < VISL
CS VOC concentrations > VISL and/or RML?	**1,2-DCA, Bromodichloromethane, CCl4, Chloroform, TCE, PCE > VISL**	**1,2-Dibromoethane, 1,2-DCA, CCl4, Chloroform, PCE, TCE > VISL**	**CCl4, Chloroform, PCE, TCE > VISL**	NA	NS
IA (basement) VOC concentrations > VISL and/or RML?	NS (partial basement)	NA	NS (partial basement)	NA	NA
IA (ground floor) VOC concentrations > VISL and/or RML?	**1,2-DCA, Bromodichloromethane, CCl4, Chloroform, > VISL TCE > VISL, = RML PCE > VISL, RML**	**1,1,2,2-Tetrachloroethane, Bromodichloromethane, CCl4, Chloroform, TCE, PCE > VISL 1,2-DCA = VISL, RML**	**1,2-DCA, CCl4, Chloroform, TCE > VISL**	**1,2-DCA, Bromodichloromethane, CCl4, Chloroform, PCE, TCE > VISL**	**1,2-DCA = VISL 1,2-Dibromoethane, Bromodichloromethane, CCl4, Chloroform > VISL**
Lines of Evidence Used to Evaluate IA Data					
Building located within the soil vapor plume area?	PCE, TCE	PCE, TCE	PCE, TCE	PCE, TCE	PCE, TCE
Nearby soil vapor results indicate sufficient source strength for potential VI if preferential pathways (such as utility conduits) are present?	Yes, located within 100-ft of 3.82 x 10^4 µg/m^3 PCE and 1.04 x 10^3 µg/m^3 TCE soil gas results.	Yes, located within 100-ft of 3.38 x 10^4 µg/m^3 PCE and 2.36 x 10^3 µg/m^3 TCE soil gas results.	Yes, located within 100-ft of 5.43 x 10^3 µg/m^3 PCE and 4.42 x 10^2 µg/m^3 TCE soil gas results.	Yes, located within 100-ft of 5.43 x 10^3 µg/m^3 PCE and 4.42 x 10^2 µg/m^3 TCE soil gas results.	Yes, located within 100-ft of 6.11 x 10^3 µg/m^3 PCE and 1.93 x 10^3 µg/m^3 TCE soil gas results.
OA (site-wide) similar or greater than IA concentrations, indicating background VOCs?	No (based on CP-017 OA results)	No (based on CP-017 OA results)	No (based on CP-064 OA results)	No (based on CP-064 OA results)	No (based on CP-064 OA results); CCl4 in OA similar to CCl4 in indoor air
Potential indoor VOC sources identified during building survey?	No	No (relatively high PPBRae results within residence though; potentially due to cig. smoke)	Yes (PPBRae results were 0 ppb though)	No	Yes (cleaning solvents noted on Bldg survey)
Building construction/conditions that could increase or decrease liklihood of VI?	Small residential building with partial basement and partial crawlspace, floor drain present in basement	Small residential building with crawlspace underneath entire building	Small residential building with partial basement and crawlspace	Small residential building, slab-on-grade	Small residential building with partial basement and crawlspace
IA ≥ CS or SS concentration?	Bromodichloromethane, CCl4, PCE, TCE IA > CS 1,2-DCA, Bromodichloromethane IA > SS (ND) (may indicate interior background source)	Bromodichloromethane, 1,2-DCA, CCl4, Chloroform IA > CS (may indicate interior background source)	1,2-DCA, Chloroform IA > CS: (may indicate interior background source)	1,2-DCA, Bromodichloromethane, Chloroform IA > SS (may indicate interior background source)	1,2-DCA, 1,2-Dibromoethane, Bromodichloromethane, CCl4 IA > SS (may indicate interior background source)
Mismatched ratios between SS, CS and IA concentrations for different VOCs?	No	No	No	Yes TCE IA vs. SS	NA
VI CSM Category					
Property likely currently has complete VI pathway that is causing IA and/or CS > VISLs, and has potential for this in the future	X[1]		X	X[a]	
Property possibly currently has complete VI pathway that is causing IA and/or CS > VISLs, and has potential for this in the future		X			
Property unlikely currently has complete VI pathway that is causing IA and/or CS > VISLs, but has potential for this in the future					X
Property unlikely currently has complete VI pathway causing IA and/or CS > VISLs, and unlikely has potential for this in the future					
Analytes that exceeded VISLs/RMLs w/ additional notes to facilitate HHRA	1,2-DCA, CCl4, Chloroform, Bromodichloromethane, TCE, PCE SS CCl4, Chloroform > VISL SS TCE, PCE > RML CS 1,2-DCA, Bromodichloromethane, CCl4, Chloroform, TCE, PCE > VISL IA 1,2-DCA, Bromodichloromethane, CCl4, Chloroform, > VISL IA TCE = RML IA PCE > RML 1,2-DCA, Bromodichloromethane, Chloroform detections often due to background source(s)	1,1,2,2-Tetrachloroethane, 1,2-Dibromoethane, 1,2-DCA, CCl4, Chloroform, Bromodichloromethane, TCE, PCE CS 1,2-DCA, 1,2-Dibromoethane, CCl4, Chloroform > VISL IA 1,1,2,2-Tetrachloroethane, 1,2-Dibromethane, 1,2-DCA, Bromodichloromethane, CCl4, Chloroform, TCE, PCE > VISL 1,2-DCA = RML TCE & PCE are likely due to VI. Other detected analytes are often associated with background source(s)	1,1,2,2-Tetrachloroethane, 1,2-Dibromoethane, 1,2-DCA, CCl4, Chloroform, Bromodichloromethane, TCE, PCE SS CCl4, Chloroform, PCE > VISL SS TCE > RML CS 1,2-DCA, 1,2-Dibromoethane, CCl4, Chloroform > VISL IA 1,1,2,2-TCA, 1,2-DCA, Bromodichloromethane, CCl4, Chloroform > VISL TCE likely due to VI	1,2-DCA, CCl4, Chloroform, Bromodichloromethane, TCE SS Chloroform, TCE > VISL IA 1,2-DCA, Bromodichloromethane, CCl4, Chloroform, TCE > VISL 1,2-DCA, Bromodichloromethane, Chloroform, CCl4 detections often due to background source(s)	1,2-Dibromoethane, 1,2-DCA, CCl4, Chloroform, Bromodichloromethane IA 1,2-DCA = VISL IA 1,2-Dibromoethane, Bromodichloromethane, CCl4, Chloroform > VISL Detection of these analytes are often due to background source(s)
Current Scenario: Site-related VI COPCs	PCE, TCE	PCE, TCE	PCE, TCE	PCE, TCE	None
Future Scenario: Site-related VI COPCs	PCE, TCE	PCE, TCE	PCE, TCE	PCE, TCE	PCE, TCE

Table 3-2

Summary of Vapor Intrusion Multiple Lines of Evidence (MLE) Evaluation - Residential Properties

Expedited Vapor Intrusion Evaluation and Estimation of Potential Human Health Risks

Keystone Corridor Groundwater Contamination Site, Marion County, Indiana

Notes:

a. Based on on the sample data, EPA has installed a vapor intrusion mitigation system (VIMS) at this property.

MLE evaluation is based on a single round of sampling.

IA results were considered to be similar to OA results if they were within a factor of 3.

The bolded text and shaded cells as applied to the rows under the "Comparison to Screening Levels" section of the table, indicate that one or more sample results exceed the indicated screening level.

Groundwater and soil vapor VISLs are based on United States Environmental Protection Agency (USEPA) VISL target groundwater and target subslab vapor concentrations at a target risk for carcinogens (TCR) = 10-6 and target hazard quotient for non-carcinogens (THQ) = 1.

Indoor air VISLs are based on USEPA Regional Screening Levels (RSLs) at a TCR = 10-6 andTHQ = 0.1

Removal Management Level = RML

RMLs are based on USEPA RSLs at a TCR = 10-4 and THQ = 3.0, except for trichloroethene (TCE), THQ = 1.0

$\mu g/m^3$ = micrograms per cubic meter

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

CS = crawlspace air

CCl4 = Carbon Tetrachloride

IA = indoor air

NA = not applicable

ND = not detected

NS = not sampled

OA = outdoor air

PCE = perchloroethene

SS = subslab soil vapor

TCE = trichloroethene

VI = vapor intrusion

VISL = Vapor Intrusion Screening Level

Attachment 4
Vapor Intrusion Screening Levels Calculator Tables (Risk Estimates)

Table 4-1
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Indoor Air Concentration to Risk (IAC-Risk) Calculator Version 3.5.1 (June 2017 RSLs) - CP-002
Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column E)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column F)

CAS	Chemical Name	Site Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
127-18-4	Tetrachloroethylene	6.60E+02	1.4E-05	3.8E+00	2.60E-07	I	4.00E-02	I	
79-01-6	Trichloroethylene	1.20E+01	4.0E-06	1.4E+00	see note	I	2.00E-03	I	TCE

Notes:

(1) **Inhalation Pathway Exposure Param**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Averaging time for carcinogens	(yrs)	ATc_R_IA	70	ATc_C_IA	70	ATc_IA	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_IA	26	ATnc_C_IA	25	ATnc_IA	25
Exposure duration	(yrs)	ED_R_IA	26	ED_C_IA	25	ED_IA	25
Exposure frequency	(days/yr)	EF_R_IA	350	EF_C_IA	250	EF_IA	250
Exposure time	(hr/day)	ET_R_IA	24	ET_C_IA	8	ET_IA	8

(2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Groundwater	(-)	AFgw_R_IA	0.001	AFgw_C_IA	0.001	AFgw_IA	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_IA	0.03	AFss_C_IA	0.03	AFss_IA	0.03

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
	mIURTCE_R_IA	1.00E-06	mIURTCE_C_IA	0.00E+00	mIURTCE_IA	0.00E+00
	IURTCE_R_IA	3.10E-06	IURTCE_C_IA	4.10E-06	IURTCE_IA	4.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html
P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml
A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html
CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp
H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml
S = See RSL User Guide, Section 5
X = PPRTV Appendix
Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).
VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).
TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).
Yellow highlighting indicates site-specific parameters that may be edited by the user.
Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.
Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-2
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Indoor Air Concentration to Risk (IAC-Risk) Calculator Version 3.5.1 (June 2017 RSLs) - CP-010
Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column E)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column F)

CAS	Chemical Name	Site Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard
		Cia	CR	HQ
		(ug/m^3)		
127-18-4	Tetrachloroethylene	3.30E+01	7.0E-07	1.9E-01

Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
IUR		RfC		
(ug/m^3)$^{-1}$		(mg/m^3)		i
2.60E-07	I	4.00E-02	I	

Notes:

(1) **Inhalation Pathway Exposure Param**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Averaging time for carcinogens	(yrs)	ATc_R_IA	70	ATc_C_IA	70	ATc_IA	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_IA	26	ATnc_C_IA	25	ATnc_IA	25
Exposure duration	(yrs)	ED_R_IA	26	ED_C_IA	25	ED_IA	25
Exposure frequency	(days/yr)	EF_R_IA	350	EF_C_IA	250	EF_IA	250
Exposure time	(hr/day)	ET_R_IA	24	ET_C_IA	8	ET_IA	8

(2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Groundwater	(-)	AFgw_R_IA	0.001	AFgw_C_IA	0.001	AFgw_IA	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_IA	0.03	AFss_C_IA	0.03	AFss_IA	0.03

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
	mIURTCE_R_IA	1.00E-06	mIURTCE_C_IA	0.00E+00	mIURTCE_IA	0.00E+00
	IURTCE_R_IA	3.10E-06	IURTCE_C_IA	4.10E-06	IURTCE_IA	4.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html
P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml
A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html
CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp
H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml
S = See RSL User Guide, Section 5
X = PPRTV Appendix
Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).
VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).
TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).
Yellow highlighting indicates site-specific parameters that may be edited by the user.
Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.
Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-3
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Indoor Air Concentration to Risk (IAC-Risk) Calculator Version 3.5.1 (June 2017 RSLs) - CP-013
Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column E)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column F)

CAS	Chemical Name	Site Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
127-18-4	Tetrachloroethylene	3.10E+02	6.6E-06	1.8E+00	2.60E-07	I	4.00E-02	I	
79-01-6	Trichloroethylene	4.50E+00	1.5E-06	5.1E-01	see note	I	2.00E-03	I	TCE

Notes:

(1) **Inhalation Pathway Exposure Param**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Averaging time for carcinogens	(yrs)	ATc_R_IA	70	ATc_C_IA	70	ATc_IA	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_IA	26	ATnc_C_IA	25	ATnc_IA	25
Exposure duration	(yrs)	ED_R_IA	26	ED_C_IA	25	ED_IA	25
Exposure frequency	(days/yr)	EF_R_IA	350	EF_C_IA	250	EF_IA	250
Exposure time	(hr/day)	ET_R_IA	24	ET_C_IA	8	ET_IA	8

(2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Groundwater	(-)	AFgw_R_IA	0.001	AFgw_C_IA	0.001	AFgw_IA	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_IA	0.03	AFss_C_IA	0.03	AFss_IA	0.03

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
	mIURTCE_R_IA	1.00E-06	mIURTCE_C_IA	0.00E+00	mIURTCE_IA	0.00E+00
	IURTCE_R_IA	3.10E-06	IURTCE_C_IA	4.10E-06	IURTCE_IA	4.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html
P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml
A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html
CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp
H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml
S = See RSL User Guide, Section 5
X = PPRTV Appendix
Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).
VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).
TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).
Yellow highlighting indicates site-specific parameters that may be edited by the user.
Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.
Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-4

EPA-OLEM VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.5.1 (June 2017 RSLs) - CP-013

Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard	Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
		Csg	Cia	CR	HQ	IUR		RfC		
		(ug/m^3)	(ug/m^3)			(ug/m^3)$^{-1}$		(mg/m^3)		i
127-18-4	Tetrachloroethylene	9.9E+04	2.97E+03	6.3E-05	1.7E+01	2.60E-07	I	4.00E-02	I	
79-01-6	Trichloroethylene	1.1E+03	3.30E+01	1.1E-05	3.8E+00	see note	I	2.00E-03	I	TCE

Notes:

(1) Inhalation Pathway Exposure Parameters (RME):

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_SG	70	ATc_C_SG	70	**ATc_SG**	**70**
Averaging time for non-carcinogens	(yrs)	ATnc_R_SG	26	ATnc_C_SG	25	**ATnc_SG**	**25**
Exposure duration	(yrs)	ED_R_SG	26	ED_C_SG	25	**ED_SG**	**25**
Exposure frequency	(days/yr)	EF_R_SG	350	EF_C_SG	250	**EF_SG**	**250**
Exposure time	(hr/day)	ET_R_SG	24	ET_C_SG	8	**ET_SG**	**8**

(2) Generic Attenuation Factors:

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_SG	0.03	AFss_C_SG	0.03	**AFss_SG**	**0.03**

(3) Formulas

Cia, target = MIN(Cia,c; Cia,nc)

Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)

Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) Special Case Chemicals

	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Trichloroethylene	mIURTCE_R_SG	1.00E-06	mIURTCE_C_SG	0.00E+00	mIURTCE_SG	0.00E+00
	IURTCE_R_SG	3.10E-06	IURTCE_C_SG	4.10E-06	IURTCE_SG	4.10E-06

Mutagenic Chemicals

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 This factor is used in the equations for mutagenic chemicals.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml

A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

S = See RSL User Guide, Section 5

X = PPRTV Appendix

Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user.

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-5
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Indoor Air Concentration to Risk (IAC-Risk) Calculator Version 3.5.1 (June 2017 RSLs) - CP-016
Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column E)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column F)

CAS	Chemical Name	Site Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
127-18-4	Tetrachloroethylene	2.00E+02	4.2E-06	1.1E+00	2.60E-07	I	4.00E-02	I	
79-01-6	Trichloroethylene	2.20E+01	7.4E-06	2.5E+00	see note	I	2.00E-03	I	TCE

Notes:

(1) **Inhalation Pathway Exposure Param**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Averaging time for carcinogens	(yrs)	ATc_R_IA	70	ATc_C_IA	70	ATc_IA	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_IA	26	ATnc_C_IA	25	ATnc_IA	25
Exposure duration	(yrs)	ED_R_IA	26	ED_C_IA	25	ED_IA	25
Exposure frequency	(days/yr)	EF_R_IA	350	EF_C_IA	250	EF_IA	250
Exposure time	(hr/day)	ET_R_IA	24	ET_C_IA	8	ET_IA	8

(2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Groundwater	(-)	AFgw_R_IA	0.001	AFgw_C_IA	0.001	AFgw_IA	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_IA	0.03	AFss_C_IA	0.03	AFss_IA	0.03

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
	mIURTCE_R_IA	1.00E-06	mIURTCE_C_IA	0.00E+00	mIURTCE_IA	0.00E+00
	IURTCE_R_IA	3.10E-06	IURTCE_C_IA	4.10E-06	IURTCE_IA	4.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html
P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml
A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html
CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp
H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml
S = See RSL User Guide, Section 5
X = PPRTV Appendix
Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).
VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).
TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).
Yellow highlighting indicates site-specific parameters that may be edited by the user.
Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.
Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-6
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.5.1 (June 2017 RSLs) - CP-016
Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard
		Csg	Cia	CR	HQ
		(ug/m^3)	(ug/m^3)		
127-18-4	Tetrachloroethylene	9.2E+04	2.76E+03	5.9E-05	1.6E+01
79-01-6	Trichloroethylene	1.1E+04	3.30E+02	1.1E-04	3.8E+01

Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
IUR		RfC		
(ug/m^3)$^{-1}$		(mg/m^3)		i
2.60E-07	I	4.00E-02	I	
see note	I	2.00E-03	I	TCE

Notes:

(1) **Inhalation Pathway Exposure Parameters (RME):**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_SG	70	ATc_C_SG	70	**ATc_SG**	**70**
Averaging time for non-carcinogens	(yrs)	ATnc_R_SG	26	ATnc_C_SG	25	**ATnc_SG**	**25**
Exposure duration	(yrs)	ED_R_SG	26	ED_C_SG	25	**ED_SG**	**25**
Exposure frequency	(days/yr)	EF_R_SG	350	EF_C_SG	250	**EF_SG**	**250**
Exposure time	(hr/day)	ET_R_SG	24	ET_C_SG	8	**ET_SG**	**8**

(2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_SG	0.03	AFss_C_SG	0.03	**AFss_SG**	**0.03**

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Trichloroethylene	mIURTCE_R_SG	1.00E-06	mIURTCE_C_SG	0.00E+00	mIURTCE_SG	0.00E+00
	IURTCE_R_SG	3.10E-06	IURTCE_C_SG	4.10E-06	IURTCE_SG	4.10E-06

Mutagenic Chemicals

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 This factor is used in the equations for mutagenic chemicals.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml

A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

S = See RSL User Guide, Section 5

X = PPRTV Appendix

Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user.

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-7
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Indoor Air Concentration to Risk (IAC-Risk) Calculator Version 3.5.1 (June 2017 RSLs) - CP-017
Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column E)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column F)

CAS	Chemical Name	Site Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ
127-18-4	Tetrachloroethylene	8.40E+01	1.8E-06	4.8E-01
79-01-6	Trichloroethylene	9.50E-01	3.2E-07	1.1E-01

Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
2.60E-07	I	4.00E-02	I	
see note	I	2.00E-03	I	TCE

Notes:

(1) **Inhalation Pathway Exposure Param**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Averaging time for carcinogens	(yrs)	ATc_R_IA	70	ATc_C_IA	70	ATc_IA	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_IA	26	ATnc_C_IA	25	ATnc_IA	25
Exposure duration	(yrs)	ED_R_IA	26	ED_C_IA	25	ED_IA	25
Exposure frequency	(days/yr)	EF_R_IA	350	EF_C_IA	250	EF_IA	250
Exposure time	(hr/day)	ET_R_IA	24	ET_C_IA	8	ET_IA	8

(2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Groundwater	(-)	AFgw_R_IA	0.001	AFgw_C_IA	0.001	AFgw_IA	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_IA	0.03	AFss_C_IA	0.03	AFss_IA	0.03

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
	mIURTCE_R_IA	1.00E-06	mIURTCE_C_IA	0.00E+00	mIURTCE_IA	0.00E+00
	IURTCE_R_IA	3.10E-06	IURTCE_C_IA	4.10E-06	IURTCE_IA	4.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html
P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml
A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html
CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp
H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml
S = See RSL User Guide, Section 5
X = PPRTV Appendix
Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).
VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).
TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).
Yellow highlighting indicates site-specific parameters that may be edited by the user.
Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.
Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-8

EPA-OLEM VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.5.1 (June 2017 RSLs) - CP-017

Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard	Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
		Csg	Cia	CR	HQ	IUR		RfC		
		(ug/m^3)	(ug/m^3)			(ug/m^3)$^{-1}$		(mg/m^3)		i
127-18-4	Tetrachloroethylene	1.5E+05	4.50E+03	9.5E-05	2.6E+01	2.60E-07	I	4.00E-02	I	
79-01-6	Trichloroethylene	4.3E+03	1.29E+02	4.3E-05	1.5E+01	see note	I	2.00E-03	I	TCE

Notes:

(1) Inhalation Pathway Exposure Parameters (RME):

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_SG	70	ATc_C_SG	70	**ATc_SG**	**70**
Averaging time for non-carcinogens	(yrs)	ATnc_R_SG	26	ATnc_C_SG	25	**ATnc_SG**	**25**
Exposure duration	(yrs)	ED_R_SG	26	ED_C_SG	25	**ED_SG**	**25**
Exposure frequency	(days/yr)	EF_R_SG	350	EF_C_SG	250	**EF_SG**	**250**
Exposure time	(hr/day)	ET_R_SG	24	ET_C_SG	8	**ET_SG**	**8**

(2) Generic Attenuation Factors:

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_SG	0.03	AFss_C_SG	0.03	**AFss_SG**	**0.03**

(3) Formulas

Cia, target = MIN(Cia,c; Cia,nc)

Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)

Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) Special Case Chemicals

	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Trichloroethylene	mIURTCE_R_SG	1.00E-06	mIURTCE_C_SG	0.00E+00	mIURTCE_SG	0.00E+00
	IURTCE_R_SG	3.10E-06	IURTCE_C_SG	4.10E-06	IURTCE_SG	4.10E-06

Mutagenic Chemicals

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 This factor is used in the equations for mutagenic chemicals.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml

A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

S = See RSL User Guide, Section 5

X = PPRTV Appendix

Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user.

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-9

EPA-OLEM VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.5.1 (June 2017 RSLs) - CP-018

Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard	Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
		Csg	Cia	CR	HQ	IUR		RfC		
		(ug/m^3)	(ug/m^3)			(ug/m^3)$^{-1}$		(mg/m^3)		i
127-18-4	Tetrachloroethylene	1.2E+05	3.60E+03	7.6E-05	2.1E+01	2.60E-07	I	4.00E-02	I	
79-01-6	Trichloroethylene	1.7E+03	5.10E+01	1.7E-05	5.8E+00	see note	I	2.00E-03	I	TCE

Notes:

(1) Inhalation Pathway Exposure Parameters (RME):

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_SG	70	ATc_C_SG	70	**ATc_SG**	**70**
Averaging time for non-carcinogens	(yrs)	ATnc_R_SG	26	ATnc_C_SG	25	**ATnc_SG**	**25**
Exposure duration	(yrs)	ED_R_SG	26	ED_C_SG	25	**ED_SG**	**25**
Exposure frequency	(days/yr)	EF_R_SG	350	EF_C_SG	250	**EF_SG**	**250**
Exposure time	(hr/day)	ET_R_SG	24	ET_C_SG	8	**ET_SG**	**8**

(2) Generic Attenuation Factors:

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_SG	0.03	AFss_C_SG	0.03	**AFss_SG**	**0.03**

(3) Formulas

Cia, target = MIN(Cia,c; Cia,nc)

Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)

Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) Special Case Chemicals

	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Trichloroethylene	mIURTCE_R_SG	1.00E-06	mIURTCE_C_SG	0.00E+00	mIURTCE_SG	0.00E+00
	IURTCE_R_SG	3.10E-06	IURTCE_C_SG	4.10E-06	IURTCE_SG	4.10E-06

Mutagenic Chemicals

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 This factor is used in the equations for mutagenic chemicals.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml

A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

S = See RSL User Guide, Section 5

X = PPRTV Appendix

Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user.

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-10
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Indoor Air Concentration to Risk (IAC-Risk) Calculator Version 3.5.1 (June 2017 RSLs) - CP-023
Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column E)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column F)

CAS	Chemical Name	Site Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard
		Cia	CR	HQ
		(ug/m^3)		
127-18-4	Tetrachloroethylene	2.00E+02	4.2E-06	1.1E+00

Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
IUR		RfC		
(ug/m^3)$^{-1}$		(mg/m^3)		i
2.60E-07	I	4.00E-02	I	

Notes:

(1) **Inhalation Pathway Exposure Param**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Averaging time for carcinogens	(yrs)	ATc_R_IA	70	ATc_C_IA	70	ATc_IA	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_IA	26	ATnc_C_IA	25	ATnc_IA	25
Exposure duration	(yrs)	ED_R_IA	26	ED_C_IA	25	ED_IA	25
Exposure frequency	(days/yr)	EF_R_IA	350	EF_C_IA	250	EF_IA	250
Exposure time	(hr/day)	ET_R_IA	24	ET_C_IA	8	ET_IA	8

(2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Groundwater	(-)	AFgw_R_IA	0.001	AFgw_C_IA	0.001	AFgw_IA	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_IA	0.03	AFss_C_IA	0.03	AFss_IA	0.03

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
	mIURTCE_R_IA	1.00E-06	mIURTCE_C_IA	0.00E+00	mIURTCE_IA	0.00E+00
	IURTCE_R_IA	3.10E-06	IURTCE_C_IA	4.10E-06	IURTCE_IA	4.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html
P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml
A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html
CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp
H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml
S = See RSL User Guide, Section 5
X = PPRTV Appendix
Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).
VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).
TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).
Yellow highlighting indicates site-specific parameters that may be edited by the user.
Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.
Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-11

EPA-OLEM VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.5.1 (June 2017 RSLs) - CP-023

Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard	Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
		Csg	Cia	CR	HQ	IUR		RfC		
		(ug/m^3)	(ug/m^3)			(ug/m^3)$^{-1}$		(mg/m^3)		i
127-18-4	Tetrachloroethylene	9.0E+04	2.70E+03	5.7E-05	1.5E+01	2.60E-07	I	4.00E-02	I	
79-01-6	Trichloroethylene	3.9E+02	1.17E+01	3.9E-06	1.3E+00	see note	I	2.00E-03	I	TCE

Notes:

(1) Inhalation Pathway Exposure Parameters (RME):

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_SG	70	ATc_C_SG	70	**ATc_SG**	**70**
Averaging time for non-carcinogens	(yrs)	ATnc_R_SG	26	ATnc_C_SG	25	**ATnc_SG**	**25**
Exposure duration	(yrs)	ED_R_SG	26	ED_C_SG	25	**ED_SG**	**25**
Exposure frequency	(days/yr)	EF_R_SG	350	EF_C_SG	250	**EF_SG**	**250**
Exposure time	(hr/day)	ET_R_SG	24	ET_C_SG	8	**ET_SG**	**8**

(2) Generic Attenuation Factors:

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_SG	0.03	AFss_C_SG	0.03	**AFss_SG**	**0.03**

(3) Formulas

Cia, target = MIN(Cia,c; Cia,nc)

Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)

Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) Special Case Chemicals

	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Trichloroethylene	mIURTCE_R_SG	1.00E-06	mIURTCE_C_SG	0.00E+00	mIURTCE_SG	0.00E+00
	IURTCE_R_SG	3.10E-06	IURTCE_C_SG	4.10E-06	IURTCE_SG	4.10E-06

Mutagenic Chemicals

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 This factor is used in the equations for mutagenic chemicals.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml

A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

S = See RSL User Guide, Section 5

X = PPRTV Appendix

Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user.

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-12
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Indoor Air Concentration to Risk (IAC-Risk) Calculator Version 3.5.1 (June 2017 RSLs) - CP-024
Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column E)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column F)

CAS	Chemical Name	Site Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ
127-18-4	Tetrachloroethylene	5.70E+02	1.2E-05	3.3E+00
79-01-6	Trichloroethylene	7.30E+00	2.4E-06	8.3E-01

Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
2.60E-07	I	4.00E-02	I	
see note	I	2.00E-03	I	TCE

Notes:

(1) **Inhalation Pathway Exposure Param**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Averaging time for carcinogens	(yrs)	ATc_R_IA	70	ATc_C_IA	70	ATc_IA	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_IA	26	ATnc_C_IA	25	ATnc_IA	25
Exposure duration	(yrs)	ED_R_IA	26	ED_C_IA	25	ED_IA	25
Exposure frequency	(days/yr)	EF_R_IA	350	EF_C_IA	250	EF_IA	250
Exposure time	(hr/day)	ET_R_IA	24	ET_C_IA	8	ET_IA	8

(2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Groundwater	(-)	AFgw_R_IA	0.001	AFgw_C_IA	0.001	AFgw_IA	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_IA	0.03	AFss_C_IA	0.03	AFss_IA	0.03

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
	mIURTCE_R_IA	1.00E-06	mIURTCE_C_IA	0.00E+00	mIURTCE_IA	0.00E+00
	IURTCE_R_IA	3.10E-06	IURTCE_C_IA	4.10E-06	IURTCE_IA	4.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html
P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml
A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html
CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp
H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml
S = See RSL User Guide, Section 5
X = PPRTV Appendix
Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).
VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).
TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).
Yellow highlighting indicates site-specific parameters that may be edited by the user.
Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.
Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-13

EPA-OLEM VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.5.1 (June 2017 RSLs) - CP-024

Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard	Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
		Csg	Cia	CR	HQ	IUR		RfC		
		(ug/m^3)	(ug/m^3)			(ug/m^3)$^{-1}$		(mg/m^3)		i
127-18-4	Tetrachloroethylene	5.0E+04	1.50E+03	3.2E-05	8.6E+00	2.60E-07	I	4.00E-02	I	
79-01-6	Trichloroethylene	3.2E+02	9.60E+00	3.2E-06	1.1E+00	see note	I	2.00E-03	I	TCE

Notes:

(1) Inhalation Pathway Exposure Parameters (RME):

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_SG	70	ATc_C_SG	70	**ATc_SG**	**70**
Averaging time for non-carcinogens	(yrs)	ATnc_R_SG	26	ATnc_C_SG	25	**ATnc_SG**	**25**
Exposure duration	(yrs)	ED_R_SG	26	ED_C_SG	25	**ED_SG**	**25**
Exposure frequency	(days/yr)	EF_R_SG	350	EF_C_SG	250	**EF_SG**	**250**
Exposure time	(hr/day)	ET_R_SG	24	ET_C_SG	8	**ET_SG**	**8**

(2) Generic Attenuation Factors:

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_SG	0.03	AFss_C_SG	0.03	**AFss_SG**	**0.03**

(3) Formulas

Cia, target = MIN(Cia,c; Cia,nc)

Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)

Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) Special Case Chemicals

	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Trichloroethylene	mIURTCE_R_SG	1.00E-06	mIURTCE_C_SG	0.00E+00	mIURTCE_SG	0.00E+00
	IURTCE_R_SG	3.10E-06	IURTCE_C_SG	4.10E-06	IURTCE_SG	4.10E-06

Mutagenic Chemicals

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 This factor is used in the equations for mutagenic chemicals.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml

A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

S = See RSL User Guide, Section 5

X = PPRTV Appendix

Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user.

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-14

EPA-OLEM VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.5.1 (June 2017 RSLs) - CP-027

Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard	Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
		Csg	Cia	CR	HQ	IUR		RfC		
		(ug/m^3)	(ug/m^3)			(ug/m^3)$^{-1}$		(mg/m^3)		i
127-18-4	Tetrachloroethylene	2.6E+04	7.80E+02	1.7E-05	4.5E+00	2.60E-07	I	4.00E-02	I	
79-01-6	Trichloroethylene	1.4E+03	4.20E+01	1.4E-05	4.8E+00	see note	I	2.00E-03	I	TCE

Notes:

(1) Inhalation Pathway Exposure Parameters (RME):

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_SG	70	ATc_C_SG	70	**ATc_SG**	**70**
Averaging time for non-carcinogens	(yrs)	ATnc_R_SG	26	ATnc_C_SG	25	**ATnc_SG**	**25**
Exposure duration	(yrs)	ED_R_SG	26	ED_C_SG	25	**ED_SG**	**25**
Exposure frequency	(days/yr)	EF_R_SG	350	EF_C_SG	250	**EF_SG**	**250**
Exposure time	(hr/day)	ET_R_SG	24	ET_C_SG	8	**ET_SG**	**8**

(2) Generic Attenuation Factors:

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_SG	0.03	AFss_C_SG	0.03	**AFss_SG**	**0.03**

(3) Formulas

Cia, target = MIN(Cia,c; Cia,nc)

Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)

Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) Special Case Chemicals

	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Trichloroethylene	mIURTCE_R_SG	1.00E-06	mIURTCE_C_SG	0.00E+00	mIURTCE_SG	0.00E+00
	IURTCE_R_SG	3.10E-06	IURTCE_C_SG	4.10E-06	IURTCE_SG	4.10E-06

Mutagenic Chemicals

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 This factor is used in the equations for mutagenic chemicals.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml

A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

S = See RSL User Guide, Section 5

X = PPRTV Appendix

Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user.

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-15
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Indoor Air Concentration to Risk (IAC-Risk) Calculator Version 3.5.1 (June 2017 RSLs) - CP-056
Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column E)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column F)

CAS	Chemical Name	Site Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard
		Cia	CR	HQ
		(ug/m^3)		
79-01-6	Trichloroethylene	1.60E+00	5.3E-07	1.8E-01

Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
IUR		RfC		
(ug/m^3)$^{-1}$		(mg/m^3)		i
see note	I	2.00E-03	I	TCE

Notes:

(1) **Inhalation Pathway Exposure Param**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Averaging time for carcinogens	(yrs)	ATc_R_IA	70	ATc_C_IA	70	ATc_IA	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_IA	26	ATnc_C_IA	25	ATnc_IA	25
Exposure duration	(yrs)	ED_R_IA	26	ED_C_IA	25	ED_IA	25
Exposure frequency	(days/yr)	EF_R_IA	350	EF_C_IA	250	EF_IA	250
Exposure time	(hr/day)	ET_R_IA	24	ET_C_IA	8	ET_IA	8

(2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Groundwater	(-)	AFgw_R_IA	0.001	AFgw_C_IA	0.001	AFgw_IA	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_IA	0.03	AFss_C_IA	0.03	AFss_IA	0.03

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
	mIURTCE_R_IA	1.00E-06	mIURTCE_C_IA	0.00E+00	mIURTCE_IA	0.00E+00
	IURTCE_R_IA	3.10E-06	IURTCE_C_IA	4.10E-06	IURTCE_IA	4.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html
P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml
A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html
CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp
H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml
S = See RSL User Guide, Section 5
X = PPRTV Appendix
Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).
VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).
TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).
Yellow highlighting indicates site-specific parameters that may be edited by the user.
Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.
Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-16
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Indoor Air Concentration to Risk (IAC-Risk) Calculator Version 3.5.1 (June 2017 RSLs) - RP-039
Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column E)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column F)

CAS	Chemical Name	Site Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
127-18-4	Tetrachloroethylene	1.90E+02	1.8E-05	4.6E+00	2.60E-07	I	4.00E-02	I	
79-01-6	Trichloroethylene	6.30E+00	1.3E-05	3.0E+00	see note	I	2.00E-03	I	TCE

Notes:

(1) **Inhalation Pathway Exposure Param**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Averaging time for carcinogens	(yrs)	ATc_R_IA	70	ATc_C_IA	70	ATc_IA	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_IA	26	ATnc_C_IA	25	ATnc_IA	26
Exposure duration	(yrs)	ED_R_IA	26	ED_C_IA	25	ED_IA	26
Exposure frequency	(days/yr)	EF_R_IA	350	EF_C_IA	250	EF_IA	350
Exposure time	(hr/day)	ET_R_IA	24	ET_C_IA	8	ET_IA	24

(2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Groundwater	(-)	AFgw_R_IA	0.001	AFgw_C_IA	0.001	AFgw_IA	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_IA	0.03	AFss_C_IA	0.03	AFss_IA	0.03

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
	mIURTCE_R_IA	1.00E-06	mIURTCE_C_IA	0.00E+00	mIURTCE_IA	1.00E-06
	IURTCE_R_IA	3.10E-06	IURTCE_C_IA	4.10E-06	IURTCE_IA	3.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 72 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml

A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

S = See RSL User Guide, Section 5

X = PPRTV Appendix

Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user.

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-17

EPA-OLEM VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.5.1 (June 2017 RSLs) - RP-039

Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard
		Csg	Cia	CR	HQ
		(ug/m^3)	(ug/m^3)		
127-18-4	Tetrachloroethylene	7.7E+03	2.31E+02	2.1E-05	5.5E+00
79-01-6	Trichloroethylene	2.6E+02	7.80E+00	1.6E-05	3.7E+00

Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
IUR		RfC		
(ug/m^3)$^{-1}$		(mg/m^3)		i
2.60E-07	I	4.00E-02	I	
see note	I	2.00E-03	I	TCE

Notes:

(1) **Inhalation Pathway Exposure Parameters (RME):**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_SG	70	ATc_C_SG	70	**ATc_SG**	**70**
Averaging time for non-carcinogens	(yrs)	ATnc_R_SG	26	ATnc_C_SG	25	**ATnc_SG**	**26**
Exposure duration	(yrs)	ED_R_SG	26	ED_C_SG	25	**ED_SG**	**26**
Exposure frequency	(days/yr)	EF_R_SG	350	EF_C_SG	250	**EF_SG**	**350**
Exposure time	(hr/day)	ET_R_SG	24	ET_C_SG	8	**ET_SG**	**24**

(2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_SG	0.03	AFss_C_SG	0.03	**AFss_SG**	**0.03**

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)

Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)

Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Trichloroethylene	mIURTCE_R_SG	1.00E-06	mIURTCE_C_SG	0.00E+00	mIURTCE_SG	1.00E-06
	IURTCE_R_SG	3.10E-06	IURTCE_C_SG	4.10E-06	IURTCE_SG	3.10E-06

Mutagenic Chemicals

The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 72 This factor is used in the equations for mutagenic chemicals.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml

A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

S = See RSL User Guide, Section 5

X = PPRTV Appendix

Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user.

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-18
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Indoor Air Concentration to Risk (IAC-Risk) Calculator Version 3.5.1 (June 2017 RSLs) - RP-041
Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column E)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column F)

CAS	Chemical Name	Site Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
127-18-4	Tetrachloroethylene	8.80E+00	8.1E-07	2.1E-01	2.60E-07	I	4.00E-02	I	
79-01-6	Trichloroethylene	4.00E-01	8.4E-07	1.9E-01	see note	I	2.00E-03	I	TCE

Notes:

(1) **Inhalation Pathway Exposure Param**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Averaging time for carcinogens	(yrs)	ATc_R_IA	70	ATc_C_IA	70	ATc_IA	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_IA	26	ATnc_C_IA	25	ATnc_IA	26
Exposure duration	(yrs)	ED_R_IA	26	ED_C_IA	25	ED_IA	26
Exposure frequency	(days/yr)	EF_R_IA	350	EF_C_IA	250	EF_IA	350
Exposure time	(hr/day)	ET_R_IA	24	ET_C_IA	8	ET_IA	24

(2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Groundwater	(-)	AFgw_R_IA	0.001	AFgw_C_IA	0.001	AFgw_IA	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_IA	0.03	AFss_C_IA	0.03	AFss_IA	0.03

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
	mIURTCE_R_IA	1.00E-06	mIURTCE_C_IA	0.00E+00	mIURTCE_IA	1.00E-06
	IURTCE_R_IA	3.10E-06	IURTCE_C_IA	4.10E-06	IURTCE_IA	3.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 72 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml

A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

S = See RSL User Guide, Section 5

X = PPRTV Appendix

Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user.

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-19
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Indoor Air Concentration to Risk (IAC-Risk) Calculator Version 3.5.1 (June 2017 RSLs) - RP-042
Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column E)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column F)

CAS	Chemical Name	Site Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
127-18-4	Tetrachloroethylene	7.80E+00	7.2E-07	1.9E-01	2.60E-07	I	4.00E-02	I	
79-01-6	Trichloroethylene	5.00E-01	1.0E-06	2.4E-01	see note	I	2.00E-03	I	TCE

Notes:

(1) **Inhalation Pathway Exposure Param**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_IA	70	ATc_C_IA	70	ATc_IA	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_IA	26	ATnc_C_IA	25	ATnc_IA	26
Exposure duration	(yrs)	ED_R_IA	26	ED_C_IA	25	ED_IA	26
Exposure frequency	(days/yr)	EF_R_IA	350	EF_C_IA	250	EF_IA	350
Exposure time	(hr/day)	ET_R_IA	24	ET_C_IA	8	ET_IA	24

(2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Groundwater	(-)	AFgw_R_IA	0.001	AFgw_C_IA	0.001	AFgw_IA	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_IA	0.03	AFss_C_IA	0.03	AFss_IA	0.03

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)

Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)

Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
	mIURTCE_R_IA	1.00E-06	mIURTCE_C_IA	0.00E+00	mIURTCE_IA	1.00E-06
	IURTCE_R_IA	3.10E-06	IURTCE_C_IA	4.10E-06	IURTCE_IA	3.10E-06

Mutagenic Chemicals

The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 72 This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride

See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml

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S = See RSL User Guide, Section 5

X = PPRTV Appendix

Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user.

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-20

EPA-OLEM VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.5.1 (June 2017 RSLs) - RP-042

Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard
		Csg	Cia	CR	HQ
		(ug/m^3)	(ug/m^3)		
127-18-4	Tetrachloroethylene	7.6E+02	2.28E+01	2.1E-06	5.5E-01
79-01-6	Trichloroethylene	8.7E+01	2.61E+00	5.5E-06	1.3E+00

Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
IUR		RfC		
(ug/m^3)$^{-1}$		(mg/m^3)		i
2.60E-07	I	4.00E-02	I	
see note	I	2.00E-03	I	TCE

Notes:

(1) **Inhalation Pathway Exposure Parameters (RME):**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_SG	70	ATc_C_SG	70	**ATc_SG**	**70**
Averaging time for non-carcinogens	(yrs)	ATnc_R_SG	26	ATnc_C_SG	25	**ATnc_SG**	**26**
Exposure duration	(yrs)	ED_R_SG	26	ED_C_SG	25	**ED_SG**	**26**
Exposure frequency	(days/yr)	EF_R_SG	350	EF_C_SG	250	**EF_SG**	**350**
Exposure time	(hr/day)	ET_R_SG	24	ET_C_SG	8	**ET_SG**	**24**

(2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_SG	0.03	AFss_C_SG	0.03	**AFss_SG**	**0.03**

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)

Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)

Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Trichloroethylene	mIURTCE_R_SG	1.00E-06	mIURTCE_C_SG	0.00E+00	mIURTCE_SG	1.00E-06
	IURTCE_R_SG	3.10E-06	IURTCE_C_SG	4.10E-06	IURTCE_SG	3.10E-06

Mutagenic Chemicals

The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 72 This factor is used in the equations for mutagenic chemicals.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml

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S = See RSL User Guide, Section 5

X = PPRTV Appendix

Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user.

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-21
EPA-OLEM VAPOR INTRUSION ASSESSMENT
Indoor Air Concentration to Risk (IAC-Risk) Calculator Version 3.5.1 (June 2017 RSLs) - RP-047
Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column E)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column F)

CAS	Chemical Name	Site Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
127-18-4	Tetrachloroethylene	5.40E+00	5.0E-07	1.3E-01	2.60E-07	I	4.00E-02	I	
79-01-6	Trichloroethylene	4.50E+00	9.4E-06	2.2E+00	see note	I	2.00E-03	I	TCE

Notes:

(1) **Inhalation Pathway Exposure Param**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Averaging time for carcinogens	(yrs)	ATc_R_IA	70	ATc_C_IA	70	ATc_IA	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_IA	26	ATnc_C_IA	25	ATnc_IA	26
Exposure duration	(yrs)	ED_R_IA	26	ED_C_IA	25	ED_IA	26
Exposure frequency	(days/yr)	EF_R_IA	350	EF_C_IA	250	EF_IA	350
Exposure time	(hr/day)	ET_R_IA	24	ET_C_IA	8	ET_IA	24

(2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
Groundwater	(-)	AFgw_R_IA	0.001	AFgw_C_IA	0.001	AFgw_IA	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_IA	0.03	AFss_C_IA	0.03	AFss_IA	0.03

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on Symbol	Selected (based on Value
	mIURTCE_R_IA	1.00E-06	mIURTCE_C_IA	0.00E+00	mIURTCE_IA	1.00E-06
	IURTCE_R_IA	3.10E-06	IURTCE_C_IA	4.10E-06	IURTCE_IA	3.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 72 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

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S = See RSL User Guide, Section 5

X = PPRTV Appendix

Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user.

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Table 4-22

EPA-OLEM VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 3.5.1 (June 2017 RSLs) - RP-047

Keystone Corridor Site, Marion County, Indiana

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard
		Csg	Cia	CR	HQ
		(ug/m^3)	(ug/m^3)		
79-01-6	Trichloroethylene	3.3E+01	9.90E-01	2.1E-06	4.7E-01

Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
IUR		RfC		
(ug/m^3)$^{-1}$		(mg/m^3)		i
see note	I	2.00E-03	I	TCE

Notes:

(1) **Inhalation Pathway Exposure Parameters (RME):**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_SG	70	ATc_C_SG	70	**ATc_SG**	**70**
Averaging time for non-carcinogens	(yrs)	ATnc_R_SG	26	ATnc_C_SG	25	**ATnc_SG**	**26**
Exposure duration	(yrs)	ED_R_SG	26	ED_C_SG	25	**ED_SG**	**26**
Exposure frequency	(days/yr)	EF_R_SG	350	EF_C_SG	250	**EF_SG**	**350**
Exposure time	(hr/day)	ET_R_SG	24	ET_C_SG	8	**ET_SG**	**24**

(2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_SG	0.03	AFss_C_SG	0.03	**AFss_SG**	**0.03**

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)

Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)

Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Trichloroethylene	mIURTCE_R_SG	1.00E-06	mIURTCE_C_SG	0.00E+00	mIURTCE_SG	1.00E-06
	IURTCE_R_SG	3.10E-06	IURTCE_C_SG	4.10E-06	IURTCE_SG	3.10E-06

Mutagenic Chemicals

The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 72 This factor is used in the equations for mutagenic chemicals.

Notation:

I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

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Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

Yellow highlighting indicates site-specific parameters that may be edited by the user.

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).