



October 5, 2011

Mr. Kevin Houppert, LPG  
Remediation Services Branch  
Indiana Department of Environmental Management  
100 North Senate Ave.  
Indianapolis, IN 46204-2251

**RE: Remediation Feasibility Study, TORX Facility  
4366 North Old US Highway 31, Rochester, Indiana  
AMEC Project Number: 3359-09-2469**

Dear Mr. Houppert:

Enclosed please find two paper copies and one electronic copy of the Remediation Feasibility Study for the TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana. The Remediation Feasibility Study includes the evaluation of the site-specific risks and an evaluation of various remedial actions that could address the volatile organic compounds in the sub-surface at the reference site.

If you have any questions regarding this report, please contact Mr. Paul Stork at 937-859-3600 or Mr. Jamie Schiff at 401-457-2422.

Sincerely,  
**AMEC Environment & Infrastructure**

A handwritten signature in black ink, appearing to read "Paul J. Stork".

AMEC Electronic Signature

Paul J. Stork  
Project Manager

Enclosures

cc: Mr. Jamie Schiff (Textron, Inc.)  
Ms. Theresa Holz (U.S. EPA Region 5)

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**REMEDIATION  
FEASIBILITY STUDY**

**TORX FACILITY, ROCHESTER, INDIANA**

**Submitted to:**

**INDIANA DEPARTMENT OF  
ENVIRONMENTAL MANAGEMENT**

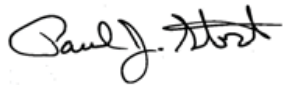
**Prepared for:**

**TEXTRON, INC.**

**October 5, 2011**

REMEDATION FEASIBILITY STUDY  
TORX FACILITY, ROCHESTER, INDIANA

Prepared for:  
TEXTRON, INC.



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Project Manager



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Dayne M. Crowley  
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October 5, 2011

Project Number: 3359-09-2469

#### **IMPORTANT NOTICE**

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**LIST OF ACRONYMS AND ABBREVIATIONS**

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1,1-DCE	1,1-dichloroethene
95-UCL	95-percent Upper Confidence Limit
ARARs	Applicable or Relevant and Appropriate Requirements
cfm	cubic feet per minute
cis-1,2-DCE	cis-1,2-dichloroethene
COCs	Chemical of Concern
DHC	Dehalococcoides
DNAPL	Dense Non-Aqueous Phase Liquid
DO	Dissolved Oxygen
DVIPPG	Draft Vapor Intrusion Pilot Program Guidance
ERC	Environmental Restrictive Covenant
FS	Feasibility Study
FSI	Further Site Investigation
ft/d	feet per day
gpd/ft	gallons per day per foot
gpm	gallons per minute
HRC	Hydrogen Release Compound
HSA	Hollow Stem Auger
IDCLs	Industrial Default Closure Levels
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources

IDNR-DOW	Indiana Department of Natural Resources Division of Water
ISCO	In-Situ Chemical Oxidation
MCL	Maximum Contaminant Level
µg/L	Micrograms per Liter
mg/L	Milligrams per Liter
MNA	Monitored Natural Attenuation
mV	Millivolts
NA	Natural Attenuation
NAVD	North American Vertical Datum
NFA	No Further Action
O&M	Operation and Maintenance
ORP	Oxidation Reduction Potential
P&T	Pump and Treat
PCE	Tetrachloroethene
POC	Perimeter of Compliance
POD	Point of Demonstration
POE	Point of Exposure
POTW	Public Operated Public Works
PRBs	Permeable Reactive Barriers
QA/QC	Quality Assurance/Quality Control
RA	Risk Assessment
RAOs	Remedial Action Objectives
RDCLs	Residential Default Closure Levels

RISC	Risk Integrated System of Closure
ROI	Radius of Influence
SSTLs	Site-Specific Target Levels
SVE	Soil Vapor Extraction
trans-1,2-DCE	trans-1,2-dichloroethene
TCE	Trichloroethene
USEPA	United States Environmental Protection Agency
VC	Vinyl Chloride
VOC	Volatile Organic Compound
ZOI	Zone of Influence
ZVI	Zero-Valent Iron

## **1.0 Introduction**

Textron, Inc. (Textron) retained AMEC E&I, Inc. (AMEC), formerly MACTEC, to prepare this remedial action feasibility study for the TORX Facility (Site) located at 4366 North Old US Highway 31 in Rochester, Fulton County, Indiana. This report presents the remedial action feasibility study (FS) for the Site as prepared in accordance with the Indiana Department of Environmental Management (IDEM), Special Notice of Liability dated November 19, 2008.

### **1.1 Purpose**

The FS was prepared by AMEC to identify and evaluate potential remedial alternatives to address the Site chemicals of concern (COCs). The monitoring wells installed during the initial further site investigation (FSI) and the Phase 2 FSI were used to delineate the vertical and horizontal extent of volatile organic compounds (VOCs) in groundwater. The primary VOCs that were detected in groundwater samples at concentrations greater than Risk Integrated System of Closure (RISC) Residential Default Closure Levels (RDCLs) and Industrial Default Closure Levels (IDCLs) are cis-1,2-dichloroethene (cis-1,2-DCE), trichloroethene (TCE), and vinyl chloride (VC). These VOCs are the COCs associated with historic operations at the Site (Site-related VOCs) and will be addressed in the FS.

### **1.2 Report Organization**

This report is divided into eleven sections:

- Section 1: Introduction – Site information and purpose for the remedial FS
- Section 2: Site Background – Site information including description and history, release background and historical environmental assessments, previous remedial actions, the current interpretation of the hydrogeology and distribution of COCs
- Section 3: Remedial Action Objectives – Describes the remedial action objectives (RAOs) for each media of interest (i.e. soil, groundwater, surface water, and air)
- Section 4: General Response Actions and Media Requiring Remedial Action – A discussion of general response actions that can be used to control and/or treat contaminants protective of human health and environment
- Section 5: Identification and Screening of Technologies – Identifies remedial technologies for each medium of interest

- Section 6: Development and Screening of Remedial Technologies for Alternatives – One or more remedial technologies were screened and developed for potential alternatives
- Section 7: Detailed Analyses of Alternatives – Alternatives are evaluated in detail with respect to specific evaluation criteria
- Section 8: Comparative Analyses of Alternatives – Provides a comparison and ranking of the developed remedial alternatives based on the specific evaluation criteria
- Section 9: Recommended Alternative – Lists the recommended alternative to attain RAOs
- Section 10: Conclusions – The selection of the remedial alternative based on site-specific findings
- Section 11: References.



## **2.0 Site Background**

### **2.1 Site Description and Contact Information**

The Site, which occupies approximately 96 acres to the west of North Old US Highway 31 and to the south of road E 450 N, is located at 4366 North Old US Highway 31, in Rochester, Fulton County, Indiana. A site location map is attached as Figure 1 (Appendix B). The Site is comprised of one large Facility operations building (Facility), a parking lot west of the Facility, and a pond located west of the Facility and north of the parking lot. The Site features are shown on Figure 2 (Appendix B). Two auxiliary buildings are located south of the parking lot. The size of the Facility is approximately 78,000 square feet. The former main water supply was provided by a supply well located east of the production building along North Old US Highway 31. Water is currently supplied to the Site from two production wells located west of the production building. Wastewater is processed through a treatment system and discharged to a septic system located north of the production building. The Site is currently operated by Acument Global Technologies/Camcar, LLC who produces products similar to those that had been historically manufactured at this Site.

Presented below is the Site contact information.

#### ***Site Information***

Site Name: TORX Facility  
State Cleanup Site Number: 7100149  
Site Mailing Address: 4366 North Old US Highway 31 Rochester,  
Indiana 46975  
Telephone Number: Contact Mr. Jamieson Schiff, Textron, Inc,  
40 Westminster Street, Providence, RI 02903  
(401) 457-2422

#### ***Investigation Contact Information***

Company Name: Textron, Inc.  
Mailing Address: 40 Westminster Street, Providence, RI 02903  
Telephone Number: (401) 457-2422  
Project Manager: Mr. Jamieson Schiff

#### ***Current Owner Information***

Owner/Operator Name: Acument Global Technologies, Camcar LLC-  
Rochester Operations  
Mailing Address: 4366 North Old US Highway 31  
Rochester, Indiana 46975  
Telephone Number: (574) 223-3131

## **2.2 Site History, Release Background, Historical Site Investigations and Corrective Actions**

The Site has been used to manufacture metal fasteners since about 1946. The Site was operated by Textron from mid 1950's to 2006 when the Site was purchased by Acument Global Technologies/Camcar, LLC. Inside the Facility is a production line where fasteners are made. The Facility did not conduct plating operations; therefore, any parts which required metal finishing were sent off-site for processing. Inside the production area, the Facility also contains a parts washer and heat treatment area.

From approximately 1952 to 1992, process wastewater and non-contact cooling water was discharged into the on-site pond located to the west of the Facility and hereafter identified as the Western Pond [Figure 2 (Appendix B)]. The source of the process wastewater included the caustic parts washer and the heat-treat washers. According to the Site Status Report that was dated August 1, 1990 (Heritage, 1990), the wastewater was comprised of water and various quantities of lubricating oils, cutting oils, quench oils, water soluble oils, metal particles, and dirt.

Sampling of the wastewater discharge in 1986 indicated that concentrations of heavy metals (cadmium, chromium, copper, and lead) and VOCs were present in the samples. At the time, process wastewater from the Site operations was discharged into the Western Pond. Therefore, additional work was proposed to assess the environmental conditions at the Site.

Available information suggests that operations prior to 1968 utilized trichloroethene (TCE), which resulted in releases that are now present within groundwater beneath the facility and down gradient properties. The primary source area appears to be areas surrounding the former degreaser pit, located in the central portion of the TORX facility (**see Figure 2**). Based on the results of groundwater sampling, a secondary source of TCE in groundwater appears to be the southeastern end of the Western Pond that formerly was used to collect process wastewater from onsite operations.

### **2.2.1 Summary of the Historical Investigations and Previous Corrective Measures (Pre-2008)**

Since 1986, numerous investigations have been performed at the Site. Results of previous investigations performed prior to the 2009 FSI are summarized in the Investigation Work Plan (MACTEC, 2010) and submitted to IDEM. Between 1986 and 2008, samples were collected from the process wastewater, the Western Pond (surface water and sediment), 15 on-site monitoring wells, on-site

production wells, nearby private drinking water wells, soils near the former degreaser pit and Western Pond, seven off-site monitoring wells, soil gas down-gradient of monitoring wells MW-6B and MW-6C (soil gas samples), and from the Eastern Pond (discrete groundwater samples).

Historically, the COCs detected in the samples submitted for laboratory analyses have been cis-1,2-DCE, TCE, and VC. Based on previous work in the early 1990's, approximately 19,000 tons of sediment and soil were excavated and removed from the Western Pond. Results of the investigations conducted since 2008 are summarized in the following subsections.

### **2.2.2 Further Site Investigations (2009 through 2010)**

The FSI (initial FSI and Phase 2 FSI) were completed in accordance with the Special Notice of Liability that was sent to Textron, Inc. (Textron) on November 19, 2008 by IDEM. The primary purpose of the FSI was to delineate the vertical and horizontal extent of the VOC plume in groundwater.

During the FSI, the following were performed:

- Residential Water Sampling
- Residential Treatment System Monitoring
- VOC Delineation in Overburden Soils
- Bedrock Investigation
- Investigation of Other COCs (i.e. metals)
- Ecological Evaluation at Down-Gradient Pond (Eastern Pond)
- Source Area Investigation
- Vapor Intrusion Evaluation at the Site and at Off-Site Properties
- Hydraulic Conductivity Evaluation
- Groundwater Sampling

Details of the investigations performed at the Site from 2008 through 2010 are presented in three reports on file with IDEM (MACTEC, 2008, 2009, and 2010). Please refer to the reports for complete details of the FSI activities. Figure 3 (Appendix B) presents the extent of the study area for the Site and includes the location of the down gradient monitoring wells. A summary of the activities performed during the FSI relating to VOCs detected in soil and groundwater are presented in the following subsections.

#### ***Source Area Investigations***

During the 2010 Phase 2 FSI, soil and groundwater were assessed for COCs beneath the Facility at the former degreasing pit and at other areas of concern.

Based on the findings of the Phase 2 FSI, VOCs in soil above the water table were not detected at concentrations exceeding IDCLs. Table 1 (Appendix A) presents the results of the laboratory analyses performed on the selected soil samples.

Groundwater assessed beneath the former degreasing pit and at other locations contained VOC's exceeding IDCL's. Table 2 (Appendix A) presents the results of the groundwater sampling performed at the source area wells and other wells since 2009. Figure 4 (Appendix B) presents the location of the wells along with the VOC concentrations from the December 2010 groundwater sampling event.

#### ***Vertical and Horizontal Groundwater Profiling and Monitoring***

As part of the FSIs, vertical and horizontal groundwater profiling of the aquifer was performed using various drilling techniques. Vertical groundwater profiling was conducted by sampling discrete groundwater intervals (approximately 10 feet in length) to aid in selecting screen intervals for permanent groundwater monitoring wells. An on-site mobile laboratory was used to determine which intervals were to be screened for groundwater monitoring. Based on the results of the vertical groundwater profiling, one or more wells were set at each location to monitor groundwater. Details of the vertical and horizontal profiling and the results of on-site laboratory analyses are presented in the 2009 and 2010 FSI reports (MACTEC, 2009 and 2010) on file with IDEM. The well locations are presented on Figure 3 (Appendix B).

### **2.2.3 Interim Corrective Actions - Residential Drinking Water**

During the FSIs, drinking water at residential properties surrounding and down-gradient of the Site were evaluated for VOCs. Low-level VOCs were detected in various residential drinking water supplies. Therefore, Textron installed whole-house water treatment systems and provided bottled drinking water to residents. In addition, at the request of near-by residents, whole-house water treatment systems were installed at properties where no VOCs were detected in analyzed water samples. Details of residential drinking water sampling and treatment are presented in correspondence on file at IDEM. Table 3 (Appendix A) presents the results of the residential well sampling and designated map ID numbers. Figure 5 (Appendix B) presents the location of residential wells sampled using designated map ID numbers listed on Table 3 (Appendix A).

## **2.3 Site Geology and Hydrology**

### **2.3.1 Site-Wide Stratigraphy**

Geologic cross-sections were prepared to interpret the lithology in the vicinity of the Site. The cross-section traverses are shown on Figure 6 (Appendix B) and the cross-sections are included as Figures 7 through 15 (Appendix B).

Based on the cross-sections, the lithology beneath the Site and surrounding area consists of interbedded coarse-grained, permeable sediments (sands and gravels) and fine-grained, low permeable sediments (silts and clays) above the limestone bedrock. Generally, the fine-grained deposits appear to be discontinuous and act as aquitards where prominent. A relatively continuous, fine-grained unit is located across a large portion of the study area at the bedrock surface.

The cross-sections appear to indicate an outwash depositional environment resulting from glacial activities, the meandering Tippecanoe River, and surface drainage. The coarse-grained sediments are preferential flow paths for groundwater and VOC migration. In addition, vertical groundwater gradients and horizontal flow components influence the direction of groundwater flow and contaminant migration.

### **2.3.2 Site-Wide Hydrogeology**

Aquifers identified during the FSI include an overburden aquifer (Maxinkukee Moraine Aquifer System) and a bedrock aquifer (Silurian and Devonian Carbonate Aquifer System). According to the Unconsolidated Aquifer Systems of Fulton County, Indiana map (IDNR, 2008), the Maxinkukee Moraine Aquifer System consists of discontinuous surficial sands and gravels, thick till sequences, and deeper sands and gravels. According to the Bedrock Aquifer Systems of Fulton County, Indiana (IDNR, 2008), Silurian-age carbonate bedrock (Wabash Formation) and Devonian-age carbonate rocks (Muscatatuck Group) compose the bedrock aquifer system in the vicinity of the Site. The bedrock is predominantly overlain by low permeable clay deposits. Domestic wells completed in the bedrock aquifer system, reportedly yield between 10 gallons and 20 gallons per minute (gpm).

#### ***Overburden Aquifer***

Artesian conditions have been measured along the western side of the Eastern Pond [monitoring wells MW-17 and well nest MW-27, Figure 3 (Appendix B)]. Excluding the artesian water conditions, the thickness of the vadose zone in the vicinity of the Site ranges from less than 1 foot near the Tippecanoe River (MW-

39 well nest) to greater than 50 feet northeast of the Site (MW-7 and MW-46). Due to artesian conditions, groundwater levels on the western side of the Eastern Pond can be approximately 0.1 feet above ground surface. Including the lower permeability units, the average overburden aquifer saturated thickness ranges from approximately 140 feet near the Site to less than 100 feet adjacent to the Tippecanoe River.

Hydraulic conductivity, transmissivity, and storativity were estimated using the water levels recorded from the irrigation well and nearby monitoring wells during pumping of the irrigation well located east of the study area in 2009, and hydraulic conductivity was estimated using the results of the falling head tests performed in 2010. The results of these calculations were reported in the FSI Report (MACTEC, 2009) and the Phase 2 FSI (MACTEC, 2010).

During the 2009 evaluation, the hydraulic conductivities in the overburden monitoring wells were estimated to range from 47.9 to 90.2 feet per day (ft/d); transmissivities ranged from approximately 59,700 to 79,600 gallons per day per ft (gpd/ft). Storativity coefficients of  $3.5 \times 10^{-4}$  and  $5.2 \times 10^{-4}$  were calculated using the Cooper-Jacob Method for wells MW-31(98.5) and MW-31(139.2), respectively. A storativity value of  $9.3 \times 10^{-4}$  was calculated for MW-31(98.5) using the Theis Method. Please note that during the FSI, the following well identification nomenclature identifies the well ID and the bottom of the well screen (in parentheses in feet).

Falling head permeability tests were completed at seven monitoring wells using the data collected on April 21, 2010. Of the seven wells tested, results were obtained at six wells that are representative of the respective saturated zones, although the values are at the upper limits of the range of values that may be calculated with slug tests. The results of the test performed in well MW-20(51) were determined to be inconclusive because of the relatively unstable water levels observed in the well during recovery. In that test, the water levels recorded alternated between positive and negative drawdown values as the recovery occurred and the data were judged to be inconclusive. The resulting hydraulic conductivities for tests completed in the remaining six wells [MW-20(35), MW-25(16.4), MW-25(45.2), MW-26(17.5), MW-26(28.8), and MW-30(41)] were estimated using the Hvorslev (1951) Basic Time Lag method. Those results ranged from 29.2 ft/d for monitoring well MW-25(16.4) to 77.1 ft/d for monitoring well MW-20(35). The average hydraulic conductivity for the six wells [excluding MW-20(51)] was 48.5 ft/d.

***Bedrock Aquifer***

The upper bedrock aquifer is comprised of limestone. The depth to the upper bedrock aquifer varies between 95 feet below ground surface at well nest MW-39 to 208 feet below ground surface at well nest MW-33.

The results of the hydraulic conductivity testing performed in the bedrock aquifer ranged from  $6.9 \times 10^{-2}$  ft/d to 19 ft/d. Based on the testing, it was generally noted that the hydraulic conductivity of the upper portion of the bedrock aquifer decreases with depth. Overall, decreasing hydraulic conductivities with depth is consistent with observations of decreasing fracture density with depth.

***Groundwater Elevations and Flow***

Groundwater elevations were calculated using the depth to water measurements obtained from the monitoring well network and established top-of-well-casing elevations relative to the 1988 North America Vertical Datum (NAVD 88). The calculated elevations and measured depths to water are included in Table 4 (Appendix A). In addition, the depths to surface water were measured for the Western Pond, the Eastern Pond, and the Tippecanoe River. The elevation of surface water in the ponds were measured from staff gages, and the elevation of surface water for the Tippecanoe River was measured from a surveyed reference point on the Tippecanoe River bridge located just north of the intersection of North Old US Highway 31 and 350N.

Using the water level elevations from December 6, 2010, groundwater contour maps were prepared for the shallow overburden aquifer [Figure 16 (Appendix B)], deep overburden aquifer [Figure 17 (Appendix B)], and bedrock aquifer [Figure 18 (Appendix B)].

Based on the groundwater contour map for the shallow overburden aquifer [Figure 16 (Appendix B)], there appears to be two dominant components of groundwater flow in the shallow overburden aquifer. Groundwater from the Site flows toward the east-southeast. In the vicinity of the Eastern Pond and E 425N, the direction of groundwater flow changes from the east-southeast to the south-southeast. Then, south of E 425N, groundwater flow moves in a more southerly direction.

Based upon the groundwater contour map for the deep overburden aquifer [Figure 17 (Appendix B)], groundwater appears to flow generally towards the south.



Groundwater flow in the bedrock aquifer appears to be in a southeasterly direction in the northern portion of the Site and in a southerly direction in the southern portion of the Site [Figure 18 (Appendix B)].

The groundwater flow interpretations appear to be consistent with groundwater flow interpretations of previous events.

#### ***Evaluation of VOC Plume in Groundwater Flow Influences from High Capacity Water Wells***

Nine high capacity wells (greater than 70 gallons per minute) were identified within two miles of the Site using the Indiana Department of Natural Resources – Division of Water (IDNR-DOW) website. Records on the IDNR-DOW website indicated that two high capacity wells are located on the Site (Map ID#’s 1A and 1F) and four high capacity wells (Map ID#’s 6, 57, 58, and 81) are located within two miles of the Site. Additionally, Site reconnaissance and public communication have identified two additional high capacity wells (Map ID#’s 82 and 83) located within two miles of the Site. The location of these high capacity water wells were presented in the 2009 FSI report (MACTEC, 2009). A copy of this map is also presented in Appendix C as Figure C1.

Due to the proximity, four of these wells were evaluated for potential influence of the VOC plume in groundwater beneath the Site and down-gradient of the Site. Figure 3 (Appendix B) presents the location of the wells. Three of the four wells are identified as production wells. Two of the three production wells are situated at the Site and one is situated at 4217 North Old US Highway 31 (AIRVAC property). The fourth well is an irrigation well situated east of the Eastern Pond. Of the four wells referenced above, the irrigation well has the greatest flow capacity. Groundwater extracted from these four wells have been sampled for VOCs and based on the analytical results performed on the samples collected from these wells, groundwater extracted from the wells do not contain VOCs associated with the Site release.

#### ***Eastern Irrigation Well***

The influence of irrigation well pumping on the surrounding groundwater environment was investigated in July 2009. The location of the irrigation well is shown on Figure 3 (Appendix B). Construction details (i.e. depth) for the irrigation well could not be located on the IDNR-DOW website. However, the property owner believes the irrigation well is either 100 feet or 150 feet deep. Based on the calculated drawdown in MW-31, the irrigation well is probably closer to 100 feet deep. The majority of the wells where drawdown was recorded are completed between 80 feet and 140 feet below ground surface.



However, drawdown was recorded in MW-32(24.1) that was completed between 19 feet and 24 feet below ground surface.

According to the well owner, when irrigation is needed for agricultural purposes, the irrigation well pumping occurs for periods of approximately 30 hours, followed by non-pumping periods. The approximate pumping rate of the irrigation well is 680 gallons per minute. During the 2009 FSI irrigation well evaluation, the maximum (single pumping episode) groundwater drawdown of 32.04 feet was recorded in the irrigation well. Based on the drawdown recorded in the background well nest (MW-22), the static groundwater drawdown is 0.35 feet or less. A drawdown of greater than 0.35 feet was recorded in several nearby monitoring wells. The greatest groundwater drawdown (2.89 feet) measured from the monitoring wells occurred at MW-31(98.5) that is approximately 100 feet deep. The closest monitoring well nest to the irrigation well is well nest MW-51, which was installed after the 2009 FSI and therefore was not evaluated during the 2009 FSI.

Based on the drawdown data obtained during irrigation well testing in 2009, it is the opinion of AMEC that groundwater pumping from the irrigation well can influence the natural groundwater flow direction of the dissolved-phase VOC plume if operated for extended periods. Groundwater flow in the deep overburden aquifer generally is towards the south [Figure 17 (Appendix B)] and extended periods of irrigation well use could alter the groundwater flow direction of the dissolved-phase VOC plume near the Eastern Pond from the south to a southeast direction.

Due to the intermittent and seasonal use of the irrigation well, depth of the irrigation well, and proximity of the dissolved-phase VOC plume in the deep overburden aquifer, it is unlikely that the dissolved-phase VOC plume in the deep overburden aquifer would be drawn towards the irrigation well. Monitoring wells situated northwest of the irrigation well are sampled for VOCs. The monitoring well nests for MW-29, MW-31, and MW-50, which are closest to the irrigation well, are good indicators to determine if seasonal and intermittent use of the irrigation well is influencing the groundwater flow direction of the dissolved-phase VOC plume in the deep overburden aquifer. To date, the data suggest that irrigation well use does not have a substantial impact on VOC plume migration.

#### ***TORX Production Wells***

Two Site production wells situated up-gradient of the source area and screened within the deep overburden aquifer do not appear to influence the direction of the VOC plume in groundwater at the Site. The VOC plume in groundwater at the

Site, overall, is limited to the shallow overburden aquifer [refer to Figures 7 and 10 (Appendix B)]. Based on periodic testing, VOCs have not been detected in water extracted from these wells.

#### ***AIRVAC Production Well***

According to water use records for 2010, the production well situated at the AIRVAC property has an estimated daily use of approximately 7,000 gallons per day. Water drawn from the existing production well is from the deep overburden aquifer according to AIRVAC personnel. Details (i.e. pumping rates) of the existing production well and other production wells at the AIRVAC facility are further discussed in Appendix C. The AIRVAC production well is situated down-gradient and cross-gradient of the dissolved-phase VOC plume [Figure 4 (Appendix B)]. Based on the data obtained from the monitoring well network, the AIRVAC production well is isolated from the VOC plume. This is demonstrated in the geologic cross-section [Figure C3 (Appendix C)], which presents the profile of the AIRVAC well and the lithology of the deep overburden aquifer where the wells are screened.

Based on the results of the tests performed on the groundwater samples obtained from MW-21 and groundwater flow direction [Figure 17 (Appendix B)], VOCs in groundwater beneath the Site do not appear to flow towards the AIRVAC production well nor appear to be influenced by the AIRVAC production well.

## **2.4 Nature and Extent of Contamination**

The nature and extent of Site-related VOCs in soil, groundwater, surface water, and sediment has been defined. Site COCs detected in soil and groundwater include TCE (parent product) and degradation products, which include cis-1,2-DCE, and VC. Based on the findings of the FSIs, these primary COCs persist in groundwater beneath the Site and at down-gradient locations. The relative concentrations of cis-1,2-DCE and VC compared to TCE concentrations in groundwater, indicate that bio-degradation has and is occurring in the source area and at down-gradient locations. The groundwater plume at the source area and down-gradient locations are presented on Figure 4 (Appendix B).

It should be pointed out that potential source areas, in addition to the Torx Site, have not been evaluated and therefore no determination has been made regarding whether the Site is the source of VOCs found in all residential wells. Historical activities at properties, including those up-gradient of the Torx Site suggest the possibility of other potential sources of VOCs in the area. Detection

of other VOCs such as certain –ethane compounds further suggests the potential of additional sources in the area

A summary of the nature and extent of COCs detected in soil, soil vapors, and groundwater is presented in the following sections.

#### **2.4.1 Soil**

During the FSIs, twenty-four (24) soil borings were advanced in and around the Facility to evaluate the VOC concentrations in soil. The soil investigations were focused in areas suspected to be source areas. The borings were located near the former degreaser pit, former process piping, the Western Pond, former dry wells, and former septic systems. Figure 19 (Appendix B) presents the location of the soil borings.

The soil borings advanced near the former degreaser pit and Western Pond also served as confirmatory soil borings to compare historical VOC concentrations detected in soil during the 1989 investigations with current conditions. None of the unsaturated soil samples submitted for analyses exceeded the RISC IDCLs for VOCs or metals (cadmium, chromium, copper, lead). The laboratory results for COCs tested in the unsaturated soil samples collected during the overburden drilling activities are summarized in Table 1 (VOCs) and Table 5 (Metals). Both Tables 1 and 5 are presented in Appendix A.

In addition to the analyses of unsaturated soil samples, the soil samples obtained from beneath the water table from select soil borings were tested for VOCs. The results of the laboratory analyses performed on the saturated soil samples collected from soil borings B59, B63, B68, B71, and B72 contained elevated concentrations of VOCs. Table 6 (Appendix A) presents the results of the laboratory analyses performed on the saturated soil samples. The concentrations of VOCs detected in the soil samples collected beneath the water table were evaluated during the screening of remedial technologies to address source area remediation for the upper water bearing zone.

#### **2.4.2 Vapor Intrusion**

Twelve vapor monitoring wells were drilled in December 2008 to evaluate the vapor intrusion pathway down-gradient of the Site. As many as three soil vapor probes were installed in each vapor monitoring well. Soil vapor samples collected from each soil vapor probe were analyzed for VOCs using EPA Method TO-15. VOCs were not detected at concentrations greater than the Residential – Soil Gas Screening Levels published in the IDEM Draft Vapor Intrusion Pilot Program Guidance (DVIPPG). Therefore, the vapor intrusion exposure pathway was considered incomplete and indoor air sampling at the residences was not

performed. The locations of the vapor monitoring wells are shown on Figure 3 (Appendix B).

In addition to the soil vapor monitoring, subslab vapor samples and indoor air samples were collected inside the Facility during the 2010 FSI. The concentrations of VOCs detected in the indoor air samples collected within the Facility were less than IDEM Commercial Indoor Air Screening Levels (25 Year Duration). TCE and cis-1,2-DCE were the only Site-related VOCs that were detected in the sub-slab soil vapor samples at concentrations greater than IDEM Commercial Sub-Slab Screening Levels (25 Year Duration). TCE concentrations exceeded the screening levels in six of the seven sub-slab soil vapor samples, and cis-1,2-DCE exceeded the screening levels in three of the seven sub-slab soil vapor samples collected inside the Facility.

Because the vapor intrusion investigation was not performed when mechanical heating system was operating (i.e. late winter/early spring), subsequent indoor air sampling was performed inside the Facility in February 2011. The laboratory results of the Facility vapor intrusion investigations conducted in May 2010 and February 2011 indicate that VOC concentrations in indoor air are sufficiently low and do not warrant further investigation.

Based on the results of soil vapor sampling, sub-slab vapor sampling, and indoor air sampling, vapor intrusion of Site-related VOCs does not appear to be an environmental health risk at the tested properties. It should be pointed out that the vapor intrusion testing was not performed at the residential property located at 4163 North Old US Highway 31, which is located east of the Site. As of the date of this report, the property owner at 4163 North Old US Highway 31 has not granted onsite access for vapor intrusion testing.

### **2.4.3 Surface Water and Pond Sediments**

On April 8, 2009, four surface water and eight sediment samples were collected from the Eastern Pond to evaluate the potential interaction between shallow groundwater and surface water and sediments. The sediment and surface water samples submitted to a laboratory for VOC analyses.

In the four surface water samples collected from the Eastern Pond, cis-1,2-DCE was the only VOC detected. Cis-1,2-DCE was also detected in one of the eight sediment samples. There is not a National Recommended Water Quality Criteria for protection of aquatic life for cis-1,2-DCE, and there is not a State of Indiana Water Quality Standard for this compound. The USEPA Region 5 list of RCRA Ecological Screening levels (USEPA, 2003) does not contain a screening value for this compound. However, detected cis-1,2-DCE concentrations were

less than the RISC RDCL. Although the Eastern Pond is not used for drinking water, the RISC RDCL is considered a concentration protective of human health. The cis-1,2-DCE concentration detected in the sediment sample was less than the RISC residential standard for soil. These RISC soil values would be considered protective of people contacting sediments.

#### **2.4.4 Groundwater**

A VOC plume in groundwater has been identified beneath the Site and at off-site down-gradient properties. The most frequently detected VOCs in groundwater were cis-1,2-DCE, trans-1,2-DCE, TCE, and VC. These frequently detected VOCs, along with 1,1-DCE, were detected in groundwater samples at concentrations greater than the RISC RDCLs.

##### ***Horizontal Extent of Site-Related VOCs***

Figure 4 (Appendix B) presents the approximate lateral extent for the VOC plume in groundwater and the concentrations of VOCs detected in the monitoring wells in December 2010. The lateral extent of the VOC plume in groundwater has been delineated by samples in which VOCs were not detected in groundwater collected from the following wells.

- Northern Extent - MW-53, and the monitoring wells located along E 450N
- Eastern Extent - Monitoring well nests MW-29, MW-31, MW-50, and MW-51
- Southern Extent - Monitoring well nests MW-37, MW-38, and MW-39
- Western Extent – Monitoring wells/well nests MW-22, MW-33, MW-35, MW-36, and MW-49

VOCs detected in up-gradient monitoring well MW-1 are not considered to be associated with the Site VOC groundwater plume based on location and other potential sources located up-gradient (north) of MW-1.

##### ***Vertical Extent of Site-Related VOCs***

Individual water bearing saturated zones appear to convey impacted groundwater independently of lesser or non-impacted saturated zones, which underlie those impacted zones. Interconnection between saturated horizons is evident due to the presence of VOCs in deeper saturated zones. However in some areas, those deeper saturated zones do not contain VOCs. The interpretative vertical extent of VOCs are shown on the cross-sections [Figures 7 through 15 (Appendix B)]. The deepest Site-related VOC (3.8 µg/L VC) was detected in the groundwater sample collected from MW-48(159) in December 2010. Previous sampling events detected very low levels of cis-1,2-DCE and in one case VC that were below the or only slightly above laboratory reporting

levels in samples collected from wells MW-20(155), MW-25(145), MW-36(124.5), and MW-37(98).

The vertical extent of VOCs in the overburden has been delineated to RISC IDCLs on the Textron property and the off-site properties.

***Evaluation of the Vertical and Horizontal Distribution of VOC Concentrations in Individual Saturated Zones***

Because the VOC plume in groundwater is distributed horizontally and vertically beneath the Site, two arbitrary saturated water bearing zones based on elevations were created to gain a better understanding of the VOC migration. The two distinct saturated water bearing zones were designated as Zone 1 and Zone 2. Concentration isopleth maps were prepared for cis-1,2-DCE, TCE, and VC at the Site in order to evaluate the horizontal extent in these saturated zones. The isopleth contours are presented on Figures 20 through 25 (Appendix B). Details of the zones are provided below.

- Zone 1: Elevation 765 to 786 feet (NAVD 88)
  - This zone is the upper saturated zone beneath the Site that extends east and southeast of the Site.
  - Figures 20 through 22 (Appendix B) presents the cis-1,2-DCE, TCE, and VC concentration isopleths, respectively.
- Zone 2: Elevation 730 to 765 feet (NAVD 88)
  - This zone is the intermediate saturated zone beneath Zone 1. Figures 23 through 25 (Appendix B) presents the cis-1,2-DCE, TCE, and VC concentration isopleths, respectively.

As illustrated by the cross-sections [Figures 7 through 15 (Appendix B)] for each zone, the concentration of VOCs decrease with depth and distance from the source area.

## **2.5 Data Gaps**

A comprehensive review of the data obtained from the FSIs has revealed some areas at the Site that may require additional data collection to allow a better understanding of the distribution of COCs near the source area and northeast of the Eastern Pond. These “data gaps” are discussed in the following sections.



## 2.5.1 Source Area Investigation

### *Horizontal Delineation West and North of MW-59*

Based on historical information and the findings of the FSIs, the source area is limited to the area shown on Figure 19 (Appendix B). For the purpose of this report, the source area is defined as the area containing the greatest concentrations of VOCs. As such, the source area west of the Facility is narrow in width surrounding MW-59 and indicates source releases only occurred along the southeast corner of the Western Pond where wastewater entered the pond. To confirm source releases are limited to this area, AMEC recommends additional delineation activities to the north and west of MW-59 along the boundary of the Western Pond.

### *Vertical Delineation Beneath the Facility*

During the source area assessment beneath the Facility, direct-push drilling equipment was used due to work area limitations (i.e. height restrictions). Source area assessment of groundwater was limited to the upper water bearing zone and therefore no vertical groundwater profiling was performed at the soil boring locations inside the Facility beyond the upper five to ten feet of saturation. Although vertical delineation completed down-gradient of the Facility indicates that the highest concentrations of VOCs in the source area is limited to Zone 1, the vertical extent of the VOC groundwater plume beneath the Facility and source area has not been assessed.

As can be seen on cross-sections E-E' and G-G' [Figures 12 and 14 (Appendix B)], an aquitard is located at an approximate elevation of 770 feet NAVD 88 along the western portion of the source area. It is unknown how far east this aquitard extends as it was not discovered at soil boring location B20 (i.e. monitoring well MW-20, located east of the Facility). However, a comparison of contaminant concentrations in Zone 1 (765 feet to 786 feet NAVD 88) and Zone 2 (730 feet to 765 feet NAVD 88) aquifers at monitoring well nests MW-6 and MW-20 indicates that the magnitude of the source area is limited to Zone 1. As such, it appears that this upper aquitard is present beneath the Facility and underlying the source area.

The interpretative lithology shown on cross-section E-E' [Figure 12 (Appendix B)] presents a second aquitard at approximately 755 feet NAVD 88 (Zone 2) extending from MW-59 to MW-14. The groundwater data obtained from MW-20 appears to indicate that the aquitard in Zone 2 at approximately 755 feet NAVD 88 is continuous between MW-59 and MW-14. Assuming this aquitard is continuous along this traverse, the vertical extent of the plume where the highest concentrations occur is limited to Zone 1 and Zone 2.

Based on the concentration of TCE (8,800 µg/L) detected during the vertical groundwater profiling at soil boring B59 (i.e. monitoring well MW-59), this aquitard at 770 feet NAVD 88 appears to be limiting vertical migration of TCE and may contain residual concentrations of TCE. The thickness of and concentrations of VOCs in the water bearing soils in the source area that requires remediation should be assessed prior to the preparation of the remedial design. In addition, the potential for residual DNAPL should be assessed on top of and sorbed into the upper aquitard beneath the Facility at 770 feet NAVD 88 as it could impact treatment remedy efficiencies if not accounted for in the remedial design.

#### ***Collection of Geochemical Parameters to Evaluate Selected Remedies***

During source area delineation activities referenced above, source area geochemical parameters for soil and groundwater should be collected to assist in the remedial design. The geochemical parameters would vary based on the remedies selected for the Site. An evaluation of Site geochemistry conditions is necessary when evaluating certain remedies. If the aquifer geochemistry conditions are not conducive for the selected remedy (i.e. high carbonate scavengers/chemical oxidation, high sulfate/biodegradation) alternative remedies would be recommended.

#### ***VOC Plume Delineation Northeast of the Eastern Pond***

To further define the VOC plume in groundwater northeast of the Eastern Pond, one additional monitoring well nest will be installed at the property located at 4377 North Old US Hwy 31. The well nest will be located approximately 400 feet northeast of the Eastern Pond. Groundwater data collected from this well nest will better define groundwater quality in this area of the Site and provide an additional data point to refine the groundwater flow diagrams. In addition, groundwater data collected from this well nest will be used to evaluate the potential for off-site sources of VOCs from adjacent properties located to the north.

### **2.5.2 4163 North Old US Highway 31 Property**

#### ***Vapor Intrusion Investigation***

Based on the VOCs concentrations detected in groundwater, a vapor intrusion investigation should be performed at the property located at 4163 North Old US Highway 31, which is located east of the Site. As of the date of this report, the property owner has not granted onsite access for vapor intrusion work.



***VOC Plume in Groundwater (Zone 2)***

Although groundwater extracted from the residential water well at 4163 North Old US Highway 31 has not detected VOCs in analyzed samples [Table 3 (Appendix A)] collected by AMEC, based on the concentration isopleths that were prepared for Zone 2, it appears that VOCs exceeding RDCLs may extend beneath the northeastern portion of the 4163 North Old US Highway 31 property along the northern boundary. AMEC recommends installing two additional nested wells along the northern property line to evaluate for the presence of VOCs migrating onto the 4163 North Old US Highway 31 property. In addition, AMEC recommends the completion of the tasks below to rule out other exposure pathways to this residence.

- Conduct a vapor intrusion study at the subject property
- Install and operate a potable water treatment system at the property prior to source area remediation or pilot testing. Based on the results of potable water sampling at the 4163 North Old US Highway 31 property, potable water extracted from the 4163 North Old US Highway 31 water well does not contain VOCs ; however, the depth of the 4163 North Old US Highway 31 potable water well is unknown

Source area treatment using in-situ remedial methods may cause changes in the fate and transport of the VOC plume in the groundwater at down-gradient and cross-gradient locations in the plume. Because 4163 North Old US Highway 31 is located near the apparent centerline of the groundwater plume, as a conservative measure protective of human health, AMEC recommends completing the above recommendations prior to pilot testing or source area remediation due to potential changes in contaminant flow.

**2.6 Chemical Fate and Transport in Groundwater**

The results of the FSIs have identified source area VOCs in groundwater beneath the Facility and a groundwater plume of VOCs extending off-site toward the southeast, then turning and continuing toward the south, in the direction of Tippecanoe River [Figure 4 (Appendix B)]. Analysis of the information gathered during installation of the soil borings and monitoring wells indicates that the hydrostratigraphic relationships of multiple saturated zones, separated by lower-permeability, fine grain units are complex. Individual saturated zones appear to convey impacted groundwater independently of lesser or non-impacted saturated zones, which underlie those impacted zones. Interconnection between saturated horizons is evident due to the presence of VOCs in deeper saturated

zones; however in some areas, those deeper saturated zones do not contain VOCs. The aquifer is therefore determined to be an unconsolidated, heterogeneous, unconfined to semi-confined aquifer of glacial and fluvial depositional composition. Bedrock underlies the aquifer system at a depth of approximately 150 feet beneath the Site.

Flow zones within the unconsolidated sediments tend to be sand and coarser grained material locally separated by fine grain, lower hydraulic conductivity layers, which impede vertical flow. Analyses of vertical flow components have indicated that the predominant vertical flow component is downward with exception for the area surrounding the Eastern Pond and Tippecanoe River.

Analyses of horizontal flow components in the upper/intermediate saturated zones (Zone 1 and Zone 2), shown on Figure 16 (Appendix B), correspond to minor and major surface water features and is most likely influenced by the upward vertical flow components near the Eastern Pond and Tippecanoe River. Groundwater (in Zone 1 and Zone 2) beneath the Site flows east toward the Eastern Pond (upward vertical flow component). Near the Eastern Pond, the direction of groundwater flow in Zones 1 and 2 follows the Eastern Pond in a southeasterly direction. South of the Eastern Pond, the direction of groundwater flow in Zones 1 and 2 flows in a more southerly direction toward the Tippecanoe River (upward vertical flow component).

Analyses of horizontal flow components in the deeper saturated zone (unconsolidated sediments) beneath Zones 1 and 2 correspondences to major surface water features (i.e. Tippecanoe River). As shown on Figure 17 (Appendix B), groundwater beneath the Site flows in a southerly direction toward the Tippecanoe River.

Although two production wells (Irrigation well and AIRVAC well) are utilized down-gradient of the Site, high capacity pumping is limited to short periods, and as such groundwater flow down-gradient of the Site and along the dissolved-phase VOC plume appears to be influenced by surface water features and not the periodic pumping of the AIRVAC production well.

Based on the coarse-grained nature of the unconsolidated deep overburden aquifer, the distribution of VOCs in groundwater, and the observed horizontal flow components, the periodic pumping at the AIRVAC property and from the irrigation well seems to have negligible influence on contaminant migration.

This fate and transport evaluation has been completed to evaluate whether the plume of VOCs in groundwater is expanding or static based on data collected through December 2010. As of December 2010, six quarters of groundwater

quality data have been collected from the wells installed during the FSIs. Overall, based upon this groundwater monitoring data, the plume appears to be stable at distances greater than 500 feet from the source area, considering seasonal variations.

Because the shallowest flow zone (Zone 1 - 765 feet to 786 feet NAVD 88) has been documented to contain the highest concentrations of VOCs, this evaluation has focused on the shallowest flow zone identified at the Site. It is important to note that the distribution of VOCs observed in December 2010 and illustrated on Figure 4 (Appendix B) includes the total vertical distribution of VOCs detected. While VOCs are present in lower saturated zones, the concentrations tend to be relatively low (compared to the shallow flow zone) and therefore, analyses of Zone 1 presents the worst-case analysis. Figures 20 through 22 (Appendix B) presents isopleths for cis-1,2-DCE, TCE, and VC, respectively, in Zone 1 where the greatest concentrations were documented during the December 2010 sampling event.

Six quarterly groundwater sampling events (from December 2010) have been conducted at the Site since the wells were installed during the FSIs, which spans approximately 18 months (May 2009 through December 2010). Based on the analyses of samples collected during those sampling events, the lateral limits of TCE, cis-1,2-DCE, and VC have been defined. Figure 4 (Appendix B) presents the lateral limits of the COCs in groundwater (December 2010 sampling event). Based on the analytical results, the lateral limits of TCE are within the limits of cis-1,2-DCE. Groundwater sampling during the FSI has also indicated that degradation products of TCE (cis-1,2-DCE and VC) are present beneath the Site. The greatest concentrations (December 2010) of TCE in groundwater occur at source area well MW-59(29) and off-site well MW-14 (approximately 450 feet down-gradient of the Site).

Analyses of the concentrations of cis-1,2-DCE, TCE, and VC with distance from the source area were performed to evaluate whether the plume is attenuating to acceptable levels. This was accomplished by selecting monitoring wells located generally along the centerline of the plume at varying distances from the source and reviewing analytical data from each groundwater monitoring event since the FSIs. For sampling events where duplicate samples were collected, the mean of the results of the duplicate analyses was used. The data were then evaluated to calculate the 95-percent upper confidence limit (95-UCL) of the mean for each VOC at each monitoring well. The 95-UCL value for each well was plotted versus the distance from the source area. Distances for each well were determined by measuring the distance in a down-gradient direction from the source based on the groundwater flow direction in the shallow overburden aquifer. The details of how the distances were computed are presented in

Section 2.4. Concentration verses distance graphs are presented in Appendix D.

Analyses of TCE concentrations down-gradient of the source area indicate that the maximum concentration of TCE was detected in samples from monitoring wells MW-59(29) (source area) and MW-14, approximately 450 feet down-gradient of the source area. TCE was also detected in samples from monitoring wells; MW-17 (approximately 925 feet down-gradient of the source area), MW-30 (approximately 1,760 feet down-gradient of the source area), and MW-34 (approximately 3,350 feet down-gradient of the source area). The data were plotted with concentration versus distance and a regression analyses was performed on the trend line of the data. The graph of the TCE data is presented in Appendix D as Figure D1.

The evaluation of TCE concentrations follows a trend line that is indicative of uniform decreasing concentrations throughout the study area. TCE has not been detected in groundwater samples collected from monitoring wells located further down-gradient than monitoring well MW-34.

Similar evaluation of the concentrations of cis-1,2-DCE and VC were completed. Both of these VOCs have been detected in their highest concentrations in samples collected from wells located in the source area. Additional analyses of concentration versus distance considered monitoring wells MW-6C (approximately 120 feet down-gradient of the source), MW-12 (approximately 210 feet down-gradient of the source), MW-13 (approximately 320 feet down-gradient of the source), MW-15 (approximately 590 feet down-gradient of the source), MW-25(16) (approximately 610 feet down-gradient of the source), MW-27(18) (approximately 810 feet down-gradient of the source), MW-30, and MW-34. It should be noted that VC was not detected in samples from well MW-34. The graph of the cis-1,2-DCE and VC data is presented in Appendix D as Figure D2.

Regression analyses of the concentrations of both cis-1,2-DCE and VC indicate uniform decreasing concentrations with distance throughout the study area. As expected based on the trend lines and distance between MW-34 and further down-gradient wells, analyses of samples of groundwater collected from monitoring wells located further down-gradient of monitoring well MW-34 have not detected concentrations of VOCs greater than laboratory detection limits.

Based on the above graphical analyses, it is determined that the plumes of TCE, cis-1,2-DCE, and VC each decrease uniformly and indicates the plume is naturally attenuating to non-detectable concentrations north of the Tippecanoe River.

Analyses were performed on the concentrations of the VOCs in wells located at the terminal end of the plume to determine whether upward trends could be detected. An upward trend to the VOC concentrations may be indicative of increasing concentrations relating to migration of impacted water into an area that had previously been non-impacted. As with the above analyses, if duplicate samples were collected on a single date, the mean of the results of the duplicate samples was used to determine the concentration for that date. The individual sample results were plotted versus the date of the sampling event without further statistical analyses.

Wells that are indicative of the center of the VOC groundwater plume (inferred) include MW-25(16.4), MW-27(18), MW-30(41), and MW-34(85), which is at the leading edge of the plume for TCE. Figure 26 (Appendix B) presents the inferred groundwater plume centerline. It should be noted that data sets used for these wells include a sample collected within a few weeks of installation of each monitoring well. In each case, the initial sample concentration was subsequently exceeded in latter samples for cis-1,2-DCE and VC. Due to the installation of the wells using roto sonic drilling methods, the initial sample may not be as representative of VOC concentrations in groundwater as the concentrations of the subsequent samples. It is believed that the drilling process is likely to have reduced VOC concentrations in groundwater by adding water during the drilling process. Therefore, short-lived decreases in concentrations of VOCs in newly installed monitoring wells are not indicative of trends in groundwater concentrations.

Initially, data from well MW-17 were plotted for the 18-month period of sampling. Well MW-17 had been installed previously and data produced from this well do not indicate the same increase in concentrations from the first sampling event (May 2009) to the second as described above for the newly installed wells. Well MW-17 is not located at the down-gradient limits of a plume but is located at the turn point where groundwater flow turns from a southeast direction to a generally southward direction. It is important to determine whether a trend is evident at this location to determine whether increasing plume concentrations are present at the turn point of the plume, as this represents the eastward limit of the expanse of the plume. Figure D3, presented in Appendix D, illustrates the concentrations of cis-1,2-DCE, TCE, and VC in well MW-17 during the 18-month period evaluated.

Figures D4 and D5, also presented in Appendix D, depicts the analyses of cis-1,2-DCE, TCE (where detected), and VC concentrations in samples collected from well MW-25(16.4) and MW-27(18) during the 18-month evaluation period. Figure D6 (Appendix D) illustrates the concentrations of cis-1,2-DCE and VC

detected during the 18-month evaluation period of the FSI at well MW-30(41.1) located near the leading edge of the plume.

The data evaluated in the graphs prepared for wells MW-17, MW-25(16.4), MW-27(18), and MW-30(41.1) is not indicative of increasing trends. As part of the long-term groundwater monitoring program for the Site, a quantitative evaluation of plume stability will be performed to validate steady or decreasing plume conditions.

Future fate and transport evaluations for stable plume conditions will be evaluated using the Mann-Kendall trend analysis as presented in the RISC Technical Guide Appendix 3 Stability Monitoring Guidelines (IDEM, 2001). In addition to the Mann-Kendall trend analysis, the data will be plotted and evaluated using regression analysis for comparison purposes to document plume stability.

## **2.7 Human Health Risk Assessment**

AMEC has prepared a human health risk assessment (RA) for the Site to evaluate the risks to human health and environment. A copy of the RA is presented in Appendix E. Based on the RA the exposure pathways that present a risk to human health and the environment include the following.

- Inhalation of vapors
- Ingestion of groundwater and surface water (Eastern Pond)
- Contact with groundwater and surface water (Eastern Pond)

Exposure risks for groundwater ingestion pathways would be restricted using ERCs and engineering controls (see section 6.0). Human contact with untreated groundwater has already been restricted at affected residential properties by installing whole-house treatment systems to remove VOCs from potable water.

### **3.0 Remedial Action Objectives**

Remedial action objectives (RAOs) for each affected media are presented in the following subsections. These RAOs are based on the fact that VOCs are no longer being introduced to the subsurface and the existing source of VOCs is the result of past activities and releases (i.e. the use of TCE was discontinued in 1968).

#### **3.1 Vadose soil**

Based on the results of the laboratory analyses of soil samples obtained from the vadose zone, the concentration of detected COCs were less than RISC IDCLs, as such there are no RAOs required for unsaturated soil beneath the Site.

#### **3.2 Vapor intrusion**

##### **3.2.1 Off-Site**

Based on the VOCs concentrations detected in groundwater, a vapor intrusion investigation should be performed at the 4163 North Old US Highway 31. As of the date of this report, the property owner at 4163 North Old US Highway 31 has not granted onsite access for vapor intrusion work.

With the exception of the above referenced property, based on the results of the off-site and on-site vapor intrusion evaluation that was conducted during the 2009-2010 FSI indicating that there was no human health risk, there are no RAOs for this media.

##### **3.2.2 Source Area**

The concentrations of VOCs detected in the indoor air samples collected within the Facility were below the 25-Year IDEM Commercial Indoor Air Screening Levels (IDEM, 2010). Cis-1,2-DCE and TCE were detected in the sub-slab soil vapor samples at concentrations greater than the 25-Year IDEM Commercial Sub-Slab Screening Levels (IDEM, 2010). TCE and cis-1,2-DCE concentrations exceeded the screening levels in multiple sub-slab soil vapor samples collected inside the Facility.

Based on the results of the vapor intrusion investigation the following RAOs apply:

- Although indoor air samples collected in the Facility suggest that vapor intrusion is not a risk to Facility workers, based on the sub-slab soil vapor concentrations, engineering controls (i.e. sub-slab depressurization or vapor



extraction) should be installed to mitigate vapors beneath the sub-slab in connection with source area treatment. AMEC anticipates that sub-slab vapors may increase upon implementation of source area treatment through volatilization occurring from groundwater disturbances. A sub-slab depressurization system would be a conservative measure protective of industrial workers until source area concentrations are reduced through remediation.

### **3.3 Surface Water and Sediment**

Based on the results of the surface water and sediment samples collected from the Eastern Pond located east of North Old US Highway 31, the Eastern Pond and the drainage feature pose no ecological or human health risk; therefore, RAOs are not required for this media.

### **3.4 Groundwater**

The RAOs for groundwater include the following.

1. Prevent human exposure to groundwater containing VOCs at levels exceeding RDCLs.
2. Reduce the mass of VOCs in the source area to achieve IDCLs and RDCLs at down-gradient, off-site properties. Section 3.4.3 presents an estimate of the reduction required.
3. Reduce the mass of VOCs at the down-gradient property east of the Site to minimize the monitoring period for MNA (see section 3.4.4).
4. Reduce the potential for migration of VOCs beyond the monitoring well network [Figure 4 (Appendix B)].

The following subsections present the basis for the RAOs.

#### **3.4.1 Whole-House Water Treatment Systems**

The RAO that is currently preventing human exposure to groundwater containing VOCs is the operation of the whole-house water treatment systems. These treatment systems were installed at 31 homes beginning in November 2008. As demonstrated by quarterly performance monitoring, the treatment systems are an effective method in preventing exposure to the VOCs in the groundwater.



### 3.4.2 Municipal Water Connection

Textron has established the South Richland Conservancy District in order to supply potable water to the properties in the affected area. Textron is in negotiation with the City of Rochester (Rochester) to supply municipal water through a master meter for the Conservancy District. One long term solution for this RAO would be to extend a municipal water supply to each home and business located in the area. If an agreement can be reached between Textron and Rochester, the municipal water line would negate the use of whole-house water treatment systems. However, if municipal water cannot be provided to the affected properties, the whole-house water treatment systems should remain in operation based on the demonstrated efficacy.

### 3.4.3 Source Area Mass VOC Reduction

The highest concentration of VOCs detected in groundwater is beneath and west of the Facility and is designated as the source area on Figure 19 (Appendix B). The majority of the VOCs beneath the Facility are contained in the upper water bearing zone referred to as Zone 1. Figures 20 through 22 (Appendix B) presents Zone 1 concentration isopleths for TCE, cis-1,2-DCE, and VC.

#### ***Source Area Site-Specific Target Levels***

Site-specific target levels (SSTLs) would be established for source area remediation considering the RAOs referenced above. The RAO for source area groundwater is to reduce the concentration of VOCs in the source area to minimize plume migration to off-site properties. As such, IDEM RISC IDCLs were evaluated for source area SSTLs (IDEM, 2001). COCs in source area groundwater exceeding IDCLs include cis-1,2-DCE, TCE, and VC. The IDCLs for these COCs are:

- TCE - 31 µg/L
- cis-1,2-DCE – 1,000 µg/L
- VC - 4 µg/L

The IDCLs may be too conservative for the RAOs in the source area at the Site based on the following facts. The findings of the Human Health Risk Assessment (Appendix E), document that there are not currently any completed exposure pathways to the VOC plume. The VOC plume is degrading through natural attenuation processes down-gradient of the source area. House Enrolled Act 1162 (IDEM, 2009) requires that IDEM evaluate institutional and engineering controls as a remedy or combined remedy. Therefore, it is AMEC's opinion that

remediating groundwater in the source area to IDCLs is not necessary and less conservative SSTLs should be developed.

SSTLs may be developed by determining the site-specific concentrations that would need to be achieved to result in concentrations at a down-gradient location that would provide adequate protection to potential receptors at that location. In lieu of using IDCLs for establishing SSTLs for the source area, SSTLs were estimated using BIOCHLOR, a Domenico-based screening tool produced by the USEPA for modeling remediation by natural attenuation (NA) of dissolved-phase chlorinated compounds in groundwater (USEPA, 2002). Source area SSTLs were estimated using a back-calculation method following model calibration. In general, groundwater concentrations that were protective of future exposure were input at a down-gradient receptor or point of exposure (POE) and the BIOCHLOR model was used to back-calculate source area concentrations using calibrated BIOCHLOR model input parameters (referenced below).

BIOCHLOR model input parameters for the aquifer were used based on site-specific data and published literature values. The source of data used is presented on the BIOCHLOR input parameters table (Table F1) located in Appendix F. Other reference data is presented on Tables F2 through F5 (Appendix F). Figure 26 (Appendix B) presents the inferred centerline of the modeled plume from the source area to a radial distance of 4,684 feet, which is a point located near monitoring well MW-39 (labeled BIOCHLOR Simulation #1). VOCs have been detected (at estimated concentrations below the reporting limit of 1 µg/L) in groundwater samples obtained from MW-37 and MW-38 during the April 2010 groundwater sampling event [Table 2 (Appendix A)].

Initial source area concentrations were entered into the model using maximum recorded values and were then later revised during model calibration. Model calibration was performed by best fit and took into account chemical transformations from TCE to cis-1,2-DCE, and cis-1,2-DCE to VC, using literature based degradation constants. Best fit was established by matching the first order decay curve to the field data [Table F4 and F5 (Appendix F)] entered into the model using a period of 43 years, (this time period assumes the release occurred in 1968). This simulation is presented in Appendix F as Simulation #1. Utilizing the best fit approach, a source area concentration was back-calculated. The source area concentrations predicted by the model appear to be acceptable based on recent average source area concentrations. As a conservative measure, the estimated source area concentrations were input into the model as a constant or continuous source and therefore does not take into account naturally occurring source area decay.

In order to predict source area SSTLs protective of future exposures levels for adjacent properties, the BIOCHLOR model was used to predict VOC concentrations at down-gradient receptors or POEs. The POE used for predicting SSTLs is approximately 1020 feet from the source along the inferred radial centerline of the plume, which is at a point located approximately 100 feet south of well MW-17. This POE is the property line separating the off-site Textron property and the AIRVAC property (industrial property). Figure 26 (Appendix B) presents the location of this POE (labeled IDCL-POE). VOC concentrations used at the POE protective of future exposure levels are:

- TCE - 31 µg/L (RISC IDCL)
- cis-1,2-DCE - 1,000 µg/L (RISC IDCL)
- VC - 4 µg/L (RISC IDCL)

The POE concentrations at a distance of 1020 feet from the source were input into BIOCHLOR and using the BIOCHLOR Simulation #1 parameters (best fit approach), SSTLs for TCE, cis-1,2-DCE, and VC were estimated for the source area. The BIOCHLOR simulation that presents the SSTLs is in Appendix F labeled as Simulation #2. Based on the BIOCHLOR model predictions shown on Simulation #2, the SSTLs for the source area are:

- TCE – 450 µg/L
- cis-1,2-DCE – 7,500 µg/L
- VC – 1,000 µg/L

Based on the model predictions that account for a constant, non-decaying source, once these SSTLs are attained at the source area, migration of VOCs from the source area to the POE at BIOCHLOR Simulation #2 should not exceed IDCLs. Based on the model chemical transport rates, assuming no other remediation occurs between the source area and the POE, IDCLs would be attained at the POE approximately 8 years following source area remediation. Monitoring well MW-17 is located approximately 100 feet up-gradient of the IDCL-POE and can be used as a point of demonstration (POD) well [Figure 26 (Appendix B)]. Based on the model predictions, the following concentrations at MW-17 should be expected after 8 years of reaching SSTLs in the source area:

- TCE - 39 µg/L (MW-17)
- cis-1,2-DCE - 18 µg/L (MW-17)
- VC - 8 µg/L (MW-17)

These concentrations are shown on Simulation #2 in the “Distance from Source” section in the bio-transformation row at the top of the page for each COC

modeled. A twenty year and an eight year simulation is shown for TCE, cis-1,2-DCE, and VC. Using the parameter inputs for Simulation #2, a third simulation (Simulation #3) was modeled to a distance of approximately 2,500 feet from the source area to evaluate model predictions down-gradient of the industrial property (AIRVAC). Model predictions (Simulation #3) at approximately 2,500 feet for TCE, cis-1,2-DCE and VC are below the RDCLs and therefore suggest that once source area SSTLs are attained, the VOC plume in groundwater will naturally attenuate to levels less than the RDCLs at this distance. Based on the model chemical transport rates and attaining the source area SSTLs, plume migration from the source area to the 2,500 foot POE [designated on Figure 26 (Appendix B) as RDCL-POE] will not exceed RDCLs. This prediction does not account for increased groundwater velocity that occurs down-gradient of MW-17 that most likely would decrease the prediction time at the RDCL-POE. Fate and transport model validation will cease after 7 years of closure stability monitoring (Section 2.6).

There are several limitations to the BIOCHLOR model. The use of the BIOCHLOR model to predict SSTLs through NA is a simplistic approach to chemical fate and transport and does not take into account certain limitations and variables such as:

- Vertical flow gradients that affect chemical transport (BIOCHLOR User's Manual Version 1.0)
- Back calculations of the referenced simulations used analytical data collected from the shallow aquifer and therefore were not used to model vertical transport of dissolved-phase VOCs
- Variations in groundwater velocity along the centerline of the plume
  - Groundwater velocity at the source area(s) vary significantly when compared to groundwater velocity near the Eastern Pond. The variable is the change in groundwater gradient.
- Complexity of predicting chemical fate and transport based on the following:
  - Hydraulic conductivity and gradient variations across the VOC groundwater plume
  - Variations in chemical retardation due to heterogeneous soils, primarily discontinuous low-permeable silt and clay layers.
  - Unknown sorbed VOC concentrations within these layers.

- Naturally occurring degradation and transformation of VOCs. It is apparent that enhanced degradation/transformation of VOCs occurred at the Western Pond because of high organic carbon substrates (i.e. oil in pond water/sludge) whereas the rate of degradation/transformation beneath the degreaser pit was apparently slower where carbon substrate levels were insignificant for enhancing the VOC transformation process.

In the Notice section of the BIOCHLOR User's Manual Version 1.0, it states, "An extensive investment in site characterization and mathematical modeling is often necessary to establish the contribution of natural attenuation at a particular site. BIOCHLOR is a screening tool to determine whether it is appropriate to invest in a full scale evaluation of natural attenuation at a particle site. Because BIOCHLOR incorporates a number of simplifying assumptions, it is not suitable for the detailed mathematical models that are necessary for making final regulatory decisions at complex sites."

Although AMEC has a substantial number of data points across the Site, the centerline of the plume was inferred based on the location of the monitoring wells and the results of the groundwater sampling from these wells. Model calibration was performed using data collected over a two year period from these wells along the inferred centerline of the plume. The inferred plume centerline is shown on Figure 26 and was drawn based on groundwater flow and locations where greatest contaminant concentrations were detected. Model validation diminishes when data used is not from the plume centerline. Although BIOCHLOR is a good screening tool for evaluating remediation using NA, AMEC does not recommend using it to determine how VOCs historically migrated in any given monitoring well or portion of a plume based on the limitations stated above and in the BIOCHLOR user manuals.

The SSTLs calculated using the BIOCHLOR simulations were developed to establish target levels for source area remediation, however, considering the above uncertainties in the model, future groundwater monitoring of the source area and down-gradient monitoring wells would be used to evaluate when source area treatment should cease. The need for additional source area remediation will be based on the results of groundwater monitoring and closure stability monitoring due to the complexity of the Site geology.

#### 3.4.4 Off-Site Mass VOC Reduction

Although the BIOCHLOR simulations presented in Section 3.4.3 suggest that source area remediation coupled with MNA for the off-site VOC plume would achieve IDCLs and RDCLs at further down-gradient properties impacted by the VOC plume in groundwater, Textron chooses to treat the adjacent property east of the Site to reduce the time required in attaining IDCLs and RDCLs at down-gradient locations. Without off-site treatment, the BIOCHLOR model predictions estimate that IDCLs and RDCLs will be attained at the designated POEs in 8 years and 15 years, respectively. The BIOCHLOR model predicts this time based on an average seepage velocity in groundwater of 230 feet per year and does not account for slower groundwater movement that occurs at the source area and the off-site property down-gradient and east of the source area. Considering this and other uncertain variables referenced above (section 3.4.3), the estimated time periods to attain IDCLs and RDCLs at the designated POEs may vary.

A groundwater plume of TCE has migrated east of the source area towards monitoring well MW-14 and MW-17. The highest concentration of TCE detected in groundwater (December 2010) off-site occurs at MW-14 (510 µg/L) and MW-17 (300 µg/L) on property owned by Textron (4377 North Old US Highway 31). The depth of the screen in monitoring well MW-14 is in Zone 1 and Zone 2 [Cross-Section E-E', Figure 12 (Appendix B)] whereas MW-17 is screened only in Zone 2. Figures 21 and 24 (Appendix B) present concentration isopleths for TCE in Zone 1 and Zone 2, respectively. As can be seen on Cross-Section E-E' Figure 12 (Appendix B), MW-17 is screened below a silt layer.

In order to reduce the concentration of TCE and daughter products resulting from natural and biological degradation, groundwater treatment of the VOC plume along the plume centerline from MW-14 to MW-17 could be implemented. In addition, the area up-gradient of MW-14 should be treated because this area (MW-12 and MW-13) contains high concentrations of cis-1,2-DCE and VC.

AMEC believes that a high concentration of TCE (400 to 500 µg/L) may exist in groundwater deeper in Zone 1 (MW-11, MW-12, and MW-13) and Zone 2 along discontinuous layers of silts and clays. Monitoring wells MW-11, MW-12, and MW-13 were installed in the upper 10 feet of the water table and may not be representative of the TCE in groundwater detected at lower groundwater elevations (i.e. MW-14). Other wells in this area indicate that high concentrations of TCE may be present below the depths of these three wells. Figure 12 (Appendix B, cross-section E-E') depicts the screen depth of MW-12 and MW-13 compared to MW-14 and MW-17. Additional data will be collected to verify the presence of TCE in Zone 2 prior to remedial action implementation.



***Off-Site Dissolved-Phase Plume Natural Attenuation Evaluation***

As presented in Section 2.6 Chemical Fate and Transport in Groundwater, the off-site groundwater plumes of TCE, cis-1,2-DCE, and VC each decrease uniformly with distance and indicates the plume is naturally attenuating to non-detectable levels north of the Tippecanoe River.

In order to evaluate decreasing trends at points along the inferred centerline of the plume down-gradient of the source area, concentration verses time plots (point attenuation) were prepared for various monitoring wells. Point attenuation was evaluated at off-site well locations MW-12, MW-13, MW-14, MW-15, MW-25(16.4), MW-27(18), MW-17, and MW-30(41.1) using concentration verses time plots. These plots are presented in Appendix D. Based on the results of the graphical analyses, decreasing trends for cis-1,2-DCE and VC are not occurring at MW-12, MW-13, and MW-15. In addition, a slight upward trend (trend line) was observed at MW-25(16.4) for cis-1,2-DCE. The upward trend of cis-1,2-DCE observed on this plot (Appendix D) is indicative of increasing concentrations in the plume. Additional monitoring is needed to rule out seasonal groundwater and laboratory analyses variations to evaluate for increasing trends or plume stability at well MW-25(16.4).

At areas down-gradient of well MW-25(16.4) along the inferred plume centerline [Figure 26 (Appendix B)], decreasing trends for TCE, cis-1,2-DCE and VC is occurring as indicated by the plots (Appendix D) for wells MW-17 and MW-30(41.1).

Between MW-17 and MW-30(41.1), the groundwater velocity increases when compared to up-gradient locations along the inferred centerline of the plume, as such, natural gradient flushing is accelerated. Table 7 (Appendix A) presents groundwater gradients along the inferred centerline of plume along with calculated groundwater velocities. Based on the distance (1,313 feet) between MW-14 and MW-30(41.1) and the average calculated groundwater velocity (approx. 450 feet/year), a pore volume of water exchange occurs every 2.9 years. Considering this, it is the opinion of AMEC that the increase of natural gradient flushing between MW-14 and MW-30(41.1) due to the increase in hydraulic gradient, natural attenuation will increase and reduce the off-site concentrations.

Due to the lower groundwater velocity calculated between the source area and monitoring well MW-14 (approx. 65 feet per year), NA processes will occur at a much slower rate.

### **3.4.5 Groundwater Monitoring**

Groundwater monitoring for VOCs is recommended to monitor the potential for groundwater exposure at the POEs. In addition to monitoring for VOCs, groundwater quality measurements (i.e. pH, temperature, DO, ORP, conductivity) and depth to water measurements will be recorded at each well. Implementation of groundwater monitoring should provide the data required to verify the location and concentration of VOCs in the groundwater plume down-gradient of the Site. Groundwater monitoring would consist of annual groundwater sampling of 79 monitoring wells. The list of wells proposed for annual monitoring is presented in Table 8 (Appendix A).



## **4.0 General Response Actions and Media Requiring Remedial Action**

The general response actions for the Site are media-specific and may include monitoring, treatment, containment, excavation, disposal, institutional controls, engineering controls, or a combination of these. The general response actions presented in following subsections include those identified to reduce potential threats to human health and the environment from affected groundwater. Site-specific RAOs have been developed to address contamination requiring remedial action for the source area and at the adjacent off-site property owned by Textron. The following subsections present a discussion of the general response actions applicable to the Site.

### **4.1 General Response Actions**

- No Action
- Risk & Hazard Management
- Monitored Natural Attenuation
- Containment
- Collection/Treatment
- Removal/Treatment or Disposal

#### **4.1.1 No Action**

This approach would not reduce the mass of VOCs in the source area or reduce further migration of off-site VOCs in a timely manner. A no action approach would consist of NA without any groundwater monitoring or any other form of action. NA cannot achieve the RAOs for the site and therefore this action has been eliminated for future evaluation.

#### **4.1.2 Risk and Hazard Management**

This approach would evaluate site-specific risks to human health and environment. Risk levels would be calculated at affected properties based on current groundwater plume concentrations. Risk and hazard management would include the use of institutional and engineering controls to further reduce risks to acceptable levels.

##### ***Institutional and Engineering Controls***

Institutional and engineering controls are implemented to control exposure pathways that threaten human health. Exposure pathways include:

- Direct Contact
- Inhalation of vapors
- Ingestion of soil or groundwater

Institutional restrictions used to eliminate or control exposure to chemicals associated with the above referenced pathways include:

- Residential use restrictions (exposure durations).
- Soil excavation activity restrictions (direct contact, inhalation, and ingestion).
- Basement/crawl space restrictions (vapor intrusion control).
- Groundwater use restrictions (ingestion, direct contact).

These types of restrictions are placed on a property deed and referred to as ERCs.

Site-specific engineering controls can be used to eliminate or control exposure to chemicals associated and may include:

- Impermeable barriers to minimize exposure (vapor intrusion control)
- Alternate potable water supply (municipal supplied) for affected properties
- Whole-house water treatment for affected properties

Although placement of institutional and engineering controls will not meet all the RAOs, this general response action coupled with other general response actions can attain the RAO's.

#### **4.1.3 Monitored Natural Attenuation**

Monitored natural attenuation (MNA) evaluates the naturally occurring processes present in the aquifer and the effects on the degradation of the COCs. MNA requires periodic groundwater sample collection, quantification of not only the COCs present in the groundwater, but also several other analytical parameters that indicate NA processes are functioning. The MNA data collected over time is evaluated using various algorithms to demonstrate that MNA is occurring. Although this general response action will not meet all the RAOs, MNA coupled with other general response actions can attain the RAO's.

#### **4.1.4 Containment**

Containment utilizes surface or subsurface barriers to isolate the affected media. Pertaining to groundwater, containment could be a physical or hydraulic barrier. Subsurface barriers include slurry walls and permeable reactive barriers (PRBs).

A common non-barrier containment approach is pump and treat. Groundwater is extracted using pumping equipment or vacuum applications and processed through a treatment system followed by re-injection or re-routing the processed groundwater to a local POTW or state-approved receptor (i.e. stream or pond).

This action may be suitable for the site where plume control is required and can meet RAOs.

#### **4.1.5 In-Situ Treatment**

Examples of in-situ treatment include chemical, biological, and physical treatment via in-situ methods where fluids or gases are introduced into the subsurface. In-situ treatment methods are viable methods in attaining RAOs.

#### **4.1.6 Removal/Treatment or Disposal**

Physical removal of affected media is usually accomplished by excavation followed by off-site disposal or ex-situ treatment using biological, chemical, or physical treatment remedies. This action is not suitable for the site based on the affected media, depth of media, and aboveground features (i.e. buildings).

## **5.0 Identification and Screening of Technologies**

Identification and screening of remedial technology types and process options were completed using the on-line screening tool at the USEPA's Clue-in website, FRTR Remediation Technologies Screening Matrix, and AMEC experience treating VOCs in groundwater. This section identifies and screens potential remedial technologies to address VOCs in groundwater and the aquifer soil matrix. The result of technology screening is a list of potential remedial technologies that may be developed into feasible remedial alternatives. Risk and hazard management options such as institutional and engineering controls are not considered technologies requiring screening and therefore are not discussed in this section. These options are carried through this section to be evaluated with technologies in attaining RAOs.

AMEC evaluated potential remedial technologies to address the VOCs in groundwater at the Site. The potential remedial technologies and screening results are presented in Table 9 (Appendix A). Presented below is a brief description of viable technologies retained to treat VOCs in groundwater. VOCs in groundwater at the Site include cis-1,2-DCE, TCE, and VC. The greatest concentrations of VOCs present in the groundwater are cis-1,2-DCE and VC. Other VOCs include 1,1-DCE and trans-1,2-DCE. The remedial screening would focus on treating these compounds.

### **5.1 Monitored Natural Attenuation**

MNA is a passive technology that relies on existing physical (dispersion, dilution, volatilization, and adsorption), chemical, and biological activity to degrade and reduce the levels of contaminants. This strategy is typically coupled with a monitoring program to document the effectiveness of the NA and to verify that the impact is not migrating. NA is typically a low cost alternative to active remedial strategies, but may require a longer time frame to achieve cleanup objectives. Limitations include the need for appropriate conditions for natural attenuation to occur, such as: biological activity (nutrients, oxygen, etc.); an allowable time frame to achieve cleanup goals, and conditions that permit this strategy to be adopted, such as a stable, non-migrating plumes and no near-by receptors (i.e. drinking water intake). In the event that plume migration is detected or levels of impact rise, as is possible when chlorinated hydrocarbons are transferred from the aquifer soil matrix to groundwater, more active strategies may have to be adopted to address the impact.

Based on the accumulation of daughter products compared to TCE (parent product), NA continues to occur at the Site. As such, MNA would be a feasible approach under the following scenarios:

- Stable plume conditions exist where MNA is proposed.
- Placement of ERCs (institutional control) on affected properties restricting groundwater uses (i.e. potable use) combined with supplying engineering controls (i.e. whole-house treatment system or municipal water) for all affected properties, thus eliminating exposure pathways for VOCs in groundwater.

## **5.2 Groundwater Pump and Treat**

Groundwater pump and treat relies on the physical extraction of impacted groundwater, typically to an aboveground treatment facility, and then discharge to the sewer system, or re-injection into the ground. This technology is relatively straight forward and has been used at many sites to address groundwater impact and control groundwater plume migration. Pump and treat may be especially effective when a small, stable plume is present within high permeability deposits. Typically, however, large quantities of groundwater are required to be extracted over time to address impacted zones due to limitations in capture and hydraulic yield within less than ideal soil conditions. Groundwater pump and treat is typically limited by hydraulic yield of the impacted groundwater zone, which can limit the capture zone of the system. Other disadvantages to pump and treat include long-term O&M and prolonged operation to treat sorbed chemicals from saturated soil. However, when designed properly, and under the appropriate conditions, pump and treat can be used effectively to control the migration of a groundwater plume.

As mentioned above, recovered groundwater would require an aboveground treatment facility and a source for discharge. Multiple treatment options for extracted groundwater include:

- liquid-phase carbon adsorption;
- ultraviolet radiation, ozonation, or other oxidation treatment;
- air stripping (vapor treatment maybe required) followed by liquid-phase carbon adsorption for final treatment; and
- aboveground amendments to treat groundwater to enhance the bio-degradation process in-situ during re-injection of treated groundwater.

Some advantages of pump and treat compared to other technologies include plume control and contaminant removal verses in-situ treatment. Due to the efficacy issues of in-situ treatment remedies [i.e., such as optimal site hydrogeological conditions and contact problems with ISCO or Hydrogen

Release Compound (HRC) products], an advantage to pump and treat systems is the effectiveness to contain and remove the VOCs from extracted groundwater.

Some disadvantages include long-term O&M, extended remediation times when compared to other technologies, and prolonged operation to treat sorbed chemicals from saturated soil. Expect higher capital cost and scheduled periods of inoperation (i.e. O&M maintenance – descaling of air stripper and carbon system) compared to other remedies due to the necessary infrastructure (i.e. treatment system). In addition, due to the semi-confining shallow aquitards present at the Site, nested extraction wells may be required for plume control.

### **5.3 Air Sparge/Soil Vapor Extraction**

Air sparging involves injecting ambient air beneath the water table using compressed air. The rising column of air volatilizes dissolved phase hydrocarbons present in groundwater. Air sparging is typically not used for chlorinated hydrocarbon plumes as some parent products (i.e. PCE) are not readily volatilized. However, where chlorinated hydrocarbon plumes contain products such as cis-1,2-DCE, TCE, and VC, air sparging is a viable remedy.

Sparging also increases the level of dissolved oxygen (DO) in groundwater, thereby enhancing natural aerobic bio-degradation processes. Sparging is typically most successful in treating homogenous, coarse grained, water table aquifers. Sparging is not recommended for heterogeneous aquifers containing silt and clay. In addition, the presence of heterogeneous aquitards above the treatment zone can prohibit vapor extraction and increase lateral plume spreading by displacement.

Well placement would vary based on several factors such as geological conditions, depth of contaminants, and volume of media injected. A pre-design well spacing for permeable formations is typically 15 feet (Battelle, 2002). Therefore, the volatilization radius of influence (ROI) for sparge applications in permeable sands typically ranges between 7.5 and 10 feet. A pilot test should be performed to evaluate ROI as the volatilization ROI can range beyond 10 feet. Beyond the volatilization zone, a zone of dissolved-oxygen (DO) can enhance the naturally occurring bio-degradation process. The ROI of the DO zone, where not depleted by biological processes, can range two to three times the volatilization ROI. To minimize cost of capital equipment, a pilot test should be performed to establish the required volume and pressure of air necessary to achieve and maintain an effective ROI and vapor capture radius. Flows up to 25 cubic feet per minute (cfm) are not uncommon for a sparge point. Typical sparge point flows range from 5 to 15 cfm. For large-scale remediation projects,

pulsed injections occurring at consecutive injection points or assortment of points can be used to minimize equipment size and energy use.

VOC-laden vapors from the sparge process are extracted using conventional SVE methods. Typically, SVE extraction rates are three times the injection rate thus providing a safety factor of three to account for complete capture of injected air and vapors. Pore volume exchange should also be evaluated when designing a system. Pore volume exchanges of at least one per day should be accomplished.

Air sparging typically is a low-cost alternative to treating dissolved-phase VOCs. As mentioned above, enhancing natural aerobic bio-degradation is a secondary benefit of sparging. VC and cis-1,2-DCE can be cometabolized aerobically. This process is best performed using amendments (i.e. alkane gas donors). Some studies have shown that VC is an acceptable donor for the co-metabolic process. Field studies should be performed to verify enhanced bio-degradation if this secondary treatment benefit is part of the remedial design.

A major site disadvantage to air sparging is Site drilling limitations due to current Facility activity and overhead clearance restrictions. Other disadvantages to sparging are vapor migration (i.e. utilities, buildings) when SVE is not applied or is not effective in capturing the sparge radius of influence and further plume migration of potential NAPL and dissolved-phase contaminants from high volume air injections (i.e. 5 to 25 cfm per point). Other Site disadvantages to sparging include the presence of heterogeneous soil that can prohibit vapor extraction and increase plume spreading.

#### **5.4 Aerobic Biodegradation Using Bio-Sparge Techniques**

Bio-sparging is very similar to air sparging as air or pure oxygen (and amendments) is injected into the saturated formation using injection wells, but at lower flow rates. Instead of injecting air into the saturated zone to induce volatilization of contaminants, air or oxygen is introduced at lower rates to stimulate naturally occurring bacteria aerobically. Injected amendments to the air are usually necessary to enhance the growth of natural occurring bacteria. Amendments include nutrients and/or donors (i.e. alkane gases).

Bio-sparge wells are typically placed at closer intervals than air sparge wells due to the decreased radius of influence caused by lower injection rates. However, certain micro-bubble design systems can achieve larger radius of influences comparable to air sparging radii. Bio-sparge is typically most successful in treating homogenous, coarse grained, water table aquifers but has demonstrated success rates in heterogeneous aquifers.

AMEC does not recommend bio-sparging for co-metabolic bio-degradation for parent chlorinated hydrocarbons such as PCE and TCE. This technique however, is well suited to treat daughter products such as cis-1,2-DCE and VC which exist at the Site.

As mentioned above, donor amendments are usually necessary to increase the co-metabolic bio-degradation process for the lower chlorinated hydrocarbons. Some studies have shown that VC is an acceptable donor for the co-metabolic process (Olaniran et al., 2004). Field studies should be performed to document the co-metabolic bio-degradation process, especially where low-level concentrations of contaminants exist and donor amendments are not used.

A disadvantage to bio-sparging at the Site includes the need for additional injection wells due to reduced ROIs.

Due to the high concentration of cis-1,2-DCE and VC detected in groundwater at the source area, it is possible that high concentrations of epoxides can be generated during the co-metabolic process. Concentrated epoxides are toxic to certain bacteria (oxygenases) cell growth, which would inhibit the bio-degradation process. Therefore, AMEC does not recommend this remedy to treat the source area unless used in combination with other technologies (i.e. pump and treat, ISCO) to limit the toxicity issues.

## **5.5 In-situ Chemical Oxidation**

In-situ chemical oxidation (ISCO) is a process where organic contaminants are destroyed or converted to by-products of less toxic compounds and inert materials (carbon dioxide and water). ISCO is a common remedial technology to treat VOCs in groundwater and VOCs sorbed to aquifer soil. Where DNAPL plumes exist, other technologies offer a more cost effective approach for removing or treating DNAPL.

The most commonly used oxidants include peroxides (i.e. hydrogen peroxide), persulfates, permanganates, and ozone. The addition of hydrogen peroxide to ozone, commonly referred as Perozone offers a more aggressive oxidant than ozone alone. Oxidant choice would vary based on the organic chemicals to treat, the mass of chemicals to treat, and hydrogeological conditions. ISCO can be accomplished by introducing chemical oxidants into the soil or aquifer at a contaminated site using a variety of injection techniques. Normally, this is accomplished using vertical or horizontal injection wells for delivery of chemical oxidants.



Some advantages to chemical oxidation processes are the range of contaminants that can be treated. The oxidants listed above offer superior control for chlorinated ethenes, especially the TCE degradation products such as cis-1,2-DCE and VC. When compared to reductive de-chlorination processes (anaerobic bio-degradation) where daughter products (i.e. cis-1,2-DCE) become more difficult to treat, ISCO has an advantage as the oxidation process is non-selective and can readily treat a broad range of organics within a similar time period. Other advantages of ISCO include the rapid process of chemical oxidation and increased levels of oxygen that can also serve as an enhancement to natural bio-degradation processes for certain organics, where sterilization has not occurred. Under aerobic conditions (secondary benefit of ISCO), case studies have documented that VC co-metabolizes without nutrient or co-substrate supplements (Olaniran et al., 2004).

Some disadvantages of ISCO include costs, difficulty controlling chemical reactions, and the oxidation process is non-selective and therefore it would oxidize natural occurring organic matter as well. Limitations include low permeability soils that tend to limit the ability to distribute the oxidant throughout the contaminated zone. A pilot study should be conducted to evaluate if subsurface conditions (especially for low-permeable soils) are favorable for the oxidation process and to assess the effectiveness of ISCO to treat contaminants on a site-specific basis.

Regulatory approval of ISCO can be difficult to obtain due to the scrutiny related to high volume batch injections of hydrogen peroxide/catalyst blends, persulfate, or permanganates that have the potential to mound and/or spread contaminants and create unsafe environments through instantaneous reactions (i.e. iron catalyzed hydrogen peroxide blends). IDEM has published a technical guidance document, "In-situ Chemical Oxidation" (IDEM, 2009), which discourages the use of ISCO under large volume batch injections due to the potential to mound and/or spread contaminants.

## **5.6 Anaerobic In-situ Chemical Reduction/Biodegradation**

Anaerobic In-situ chemical reduction (ISCR) and/or bio-degradation is a common remedial technology to treat chlorinated VOCs in groundwater. ISCR can be accomplished using biological and/or abiotic processes. For biological processes, a wide range of donor compounds (i.e. HRC, vegetable oils, lactates, molasses) are available for degrading VOCs. In addition to using donor compounds, zero-valent iron (ZVI) has been used to degrade chlorinated VOCs abiotically. Under biological conditions using donor compounds, naturally occurring microorganisms create hydrogen and reducing conditions in the aquifer (reductive de-chlorination). Reductive de-chlorination is one of the

primary attenuation mechanisms by which chlorinated solvent groundwater plumes can be remediated to less toxic compounds. Degradation of chlorinated compounds also occurs abiotically when using certain metals such as ZVI.

The injection of donor compounds into the subsurface is fairly clean and non-disruptive to site operations. Typically, injection is performed using direct-push drilling techniques with or without permanent wells. Injection well/point placing varies based on soil type. Typically, wells are placed approximately 10 to 50 feet apart depending on soil type, media injected, and contaminant loading.

Some advantages of certain donors, such as HRC, include the slow-release of lactic acid to support anaerobic microbial activity and produce hydrogen that is optimal for reductive de-chlorination. HRC provides a long-term source of lactic acid/hydrogen to the subsurface which depending on the donor selected, can treat over extended periods up to 4 years. Operation and maintenance is not required and where green remediation practice management are factors, ISCR and/or biostimulation using carbon substrates rates high when compared to conventional technologies (i.e. pump & treat) that require continuous energy usage. ISCR and/or biostimulation is faster and often, lower cost than conventional NA where long-term monitoring is needed.

Some disadvantages to ISCR and/or biostimulation include Site drilling limitations due to current activity and overhead clearance restrictions. Other disadvantages are that multiple applications may be required to attain low-level concentrations considering the mass of VOCs present at the Site. Subsurface treatment through leaching and diffusion can span periods greater than 3 years, thus prolonging closure when compared to shorter-term remedial technologies (ISCO). Other disadvantages of the reductive de-chlorination process include the transformation of parent products to more toxic daughter products (i.e. VC). If incomplete reductive de-chlorination of PCE/TCE occurs, which case studies have documented when ideal conditions are not present, daughter product plumes such as DCE and VC increase in volume and concentration. In addition, the degradation of DCE and VC is much slower under anaerobic (anoxic bacteria) conditions than under aerobic conditions (i.e. oxygen enrichments). Although the Site VOC groundwater plume is mainly daughter products of cis-1,2-DCE and VC, it is conceivable that the de-chlorination of cis-1,2-DCE could increase VC concentrations under incomplete de-chlorination processes.

The use of ZVI, as an ISCR approach to enhance the de-chlorination process is beneficial in reducing daughter products such as cis-1,2-DCE and VC as TCE is primarily reduced to chloroacetylenes (Brown et al., 2009). ZVI is typically used in permeable reactive barriers (PRBs). PRBs can be successful remedies to control plume migration. Additional treatment media may include donor

compounds (i.e., carbon substrates) and microbes. A disadvantage of using ZVI is product and installation costs.

The conventional means of installing PRBs is by braced excavation, continuous trencher or slurry wall techniques. These conventional installation methods share four major limitations; 1) they are typically incapable of installing PRB wall at depths greater than 40 ft bgs, 2) they include little if any QA/QC to ensure and validate the PRB is built to specifications, 3) they cause substantial disruption of the surface and subsurface where the PRB is to be installed and 4) the excavated soil requires special handling and controlled disposal. In addition, PRBs typically do not address the source area, therefore continued plume migration occurs. Other methods of PRB installation include common injection techniques which share the limitation of item number 2.

## **6.0 Development and Screening for Alternatives**

Based on the applicable remedial technologies discussed in Section 5.0, numerous remedial technologies were retained as potential remedies in achieving the RAOs. The remedial technologies are summarized below.

### **6.1 Rational for Developing Remedies for Alternatives**

Evaluation of the data collected during the FSI, quarterly groundwater sampling events, the risk assessment findings, and the fate and transport evaluation of VOCs in groundwater indicate the following:

- Source area plume treatment is required to minimize the persistence of VOCs in the groundwater.
- Off-site treatment east of the source area would reduce the time-frame for achieving clean up goals.
- The VOCs in groundwater have affected the groundwater quality that is used as a source of drinking water for adjacent and down-gradient properties.
- Institutional controls would need to be implemented to control exposure routes to near-by residents.
- Engineering controls have already been implemented to prevent human consumption and contact with groundwater containing VOCs.

Based on the above rational, source area treatment, down-gradient plume treatment (between MW-6 and MW-16), monitored natural attenuation of the groundwater plume (down-gradient of monitoring well MW-17), institutional and engineering controls, and groundwater monitoring in accordance with the RISC guidelines (IDEM, 2001) were determined to be an effective strategy for achieving RAO's at the Site. Figure 19 (Appendix B) presents the location of the source area and down-gradient area targeted for treatment.

### **6.2 Screening of Remedial Technologies**

Based on the rational for the remedial strategy presented in the previous section, the selected remedial technologies for the Site include the following:

- Institutional Controls/Implementing Engineering Controls
- Monitored Natural Attenuation
- In-Situ Chemical Oxidation
- Anaerobic In-Situ Chemical Reduction/Biodegradation

- Pump and Treat
- Aerobic Biodegradation (Bio-Sparge)
- Air Sparge and Soil Vapor Extraction

A brief description of how these remedial technologies would address the VOC plume in groundwater is presented in the below sections.

#### **6.2.1 No Action**

This option is for comparison purposes only. No action would not be implemented at the Site.

#### **6.2.2 Intuitional Control – Restriction of Groundwater Use**

This option would consist of placing ERCs on affected down-gradient properties. Where this control is not enforced at the discretion of the property owner, engineering controls (referenced in the following section) would be used to restrict consumption and contact of groundwater. A deed restriction has already been place on the Site to minimize groundwater usage in the affected area (source area). Presented in Appendix G is a copy of a typical ERC that would be utilized on the selected down-gradient properties. The use of ERC's on affected properties would not meet all of the RAOs and therefore could not stand alone as an alternative for the Site. However, when combined with other remedial options to address the source area and off-site area proposed for treatment, ERC's offer both short-term and long-term effectiveness in reducing health risk by restricting contact with groundwater containing VOCs. Engineering Controls – Use of Whole House Water Treatment Systems or Municipal Supplied Drinking Water at affected Properties

The engineering control of whole-house water treatment systems on affected properties (excluding 4163 North Old US Highway 31) has already been implemented and will remain in place as the engineering control to restrict consumption and contact of groundwater containing VOCs. The alternative option of extending the City of Rochester's drinking water supply line to affected properties and providing a municipal water supply to the properties is currently in progress. If this option is carried through, the existing potable water wells would be disconnected from the homes and would not be used as a source of potable water. If the water line cannot be extended to the affected areas, then the whole-house water treatment systems will remain in place. This option has similar short-term/long-term effectiveness as ERCs and will not meet all RAOs (i.e. source area mass reduction).

### 6.2.3 Monitored Natural Attenuation

This option would not meet all the RAOs. However, MNA would be a viable option for portions of the down-gradient plume south of the treatment areas [Figure 19 (Appendix B)] considering that engineering controls (i.e. whole-house treatment systems) have been implemented at down-gradient affected properties (excluding 4163 North Old US Highway 31).

Considering that the use of TCE was discontinued in 1968, TCE has only been documented in the groundwater and not in the vadose zone soils at concentrations exceeding RCDLs, and that stable plume conditions have been documented at down-gradient locations, MNA is a viable remedy for the plume down-gradient of MW-17.

TCE degradation rates calculated from concentration versus time plots for monitoring wells MW-14 and MW-17 coupled with elevated concentrations of TCE at this area suggest that the TCE plume is not attenuating quick enough to meet the RAO of reduce the mass of VOCs at the off-site property east of the Site to minimize the monitoring period for MNA. As such, off-site treatment is proposed for the area between MW-14 and MW-17. Degradation rates presented in Appendix D for TCE, cis-1,2-DCE, and VC at well locations down-gradient of MW-17 (i.e. MW-30) suggest that MNA is a viable remedy for this portion of the plume. Degradation rates were calculated using regression analyses (Concentration vs time plots) and the plots are presented in Appendix D.

The TCE degradation rate at monitoring well MW-14 [Figure D9 (Appendix D)] is approximately 0.154 per year, as compared to 0.205 per year at MW-30(41.1). Using a calculation (USEPA, Groundwater Issue, 2009, pg 9) for estimating time to attain a concentration at a given point (MW-17) along the plume centerline, a degradation rate of 0.154 per year [Figure D9 (Appendix D)], a concentration of 31 µg/L TCE (IDEM IDCL), and a trend line concentration of 676 µg/L TCE [Figure D9 (Appendix D)], the calculated time to attain the 31 µg/L TCE at MW-14 is approximately 20 years, assuming no changes in plume mass at up-gradient locations. The formula used to derive this calculation is “natural logarithm (-Ln) \* ((31/308) /.007).”

Using this calculation and the regression trend analyses for MW-30 [Figure D6 (Appendix D)], the time required to attain the TCE IDCL (31 µg/L) at MW-30 is approximately 5 years. AMEC has presented this data for comparison use only and the time frames estimated above to achieve target concentrations do not take in account complexities of the aquifer related to groundwater and chemical transport, actual plume centerline locations (horizontal and vertical), and

variation of decay rates as more data is collected. It should be noted that the degradation rates referenced above were calculated using the above exponential decay equation and do not coincide with the degradation rates that were established for the entire plume using BIOCHLOR fate and transport modeling (Section 3.4.3).

Since MNA alone would not meet all RAOs, a combination of one or more alternative options would be required to address the VOC plume in groundwater at the Site and at the off-site property east of the Site. MNA progress will be monitored quarterly at select well locations. Section 7.1 provides detail on the number of wells to be monitored and the frequency. Groundwater samples will be analyzed for VOCs once every calendar quarter and the results will be evaluated using graphical analyses (trend-line regression) to establish natural and/or enhanced decay rates. In addition to VOC analyses, groundwater quality parameters (ORP, DO, pH, temperature, conductivity) from each well will be recorded and evaluated for trends.

#### **6.2.4 In-situ Chemical Oxidation**

ISCO processes were evaluated for the source area and off-site treatment area [Figure 19 (Appendix B)] to address RAOs. ISCO was not evaluated for down-gradient areas of the plume south of the treatment areas. ISCO processes using liquid oxidants such as hydrogen peroxide, persulfates, or permanganates were ruled out for the following reasons:

- Regulatory approval issues regarding safety (i.e. handling and exothermic reactions) and plume spreading from batch injections (IDEM 2009)
- Injection of liquid hydrogen peroxide (batch injections) oxidant blends beneath permanent structures are not recommended due to exothermic reactions

Perozone was considered for this option for source area and off-site treatment. As a conceptual design, perozone would be injected into the shallow aquifer using a grid of injection wells spaced approximately 30 feet apart. By staggering the injection points, the 30-foot conceptual distance between injection points should be adequate for treatment utilizing two zones of influence (ZOI), an inner oxidation zone to oxidize VOCs (approximately five to ten feet) and an outer oxygen-enriched zone (approximately 15 to 20 feet) to promote aerobic biodegradation for the TCE degradation products, cis-1,2-DCE and VC. The reasons for selecting Perozone over other oxidant choices presented and in Section 5.5 include:



- The Perozone system allows for low-volume controlled (no overdosing) injections using automated equipment to reduce the potential of groundwater mounding and mobilizing contaminants as opposed to high-volume batch injections using hydrogen peroxide/catalyst blends, persulfate, or permanganate which have the potential to mound and spread contaminants.
- Controlled balance of oxidant to contaminants over time (24/7) to reduce fugitive emissions. Due to the low volume injections, the contaminants consume the oxidants rapidly. Based on the estimated mass of contaminants in groundwater, a factor of three to account for sorbed mass, and the required dose of oxidant to treat the estimated mass, continuous Perozone injections are estimated for 2-4 years. Fugitive emissions are unlikely due to continuous soil to groundwater partitioning. If fugitive emissions do escape the saturated zone, they are not likely to reach the surface as other oxidant scavengers (i.e. natural and chemical organic matter) present in the vadose zone (approximately 25 feet deep) would likely consume any remaining oxidant.
- Perozone has one of the highest oxidation potential (2.8 volts) when compared to the other referenced oxidants.
- Reduction of off-gassing by using Perozone micro-bubble technology to increase contact with dissolved and sorbed contaminants.
- Continuous micro-bubble injections should oxidize sorbed contaminants as they leach to groundwater overtime as opposed to batch injections that are short lived and do not provide continuous oxidation as sorbed contaminants partition for soil to groundwater.
- There is less of a potential to push the VOC groundwater plume in the subsurface when compared to other ISCO techniques that require the injection of large amounts of oxidants over short periods (through batch injections).
- Groundwater transport across the source area is low (approx. 0.13 feet per day), based on an average groundwater gradient of 0.0007, effective porosity of 0.26, and a hydraulic conductivity value of 1.63E-02 centimeters per second [Table F2 (Appendix F)].

#### **6.2.5 Anaerobic In-situ Chemical Reduction/Biodegradation**

This remedial technology would consist of injecting a blend of carbon-based donor and ZVI into the shallow source area and portions of the down-gradient aquifer where stable or shrinking plume conditions do not exist. For the off-site treatment locations, ZVI use would be limited unless used in a permeable reactive zone. A wide range of donor compounds (i.e. vegetable oils, lactates,



and molasses) are available for degrading VOCs biologically. The addition of ZVI should trigger an abiotic reduction process where TCE and cis-1,2-DCE are reduced to chloroacetylenes and ethenes as opposed to the reductive de-chlorination process ( TCE  $\Rightarrow$  cis-1,2-DCE  $\Rightarrow$  VC  $\Rightarrow$  ethenes). This enhancement of using ZVI should limit the formation of cis-1,2-DCE to VC, thus reducing the generation of toxic by-products (i.e. VC) prior to completing the reduction process to ethene and non-toxic end products. The donor compound/ZVI blend would be injected using direct-push technology on 15 by 20 foot spacing's (conceptual design). Due to the mass of VOCs present in groundwater, AMEC estimates that 1 to 3 batch injections would be required to treat the source area to SSTLs to reduce further migration onto down-gradient properties depending on application design. Off-site batch injections could be limited to one event based on the lower concentrations of COCs and the carbon substrate used. After initial treatment at off-site locations, MNA may be a likely remedy as opposed to multiple injections. The frequency of batch injections could range from one to four years depending on the composition of donor compounds and ZVI used.

#### **6.2.6 Pump and Treat**

This remedial technology would consist of extracting affected groundwater from the source area and from portions of the down-gradient aquifer where stable or shrinking plume conditions do not exist for above-ground treatment. The treated groundwater (VOC concentrations less than MCLs) most likely would be discharged to a receptor such as a pond or river for re-infiltration into the subsurface. This approach provides hydraulic gradient control to minimize off-site migration, however, pump and treat is a slower process that relies on desorption of the VOCs from the aquifer pore spaces. Typically, once performance monitoring indicates that asymptotic conditions of mass removal from pump and treat have been reached, further remediation using pump and treat alone becomes impractical.

#### **6.2.7 Aerobic Biodegradation (Bio-Sparge)**

This remedial technology would consist of injecting oxygen and donor compounds to promote co-metabolic bio-degradation processes for the chlorinated VOCs in the source area and off-site treatment area [Figure 19 (Appendix B)]. This is typically performed by bio-sparging these gases into the aquifer at very low volumes using an array of injection/monitoring wells. Bio-sparging is well suited for environments where DNAPL does not occur. In addition, bio-sparging in the source area where high concentration of VOCs occur could promote a toxic environment. It is likely that epoxides generated from the co-metabolic process would likely be toxic to the bacteria. As such,

mass reductions must be performed prior to using this technology in these areas (source area) by combining technologies. Examples of combined technologies include:

- Pump and Treat: Recovered groundwater is treated and a portion of the treated water is augmented with oxygen/donor gas substrate and re-injected into the aquifer.

Implementing one of the retained technologies prior to bio-sparging. An example would be converting the Perozone injection wells to bio-sparge wells to change up the technology process from oxidation to aerobic bio-degradation.

#### **6.2.8 Air Sparge and Soil Vapor Extraction (SVE)**

This remedial technology would consist of using air sparging to transfer VOCs from groundwater to vapors followed by vapor-phase removal using SVE processes for the chlorinated VOCs in the shallow aquifer at the source area. This option was not considered for portions of the source area beneath the saturated aquitard or for the off-site treatment area [Figure 19 (Appendix B)]. Air would be injected into the shallow aquifer using a grid of injection wells spaced approximately 30 feet apart (conceptual design). Air volumes injected into each well could range between 5 and 25 cubic feet per minute (cfm). Injection well spacing and air flow should be evaluated during pilot testing. As a conservative estimate, SVE should be sized to extract at least three times (safety factor) the injected flow. Due to the magnitude of VOCs in the source area aquifer, vapor treatment using a scrubber/oxidizer or activated carbon is recommended.

## **7.0 Detailed Analyses of Alternatives**

This section presents a detailed analyses and a conceptual design for each of the developed alternatives for the Site. The alternatives were developed to meet the RAOs referenced in Section 3. Multiple remedial process options were evaluated for groundwater remediation. Only one option was selected for the Site pertaining to vapor intrusion and consists of sub-slab depressurization. A summary of the alternatives evaluated for reducing the mass of COCs in groundwater are presented below and on Table 10 (Appendix A).

### **7.1 Alternative Description/Conceptual Design**

#### **7.1.1 Alternative 1 – No Action**

This no action alternative is retained throughout the alternative development and analyses process as a baseline for comparison to other alternatives. The no action alternative consists of allowing the site to remain in its current condition, with no remedial measures to reduce the contaminate mass beneath the Site. As such, this alternative should not be considered for the Site.

#### **7.1.2 Alternative 2 - Source Area and Down-Gradient Treatment Using Chemical Oxidation, Institutional / Engineering Controls and Monitored Natural Attenuation**

Alternative 2 consists of:

- **Source Area Pre-Design Investigation:** A pre-design investigation would be conducted to adequately define the extent of the source area west and northwest of monitoring well MW-59 (see section 9.1). In addition, the lithology would be assessed beneath the Facility for the silt aquitard, which was observed at MW-59, west of the Site at an elevation of approximately 770 feet NAVD 88. Where encountered, a sample of the silt would be collected and analyzed for VOC concentration to aid in system design (i.e. placement of well points and oxidant demand). During the investigation, soil aquifer matrix, and water samples would be collected and analyzed for VOCs. Soil sampling would focus on the silt aquitard to evaluate the presence of potential DNAPL.
- The groundwater chemistry would be evaluated for parameters pertaining to oxidation potential, total organic matter, total oxidant demand, and metals to evaluate the potential for mobilization. Some of these parameters have already been obtained during the Phase 2 FSI.

- **Engineering Controls:** Engineering controls would be implemented to restrict human contact with affected groundwater and to provide vapor migration control for the Facility. Engineering controls would consist of the following:
  - Whole-house potable water treatment systems for all potable water well systems where VOCs were detected in samples obtained from potable water well supplies. Please note this control has already been implemented. Elimination of whole-house water treatment systems would occur when a new potable water source is supplied to all affected properties (where VOCs were documented in groundwater). Textron and the City of Rochester are currently in the discussions regarding the implementation of this control.
  - Installation of a sub-slab vapor depressurization system to control vapor migration into the Facility (see below bullet: “On-Site Sub-Slab Depressurization System”).
- **Institutional Controls:** Institutional controls would be implemented to restrict future use of groundwater at all affected properties, subsequent to providing a new potable water source as described above. This would be accomplished through an ERC that limits the use of groundwater.
- **Source Area ISCO Injections:** A Perozone system would be utilized for source area cleanup. Based on plume concentrations in the source area, a 24-point, 120 grams per hour oxidant injection system manufactured by Kerfoot Technologies, Inc. would be utilized. At this oxidant delivery rate, it is estimated to require four years to reach SSTLs. Conceptual Perozone model calculations are presented in Appendix H. Kerfoot Technologies, Inc. holds several injection patents utilizing a micro-bubble technology to increase the contact and radius of influence between contaminants and oxidants. Figure 27 (Appendix B) presents the proposed treatment area and the location of the proposed injection wells (conceptual design). If through the pre-design investigation, it is determined that offset injection points are required to treat the affected groundwater below the silt aquitard or the aquitard, an additional Perozone system and injection wells would be installed and operated. Treatment of the aquitard, if deemed necessary, would be difficult for any feasible in-situ remedy. If the aquitard is thicker than one foot, Perozone injections would have limited affects due to contact issues associated with heterogeneous soil types.
- **Down-Gradient Treatment Zone ISCO Injections:** A Perozone system would be utilized to treat the off-site property immediately east of the Site. Figure 27 (Appendix B) presents the proposed down-gradient treatment area and the location of the proposed injection wells (conceptual design). A Kerfoot system equivalent to the one specified for the source area (24-point, 120

grams per hour oxidant injection system) is recommended. Injection well depth may vary based on lithology and COC concentrations. The injectors would be installed to the first confining layer beneath the water table or to a maximum depth below the water table of approximately 50 feet (MW-17). If during the injection well installation, it is determined that offset injection points are required to treat the affected groundwater below a confining layer, nested injection wells would be installed and operated.

- **On-Site Sub-Slab Depressurization System:** During the installation of the injection wells, shallow vapor extraction wells would be installed at an estimated six locations for potential vapor abatement. Based on the results of the sub slab vapor sample testing performed in 2010 and 2011 beneath the Facility floor, low-flow vapor extraction at several locations would be initiated during start-up of ISCO remediation and continue for the first three months of operation. After three months of operation, evaluation of potential vapor migration by testing the vapor stream for potential VOCs and any fugitive ozone emissions would be conducted followed by sub-slab sampling under no vapor control situations. If the results of the testing indicate that sub-slab vapors and fugitive ozone emissions do not pose a risk to industrial workers, sub-slab vapor migration control could be discontinued.
- **Monitored Natural Attenuation/Groundwater Monitoring of MNA and Performance Indicator Wells:** The remedial approach for areas outside of the treatment zones would consist of MNA as described in Section 5.1 and 6.2.4. Table 11 (Appendix A) lists the wells (28) selected for MNA monitoring and remediation progress monitoring. Eleven (11) of the 28 wells are situated within the proposed treatment zones (source area and off-site areas). Monitoring these wells would continue for four quarters following remediation to evaluate rebound conditions. AMEC estimates a time period of approximately 3 years to complete remediation under this alternative. Once remediation is determined to be sufficient in meeting the RAOs, a stability monitoring program for closure would commence.
- **Closure by stability monitoring as described in Appendix 3 of the RISC Technical Guide** would consist of monitoring messenger wells, perimeter of compliance (POC) wells, and sentinel wells quarterly for seven years. The stability monitoring program would include quarterly sampling of messenger wells, point of compliance wells, and sentinel wells, as described in Appendix 3 of the RISC Technical Guide (IDEM, 2001). Table 12 (Appendix A) presents the list of 21 wells to be sampled for closure stability monitoring.

Stability monitoring is proposed for seven years. If stable or decreasing plume conditions (i.e. non-increasing trends) exists at the down-gradient well locations and source area and off-site treatment is no longer required, a "No Further Action" request would be submitted to IDEM. A NFA request would

also be submitted if RDCLs and IDCLs are achieved before the seven years of stability monitoring. Stable or decreasing plume conditions would be evaluated using the Mann Kendall analysis. In addition to the Mann Kendall analysis, regression analysis would be used to established degradation rates and to provide backup for stable or decreasing plume conditions where the Mann Kendall analysis may be inconclusive under a “No Trend” situation.

### **7.1.3 Alternative 3 – In-Situ Chemical Reduction of Source Area and Down-Gradient Treatment Using Anaerobic Biodegradation, Institutional / Engineering Controls and Monitored Natural Attenuation**

Alternative 3 consists of:

- **Source Area Pre-Design Investigation:** The pre-design investigation would consist of the same refinement of the source area as presented in Alternative 2. The groundwater chemistry would be evaluated for parameters pertaining to reductive dechlorination. The groundwater samples would be analyzed for; dehalococcoides (DHC), sulfate, ferric iron, nitrate, chloride, and alkalinity. In addition, a pilot scale injection test would be performed. The data that would be collected during the pilot scale injection test include; optimal injection rates, injection pressures, and an evaluation of injection point spacing.
- **Engineering Controls:** Engineering controls would be implemented as described in Alternative 2.
- **Institutional Controls:** Institutional controls would be implemented as described in Alternative 2.
- **Source Area Injections:** Source area injections would include a blend of carbon substrate and ZVI known as product ABC+(ABC/ZVI), a proprietary formulation registered to REDOX TECH, LLC under a licensed agreement with Adventus Company (Adventus). Adventus holds patents pertaining to ZVI injections. ABC/ZVI injections promote in-situ chemical reduction (ISCR) that involves synergistic effects of stimulated anaerobic biodegradation and anaerobic abiotic degradation. The combination of controlled release of organic carbon to stimulate anaerobic biodegradation and direct reduction via ZVI would drive aquifer geochemistry to a very reductive environment (i.e. -500mV). In order to degrade cis-1,2-DCE and VC anaerobically, a very reductive environment is required. The primary pathway for ISCR is through beta elimination (abiotic degradation processes), whereas TCE is reduced to chloroacetylenes instead of cis-1,2-DCE and VC, the daughter products that are generated through the reductive dechlorination process. Although this is the primary pathway for the transformation of TCE, a low percent (i.e. 10%) of transformation occurs through the reductive dechlorination process. The

synergistic effects of stimulated anaerobic biodegradation and abiotic processes would further reduce cis-1,2-DCE and VC to less toxic by-products.

Considering the aquifer properties and the substrate blend to be used, AMEC estimates the longevity of the product at approximately 12 months. Based on plume concentrations in the source area and a conceptual design, approximately 80 injection points [Figure 28 (Appendix B)] would be advanced using direct-push technology for injecting the substrate. The substrate would be injected into the upper 15 feet of the aquifer and terminated at the first aquitard at approximately 770 feet NAVD 88. This distance between the points is conservative as the typical ROI for ZVI injections is 7.5 feet. Pilot testing would be performed to evaluate the ROI and the point spacings would be adjusted based on the results of the pilot testing.

Model calculations for estimating the volume of ABC/ZVI solution to be injected are presented in Appendix H. Following injection of approximately 1,100 gallons per point, the soil borings would be sealed with bentonite grout to the surface. AMEC anticipates up to two injections, occurring 12 months apart (allowing for rebound monitoring) to remediate the source area to SSTLs. Based on two batch injections, approximately 160 direct-push soil borings would be advanced in the source area over a two-year period. The second injection is estimated to be at 50% the initial injection volume.

If through the pre-design investigation it is determined that deeper injections are required to treat the affected groundwater beneath the silt aquitard, AMEC would develop a work plan to address this area during the second application in the source area.

- **Down-Gradient Treatment Area Injections:** Injections of a proprietary lactate based substrate manufactured by Redox Tech, referred to as ABC, would be mixed with potable water and utilized to treat the off-site property immediately east of the Facility. Figure 28 (Appendix B) presents the proposed down-gradient treatment areas. Based on down-gradient plume concentrations, a conceptual design would consist of the down-gradient treatment areas divided into 4 sections designated as Treatment Areas A through D. Approximately 95 injection wells would be installed to facilitate the injections at different intervals and locations. Each well location would be spaced at approximately 50 feet parallel to the plume and approximately 30 feet perpendicular to the plume. The injection wells would be installed using hollow stem auger (HSA) or rotosonic drilling techniques.



– Treatment Area A

The conceptual design for Area A includes 18 one-inch diameter PVC injection wells screened across the 770 to 780 foot NAVD 88 interval. Approximately 2,000 gallons of ABC solution is proposed to be injected into each well using high-pressure injection equipment.

– Treatment Area B

The conceptual design for Area B includes 28 nested one-inch diameter PVC injection wells located at 14 locations within Area B. The wells would be screened across the 770 to 780 foot and the 755 to 765 foot NAVD 88 intervals. Approximately 2,200 gallons of ABC solution is proposed to be injected into each well using high-pressure injection equipment.

– Treatment Area C

The conceptual design for Area C includes 21 nested one-inch diameter PVC injection wells located at 7 locations within Area C. The wells would be screened across the 770 to 780 foot, the 755 to 765 foot, and the 735 to 745 NAVD 88 intervals. Approximately 3,000 gallons of ABC solution is proposed to be injected into each well using high-pressure injection equipment.

– Treatment Area D

The conceptual design for Area D includes 28 nested one-inch diameter PVC injection wells located at 14 locations within Area D. The wells would be screened across the 770 to 780 foot and the 755 to 765 foot NAVD 88 intervals. Approximately 3,500 gallons of ABC solution is proposed to be injected into each well using high-pressure injection equipment.

Model calculations for estimating the volume of ABC to be injected are presented in Appendix H. AMEC anticipates up to three injections, occurring every 90 days (allowing for rebound monitoring), is required to remediate this area. Based on three batch injections, the injections would cover a period of 9 months to treat the down-gradient treatment areas. The second and third injections are estimated to be at 50% and 30%, the initial injection volume.

- Sub-Slab Depressurization System: Source area vapor migration control would be implemented as described in Alternative #2 with the following provisions:
  - Vapor migration control beneath the Facility would require installation of six sub-slab vapor recovery wells and ancillary piping.



- Monitored Natural Attenuation/Groundwater Monitoring: MNA and Groundwater monitoring would be conducted as described in Alternative 2, with the following provisions:
  - Monitoring of nine performance indicator wells for reductive dechlorination monitoring parameters to include total organic carbon, fatty acids, alkalinity, metals, major anions, and dissolved gasses. Monitoring wells MW-6C, MW-12, MW-13, MW-14, MW-15, MW-25(16.4), MW-25(32.6), MW-59(29), and MW-72(32).
  - AMEC estimates that performance monitoring would be performed over a 3 year period.

#### **7.1.4 Alternative 4 – Source Area and Down-Gradient Treatment Using Anaerobic Biodegradation and ISCR ZVI Reactive Zones, Institutional / Engineering Controls and Monitored Natural Attenuation**

Alternative 4 consists of:

- Source Area Pre-Design Investigation: A pre-design investigation would be the same for Alternative #3.
- Engineering controls: Engineering controls would be implemented as described in Alternative 2.
- Institutional Controls: Institutional controls would be implemented as described in Alternative 2.
- Source Area Injections: Injections of a proprietary lactate based substrate manufactured by Redox Tech, referred to as ABC would be utilized to treat the source area. Figure 29 (Appendix B) presents the location of the proposed injection wells located in the source area. Based on plume concentrations, a conceptual design for injecting ABC solution in the source area would consist of approximately 17 injection wells spaced at approximately 50 feet parallel to the plume and approximately 30 feet perpendicular to the plume would be installed using HSA drilling techniques. The injection wells would be screened across the 770 to 780 foot NAVD 88 interval of the source area. Approximately 2,100 gallons of ABC solution is proposed to be injected into each well using high-pressure injection equipment.

Model calculations for estimating the volume of ABC solution (ABC and water) to be injected is presented in Appendix H. AMEC anticipates up to three injections, occurring every 90 days, would be required to remediate this area to SSTLs. The second and third injections are estimated to be at 50%

and 30%, the initial injection volume. Based on three batch injections, the injections would cover a period of 9 months.

Prior to source area injections of ABC, a permeable reactive zone (Figure 29) consisting of ABC/ZVI would be installed along the down-gradient edge of the source area. ABC/ZVI injections would be accomplished using direct-push technology for injecting the substrate. The ZVI reactive zone would comprise of a double row of injection points staggered and spaced 15 feet apart along each row. At each of the 27 points, approximately 1,900 gallons of ABC/ZVI solution would be injected using a bottom-up approach starting at 770 feet NAVD 88. Injections at each point would terminate at 785 feet NAVD 88, plus or minus 2 feet. For this application, 75,000 pounds of microscale ZVI would be blended with approximately 3,800 gallons of ABC.

Model calculations for estimating the volume of ABC/ZVI to be injected are presented in Appendix H. Following injection of approximately 1,850 gallons point, the soil borings would be sealed with bentonite grout to the surface. AMEC anticipates recharging the ZVI reactive zone at 50% initial volume approximately 12 months after the first injections as a conservative approach. However, if the results of the groundwater monitoring suggest that recharging of the ZVI reactive zone is not required as the source area would have underwent three injections, this step would be eliminated.

If through the pre-design investigation it is determined that deeper injections are required to treat the affected groundwater beneath the silt aquitard, AMEC would develop a work plan to address this area during the second application in the source area.

- Down-Gradient Treatment Area Injections: Injections of ABC would be utilized to treat the off-site area shown on Figure 29 (Appendix B). Based on down-gradient plume concentrations and a conceptual design, the down-gradient treatment areas for ABC injections were divided into three sections designated as Treatment Areas A through C. Approximately 70 injection wells would be installed to facilitate the injections at different intervals and locations. Each well location, containing one to three nested wells depending on the area, would be spaced at approximately 50 feet parallel to the plume and approximately 30 feet perpendicular to the plume would be installed using hollow stem auger drilling techniques.

- Treatment Area A

The conceptual design for Area A includes 11 one-inch diameter PVC injection wells screened across the 770 to 780 foot NAVD 88 interval. Approximately 2,800 gallons of ABC solution is proposed to be injected into each well using high-pressure injection equipment.

- Treatment Area B

The conceptual design for Area B includes 32 nested (2) one-inch diameter PVC injection wells located at 16 locations within Area B. The wells would be screened across the 770 to 780 foot and the 755 to 765 foot NAVD 88 intervals. Approximately 2,000 gallons of ABC solution is proposed to be injected into each well using high-pressure injection equipment.

- Treatment Area C

The conceptual design for Area C includes 27 nested (3) one-inch diameter PVC injection wells located at 9 locations within Area C. The wells would be screened across the 770 to 780 foot, the 755 to 765 foot, and the 735 to 745 NAVD 88 intervals. Approximately 2,200 gallons of ABC solution is proposed to be injected into each well using high-pressure injection equipment.

Model calculations for estimating the volume of ABC solution to be injected are presented in Appendix H. AMEC anticipates up to three injections, occurring every 90 days, would be required to remediate this area to SSTLs. The second and third injections are estimated to be at 50% and 30%, the initial injection volume. Based on three batch injections, the injections would cover a period of 9 months.

Prior to down-gradient treatment area injections, a ZVI reactive zone consisting of ABC/ZVI would be installed in the down-gradient Treatment Area D (Figure 29). Installation of the ZVI reactive zone is analogous to the ZVI reactive zone injections described in the source area and would include 37 injection points with each point receiving approximately 2,100 gallons of ABC/ZVI solution starting at 770 feet NAVD 88 and ending at 785 feet NAVD 88, plus or minus 2 feet. For this application, 140,000 pounds of microscale ZVI would be blended with approximately 7,000 gallons of ABC.

Model calculations for estimating the volume of ABC/ZVI to be injected are presented in Appendix H. Following injection of approximately 2,100 gallons per point, the soil borings would be sealed with bentonite grout to the surface.

- Sub-Slab Depressurization System: Source area vapor migration control would be implemented as described in Alternative #2 with the following provisions:
  - Vapor migration control beneath the Facility would require installation of six sub-slab vapor recovery wells and ancillary piping.

- Monitored Natural Attenuation/Groundwater Monitoring: MNA and Groundwater monitoring would be conducted as described in Alternative 2, with the following provisions:
  - Monitoring of nine performance indicator wells for HRC monitoring parameters to include total organic carbon, volatile fatty acids, alkalinity, metals, major anions, and dissolved gasses. Monitoring wells MW-6C, MW-12, MW13, MW-14, MW-15, MW-25(16.4), MW-25(32.6), MW-59(29), and MW-72(32).

AMEC estimates that performance monitoring would be performed over a 3 year period.

#### **7.1.5 Alternative 5 - Source Area and Down-Gradient Pump and Treat, Institutional / Engineering Controls, and Monitored Natural Attenuation**

Alternative 5 consists of:

- Source Area Pre-Design Investigation: The pre-design investigation would consist of the same refinement of the source area as presented in Alternative 2. An aquifer test would be performed in order to evaluate the hydrogeological parameters in the source area. The data obtained from the aquifer test would be used to refine the number of recovery wells for this alternative.
- Engineering controls: Engineering controls would be implemented as described in Alternative 2.
- Institutional Controls: Institutional controls would be implemented as described in Alternative 2.
- Source Area and Off-Site Pump and Treat: Pump and treat would be accomplished by extracting groundwater from the shallow aquifer at the source area and the off-site property immediately east of the Site. Figure 30 (Appendix B) presents the proposed treatment areas and the location of the proposed system and extraction wells. As a conceptual design, AMEC estimates an approximate extraction rate of 350 to 400 gallons per minute (gpm) across the treatment area to ensure hydraulic containment. An aquifer test would need to be implemented to refine a pumping rate high enough to ensure hydraulic containment.

Assuming a flow rate of approximately 350 to 400 gpm, AMEC assumes installation of 13 extraction wells would address the source area and off-site treatment areas. Three of the 13 extraction wells would be installed in the source area at an approximate elevation of 770 feet NAVD 88 (on top of the silt aquitard, where encountered) in order to extract groundwater from the

upper 15 feet where the highest concentrations of VOCs have been detected. Four of the 13 extraction wells would be installed immediately down-gradient of the source area near MW-6 and MW-20. Elevations for these four wells would vary between 750 and 770 feet NAVD 88 based on the lithology (presence of aquitards). The remaining six extraction wells would be installed along the down-gradient treatment area between MW-12 and MW-26. Elevations for these six wells would vary between 740 and 770 feet NAVD 88 based on the lithology (presence of aquitards) and contaminate concentrations at varying intervals. Between MW-14 and MW-17, the TCE plume elevation drops from approximately 765 feet to 745 feet NAVD 88 as shown on Figure 12 (Appendix B).

Groundwater extracted from the wells would be processed through a treatment system equipped with shallow tray air strippers and activated carbon vessels and would incorporate a redundant treatment system to address down time associated with chemical cleaning of the air stripper and carbon vessels due to precipitated minerals associated with the naturally occurring organic chemicals in the groundwater. The conceptual design does not include vapor-phase treatment for the air stripper. Treated water would be discharged into the Eastern Pond. Pump and treat would not address aquifer matrix soil VOC concentration quickly and as such aquifer soil remediation would be a long process as desorption occurs as clean water moves across the soil pores. AMEC estimates pump and treat operations would need to operate for approximately 10 to 12 years to treat the source area to reach SSTLs.

- Monitored Natural Attenuation/Groundwater Monitoring: MNA and Groundwater monitoring would be conducted as described in Alternative 2, with the following provisions:
  - AMEC estimates that performance monitoring considering the longer period of system operation typically associated with pump & treat would be performed over a 10-year period.

#### **7.1.6 Alternative 6 - Source Area Air Sparging/SVE, Down-Gradient Aerobic Biodegradation, Institutional / Engineering Controls and Monitored Natural Attenuation**

Alternative 6 consists of:

- Source Area Pre-Design Investigation: The pre-design investigation would consist of the same refinement of the source area as presented in Alternative 2. An air sparge/SVE pilot test would be implemented to evaluate the air sparge well and SVE well spacing. The data obtained from the pilot test

would be used to refine the number of air sparge and SVE wells for this alternative.

- **Engineering Controls:** Engineering controls would be implemented as described in Alternative 2.
- **Institutional Controls:** Institutional controls would be implemented as described in Alternative 2.
- **Source Area Air Sparging/SVE:** Air sparge and SVE would be utilized for the source area. Based on the size of the source area, a conceptual well spacing design of placing the wells every 30 feet on row, the source area would include 19 air injection wells. In addition to the 19 air injection wells in the source area, three air injection wells would be installed near MW-6 and MW-20. Four SVE wells (conceptual design) would be installed to capture hydrocarbon vapors from the air stripping process. Figure 31 (Appendix B) presents the proposed treatment area and the location of the proposed wells. If during the pre-design investigation, it is determined that offset injection points are required to treat the affected groundwater below the silt aquitard, this alternative would either not be implemented or an additional technology (i.e. Aerobic Biodegradation – iSOC technology) would be utilized due to vapor control issues of injecting air beneath a saturated aquitard (semi-confined conditions). Using a conceptual design flow rate of approximately 5 cfm per injection well, the air system would incorporate a rotary-lobe blower rated at approximately 120 cfm at 15 pounds per square inch (psi). The air sparge system would include the rotary lobe blower, silencers, safety controls, heat exchanger, and a manifold system equipped with pressure and flow gages.

SVE would be accomplished using three SVE wells (conceptual design). The SVE system would include a 350 cfm rated regenerative blower equipped with a condensate knockout tank, safety controls, a vapor treatment system (scrubber/catalytic oxidizer), inlet filtration, and flow/vacuum gages.

- **Down-Gradient Aerobic Biodegradation:** An iSOC<sup>®</sup> system (iSOC) manufactured by InVentures would be utilized to the off-site treatment area immediately east of the Site. Figure 31 (Appendix B) presents the proposed off-site treatment area and the location of the proposed injection wells (conceptual design). AMEC estimates a period for approximately 4 years to treat the areas consistent with the other approaches.

The iSOC system is used to deliver oxygen as a terminal electron acceptor along with a gaseous growth substrate, typically an alkane gas, in a process known as Co-infusion to stimulate complete in-situ contaminants destruction. The iSOC system uses the Gas inFusion technology described with the

gPRO system. An iSOC delivery system is installed into each well point. The iSOC is equipped with a proprietary structured polymer mass transfer device that is filled with micro-porous hollow fiber material and provides a large surface area for mass transfer of oxygen. The fiber is hydrophobic and therefore excludes water. The system efficiently delivers gas to liquid by mass transfer without sparging. The low volume addition of oxygen and alkane gas minimizes groundwater mounding and plume spreading. This is ideal near the Eastern Pond because groundwater elevations are near the surface under semi-confined conditions.

Injection well depth would vary based on lithology and COC concentrations. The injectors would be installed to the first confining layer beneath the water table or to a maximum saturated depth of approximately 50 feet (i.e. near MW-17). If during the injection well installation, it is determined that offset injection points are required to treat the affected groundwater below a confining layer, nested injection wells would be installed and operated. AMEC estimates a period for approximately 4 years to treat the areas consistent with the other approaches.

With concerns of dissolved-phase plume migration and vapor migration utilizing air sparge/SVE in this area, air sparge/SVE was not proposed for the off-site treatment areas due to the following:

- Air sparging creates groundwater mounding and potential plume spreading where limited treatment is utilized. Due to the nearby sensitive feature (potable water well) at the 4163 North Old US Highway 31 property east of the Site, AMEC does not recommend air sparging.
  - Artesian conditions have been measured along the Eastern Pond (MW-17) where treatment is proposed. In addition groundwater elevations are near the surface and the vadose zone is comprised of low permeable silts and clays (Figure 12). Vapor recovery utilizing SVE would not be possible in this area. Preferential pathways would include the Eastern Pond.
  - Air sparging near the Eastern Pond would require injecting air beneath a silt layer [Figure 12 (Appendix B)] at approximately 740 feet NAVD. Depending on the magnitude of this silt layer, vapor recovery utilizing SVE could be difficult in this area.
- Monitored Natural Attenuation/Groundwater Monitoring: MNA and groundwater monitoring would be conducted as described in Alternative 2.



## 7.2 Detailed Analyses

A detailed analysis of the alternatives were completed to establish if the alternatives satisfy mandatory requirements, are feasible for the site, and to describe the differences among them. The results of the detailed analyses are presented on Table 13 (Appendix A).



## **8.0 Comparative Analyses of Alternatives**

The purpose of the comparative analyses is to evaluate and rank the effectiveness of each remedial alternative in relation to the evaluation criteria. This step also discusses the advantages and disadvantages of each alternative relative to one another in order to provide a basis of decision for the recommended remedial alternative for the Site. Overall protection of human health and the environment and compliance with Applicable or Relevant and Appropriate Requirements (ARARs) serve as threshold criteria, so they must be met by any alternative for it to be eligible for selection. Because Alternative 1 (No Action) does not meet these criteria, it would not be included in the detailed comparison.

Each of the alternatives were evaluated against the following criteria:

- Overall Protection of Human Health and the Environment
- Compliance with ARARs
- Long-Term Effectiveness and Permanence
- Reduction of Toxicity, Mobility, or Volume through Treatment
- Short-Term Effectiveness
- Implementability
- State and Community Acceptance
- Cost

The six alternatives developed to address the groundwater plume are presented in Table 10 (Appendix A).

### **8.1 Overall Protection of Human Health and the Environment**

Based on the human health risk assessment prepared for the Site and the results of the groundwater sampling from potable water treatment systems installed down-gradient of the source area, risks to human health from VOCs in groundwater have been eliminated. The installation of whole-house treatment systems at affected residential properties down-gradient of the Site have restricted the consumption and contact of groundwater. Therefore all of the below alternatives provide a level of protection to human health.

In regards to overall protection of the environment, Alternative 3 (ISCR) would provide the highest level of protection to human health and the environment through abiotic and biological reduction of contaminants in groundwater. Anaerobic aquifer conditions currently exist for the VOC plume in groundwater.

Alternative 4 (Anaerobic biostimulation/ISCR-ZVI reactive zones) ranks second to Alternative 3 as very similar treatment techniques are utilized.

Alternative 2 (ISCO) would provide the third highest level of protection to human health and the environment by chemically oxidizing the contaminants in groundwater and the contaminants sorbed to aquifer matrix soil. The oxidation process is much more aggressive than the other alternatives where direct contact occurs. However, the conceptual design for the Perozone system proposed injection well ROI at great distances to permit aerobic degradation between the wells. Perozone oxidation is short-lived and based on the pulsed-injections and rate/volume of perozone injected, the time frame to attain similar plume control as Alternative 3 and 4 is doubled.

Alternative 5 and Alternative 6, under ideal conditions would provide similar level of protection as Alternative 2.

Implementation of Alternative 6 provides protection to human health and the environment, but depending on the occurrence of discontinuous aquitards in the source area, air sparging may spread the VOCs.

For all of the alternatives excluding Alternative 1, institutional and engineering controls would be implemented to protect human health by restricting the use of and access to groundwater containing VOCs.

## **8.2 Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)**

None of the alternatives would meet RDCLs for groundwater in a feasible time frame. As such, Textron plans to seek a conditional closure for the groundwater plume in accordance with the House Enrolled Act 1162 (IDEM, 2009), which requires that IDEM evaluate institutional controls as a remedy. This would be accomplished by limiting exposure to groundwater through ERCs, engineering controls, and reduction of source area mass by implementing source area remediation. Alternative 2 through Alternative 6 include these controls.

## **8.3 Long-Term Effectiveness and Permanence**

Alternative 3 (ISCR) would be expected to provide the highest degree of long-term effectiveness and permanence followed by Alternative 4. These alternatives would achieve the quickest destruction of contaminants dissolved in groundwater at the source area, when compared to the other alternatives. The abiotic and biotic processes would quickly degrade the contaminants to less

toxic by-products (i.e. ethane, carbon dioxide). As stated above, the aquifer is currently in an anaerobic environment.

Alternative 2 (ISCO) would be expected to provide the third highest degree of long-term effectiveness and permanence because this technology would achieve the quick destruction of contaminants sorbed to soil and dissolved in groundwater, when compared to the other alternatives. The micro-bubble Perozone can aggressively oxidize contaminants upon contact that are adsorbed onto the lower-permeable silt layer identified in the source area, which is suspected to contain residual TCE. However, because Perozone is pulsed at low concentrations to control off-gassing and exothermic reactions, the time required to attain SSTLs is twice as long as Alternative 3.

Alternative 6 would be expected to provide the fourth highest degree of long-term effectiveness and permanence because this technology would also achieve quick destruction of contaminants sorbed to soil and dissolved in groundwater. However, Alternative 6 depends solely on mass transfer of contaminants from dissolved phase to vapor phase, whereas Alternative 2 oxidizes the contaminants on contact. It is AMEC's opinion that the use of aerobic biodegradation in lieu of Perozone (Alternative 2) for remediation of the down-gradient treatment area would not be as efficient in regards to long-term effectiveness due to the discontinuous low-permeable layers where Perozone would be more aggressive in contacting these layers.

Alternative 5 (P&T) would provide long term plume migration control, but would be operated for at least 10 to 12 years to meet ARARs due to the slow desorption from the low permeability aquitards in the saturated zone.

#### **8.4 Reduction of Toxicity, Mobility, or Volume Through Treatment**

Alternative 3 and 4 would provide the most reduction of toxicity and volume of contaminants through abiotic and biotic processes. Based on the quantity of ZVI used in the source area, Alternative 3 would offer the most reduction, however, mobility of transformation products (i.e. VC) may increase along the down-gradient edge of the treatment areas during the first few months. Alternative 5 (P&T) would reduce the toxicity and volume of contaminants in the dissolved-phase through physical removal processes, however would have limited effect on contaminants sorbed to soil. Alternative 5 would also provide an excellent reduction in contaminant mobility through hydraulic containment.

Alternative 6 (Air Sparge & SVE/Aerobic Biodegradation) would reduce the toxicity and volume of contaminants in the dissolved-phase through physical removal (volatilization) processes in the source area and bio-degradation

processes at the treatment areas. The addition of large volumes of injected air at the source area could increase contaminant mobility outside of the treatment area.

## **8.5 Short-Term Effectiveness**

Alternative 3 and 4 are anticipated to have the greatest short-term effectiveness with respect to meeting RAO's. Remediation efforts are estimated at a minimum of approximately 2 to 3 years to reach source area cleanup SSTLs.

Alternative 2 (ISCO), Alternative 5 (P&T), and Alternative 6 (Air Sparge & SVE/Aerobic Biodegradation) are anticipated to have the moderate short-effectiveness with respect to meeting RAO's. Remediation efforts are estimated at a minimum of approximately four to five years to reach source area SSTLs for Alternative 2; 12 to 15 years for Alternative 5; and five to six years for Alternative 6.

## **8.6 Implementability**

In respect to the remedial approach for the source area and the down-gradient treatment area, all of the alternatives can be readily implemented as the technologies have been well established. With respect to the construction phase considering drilling limitations inside the Facility and disruption of Facility operations the alternatives for source area treatment are rated and ranked in order of easily implemented to most difficult.

Alternative 2 (ISCO), Alternative 3 (ISCR), and Alternative 6 (Air Sparge & SVE/Aerobic Biodegradation) could be implemented moderately easily with adequate planning. Facility disruptions would occur considering the number of wells and infrastructure (excluding Alternative 3) that are required for these technologies. Implementation of Alternative 3 (ISCR) requires 80 injection points for the first set of injections. Due to the amount of machinery in the Facility, many of the injection points may be unable to be installed. These approaches are less favorable than Alternatives 4 with respect to active Facility disruptions.

Alternative 4 (Anaerobic Bio-Stimulation/ISCR-ZVI reactive zones) could be implemented moderately easily with adequate planning. Facility disruptions would be lower than Alternatives 2, 3 and 6.

Alternative 5 could be implemented moderately easily with adequate planning. Facility disruptions would occur considering the number of extraction wells and the infrastructure required. The installation of a six-inch diameter extraction well inside the Facility would be difficult to implement due to Facility height restrictions.

## **8.7 State and Community Acceptance**

It is AMEC's opinion that with the level of protection proposed herein to reduce exposure risks at the Site and off-site affected properties using ERC's and engineering controls coupled with source area and off-site treatment that state and community acceptance of this FS would be attainable for all of the alternatives excluding Alternative 1. Since Alternative 1 consists of a "No Action Approach", this alternative most likely would not be granted regulatory acceptance.

## **8.8 Cost**

The costs prepared are estimates having an accuracy of plus or minus 30 percent and are suitable for comparing costs, not as an estimate of construction costs. The actual costs for these alternatives would depend on many variables, including results of pilot testing, subsurface conditions, competitive bids, and market conditions at the time of implementation. Due to these factors, the actual cost and feasibility of these alternatives may vary. A detailed summary of these costs are included in Appendix I. The alternatives have been ranked in order of lowest present net worth to highest present net worth:

- Alternative 1 ( \$ 0.00 )
- Alternative 3 ( \$ 4,806,300 )
- Alternative 6 ( \$ 4,875,3000 )
- Alternative 2 ( \$ 5,193,300 )
- Alternative 4 ( \$ 5,260,600 )
- Alternative 5 ( \$ 7,778,800 )

## 9.0 Recommended Alternative

There are many factors that must be considered when making a recommendation of an alternative for a specific project. Because of the many evaluation criteria that are used and the long term viability of the alternative to meet the RAOs there may be several alternatives that rank very high in the comparative analysis. Therefore, the recommendation of a remedial alternative is based on the interpretations of the data and any data gaps that may exist.

A ranking of the alternatives using the above criteria was performed in order to select a feasible alternative to address the VOCs in groundwater. For each criterion, each alternative (excluding Alternative 1) was compared and scored by assigning a value between one and five where five is the highest ranking and one is the lowest ranking. Listed in Table 14 (Appendix A) are the results of the scoring.

Alternative 4 received the highest score based on the ranking that was applied to each of the criteria for all of the alternatives. Alternative 4 consists of the following approaches:

- Source area and down-gradient treatment using a combination of reductive dechlorination using a carbon substrate and ISCR ZVI reactive zones using a blend of carbon substrates and ZVI. Figure 29 (Appendix B) presents the conceptual design for the source area and down-gradient treatment areas.
- Engineering Control: Maintain whole-house treatment systems at all affected properties until an extension of municipal water can be supplied to the Site and affected areas and connection to affected properties.
- Institutional Control: Placement of ERCs on affected properties to restrict the use of groundwater for human use or consumption. MNA of the groundwater plume down-gradient and cross-gradient of the treatment areas coupled with groundwater monitoring.

Some key factors in selecting Alternative 4 over the following alternatives include:

- Alternative 4 is less intrusive in regards to Facility operation disruptions when compared to other alternatives.
- Alternative 4 provides a treatment remedy using a combination of abiotic and biological processes. Unlike Alternative 3, where ISCR would aggressively remediate the source area, Alternative 4 incorporates ISCR using ZVI reactive zones containing ZVI along the tail end of the source area and at the

down-gradient treatment zone to reduce contaminant mobilization that may occur from the reductive dechlorination processes.

- Alternative 4 approach is anticipated to address the source area much faster than the other alternatives (excluding Alternative 3).
- Alternative 4 has the shortest anticipated timeframe to meet target cleanup goals than the other alternatives (excluding Alternative 3).
- Alternative 4 processes are less likely to mobilize contaminants at the downgradient treatment areas when compared to Alternative 3 and Alternative 6.
- Implementation of Alternative 4 would accelerate the natural anaerobic biodegradation processes that have been and are currently occurring beneath the site.
- Alternative 4 ranks the highest next to Alternative 3 for “Green” or sustainable remediation.
- Costs to implement Alternative 4 is estimated to be mid to high range.

## **9.1 Work Plan - Pilot Test**

Upon IDEM approval to proceed with remedial actions at the Site, a work plan would be prepared by AMEC detailing the steps and performance monitoring that would be implemented to evaluate the efficacy of Alternative 4 to treat the source area and down-gradient treatment areas. In addition, details of the pre-design investigation would be included in the work plan. Pilot testing for the ISCR ZVI Reactive Zone utilizing ABC/ZVI would be performed in the proposed down-gradient treatment area. Figure 32 (Appendix B) presents the location of ZVI Reactive Zone and the proposed ZVI Reactive Zone performance monitoring wells. For the pilot test ZVI Reactive Zone monitoring, three nested 1-inch diameter wells, two at each location, will be installed to monitor for placement and radius of ABC/ZVI, presence of VOCs, and geochemistry parameters (i.e. DO, pH, ORP, conductivity, and iron content). The nested wells will be screened at approximately 750 to 760 feet NAVD 88 and at approximately 770 to 780 feet NAVD 88. Two of the three nested well locations would be placed down-gradient of the ZVI Reactive Zone at approximately 8, 15, and 20 foot distances from the proposed ZVI Reactive Zone injection points. Placement and effective radius of ABC/ZVI would be determined by collecting field data (i.e. groundwater elevations, and geochemistry data) from the nested well points. Also, core samples would be collected from select intervals to visually monitor for the presence of ABC/ZVI.



Pilot testing for the anaerobic biostimulation would be performed near monitoring well MW-59 [Figure 32 (Appendix B)] in the source area. This area was selected for pilot testing in order to utilize existing monitoring well MW-59 and two monitoring wells proposed defining the extent of the source area west and north of MW-59. The proposed injection wells for piloting for the anaerobic biostimulation would also serve as injection wells for the full-scale implementation (if Alternative 4 proves to be a feasible remedial alternative). The proposed injection wells would be screened from approximately 770 feet NAVD 88 to 780 feet NAVD 88.

The monitoring points surrounding the proposed pilot test areas would be used to monitor for:

- **ROI:** ROI determination would consider changes in dissolved oxygen, oxidation reduction potential, pH, temperature, VOCs, and groundwater elevations. Additionally, total and dissolved iron would be monitored at the ZVI Reactive Zone.
- **Reduction of VOCs:** Baseline and periodic VOC analyses would be collected from the points to evaluate for the reduction of VOCs. This data would be used to evaluate the efficacy of Alternative 4 at the pilot tested areas.
- **Rebound of VOCs:** Baseline and post injection VOC analyses would be collected from the monitoring points to evaluate for potential rebound of VOCs. Potential rebound of VOCs could be used to evaluate the source of the rebounding VOCs (i.e. sorbed mass or potential up-gradient sources beneath the Western Pond).
- **Baseline and post chemical analyses of anions, cations, metals, alkalinity, total organic matter, and volatile fatty acids (VFAs).**
- **Baseline and post analyses of DHC.** Based on some case studies, the presence of DHC is required to complete the reductive dechlorination of cis-1,2-DCE to VC. The presence for DHC would be evaluated at three monitoring wells. The locations selected for DHC analyses include MW-59 and one of the proposed nested (2) monitoring wells down-gradient of the ZVI Reactive Zone. Although degradation of chlorinated hydrocarbons by the ZVI Reactive Zone would occur through abiotic processes, the presence of DHC in the down-gradient treatment area should be evaluated. Since product ABC/ZVI contain carbon substrate, DHC analyses at the proposed ZVI Reactive Zone would be beneficial in evaluating the need for bio-augmentation of the down-gradient treatment area up-gradient of the ZVI Reactive Zone.



## 10.0 Conclusions

Based on the data obtained from the FSIs, the VOC groundwater plume is the only media at the Site and off-site locations that require remediation. In accordance with the RAOs listed in Section 3.0, two exposure pathways present risks to human health. They are contact with groundwater and contact with vapors from VOCs in groundwater. To be protective of human health at the Site, six alternative approaches were developed to control and/or treat the VOCs in groundwater. Of the six alternatives, Alternative 4 was selected for the Site to address VOCs in groundwater. Alternative 4 would consist of the following:

- Performing a source area pre-design investigation to refine the limits of the source area.
- Performing a pilot test to evaluate the efficacy and obtain design parameters to use Alternative 4 to treat groundwater containing VOCs at the source area and down-gradient treatment locations.
- Source area treatment using product ABC and 17 injection wells screened from approximately 770 feet NAVD 88 to 780 feet NAVD 88 [Figure 29 (Appendix B)].
- Down-gradient treatment using product ABC and 36 injection well locations [Figure 29 (Appendix B)]. Two well nests (755 to 765 feet NAVD 88 and 770 to 780 feet NAVD 88) would be installed at each injection well in treatment areas B and C. In addition, a third nested well (735 to 745 feet NAVD 88) would be installed at each injection well in Area C. Although sealing (using a bentonite/concrete slurry) between the nested well points would isolate the screened intervals, the intervals between the well screens (i.e. 765 to 770 feet NAVD 88) would receive product ABC through blending and upwelling of injected media.
- Installing a sub-slab depressurization system in the Facility overlying the source area as a preventive measure to control potential vapor intrusion into the Facility during implementation of the biostimulant injections.
- Maintaining the whole-house water treatment system engineering control at affected properties.
- A secondary engineering control would involve an extension of the municipal water supply line from the City of Rochester (Rochester) to the Site and affected areas and connected to affected properties. Implementing an institutional control consisting of placing ERCs on all affected properties to restrict the use of groundwater for human use or consumption, thus limiting contact with groundwater containing VOCs. This institutional control would

be conditional on municipal water being used as a source of drinking water for the affected properties.

- Monitored Natural Attenuation of the groundwater plume down-gradient of the source area and groundwater monitoring using IDEM's closure stability monitoring plan.

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Textron, Inc.  
TORX Facility, Rochester, Indiana  
Remediation Feasibility Study

## APPENDIX A

### TABLES

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Table 1  
Comprehensive Summary of Volatile Organic Compound Analyses  
Performed on the Unsaturated Soil Samples Collected from the Soil Borings Installed Between February and March 2010  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana  
(Results reported in micrograms per kilogram, ug/kg)

Soil Boring Number	Field Sample ID	Sample Date	1,1,1-Trichloroethane	1,1-Dichloroethene	1,2-Dichloroethene, Total	2-Butanone	4-Methyl-2-pentanone	Acetone	Benzene	Carbon disulfide	Chlorobenzene	Chloroform	cis-1,2-Dichloroethane	Ethylbenzene	Methylene chloride	Tetrachloroethene	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride	Xylenes, Total
B53	MTR-B53-S2022	02/27/10	0.15 U	0.2 U	0.38 U	0.38 U	0.67 U	1.5 U	0.22 U	0.42 U	0.36 U	0.19 U	0.22	0.36 U	0.51 U	0.33 U	0.49	0.23 U	0.49	0.23 U	1 U
B54	MTR-B54-S1618	03/09/10	0.66 U	0.66 U	0.83 U	1.3 U	3.3 U	1.1 U	0.52 U	3.3 U	1.7 U	0.66 U	0.66 U	0.5 U	0.54 U	1.1 U	0.66 U	0.66 U	0.83 U	0.66 U	1.7 U
B55	MTR-B55-S1012	02/08/10	0.22 U	0.29 U	0.56 U	0.55 UJ	0.98 U	2.1 U	0.32 U	0.6 U	0.53 U	0.28 U	0.22 U	0.53 U	13	0.48 U	0.51	0.34 U	0.67 U	0.34 UJ	1.5 U
B56	MTR-B56-S0608	02/10/10	0.35	0.27 U	0.52 U	21	0.91 U	270	0.3 U	2.3	0.49 U	0.98	0.2 U	0.51	52	0.44 U	0.37	0.32 U	0.78	0.32 U	1.4 U
B57	MTR-B57-S0406	02/24/10	0.089 U	0.12 U	0.23 U	0.22 UJ	0.4 U	0.88 UJ	0.13 U	0.25 U	0.22 U	0.14	0.089 U	0.22 U	0.3 U	0.19 U	0.16 U	0.14 U	0.45	0.14 U	0.62 U
B58	MTR-B58-S0406	02/23/10	0.09 U	0.12 U	0.24	0.23 U	0.4 U	10	0.13 U	0.25 U	0.22 U	0.12 U	0.24	0.22 U	0.3 U	0.2 U	0.16 U	0.14 U	0.57	0.14 U	0.63 U
B59	MTR-B59-S0406	02/12/10	0.093 U	0.12 U	0.24 U	0.23 U	0.42 U	0.92 U	0.14 U	0.26 U	0.23 U	0.12 U	0.093 U	0.23 U	0.31 U	0.2 U	0.17 U	0.14 U	0.34	0.14 U	0.65 U
	MTR-B59-S0810	02/12/10	0.059 UJ	0.08 UJ	0.15 UJ	4 J	0.27 UJ	31 J	0.089 UJ	0.54 J	0.14 UJ	0.076 UJ	0.059 UJ	300 J	0.2 UJ	0.5 J	21 J	0.093 UJ	2.5 J	0.093 UJ	940 J
B60	MTR-B60-S0608	02/16/10	0.09 U	0.12 U	2.5	5.7	0.4 U	50	0.47	2.2	0.32	0.12 U	2.2	12	0.3 U	0.33	7.3	0.3	0.89	1.3	49
B61	MTR-B61-S0204	02/14/10	0.086 UJ	0.12 UJ	0.25 J	0.22 UJ	0.39 UJ	0.85 UJ	0.13 UJ	0.24 UJ	0.21 UJ	0.11 UJ	0.25 J	0.21 UJ	0.29 UJ	0.19 UJ	0.16 UJ	0.14 UJ	2.4 J	0.13 UJ	0.61 UJ
B62	MTR-B62-S2426	02/26/10	0.16 U	0.21 U	5	0.4 U	0.71 U	1.6 U	0.23 U	0.44 U	0.38 U	0.27	5	0.38 U	0.53 U	0.34 U	0.29 U	0.25 U	2.7	0.25 U	1.1 U
B63	MTR-B63-S1820	02/28/10	0.14 U	0.19 U	4	0.35 U	0.62 U	1.4 U	0.21 U	0.39 U	0.34 U	0.18 U	4	0.34 U	0.47 U	0.3 U	0.25 U	0.22 U	0.57	0.22 U	0.97 U
B64	MTR-B64-S1820	02/25/10	0.096 U	0.13 U	0.25 U	0.24 U	0.43 U	0.95 U	0.14 U	0.27 U	0.23 U	0.16	0.096 U	0.24 U	0.33 U	0.21 U	0.17 U	0.15 U	0.49	0.15 U	0.68 U
	MTR-B64-S1820R	02/25/10	0.091 U	0.12 U	0.23 U	0.23 U	0.41 U	0.9 U	0.14 U	0.25 U	0.22 U	0.15	0.091 U	0.22 U	0.31 U	0.2 U	0.17 U	0.14 U	0.44	0.14 U	0.64 U
B65	MTR-B65-S1618	02/23/10	0.092 U	0.12 U	13	0.23 U	0.41 U	0.91 U	0.14 U	0.26 U	0.22 U	0.26	13	0.22 U	0.31 U	2	0.31	0.14 U	6	0.14 U	0.65 U
B66	MTR-B66-S0608	02/12/10	0.082 UJ	0.11 UJ	16.1	0.21 UJ	0.37 UJ	5.4 J	0.12 UJ	0.23 UJ	0.2 UJ	0.1 UJ	15	0.2 UJ	0.28 UJ	37 J	0.15 UJ	1.1 J	89	0.13 UJ	0.57 UJ
B67	MTR-B67-S2224	02/15/10	0.077 U	0.1 U	59.8 J	0.2 U	0.35 U	0.77 U	0.12 U	0.22 U	0.19 U	0.099 U	59 J	0.19 U	0.26 U	7.5	0.14 U	0.77	25	0.12 U	0.54 U
B68	MTR-B68-S1.52.0	02/14/10	1.6 UJ	2.2 UJ	4.2 UJ	4.2 UJ	7.4 UJ	16 UJ	2.5 UJ	4.6 UJ	4 UJ	2.1 UJ	1.6 UJ	4 UJ	5.6 UJ	3.6 UJ	3 UJ	2.6 UJ	5.3 J	2.6 UJ	12 UJ
	MTR-B68-S1.52.0R	02/14/10	0.08 U	0.11 U	1.4	0.2 U	0.36 U	0.79 U	0.12 U	0.22 U	0.19 U	0.1 U	1.4	0.19 U	0.27 U	0.24	0.14 U	0.12 U	0.86 J	0.12 U	0.56 U
B69	MTR-B69-S2022	02/22/10	0.09 U	0.4	72.3	0.23 U	0.4 U	0.89 U	0.13 U	0.25 U	0.22 U	0.44	70	0.22 U	0.31 U	6.1	0.16 U	2.3	40	0.14 U	0.63 U
B71	MTR-B71-S2022	02/16/10	0.091 UJ	0.12 UJ	36.3	0.23 UJ	0.41 UJ	0.9 UJ	0.14 UJ	0.25 UJ	0.22 UJ	0.12 UJ	36	0.22 UJ	0.31 UJ	2.4 J	0.18 J	0.25 J	15 J	0.14 UJ	0.64 UJ
B72	MTR-B72-S2024	02/13/10	0.093 UJ	0.12 UJ	6.7	0.24 UJ	0.42 UJ	0.92 UJ	0.14 UJ	0.26 UJ	0.23 UJ	0.12 UJ	6.3	0.23 UJ	0.32 UJ	3.2 J	0.17 UJ	0.37 J	18 J	0.14 UJ	0.65 UJ
B73	MTR-B73-S2.503	02/24/10	0.2 U	0.26 U	3.3	0.49 U	0.88 U	1.9 U	0.29 U	0.54 U	0.48 U	0.25 U	3.3	0.48 U	0.66 U	4.7	0.35 U	0.31 U	27	0.3 U	1.4 U
	MTR-B73-S1620	02/24/10	1.9 U	2.6 U	4.9 U	4.8 U	8.6 U	19 U	2.9 U	5.3 U	4.6 U	2.5 U	1.9 U	4.7 U	6.5 U	4.2 U	3.5 U	3 U	5.9 U	3 U	13 U
	MTR-B73-S1620R	02/24/10	0.093 U	0.13 U	2.2	0.24 U	0.95	7.3	0.14 U	0.49	0.23 U	0.21	2.2	0.23 U	0.32 U	1.1	0.61	0.15 U	6.9	0.15 U	0.65 U
B74	MTR-B74-S0406	02/10/10	19 U	25 U	48 U	47 U	84 U	180 U	28 U	52 U	45 U	24 U	19 U	45 U	63 U	41 U	34 U	29 U	58 U	29 U	710
B75	MTR-B75-S1618	02/09/10	0.091 U	0.12 U	0.23 U	0.23 U	0.41 U	0.9 U	0.14 U	0.25 U	0.22 U	0.12 U	0.091 U	0.22 U	0.31 U	0.2 U	0.17 U	0.14 U	0.28 U	0.14 U	0.64 U
IDEM RISC Default Closure																					
Industrial			280000	42000	NE	250000	75000	370000	350	82000	27000	4700	5800	160000	180	640	96000	14000	350	27	170000

Notes:

ug/kg - microgram per kilogram

NA - Not analyzed

NE - None established

R - replicate sample

U - not detected, value is the detection limit

Xylene mixed (total) used as a surrogate for Xylene, m/p.

Concentration exceeds IDEM RISC industrial default closure level

J - value is estimated

N - uncertainty regarding result

H - additional analysis conducted on sample outside of hold time

For a complete list of analyzed compounds and results please refer to the laboratory reports

PB: WDG

CB: PJS

Table 2  
Comprehensive Summary of Volatile Organic Compound Analyses  
Performed on the Groundwater Samples Collected Through December 2010  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana  
(Results reported in micrograms per liter, ug/l)

Monitoring Well Number	Field Sample ID	Sample Date <sup>1</sup>	Acetone	Benzene	Carbon Disulfide	Chlorobenzene	Chloroethane	Chloroform	1,1-Dichloroethane	1,1-Dichloroethene	Cis-1,2-Dichloroethene	Ethyl benzene	Tetrachloroethene	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride	Xylenes, Total
MW-1	MTR-MW1-G051209	05/12/09	20 U	1.3	2.5 U	3.3	3.4	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW1-G082609	08/26/09	20 U	1.4	2.5 U	3.1	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW1-G120209	12/02/09	20 U	1.3	2.5 U	3.9	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW1-G040710	04/07/10	20 U	1.7	2.5 U	6.0	1 U	1 U	0.78 J	1 U	0.42 J	1 U	2 U	1 U	1 U	0.36 J	0.89 J	2 U
	MTR-MW1-G080510	08/05/10	20 U	1.2	2.5 U	5.2	1.0	1 U	0.68 J	1 U	1 U	1 U	2 U	1 U	1 U	1 U	0.41 J	2 U
	MTR-MW1-G120810	12/08/10	20 U	1.4	2.5 U	7.4	1.2	1 U	0.62 J	1 U	0.62 J	1 U	2 U	1 U	1 U	1 U	0.87 J	2 U
MW-2	MTR-MW2-G051209	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW2-G082709	08/27/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW2-G120209	12/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW2-G040710	04/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-3	MTR-MW3-G051209	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	16	0.28 J	2 U	1 U	1 U	1 U	49	2 U
	MTR-MW3-G090109	09/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	0.54 J	1 U	2 U	1 U	1 U	1 U	480	2 U
	MTR-MW3-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	3.1	440 J	1 U	2 U	1 U	8.7	1.6	420 J	2 U
	MTR-MW3-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	270	0.41 J	2 U	1 U	1.4	1 U	400	0.64 J
	MTR-MW3-G080610	08/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	260	0.27 J	2 U	1 U	1.2	1 U	73	2 U
	MTR-MW3-G121010	12/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	67 J	0.36 J	2 U	1 U	1 U	1 U	44 J	2 U
MW-4	MTR-MW4-G050809	05/08/09	20 UJ	1 U	2.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW4-G082809 <sup>(1)</sup>	08/28/09	1.6 J	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW4-G120209	12/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW4-G041210	04/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-5	MTR-MW5-G050809	05/08/09	20 UJ	1 U	2.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW5-G083109	08/31/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW5-G120209	12/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW5-G041210	04/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-6B	MTR-MW6B-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	0.73 J	67	1 U	1 U	2 U	1 U	5.5	1 U	17	2 U
	MTR-MW6B-G051409R	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	0.71 J	64	1 U	1 U	2 U	1 U	5.1	1 U	16	2 U
	MTR-MW6B-G090309	09/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	19 J	1 U	1 U	2 U	1 U	1 U	1 U	4.2 J	2 U
	MTR-MW6B-G121009	12/10/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	13	1 U	1 U	2 U	1 U	1 U	1 U	1.8	2 U
	MTR-MW6B-G041910	04/19/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	12	1 U	1 U	2 UJ	1 U	1 U	1 U	1.9	2 U
MW-6C	MTR-MW6C-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 UJ	1 U	1 U	11	12000	1 U	0.84 J	1 U	68	2.7	1300	2 U
	MTR-MW6C-G090309	09/03/09	20 U	1 U	2.5 U	1 U	1 UJ	1 U	25 J	17000	1 U	1 U	2 U	1 U	92	12 J	3000	2 U
	MTR-MW6C-G121009	12/10/09	20 U	1 U	2.5 U	1 U	1 U	1 U	12	9000	1 U	0.97 J	1 UJ	94	8.3	750	2 U	
	MTR-MW6C-G041910	04/19/10	20 U	1 U	2.5 U	1 U	1 U	1 U	11	7400	1 U	0.50 J	1 U	98	6.5	1000	2 U	
	MTR-MW6C-G081110	08/11/10	20 U	1 U	2.5 U	1 U	1 U	1 U	15	12000	1 U	1.0 J	0.22 J	150 J	14	3800	2 U	
	MTR-MW6C-G121610	12/16/10	200 U	10 U	25 U	10 U	10 U	10 U	10 U	10 U	7700	10 U	20 U	10 U	42	18	1000	20 U
MW-7	MTR-MW7-G051109	05/11/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW7-G082609	08/26/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW7-G120109	12/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW7-G040710	04/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-8	MTR-MW8-G051209	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1.5	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW8-G090109	09/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1.7	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW8-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1.3	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW8-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1.5	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-9A	MTR-MW9A-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW9A-G090109	09/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW9A-G120709	12/07/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW9A-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-9B	MTR-MW9B-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW9B-G051409R	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW9B-G090109	09/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW9B-G120709	12/07/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW9B-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW9B - G080610	08/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW9B-G120910	12/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U



Table 2 (continued)

Comprehensive Summary of Volatile Organic Compound Analyses  
Performed on the Groundwater Samples Collected Through December 2010  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana

(Results reported in micrograms per liter, ug/l)

Monitoring Well Number	Field Sample ID	Sample Date <sup>1</sup>	Acetone	Benzene	Carbon Disulfide	Chlorobenzene	Chloroethane	Chloroform	1,1-Dichloroethane	1,1-Dichloroethene	Cis-1,2-Dichloroethene	Ethyl benzene	Tetrachloroethene	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride	Xylenes, Total
MW-9C	MTR-MW9C-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	4.4	1 U	1 U	1 U	1 U	2 U	1 U	1 U	2.6	1 U	2 U
	MTR-MW9C-G090109	09/01/09	20 U	1 U	2.5 U	1 U	1 U	4.2 J	1 U	1 U	1 U	1 U	2 U	1 U	1 U	2.1 J	1 U	2 U
	MTR-MW9C-G120709	12/07/09	20 U	1 U	2.5 U	1 U	1 U	4.7	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1.7	1 U	2 U
	MTR-MW9C-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	2.3	1 U	1 U	1 U	1 U	0.43 J	1 U	1 U	2.1	1 U	2 U
	MTR-MW9C-G080610	08/06/10	20 U	1 U	2.5 U	1 U	1 U	4.3	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1.3	1 U	2 U
	MTR-MW9C-G120910	12/09/10	20 U	1 U	2.5 U	1 U	1 U	5.8	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1.5	1 U	2 U
MW-10A	MTR-MW10A-G050709	05/07/09	20 UJ	1 U	2.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW10A-G082709	08/27/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW10A-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW10A-G040810	04/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 UJ	1 U	1 U	1 U	1 U	2 U
MW-10B	MTR-MW10B-G050709	05/07/09	20 UJ	1 U	2.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW10B-G082709	08/27/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW10B-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW10B-G040810	04/08/10	20 UJ	1 UJ	2.5 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	2 UJ	1 UJ	1 UJ	1 UJ	1 UJ	2 UJ
MW-10C	MTR-MW10C-G050709	05/07/09	20 UJ	1 U	2.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW10C-G082709	08/27/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW10C-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW10C-G040810	04/08/10	20 UJ	1 UJ	2.5 UJ	1 UJ	1 UJ	1 UJ	0.26 J	1 UJ	1 UJ	1 UJ	2 UJ	1 UJ	1 UJ	1 UJ	1 UJ	2 UJ
MW-11	MTR-MW11-G051309	05/13/09	20 U	0.23 J	2.5 U	1 U	1 U	1 U	1 U	1 U	1.6	0.2 J	2 U	0.68 J	1 U	2	1 U	2 U
	MTR-MW11-G083109	08/31/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1.5	1 U	2 U	1 U	1 U	2.9	1 U	2 U
	MTR-MW11-G120709	12/07/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1.7	0.18 J	2 U	1 U	1 U	2.6	1 U	0.75 J
	MTR-MW11-G041910	04/19/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	2.9	1 U	2 UJ	1 U	1 U	2.4	3.2	2 U
	MTR-MW11-G081210	08/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	2 U	1 U	1 U	3.4	1 U	2 U
	MTR-MW11-G121310	12/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	3.5	1 U	2 U	1 U	1 U	2.8	7.8	2 U
MW-12	MTR-MW12-G051309	05/13/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	2.2	2500	1 U	2 U	0.34 J	27	1 U	1300	2 U
	MTR-MW12-G083109	08/31/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	3.5	4100	1 U	2 U	1 U	43	1 U	1400	2 U
	MTR-MW12-G120909	12/09/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	2.4	4900	0.19 J	2 U	0.61 J	40	0.71 J	1200	2 U
	MTR-MW12-G041910	04/19/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	3.6	3100	1 U	2 UJ	1 U	16	1.4	1400	2 U
	MTR-MW12-G081210	08/12/10	200 U	10 U	25 U	10 U	10 U	10 U	10 U	8.3 J	9300	10 UJ	20 U	10 U	30	10 U	2300	20 U
	MTR-MW12-G121310	12/13/10	200 U	10 U	25 U	10 U	10 U	10 U	10 U	10 U	6900	10 U	20 U	10 U	29	10 U	1300	20 U
MW-13	MTR-MW13-G051309	05/13/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1.6	1700	1 U	1.1 J	1 U	15	14	580	2 U
	MTR-MW13-G083109	08/31/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1.4	2300	1 U	1.1 J	1 U	14	14	830	2 U
	MTR-MW13-G121009	12/10/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	37	1 U	2 U	1 U	2.3	1 U	12	2 U
	MTR-MW13-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	4.4	4300	1 U	1.6 J	1 U	34	16	490	2 U
	MTR-MW13-G081210	08/12/10	100 U	5 U	12 U	5 U	5 U	5 U	5 U	5 U	4500	5 UJ	10 U	5 U	18	15	760	10 U
	MTR-MW13-G121410	12/14/10	100 U	5 U	12 U	5 U	5 U	5 U	5 U	5 U	5700	5 U	10 U	5 U	28	15	940	10 U
MW-14	MTR-MW14-G051209	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	4	210	1 U	2 U	1 U	6.2	640	18	2 U
	MTR-MW14-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	3.7	170	1 U	2 U	1 U	4.8	680	23	2 U
	MTR-MW14-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	2.3	140	1 U	2 U	1 U	3.6	610	8.2	2 U
	MTR-MW14-G041410	04/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	2.9	130	1 U	r	1 U	4.0	620	6.3	2 U
	MTR-MW14-G080910	08/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	3.9	140	1 U	2 U	1 U	5.2	560	17	2 U
	MTR-MW14-G121510	12/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	2.3 J	100	1 U	2 U	1 U	3.4	510	5.9	2 U
MW-15	MTR-MW15-G051209	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	7.5	1300	1 U	2 U	1 U	29	25	510	2 U
	MTR-MW15-G090309	09/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	7.6	1400	1 U	2 U	1 U	42	29	440	2 U
	MTR-MW15-G090309R	09/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	8.0	1600	1 U	2 U	1 U	45	29	520	2 U
	MTR-MW15-G121009	12/10/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	4.9	1300	1 U	2 U	1 U	39	28	350	2 U
	MTR-MW15-G121009R	12/10/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1.0	5000	1 U	1.2 J	1 UJ	29	15	1300	2 U
	MTR-MW15-G042010	04/20/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	9.2	1900	1 U	2 UJ	1 U	47	29	390	2 U
	MTR-MW15-G042010R	04/20/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	9.1	1900	1 U	2 UJ	1 U	44	29	350	2 U
	MTR-MW15-G081110	08/11/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	8.8	1800 J	1 U	2 U	1 U	50	29	380	2 U
	MTR-MW15-G081110	08/11/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	8.8	1800 J	1 U	2 U	1 U	50	29	380	2 U
	MTR-MW15-G121510	12/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	15	3000	1 U	2 U	1 U	64	37	560	2 U

Table 2 (continued)

Comprehensive Summary of Volatile Organic Compound Analyses  
Performed on the Groundwater Samples Collected Through December 2010  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana

(Results reported in micrograms per liter, ug/l)

Monitoring Well Number	Field Sample ID	Sample Date <sup>1</sup>	Acetone	Benzene	Carbon Disulfide	Chlorobenzene	Chloroethane	Chloroform	1,1-Dichloroethane	1,1,1-Dichloroethane	Cis-1,2-Dichloroethane	Ethyl benzene	Tetrachloroethane	Toluene	trans-1,2-Dichloroethane	Trichloroethane	Vinyl chloride	Xylenes, Total
MW-16	MTR-MW16-G051209	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1.9	300	1 U	2 U	1 U	9.8	49	210	2 U
	MTR-MW16-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1.1	190	1 U	2 U	1 U	6.8	45	160	2 U
	MTR-MW16-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	0.71 J	220	1 U	2 U	1 U	6.9	42	98	2 U
	MTR-MW16-G042010	04/20/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1.1	210	1 U	2 U	1 U	7.0	40	94	2 U
	MTR-MW16-G081101	08/11/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	250	1 U	2 U	1 U	7.6	43	130	2 U
	MTR-MW16-G121510	12/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	270	1 U	2 U	1 U	8.4	45	100	2 U
MW-17	MTR-MW17-G051209	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	2.4	160	1 U	2 U	1 U	5.2	300	2.8	2 U
	MTR-MW17-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	2.1	140	1 U	2 U	1 U	4.7	330	1.6	2 U
	MTR-MW17-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1.4	92	1 U	2 U	1 U	3.4	270	1.6	2 U
	MTR-MW17-G041510	04/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1.7 J	110 J	1 U	2 U	1 U	3.6 J	360 J	1.5 J	2 U
	MTR-MW17-G080910	08/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1.6	110	1 U	2 U	1 U	3.8	290	1.4	2 U
	MTR-MW17-G121510	12/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	96	1 U	2 U	1 U	3.3	300	1 U	2 U
MW-18(38.6)	MTR-MW18(38.6)-G050709	05/07/09	20 UJ	1 U	2.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW18(38.6)-G082709	08/27/09	20 U	1 U	2.5 U	0.87 J	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW18(38.6)-G120209	12/02/09	20 U	1 U	2.5 U	2.8	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW18(38.6)-G040810	04/08/10	20 U	1 U	2.5 U	1.1	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-18(63)	MTR-MW18(63)-G050709	05/07/09	20 UJ	1 U	2.5 UJ	1 U	1 U	1 U	1.2	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW18(63)-G082709	08/27/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1.2	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW18(63)-G120209	12/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1.2	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW18(63)-G040810	04/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1.3 J	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-18(164)	MTR-MW18(164)-G050709	05/07/09	20 UJ	1 U	2.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW18(164)-G082609	08/26/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW18(164)-G120209	12/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW18(164)-G040810	04/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-19(33)	MTR-MW19(33)-G050509	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW19(33)-G090109	09/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW19(33)-G090109R	09/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW19(33)-G120709	12/07/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW19(33)-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-19(53)	MTR-MW19(53)-G050509	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	11	1 U	2 U	1 U	1 U	1 U	14	2 U
	MTR-MW19(53)-G050509R	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	11	1 U	2 U	1 U	1 U	1 U	15	2 U
	MTR-MW19(53)-G090109	09/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	19	1 U	2 U	1 U	1 U	1 U	21	2 U
	MTR-MW19(53)-G120709	12/07/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	12 J	1 U	2 U	1 U	1 U	1 U	6.1 J	2 U
	MTR-MW19(53)-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	0.49 J	25	25	1 U	2 U	1 U	1 U	1 U	16	2 U
	MTR-MW19(53)-G080910	08/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	20	20	1 U	2 U	1 U	1 U	1 U	20	2 U
MW-19(118)	MTR-MW19(53)-G121410	12/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	21	21	1 U	2 U	1 U	1 U	1 U	10	2 U
	MTR-MW19(118)-G050509	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW19(118)-G090109	09/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW19(118)-G120709	12/07/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-20(35)	MTR-MW19(118)-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW20(35)-G051409	05/14/09	20 U	1 U	2.5 U	1 U	4.2	1 U	1 U	2.5	2200	1 U	2 U	1 U	29	14	1500	2 U
	MTR-MW20(35)-G090309	09/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	5.4	3500	1 U	1.4 J	0.19 J	24	13	2100	2 U
	MTR-MW20(35)-G121009	12/10/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	2.5	1900	1 U	1 J	1 U	20	7.1	490	2 U
	MTR-MW20(35)-G041910	04/19/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	3.4	2600	1 U	0.87 J	1 U	13	10	1100	2 U
	MTR-MW20(35)-G081110	08/11/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	2.9	2500	1 U	1.4 J	0.14 J	12	6.4	1000	2 U
MW-20(35)	MTR-MW20(35)-G121610	12/16/10	100 U	5 U	12 U	5 U	5 U	5 U	5 U	5 U	2200	5 U	10 U	5 U	10	10	1300	10 U

Table 2 (continued)

Comprehensive Summary of Volatile Organic Compound Analyses  
Performed on the Groundwater Samples Collected Through December 2010  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana

(Results reported in micrograms per liter, ug/l)

Monitoring Well Number	Field Sample ID	Sample Date <sup>1</sup>	Acetone	Benzene	Carbon Disulfide	Chlorobenzene	Chloroethane	Chloroform	1,1-Dichloroethane	1,1-Dichloroethene	Cis-1,2-Dichloroethene	Ethyl benzene	Tetrachloroethane	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride	Xylenes, Total
MW-20(51)	MTR-MW20(51)-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	72	1 U	2 U	1 U	0.40 J	0.76 J	220	2 U
	MTR-MW20(51)-G090309	09/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	88	1 U	2 U	1 U	0.69 J	1 U	80	2 U
	MTR-MW20(51)-G090309R	09/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	91	1 U	2 U	1 U	1 U	1 U	71	2 U
	MTR-MW20(51)-G121009	12/10/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	62	1 U	2 U	1 U	0.42 J	1 U	110	2 U
	MTR-MW20(51)-G121009R	12/10/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	59	1 U	2 U	1 U	0.40 J	1 U	100	2 U
	MTR-MW20(51)-G041910	04/19/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	40	1 U	2 UJ	1 U	1 U	1 U	81	2 U
	MTR-MW20(51)-G041910R	04/19/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	42	1 U	2 UJ	1 U	1 U	1 U	81	2 U
	MTR-MW20(51)-G081110	08/11/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	34	1 U	2 U	1 U	1 U	1 U	45	2 U
	MTR-MW20(51)-G081110R	08/11/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	35	1 U	2 U	1 U	1 U	1 U	47	2 U
	MTR-MW20(51)-G121610	12/16/10	20 U	1 U	2.5 U	1 U	1 UJ	1 U	1 U	1 U	59	1 U	2 U	1 U	1 U	1 U	680	2 U
	MTR-MW20(51)-G121610R	12/16/10	20 U	1 U	2.5 U	1 U	1 UJ	1 U	1 U	1 U	56	1 U	2 U	1 U	1 U	1 U	670	2 U
MW-20(124)	MTR-MW20(124)-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW20(124)-G051409R	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW20(124)-G090309	09/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW20(124)-G121009	12/10/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW20(124)-G041910	04/19/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 UJ	1 U	1 U	1 U	1 U	2 U
	MTR-MW20(124)-G081110	08/11/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-20(155)	MTR-MW20(155)-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW20(155)-G090309	09/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW20(155)-G121009	12/10/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW20(155)-G041910	04/19/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	0.4 J	1 U	2 UJ	1 U	1 U	1 U	1 U	2 U
	MTR-MW20(155)-G081110	08/11/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW20(155)-G121610	12/16/10	20 U	1 U	2.5 U	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-21(40.2)	MTR-MW21(40.2)-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1.5	1 U	2 U
	MTR-MW21(40.2)-G051409R	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1.5	1 U	2 U
	MTR-MW21(40.2)-G083109	08/31/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1.4	1 U	2 U
	MTR-MW21(40.2)-G083109R	08/31/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1.4	1 U	2 U
	MTR-MW21(40.2)-G120409	12/04/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1.5	1 U	2 U
	MTR-MW21(40.2)-G120409R	12/04/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1.5	1 U	2 U
	MTR-MW21(40.2)-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1.6	1 U	2 U
	MTR-MW21(40.2)-G041310R	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1.6	1 U	2 U
MW-21(128)	MTR-MW21(128)-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW21(128)-G083109	08/31/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW21(128)-G120409	12/04/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW21(128)-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-21(155.3)	MTR-MW21(155.3)-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW21(155.3)-G083109	08/31/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW21(155.3)-G120409	12/04/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW21(155.3)-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-22(37)	MTR-MW22(37)-G050709	05/07/09	20 UJ	1 U	2.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW22(37)-G082809	08/28/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW22(37)-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW22(37)-G041210	04/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-22(67.7)	MTR-MW22(67.7)-G050709	05/07/09	20 UJ	1 U	2.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW22(67.7)-G082809	08/28/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW22(67.7)-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW22(67.7)-G041210	04/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-22(130.7)	MTR-MW22(130.7)-G050709 <sup>(2)</sup>	05/07/09	20 UJ	1 U	2.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW22(130.7)-G082809	08/28/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW22(130.7)-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW22(130.7)-G041210	04/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 UJ	1 UJ	1 UJ	1 U	2 U	1 U	1 UJ	1 UJ	1 U	2 U

Table 2 (continued)

Comprehensive Summary of Volatile Organic Compound Analyses  
Performed on the Groundwater Samples Collected Through December 2010  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana

(Results reported in micrograms per liter, ug/l)

Monitoring Well Number	Field Sample ID	Sample Date	Acetone	Benzene	Carbon Disulfide	Chlorobenzene	Chloroethane	Chloroform	1,1-Dichloroethane	1,1-Dichloroethene	Cis-1,2-Dichloroethene	Ethyl benzene	Tetrachloroethane	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride	Xylenes, Total
MW-23(39.9)	MTR-MW23(39.9)-G051109	05/11/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW23(39.9)-G082809	08/28/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW23(39.9)-G120309	12/03/09	20 U	1 U	2.5 U	1 U	2.2	1 U	0.37 J	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW23(39.9)-G040810	04/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	0.73 J	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-23(105.6)	MTR-MW23(105.6)-G051109	05/11/09	20 U	1 U	2.5 U	1 U	8.0	1 U	1.4	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW23(105.6)-G082809	08/28/09	20 U	1 U	2.5 U	1 U	10	1 U	1.2	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW23(105.6)-G082809R	08/28/09	20 U	1 U	2.5 U	1 U	9.1	1 U	1.2	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW23(105.6)-G120309	12/03/09	20 U	1 U	2.5 U	1 U	8.3	1 U	1.4	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW23(105.6)-G120309R	12/03/09	20 U	1 U	2.7 J	1 U	9.1	1 U	1.0	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW23(105.6)-G040810	04/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1.5 J	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MTR-MW23(105.6)-G040810R	04/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1.4 J	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U	
MW-23(122.7)	MTR-MW23(122.7)-G051109	05/11/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW23(122.7)-G082809	08/28/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW23(122.7)-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW23(122.7)-G040710	04/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-24(24.9)	MTR-MW24(24.9)-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW24(24.9)-G090109	09/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW24(24.9)-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW24(24.9)-G041410	04/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	0.38 J	1 U	2 U
MW-24(55.4)	MTR-MW24(55.4)-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	0.78 J	56	1 U	1 U	2 U	1 U	7.1	150	1.5	2 U
	MTR-MW24(55.4)-G051409R	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	0.75 J	55	1 U	1 U	2 U	1 U	7.0	150	1.5	2 U
	MTR-MW24(55.4)-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	0.71 J	68	1 U	1 U	2 U	1 U	6.2	150	1 U	2 U
	MTR-MW24(55.4)-G090209R	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	0.75 J	69	1 U	1 U	2 U	1 U	6.4	150	1 U	2 U
	MTR-MW24(55.4)-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	0.52 J	59	1 U	1 U	2 U	1 U	5.0	130	0.77 J	2 U
	MTR-MW24(55.4)-G120809R	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	0.50 J	53	1 U	1 U	2 U	1 U	4.4	130	1 U	2 U
	MTR-MW24(55.4)-G041410	04/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	0.76 J	98	1 U	r	1 U	7.9	170	0.75 J	2 U	
	MTR-MW24(55.4)-G041410R	04/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	0.85 J	100	1 U	r	1 U	9.1	180	0.85 J	2 U	
	MTR-MW24(55.4)-G080910	08/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	92	1 U	1 U	2 U	1 U	5.3	110	1 U	2 U
	MTR-MW24(55.4)-G080910R	08/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	83	1 U	1 U	2 U	1 U	5.2	110	1 U	2 U
	MTR-MW24(55.4)-G121410	12/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	130	1 U	1 U	2 U	1 U	9.3	140	1 U	2 U
	MTR-MW24(55.4)-G121410R	12/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	0.75 J	110	1 U	1 U	2 U	1 U	8.3	130	1.2 J	2 U
MW-24(122.6)	MTR-MW24(122.6)-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW24(122.6)-G090109	09/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW24(122.6)-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW24(122.6)-G041410	04/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-24(159.4)	MTR-MW24(159.4)-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW24(159.4)-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW24(159.4)-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW24(159.4)-G041410	04/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-25(16.4)	MTR-MW25(16.4)-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	4.9	1500	1 U	1 U	2 U	1 U	9.9	7.8	980	2 U
	MTR-MW25(16.4)-G051409R	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	4.8	1400	1 U	1 U	2 U	1 U	9.6	6.4	980	2 U
	MTR-MW25(16.4)-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	4.1	1500	1 U	1 U	2 U	1 U	9.9	1 U	1200	2 U
	MTR-MW25(16.4)-G090209R	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	4.3	1500	1 U	1 U	2 U	1 U	9.0	1 U	1300	2 U
	MTR-MW25(16.4)-G121009	12/10/09	20 U	1 U	2.5 U	1 U	1 U	1 U	0.45 J	1300 J	1 U	1 U	2 U	1 U	1.2 J	26 J	960 J	2 U
	MTR-MW25(16.4)-G121009R	12/10/09	20 U	1 U	2.5 U	1 U	1 U	1 U	3.2 J	1400	1 U	1 U	2 U	1 U	8.0 J	1.5 J	980	2 U
	MTR-MW25(16.4)-G042010	04/20/10	20 U	1 U	2.5 U	1 U	1 U	1 U	4.0	1200	1 U	1 U	2 U	1 U	9.1	1.1	610	2 U
	MTR-MW25(16.4)-G042010R	04/20/10	20 U	1 U	2.5 U	1 U	1 U	1 U	4.1	1300	1 U	1 U	2 U	1 U	9.6	1.1	680	2 U
	MTR-MW25(16.4)-G081110	08/11/10	20 U	1 U	2.5 U	1 U	1 U	1 U	3.6 J	1400 J	1 U	1 U	2 U	1 U	8.4 J	1 U	780	2 U
	MTR-MW25(16.4)-G081110R	08/11/10	20 U	1 U	2.5 U	1 U	1 U	1 U	3.6	1500	1 U	1 U	2 U	1 U	7.2	0.52 J	880	2 U
	MTR-MW25(16.4)-G121510	12/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	4.5 J	1800	1 U	1 U	2 U	1 U	9.8	1 U	960	2 U
MW-25(32.6)	MTR-MW25(32.6)-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	2.8	440	1 U	1 U	2 U	1 U	3.4	150	400	2 U
	MTR-MW25(32.6)-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	280	1 U	1 U	2 U	1 U	1.5	81	290	2 U
	MTR-MW25(32.6)-G121009	12/10/09	20 U	1 U	2.5 U	1 U	1 U	1 U	4.6	220 J	1 U	1 U	2 U	1 U	36	27	310	2 U
	MTR-MW25(32.6)-G042010	04/20/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	280	1 U	1 U	2 U	1 U	1.3	4.9	370	2 U
	MTR-MW25(32.6)-G081110	08/11/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	210 J	1 U	1 U	2 U	1 U	1.1	1 U	140	2 U
	MTR-MW25(32.6)-G121510	12/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	110	1 U	1 U	2 U	1 U	1 U	1 U	110	2 U

Table 2 (continued)

Comprehensive Summary of Volatile Organic Compound Analyses  
Performed on the Groundwater Samples Collected Through December 2010  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana

(Results reported in micrograms per liter, ug/l)

Monitoring Well Number	Field Sample ID	Sample Date <sup>1</sup>	Acetone	Benzene	Carbon Disulfide	Chlorobenzene	Chloroethane	Chloroform	1,1-Dichloroethane	1,1-Dichloroethene	Cis-1,2-Dichloroethene	Ethyl benzene	Tetrachloroethane	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride	Xylenes, Total
MW-25(45.2)	MTR-MW25(45.2)-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1.5	410	1 U	2 U	1 U	33	11	170	2 U
	MTR-MW25(45.2)-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1.5	430	1 U	2 U	1 U	29	9.2	300	2 U
	MTR-MW25(45.2)-G121009	12/10/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1.2	350	1 U	2 U	1 U	26	6.7	80 J	2 U
	MTR-MW25(45.2)-G041910	04/19/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1.7	390	1 U	2 U	1 U	28	6.3	100	2 U
MW-25(82)	MTR-MW25(82)-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	0.47 J	1 U	2 U	1 U	1 U	1 U	4.8	2 U
	MTR-MW25(82)-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	3.2	2 U
	MTR-MW25(82)-G120909	12/09/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	0.47 J	1 U	2 U	1 U	1 U	1 U	2.4	2 U
	MTR-MW25(82)-G041910	04/19/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	0.4 J	1 U	2 U	1 U	1 U	1 U	2.2	2 U
	MTR-MW25(82)-G081110	08/11/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	0.61 J	1 U	2 U	1 U	1 U	1 U	2.2	2 U
	MTR-MW25(82)-G121510	12/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	2.8	2 U
MW-25(145)	MTR-MW25(145)-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW25(145)-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW25(145)-G120909	12/09/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW25(145)-G041910	04/19/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1.4	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-26(17.5)	MTR-MW26(17.5)-G051209	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1.7	1000	1 U	2 U	1 U	15	12	250	2 U
	MTR-MW26(17.5)-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	2.6	960	1 U	2 U	1 U	15	13	270	2 U
	MTR-MW26(17.5)-G120909	12/09/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1.9	1400	1 U	2 U	1 U	15	8.4	290	2 U
	MTR-MW26(17.5)-G041910	04/19/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	2.7	1000	1 U	2 U	1 U	16	5.7	250	2 U
	MTR-MW26(17.5)-G081010	08/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	2.7	1200 J	1 U	2 U	1 U	14	6.1	250 J	2 U
	MTR-MW26(17.5)-G121510	12/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	3.0 J	1900	1 U	2 U	1 U	16	5.9	440	2 U
MW-26(28.8)	MTR-MW26(28.8)-G051209	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	84	1 U	2 U	1 U	3.6	26	19	2 U
	MTR-MW26(28.8)-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	36	1 U	2 U	1 U	1.6	25	23	2 U
	MTR-MW26(28.8)-G120909	12/09/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	28	1 U	2 U	1 U	1.5	20	14	2 U
	MTR-MW26(28.8)-G041410	04/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	0.25 J	36	1 U	2 U	1 U	1.8	24	15	2 U
MW-26(58.2)	MTR-MW26(58.2)-G051209	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	2.6 J	1 U	2 U	1 U	1 U	1.5	0.7 J	2 U
	MTR-MW26(58.2)-G051209R	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	4.0 J	1 U	2 U	1 U	1 U	1.6	0.8 J	2 U
	MTR-MW26(58.2)-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	2.0	1 U	2 U	1 U	1 U	2.1	1 U	2 U
	MTR-MW26(58.2)-G120909	12/09/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	2.5	1 U	2 U	1 U	1 U	2.0	0.69 J	2 U
	MTR-MW26(58.2)-G041410	04/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	2.2	1 U	2 U	1 U	1 U	2.0	1 U	2 U
	MTR-MW26(58.2)-G081010	08/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	2.8	1 U	2 U	1 U	1 U	1.9	0.66 J	2 U
MW-26(114.8)	MTR-MW26(114.8)-G051209	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW26(114.8)-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW26(114.8)-G120909	12/09/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW26(114.8)-G041410	04/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-26(143.6)	MTR-MW26(143.6)-G051209	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW26(143.6)-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW26(143.6)-G120909	12/09/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW26(143.6)-G041410	04/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-27(18)	MTR-MW27(18)-G051209	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	3.2	840	1 U	2 U	1 U	6.6	13	360	2 U
	MTR-MW27(18)-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	3.7	1100	1 U	2 U	1 U	7.9	19	510	2 U
	MTR-MW27(18)-G090209R	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	3.6	1200	1 U	2 U	1 U	7.6	20	610	2 U
	MTR-MW27(18)-G120909	12/09/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	2.9	1100 J	1 U	2 U	1 U	6.4	16 J	400	2 U
	MTR-MW27(18)-G120909R	12/09/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	2.5	1400 J	1 U	2 U	1 U	6.6	13 J	400	2 U
	MTR-MW27(18)-G041410	04/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	2.2	610	1 U	2 U	1 U	4.4	5.3	170	2 U
	MTR-MW27(18)-G041410R	04/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	2.3	650	1 U	2 U	1 U	4.7	6.1	170	2 U
	MTR-MW27(18)-G081010	08/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	3.0	1100	1 U	2 U	1 U	7.1	11	270	2 U
	MTR-MW27(18)-G081010R	08/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	3.3 J	1000	1 U	2 U	1 U	7.9 J	11 J	210	2 U
	MTR-MW27(18)-G121510	12/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	2.2 J	790	1 U	2 U	1 U	5.7	20	160	2 U
MW-27(53.05)	MTR-MW27(18)-G121510R	12/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	2.1 J	780	1 U	2 U	1 U	5.5	19	150	2 U
	MTR-MW27(53.05)-G051209	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	0.64 J	1 U	1 U	2 U	1 U	1 U	52	1 U	2 U
	MTR-MW27(53.05)-G051209R	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	0.59 J	1 U	1 U	2 U	1 U	1 U	49	1 U	2 U
	MTR-MW27(53.05)-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	55	1 U	2 U
	MTR-MW27(53.05)-G120909	12/09/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	0.56 J	1 U	1 U	2 U	1 U	1 U	40	1 U	2 U
	MTR-MW27(53.05)-G041410	04/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	0.62 J	1 U	1 U	2 U	1 U	1 U	36	1 U	2 U
MW-27(53.05)	MTR-MW27(53.05)-G081010	08/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	31 J	1 U	2 U
	MTR-MW27(53.05)-G121510	12/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	12	1 U	2 U

Table 2 (continued)

Comprehensive Summary of Volatile Organic Compound Analyses  
Performed on the Groundwater Samples Collected Through December 2010  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana

(Results reported in micrograms per liter, ug/l)

Monitoring Well Number	Field Sample ID	Sample Date <sup>1</sup>	Acetone	Benzene	Carbon Disulfide	Chlorobenzene	Chloroethane	Chloroform	1,1-Dichloroethane	1,1-Dichloroethene	Cis-1,2-Dichloroethene	Ethyl benzene	Tetrachloroethane	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride	Xylenes, Total
MW-27(75.4)	MTR-MW27(75.4)-G051209	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	30	1 U	2 U	1 U	1.2	37	1.6	2 U
	MTR-MW27(75.4)-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	33	1 U	2 U	1 U	1.5	37	1.1	2 U
	MTR-MW27(75.4)-G120909	12/09/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	24	1 U	2 U	1 U	1.1	31	1.1	2 U
	MTR-MW27(75.4)-G041410	04/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	34	1 U	2 U	1 U	1.4	31	1.2	2 U
	MTR-MW27(75.4)-G081010	08/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	36	1 U	2 U	1 U	1.2	32	1.5	2 U
	MTR-MW27(75.4)-G121510	12/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	30	1 U	2 U	1 U	1 U	29	1 U	2 U
MW-27(104.2)	MTR-MW27(104.2)-G051209	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	4.4	2 U
	MTR-MW27(104.2)-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	8.6	2 U
	MTR-MW27(104.2)-G120909	12/09/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	5.7	2 U
	MTR-MW27(104.2)-G041410	04/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	4.3	2 U
	MTR-MW27(104.2)-G081010	08/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	5.2	2 U
	MTR-MW27(104.2)-G121510	12/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	4.4	2 U
MW-27(135)	MTR-MW27(135)-G051209	05/12/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW27(135)-G090209	09/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW27(135)-G120909	12/09/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW27(135)-G041410	04/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-28(24.3)	MTR-MW28(24.3)-G050509	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW28(24.3)-G082709	08/27/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW28(24.3)-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW28(24.3)-G041210	04/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-28(53.2)	MTR-MW28(53.2)-G050509	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW28(53.2)-G050509R	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW28(53.2)-G082709	08/27/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW28(53.2)-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW28(53.2)-G041210	04/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-28(117.7)	MTR-MW28(117.7)-G050509	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW28(117.7)-G082709	08/27/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW28(117.7)-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW28(117.7)-G041210	04/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-28(138.1)	MTR-MW28(138.1)-G050509	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW28(138.1)-G082709	08/27/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW28(138.1)-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW28(138.1)-G041210	04/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-29(82.5)	MTR-MW29(82.5)-G050609	05/06/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW29(82.5)-G082709	08/27/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW29(82.5)-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW29(82.5)-G040810	04/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW29(82.5)-G080510	08/05/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW29(82.5)-G120810	12/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-29(103.3)	MTR-MW29(103.3)-G050609	05/06/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW29(103.3)-G082709	08/27/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW29(103.3)-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW29(103.3)-G040810	04/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW29(103.3)-G080510	08/05/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW29(103.3)-G120810	12/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-29(132.8)	MTR-MW29(132.8)-G050609	05/06/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW29(132.8)-G082709	08/27/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW29(132.8)-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW29(132.8)-G040810	04/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW29(132.8)-G080510	08/05/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW29(132.8)-G120810	12/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U

Table 2 (continued)

Comprehensive Summary of Volatile Organic Compound Analyses  
Performed on the Groundwater Samples Collected Through December 2010  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana

(Results reported in micrograms per liter, ug/l)

Monitoring Well Number	Field Sample ID	Sample Date <sup>1</sup>	Acetone	Benzene	Carbon Disulfide	Chlorobenzene	Chloroethane	Chloroform	1,1-Dichloroethane	1,1-Dichloroethene	Cis-1,2-Dichloroethene	Ethyl benzene	Tetrachloroethene	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride	Xylenes, Total
MW-30(41.1)	MTR-MW30(41.1)-G050709	05/07/09	20 UJ	1 U	2.5 UJ	1 U	1 U	1 U	1 U	1.0	130	1 U	2 U	1 U	2.7	77	2.2	2 U
	MTR-MW30(41.1)-G090109	09/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1.2	150	1 U	2 U	1 U	3.2	82	3.5	2 U
	MTR-MW30(41.1)-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	0.62 J	95	1 U	2 U	1 U	2.1	65	2.8	2 U
	MTR-MW30(41.1)-G041410	04/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	0.7 J	82	1 U	2 U	1 U	1.8	72	1.8	2 U
	MTR-MW30(41.1)-G080910	08/09/10	20 U	1 U	2.5 U	1 U	1 UJ	1 U	1 U	1 U	73	1 U	2 U	1 U	1.3	59	1.6	2 U
	MTR-MW30(41.1)-G121410	12/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	59	1 U	2 U	1 U	1 U	58	1 U	2 U
MW-30(120.2)	MTR-MW30(120.2)-G050709	05/07/09	20 UJ	1 U	2.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW30(120.2)-G090109	09/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW30(120.2)-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW30(120.2)-G041410	04/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-30(148)	MTR-MW30(148)-G050709	05/07/09	20 UJ	1 U	2.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW30(148)-G090109	09/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW30(148)-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW30(148)-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-31(30.9)	MTR-MW31(30.9)-G050509	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(30.9)-G090109	09/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	0.89 J	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(30.9)-G090109R	09/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	0.87 J	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(30.9)-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	0.81 J	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(30.9)-G120309R	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	0.79 J	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(30.9)-G040910	04/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 UJ	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(30.9)-G040910R	04/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 UJ	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(30.9)-G080510	08/05/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(30.9)-G120910	12/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	0.68 J	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-31(55.5)	MTR-MW31(55.5)-G050509	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(55.5)-G090109	09/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(55.5)-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(55.5)-G040910	04/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 UJ	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(55.5)-G080510	08/05/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(55.5)-G120910	12/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-31(98.5)	MTR-MW31(98.5)-G050509	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(98.5)-G090109	09/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(98.5)-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(98.5)-G040910	04/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 UJ	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(98.5)-G080510	08/05/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(98.5)-G120910	12/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-31(139.2)	MTR-MW31(139.2)-G050509	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(139.2)-G050509R	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(139.2)-G090109	09/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(139.2)-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(139.2)-G040910	04/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 UJ	1 U	1 U	1 U	1 U	2 U
	MTR-MW31(139.2)-G080510	08/05/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-32(24.1)	MTR-MW32(24.1)-G050609	05/06/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	3.8	1 U	2 U	1 U	0.43 J	1 U	1 U	2 U
	MTR-MW32(24.1)-G090309	09/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	3.4	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW32(24.1)-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	4.2	1 U	2 U	1 U	0.45 J	1 U	2.2	2 U
	MTR-MW32(24.1)-G041510	04/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	4.2	1 U	2 U	1 U	0.47 J	1 U	5.2	2 U
	MTR-MW32(24.1)-G081010	08/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	6.9 J	1 U	2 U	1 U	1 U	1 U	3.6 J	2 U
	MTR-MW32(24.1)-G121410	12/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	4.6	1 U	2 U	1 U	1 U	1 U	2.4	2 U
MW-32(89)	MTR-MW32(89)-G050609 <sup>(3)</sup>	05/06/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	12	2 U
	MTR-MW32(89)-G090309	09/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	15	2 U
	MTR-MW32(89)-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	12	2 U
	MTR-MW32(89)-G041510	04/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	9.4	2 U
	MTR-MW32(89)-G041510R	04/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	12	2 U
	MTR-MW32(89)-G081010	08/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	12 J	2 U
MW-32(89)	MTR-MW32(89)-G121410	12/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	11	2 U

Table 2 (continued)

Comprehensive Summary of Volatile Organic Compound Analyses  
Performed on the Groundwater Samples Collected Through December 2010  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana

(Results reported in micrograms per liter, ug/l)

Monitoring Well Number	Field Sample ID	Sample Date <sup>1</sup>	Acetone	Benzene	Carbon Disulfide	Chlorobenzene	Chloroethane	Chloroform	1,1-Dichloroethane	1,1-Dichloroethene	Cis-1,2-Dichloroethene	Ethyl benzene	Tetrachloroethane	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride	Xylenes, Total
MW-32(110)	MTR-MW32(110)-G050609	05/06/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW32(110)-G090309	09/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW32(110)-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW32(110)-G041510	04/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW32(110)-G081010	08/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW32(110)-G121410	12/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-33(23.1)	MTR-MW33(23.1)-G050509	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW33(23.1)-G082609	08/26/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW33(23.1)-G120209	12/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW33(23.1)-G040710	04/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-33(70.9)	MTR-MW33(70.9)-G050509	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW33(70.9)-G082609	08/26/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW33(70.9)-G120209	12/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW33(70.9)-G040710	04/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-33(129.1)	MTR-MW33(129.1)-G050509	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW33(129.1)-G082609	08/26/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW33(129.1)-G120209	12/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW33(129.1)-G040710	04/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-33(208.9)	MTR-MW33(208.9)-G050509	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW33(208.9)-G082609	08/26/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW33(208.9)-G120209	12/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW33(208.9)-G040710	04/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-34(37)	MTR-MW34(37)-G050609	05/06/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW34(37)-G090309	09/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW34(37)-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW34(37)-G041510	04/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW34(37)-G080910	08/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW34(37)-G121010	12/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-34(85)	MTR-MW34(85)-G050609	05/06/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	12	1 U	2 U
	MTR-MW34(85)-G090309	09/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	14	1 U	2 U
	MTR-MW34(85)-G090309R	09/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	14	1 U	2 U
	MTR-MW34(85)-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	13	1 U	2 U
	MTR-MW34(85)-G120809R	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	14	1 U	2 U
	MTR-MW34(85)-G041510	04/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	15	1 U	2 U
	MTR-MW34(85)-G041510R	04/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	15	1 U	2 U
	MTR-MW34(85)-G080910	08/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	15	1 U	2 U
MW-34(110)	MTR-MW34(85)-G121010	12/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	16	1 U	2 U
	MTR-MW34(110)-G050609	05/06/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	3.1	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW34(110)-G090309	09/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	3.3	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW34(110)-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	2.8	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW34(110)-G041510	04/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	2.8	1 U	2 U	1 U	0.29 J	1 U	1 U	2 U
	MTR-MW34(110)-G080910	08/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	2.4	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW34(110)-G121010	12/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	2.7	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW34(110)-G121010	12/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	2.7	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-34(135)	MTR-MW34(135)-G050609	05/06/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW34(135)-G090309	09/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW34(135)-G120809	12/08/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW34(135)-G041510	04/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-35(45)	MTR-MW35(45)-G050509	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW35(45)-G082609	08/26/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW35(45)-G120209	12/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW35(45)-G040710	04/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW35(45)-G080410	08/04/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW35(45)-G120810	12/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U



Table 2 (continued)

Comprehensive Summary of Volatile Organic Compound Analyses  
Performed on the Groundwater Samples Collected Through December 2010  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana

(Results reported in micrograms per liter, ug/l)

Monitoring Well Number	Field Sample ID	Sample Date <sup>1</sup>	Acetone	Benzene	Carbon Disulfide	Chlorobenzene	Chloroethane	Chloroform	1,1-Dichloroethane	1,1-Dichloroethene	Cis-1,2-Dichloroethene	Ethyl benzene	Tetrachloroethane	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride	Xylenes, Total
MW-35(90)	MTR-MW35(90)-G050509	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW35(90)-G082609	08/26/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW35(90)-G120209	12/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW35(90)-G040710	04/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW35(90)-G080410	08/04/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW35(90)-G120810	12/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-35(148)	MTR-MW35(148)-G050509	05/05/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW35(148)-G082609	08/26/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW35(148)-G120209	12/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW35(148)-G040610	04/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW35(148)-G080410	08/04/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW35(148)-G120810	12/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-36(35.2)	MTR-MW36(35.2)-G050609	05/06/09	20 UJ	1 U	2.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW36(35.2)-G082509	08/25/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW36(35.2)-G120109	12/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW36(35.2)-G040610	04/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW36(35.2)-G080410	08/04/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW36(35.2)-G120710	12/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-36(92.4)	MTR-MW36(92.4)-G050609	05/06/09	20 UJ	1 U	2.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW36(92.4)-G082509	08/25/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW36(92.4)-G120109	12/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW36(92.4)-G040610	04/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW36(92.4)-G080410	08/04/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW36(92.4)-G120710	12/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-36(124.5)	MTR-MW36(124.5)-G050609	05/06/09	20 UJ	1 U	2.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW36(124.5)-G082509	08/25/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW36(124.5)-G120109	12/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW36(124.5)-G040610	04/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW36(124.5)-G080410	08/04/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW36(124.5)-G120710	12/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-37(23.3)	MTR-MW37(23.3)-G050409	05/04/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW37(23.3)-G082509	08/25/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW37(23.3)-G120109	12/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW37(23.3)-G040610	04/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW37(23.3)-G080310	08/03/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW37(23.3)-G120710	12/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-37(70)	MTR-MW37(70)-G050409	05/04/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW37(70)-G082509	08/25/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW37(70)-G120109	12/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW37(70)-G040610	04/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW37(70)-G080310	08/03/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW37(70)-G120710	12/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-37(98)	MTR-MW37(98)-G050409	05/04/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW37(98)-G082509	08/25/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW37(98)-G120109	12/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW37(98)-G040610	04/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW37(98)-G080310	08/03/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW37(98)-G080310R	08/03/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-38(20.8)	MTR-MW38(20.8)-G050409	05/04/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(20.8)-G082509	08/25/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(20.8)-G120109	12/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(20.8)-G040610	04/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(20.8)-G080310	08/03/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(20.8)-G120710	12/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U

Table 2 (continued)

Comprehensive Summary of Volatile Organic Compound Analyses  
Performed on the Groundwater Samples Collected Through December 2010  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana

(Results reported in micrograms per liter, ug/l)

Monitoring Well Number	Field Sample ID	Sample Date <sup>1</sup>	Acetone	Benzene	Carbon Disulfide	Chlorobenzene	Chloroethane	Chloroform	1,1-Dichloroethane	1,1,1-Trichloroethane	Cis-1,2-Dichloroethane	Ethyl benzene	Tetrachloroethane	Toluene	trans-1,2-Dichloroethane	Trichloroethene	Vinyl chloride	Xylenes, Total
MW-38(29.1)	MTR-MW38(29.1)-G050409	05/04/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(29.1)-G082509	08/25/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(29.1)-G082509R	08/25/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(29.1)-G120109	12/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(29.1)-G120109R	12/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(29.1)-G040610	04/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(29.1)-G040610R	04/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(29.1)-G080310	08/03/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(29.1)-G120710	12/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-38(69.9)	MTR-MW38(69.9)-G050409	05/04/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(69.9)-G082509	08/25/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(69.9)-G120109	12/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(69.9)-G040610	04/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(69.9)-G080310	08/03/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(69.9)-G080310R	08/03/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(69.9)-G120710	12/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-38(102.5)	MTR-MW38(102.5)-G050409	05/04/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(102.5)-G082509	08/25/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(102.5)-G120109	12/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(102.5)-G040610	04/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(102.5)-G080310	08/03/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(102.5)-G120710	12/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW38(102.5)-G120710R	12/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-39(13)	MTR-MW39(13)-G050409	05/04/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW39(13)-G082509	08/25/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW39(13)-G120109	12/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW39(13)-G040610	04/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW39(13)-G080310	08/03/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW39(13)-G120710	12/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-39(29.3)	MTR-MW39(29.3)-G050409	05/04/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW39(29.3)-G082509	08/25/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW39(29.3)-G120109	12/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW39(29.3)-G040610	04/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW39(29.3)-G080310	08/03/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW39(29.3)-G120710	12/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-39(76.8)	MTR-MW39(76.8)-G050409	05/04/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW39(76.8)-G082509	08/25/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW39(76.8)-G120109	12/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW39(76.8)-G040610	04/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW39(76.8)-G080310	08/03/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW39(76.8)-G120710	12/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-40(198.8) (Bedrock Well)	MTR-MW40(198.8)-G051109	05/11/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW40(198.8)-G083109	08/31/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW40(198.8)-G120209	12/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW40(198.8)-G040710	04/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-41(190) (Bedrock Well)	MTR-MW41(190)-G051509	05/15/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW41(190)-G083109	08/31/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW41(190)-G120409	12/04/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW41(190)-G041210	04/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-42(175.3) (Bedrock Well)	MTR-MW42(175.3)-G050709	05/07/09	49 J	1 U	2.5 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW42(175.3)-G082709	08/27/09	20 U	1 U	3.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	0.46 J	1 U	1 U	1 U	2 U
	MTR-MW42(175.3)-G120209	12/02/09	20 U	1 U	2.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW42(175.3)-G040910	04/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 UJ	1 U	1 U	1 U	1 U	2 U
MW-43(190) (Bedrock Well)	MTR-MW43(190)-G051509	05/15/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW43(190)-G083109	08/31/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW43(190)-G120409	12/04/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW43(190)-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U

Table 2 (continued)

Comprehensive Summary of Volatile Organic Compound Analyses  
Performed on the Groundwater Samples Collected Through December 2010  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana

(Results reported in micrograms per liter, ug/l)

Monitoring Well Number	Field Sample ID	Sample Date <sup>1</sup>	Acetone	Benzene	Carbon Disulfide	Chlorobenzene	Chloroethane	Chloroform	1,1-Dichloroethane	1,1,1-Dichloroethane	Cis-1,2-Dichloroethane	Ethyl benzene	Tetrachloroethane	Toluene	trans-1,2-Dichloroethane	Trichloroethane	Vinyl chloride	Xylenes, Total
MW-44(185.9) (Bedrock Well)	MTR-MW44(185.9)-G051109	05/11/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW44(185.9)-G083109	08/31/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW44(185.9)-G120309	12/03/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW44(185.9)-G041210	04/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-45(185) (Bedrock Well)	MTR-MW45(185)-G051409	05/14/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW45(185)-G083109	08/31/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW45(185)-G120409	12/04/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW45(185)-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW45(185)-G080510	08/05/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW45(185)-G120810	12/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-46(95.5)	MTR-MW46(95.5)-G050709	05/07/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW46(95.5)-G082609	08/26/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW46(95.5)-G120109	12/01/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW46(95.5)-G040810	04/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-47(109.7)	MTR-MW47(109.7)-G050709	05/07/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW47(109.7)-G082609	08/26/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW47(109.7)-G120209	12/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW47(109.7)-G040810	04/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-47(137.8)	MTR-MW47(137.8)-G050709	05/07/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW47(137.8)-G082609	08/26/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW47(137.8)-G082609R	08/26/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW47(137.8)-G120209	12/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW47(137.8)-G120209R	12/02/09	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW47(137.8)-G040810	04/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW47(137.8)-G040810R	04/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-48(56)	MTR-MW48(56)-G040810(4)	04/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW48(56)-G080510	08/05/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW48(56)-G120910	12/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-48(105)	MTR-MW48(105)-G040910(4)	04/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW48(105)-G080510	08/05/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW48(105)-G120910	12/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-48(129)	MTR-MW48(129)-G040910	04/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW48(129)-G080510	08/05/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW48(129)-G120910	12/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-48(159)	MTR-MW48(159)-G040810	04/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	2.6	2 U
	MTR-MW48(159)-G080510	08/05/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	2.1	2 U
	MTR-MW48(159)-G120910	12/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	3.8	2 U
MW-49(20)	MTR-MW49(20)-G040710(4)	04/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW49(20)-G080410	08/04/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW49(20)-G120810	12/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-49(45)	MTR-MW49(45)-G040710	04/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW49(45)-G080410	08/04/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW49(45)-G120810	12/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-49(95)	MTR-MW49(95)-G040710(4)	04/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW49(95)-G080410	08/04/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW49(95)-G120810	12/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-49(200)	MTR-MW49(200)-G040710	04/07/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW49(200)-G080410	08/04/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW49(200)-G120810	12/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-50(45)	MTR-MW50(45)-G041510	04/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	3.7	1 U	2 U	1 U	0.54 J	1 U	0.53 J	2 U
	MTR-MW50(45)-G081010	08/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	4.1	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW50(45)-G121410	12/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	4.1	1 U	2 U	1 U	1 U	1 U	1 U	2 U

Table 2 (continued)

Comprehensive Summary of Volatile Organic Compound Analyses  
Performed on the Groundwater Samples Collected Through December 2010  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana

(Results reported in micrograms per liter, ug/l)

Monitoring Well Number	Field Sample ID	Sample Date <sup>1</sup>	Acetone	Benzene	Carbon Disulfide	Chlorobenzene	Chloroethane	Chloroform	1,1-Dichloroethane	1,1-Dichloroethene	Cis-1,2-Dichloroethene	Ethyl benzene	Tetrachloroethane	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride	Xylenes, Total
MW-50(80)	MTR-MW50(80)-G041510	04/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW50(80)-G081010	08/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW50(80)-G121410	12/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-50(130)	MTR-MW50(130)-G041510	04/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW50(130)-G081010	08/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW50(130)-G121410	12/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-51(25)	MTR-MW51(25)-G041510	04/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	0.35 J	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW51(25)-G081010	08/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW51(25)-G121410	12/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-51(70)	MTR-MW51(70)-G041510	04/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW51(70)-G081010	08/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW51(70)-G121410	12/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-51(117)	MTR-MW51(117)-G041510	04/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW51(117)-G081010	08/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW51(117)-G121410	12/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-52(55)	MTR-MW52(55)-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	0.86 J	1 U	2 U	1 U	1 U	1 U	0.79 J	2 U
	MTR-MW52(55)-G080610	08/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	0.45 J	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW52(55)-G120910	12/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-52(148)	MTR-MW52(148)-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW52(148)-G080610	08/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW52(148)-G120910	12/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-53(41)	MTR-MW53(41)-G040810	04/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW53(41)-G080410	08/04/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-MW53(41)-G120810	12/08/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
MW-55(49)	MTR-MW55(49)-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	3.6	1 U	2 U	1 U	1 U	4.2	1 U	2 U
	MTR-MW55(49)-G080510	08/05/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	3	1 U	2 U	1 U	1 U	3.3	1 U	2 U
	MTR-MW55(49)-G120910	12/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	2.7	1 U	2 U	1 U	1 U	3.1	1 U	2 U
MW-56(50)	MTR-MW56(50)-G042010	04/20/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	15	1 U	2 U	1 U	1 U	1 U	3	2 U
	MTR-MW56(50)-G080610	08/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	14	1 U	2 U	1 U	1 U	1 U	2.6	2 U
	MTR-MW56(50)-G121410	12/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	16	1 U	2 U	1 U	1 U	1 U	3	2 U
MW-57(38)	MTR-MW57(38)-G041210	04/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	2.9	1 U	2 U	1 U	1 U	2.2	1 U	2 U
	MTR-MW57(38)-G080510	08/05/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	2.9	1 U	2 U	1 U	1 U	2.4	1 U	2 U
	MTR-MW57(38)-G120910	12/09/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1.5	1 U	2 U	1 U	1 U	1.6	1 U	2 U
MW-59(29)	MTR-MW59(29)-G042010	04/20/10	r	r	r	r	r	r	r	r	r	r	r	r	r	r	r	r
	MTR-MW59(29)-G042010R	04/20/10	r	r	r	r	r	r	r	r	r	r	r	r	r	r	r	r
	MTR-MW59(29)-G051110(6)	05/11/10	20 U	0.58 J	2.5 U	1 U	1 U	1 U	1 U	130	40000	6.5 J	2 U	74 J	350	190	17000	19 J
	MTR-MW59(29)-G081110	08/11/10	2000 U	100 U	250 U	100 U	100 U	100 U	100 U	220	57000 J	100 U	200 U	84 J	290	100 U	9200	200 U
	MTR-MW59(29)-G121610	12/16/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	220	53000	9.2	2 U	110	310	520	12000	26
MW-59(46)	MTR-MW59(46)-G042010	04/20/10	200 U	10 U	25 U	10 U	10 U	10 U	10 U	11	1900	10 U	20 U	10 U	5.9 J	9.6 J	190	20 U
	MTR-MW59(46)-G081110	08/11/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	3.1	360	2.5 J	2 U	0.89 J	3.2	2.3	100	3.5
	MTR-MW59(46)-G121610	12/16/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	12	1400	4.6	2 U	1.5	8.9	120	250	6.1
	MTR-MW59(46)-G121610R	12/16/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	11	1300	4.3	2 U	1.4	7.7	100	260	5.7
MW-60(38)	MTR-MW60(38)-G042910	04/29/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	94	0.34 J	2 U	0.18 J	0.44 J	1 U	170 J	0.71 J
	MTR-MW60(38)-G080610	08/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	78	0.4 J	2 U	1 U	1 U	1 U	90	0.45 J
	MTR-MW60(38)-G121410	12/14/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	24	0.44 J	2 U	1 U	1 U	1 U	100	0.48 J
MW-61(26)	MTR-MW61(26)-G041310	04/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	96	1 U	2 U	1 U	0.46 J	1 U	140	2 U
	MTR-MW61(26)-G080610	08/06/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	15	1 U	2 U	1 U	1 U	1 U	8.6	2 U
	MTR-MW61(26)-G121010	12/10/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	64	0.39 J	2 U	1 U	1 U	1 U	42	0.37 J

Table 2 (continued)

Comprehensive Summary of Volatile Organic Compound Analyses  
Performed on the Groundwater Samples Collected Through December 2010  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana

(Results reported in micrograms per liter, ug/l)

Monitoring Well Number	Field Sample ID	Sample Date <sup>1</sup>	Acetone	Benzene	Carbon Disulfide	Chlorobenzene	Chloroethane	Chloroform	1,1-Dichloroethane	1,1-Dichloroethene	Cis-1,2-Dichloroethene	Ethyl benzene	Tetrachloroethene	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride	Xylenes, Total
MW-62(36)	MTR-MW62(36)-G041910	04/19/10	400 U	20 U	50 U	20 U	20 U	20 U	20 U	20 U	1400	20 U	40 UJ	20 U	20 U	20 U	1100	40 U
	MTR-MW62(36)-G081110	08/11/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	0.85 J	710	1 UJ	1.3 J	1 U	3.7	2.8	1000	2 U
	MTR-MW62(36)-G121610	12/16/10	20 U	1 U	2.5 U	1 U	1 UJ	1 U	1 U	1 U	610	1 U	2 U	1 U	3.0	2.2	2600	2 U
	MTR-MW62(36)-G121610R	12/16/10	20 U	1 U	2.5 U	1 U	1 UJ	1 U	1 U	1 U	610	1 U	2 U	1 U	3.2	2.0	2400	2 U
MW-65(32)	MTR-MW65(32)-G041610	04/16/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	2.1	1 U	2 UJ	1 U	1 U	1 U	31	2 U
	MTR-MW65(32)-G081210	08/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	53	1 UJ	2 U	1 U	1 U	1 U	100	2 U
	MTR-MW65(32)-G081210R	08/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	52	1 UJ	2 U	1 U	1 U	1 U	120	2 U
	MTR-MW65(32)-G121310	12/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	3.0	1 U	2 U	1 U	1 U	1 U	2700	2 U
	MTR-MW65(32)-G121310R	12/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	3.1	1 U	2 U	1 U	1 U	1 U	2700	2 U
MW-67(30)	MTR-MW67(30)-G041610	04/16/10	400 U	20 U	50 U	20 U	20 U	20 U	20 U	66	50000	20 U	40 UJ	20 U	300	7.4 J	6300	40 U
	MTR-MW67(30)-G041610R	04/16/10	400 U	20 U	50 U	20 U	20 U	20 U	20 U	81	48000	20 U	40 UJ	20 U	370	9 J	5400	40 U
	MTR-MW67(30)-G081210	08/12/10	1000 U	50 U	120 U	50 U	50 U	50 U	50 U	52 J	41000	50 UJ	100 UJ	50 UJ	270 J	50 UJ	8400 J	100 U
	MTR-MW67(30)-G081210R	08/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	90 J	44000	1 U	1.8 J	3.5 J	530 J	2.2 J	14000 J	2 U
	MTR-MW67(30)-G121310	12/13/10	200 U	10 U	25 U	10 U	10 U	10 U	10 U	20 J	9300	10 U	20 U	10 U	99	10 U	1400	20 U
	MTR-MW67(30)-G121310R	12/13/10	200 U	10 U	25 U	10 U	10 U	10 U	10 U	22 J	11000	10 U	20 U	10 U	110	10 U	1800	20 U
MW-68(32)	MTR-MW68(32)-G041610	04/16/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	50	23000	1 U	1.1 J	1 U	170 J	1.6	3100	2 U
	MTR-MW68(32)-G081210	08/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	53	29000	1 U	0.61 J	2	280 J	1.2	11000	2 U
	MTR-MW68(32)-G081210R	08/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	45	32000	1 U	0.56 J	1.4	530 J	1	9500	2 U
	MTR-MW68(32)-G121310	12/13/10	400 U	20 U	50 U	20 U	20 U	20 U	20 U	48 J	13000	20 U	40 U	20 U	250	20 U	4100	40 U
MW-71(33)	MTR-MW71(33)-G041610	04/16/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	20	8200	1 U	2 UJ	31	56	0.56 J	7600	2 U
	MTR-MW71(33)-G041610R	04/16/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	20	7900	1 U	2 UJ	31	55	0.51 J	7800	2 U
	MTR-MW71(33)-G081210	08/12/10	200 U	10 U	25 U	10 U	10 U	10 U	10 U	2100	2100	10 UJ	20 U	15	7.6 J	10 U	6200	20 U
	MTR-MW71(33)-G121310	12/13/10	1000 U	50 U	120 U	50 U	50 U	50 U	50 U	50 U	32000	50 U	100 U	54	210	50 U	16000	100 U
MW-72(32)	MTR-MW72(32)-G041610 (5)	04/16/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	270	64000	1 U	0.44 J	57	290	0.79 J	12000	2 U
	MTR-MW72(32)-G041610R (5)	04/16/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	210	68000	1 U	0.58 J	58	280	0.97 J	11000	2 U
	MTR-MW72(32)-G081210	08/12/10	4000 U	200 U	500 U	200 U	200 U	200 U	200 U	160 J	60000	200 UJ	400 U	200 U	200 U	200 U	14000	400 U
	MTR-MW72(32)-G121310	12/13/10	2000 U	100 U	250 U	100 U	100 U	100 U	100 U	220 J	100000	100 U	200 U	100 U	280	100 U	23000	200 U
MW-75(32)	MTR-MW75(32)-G041610	04/16/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 UJ	1 U	1 U	6.3	1 U	2 U
	MTR-MW75(32)-G081210	08/12/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	2 U	1 U	1 U	5.2	1 U	2 U
	MTR-MW75(32)-G121310	12/13/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	5.8	1 U	2 U
4377 N O HWY 31	MTR-4377NOHWY31-G121510	12/15/10	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U
	MTR-4377NOHWY31-G010511	01/05/11	20 U	1 U	2.5 U	1 U	1 U	1 U	1 U	1 U	0.45 J	1 U	2 U	1 U	1 U	1 U	1.4	2 U
USEPA MCLs			NE	5.0	NE	100	NE	80	NE	7.0	70	700	5.0	1000	100	5.0	2.0	10000
IDEM RISC Default Closure																		
Industrial			92000	52	10000	2000	990	1000	10000	5100	1000	10000	55	8200	2000	31	4.0	20000
Residential			6900	see MCL	1300	see MCL	62	see MCL	see MCL	see MCL	see MCL	see MCL	see MCL	see MCL	see MCL	see MCL	see MCL	see MCL

## Notes:

NA - Not analyzed  
NE - None established

R - replicate sample

r - rejected

ected, value is the detection limit

J - value is estimated

uncertainty regarding result

sis conducted on sample outside of hold time

ction Agency (USEPA) Maximum Contaminant Levels (MCLs) (May 2005)

al Management (IDEM) risk integrated system of closure (RISC) (05/01/05)

otal) used as a surrogate for Xylene, m/p

ompounds and results please refer to the laboratory report

Concentration exceeds IDEM RISC industrial default closure level

Concentration exceeds IDEM RISC residential default closure level and U.S. EPA maximum contaminant level

(1) 2-Butanone was detected at a concentration of 14 ug/l in the sample collected from MW-4 on 08/28/09

(2) MTR-MW22(130.7)-G050709 was mistakenly labeled as MTR-MW22(138.7)-G050709 on the Chain of Custody (COC)

(3) MTR-MW32(89)-G050609 was mistakenly labeled as MTR-MW32(82)-G050609 on the Chain of Custody (COC)

(4) Methylene Chloride was detected in the samples collected from MW-48(56) (0.45 J ug/l) and from MW48(105) (0.69 J ug/L) collected on 4/8/10 and 4/9/10, respectively; and in the samples collected from MW49(20) (1.3 J ug/l) and MW49(95) (0.56 J ug/l), both collected on 4/7/10.

(5) 1,2-Dichloroethane was detected at a concentration of 0.67 J and 0.71 J ug/l in the sample and its respective replicate sample collected from MW-72(32) on 04/16/10.

(6) Chloromethane was detected at a concentration of 1.7 J ug/L in the sample MW59(29) collected on 5/11/10.

(7) o-Xylene was detected at a concentration of 0.45 J ug/L in the sample MW60(38) collected on 8/6/10.

PB: WDG  
CB: PJS

**Table 3**  
**Comprehensive Summary of the Volatile Organic Compound Analyses**  
**Performed on the Potable Water Samples Collected since 2004**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**  
**(Results reported in micrograms per liter, ug/l)**

Map ID#	House Number	Sample Date	Chloroethane	cis 1,2 Dichloroethene	trans 1,2 Dichloroethene	Trichloroethene	Vinyl Chloride	Comments
<b>Houses located along North Old US Highway 31</b>								
2	4403	08/24/04	<0.50	<0.50	<0.50	<0.50	<0.50	Collected By IDEM Inside Spigot Outside Spigot
		07/14/05	<0.50	<0.50	<0.50	<0.50	<0.50	
		06/22/06	<0.50	<0.50	<0.50	<0.50	<0.50	
		10/22/07	<0.50	<0.50	<0.50	<0.50	<0.50	
		10/21/08	<0.50	<0.50	<0.50	<0.50	<0.50	
		11/18/08*	ND	ND	ND	ND	ND	
		04/14/10	<0.50	<0.50	<0.50	<0.50	<0.50	
		04/14/10	<0.50	<0.50	<0.50	<0.50	<0.50	
3	4377	10/21/08	<0.50	<0.50	<0.50	<0.50	<b>0.54</b>	Collected by IDEM Collected by IDEM
		11/03/08	<0.50	<0.50	<0.50	<0.50	<b>0.50</b>	
		11/18/08*	ND	ND	ND	ND	<b>1.1</b>	
		11/18/08*	ND	ND	ND	ND	<b>1.1</b>	
		11/20/08	<0.50	<0.50	<0.50	<0.50	<b>0.84</b>	
4	4375	11/03/08	<0.50	<0.50	<0.50	<0.50	<b>5.92</b>	Outside Spigot Kitchen Faucet Collected by IDEM well pump removed duplicate sample
		11/06/08	<0.50	<0.50	<0.50	<0.50	<b>5.00</b>	
		11/18/08*	ND	ND	ND	ND	<b>8.4</b>	
		09/03/09	<1.0	<1.0	<1.0	<1.0	<b>8.7</b>	
		09/03/09	<1.0	<1.0	<1.0	<1.0	<b>8.6</b>	
5	4163	08/24/04	<0.50	<0.50	<0.50	<0.50	<0.50	Collected By IDEM
		07/14/05	<0.50	<0.50	<0.50	<0.50	<0.50	
		06/22/06	<0.50	<0.50	<0.50	<0.50	<0.50	
		10/22/07	<0.50	<0.50	<0.50	<0.50	<0.50	
		10/21/08	<0.50	<0.50	<0.50	<0.50	<0.50	
		11/18/08*	ND	ND	ND	ND	ND	
		11/20/09	<0.50	<0.50	<0.50	<0.50	<0.50	
		06/03/10	<0.50	<0.50	<0.50	<0.50	<0.50	
6	4217/4081	08/24/04	<0.50	<0.50	<0.50	<0.50	<0.50	Collected By IDEM
		07/14/05	<0.50	<0.50	<0.50	<0.50	<0.50	
		06/22/06	<0.50	<0.50	<0.50	<0.50	<0.50	
		10/22/07	<0.50	<0.50	<0.50	<0.50	<0.50	
		11/03/08	<0.50	<0.50	<0.50	<0.50	<0.50	
		11/18/08*	ND	ND	ND	ND	ND	
		05/11/10	<0.50	<0.50	<0.50	<0.50	<0.50	
18	4016	11/18/08*	ND	ND	ND	ND	ND	Collected By IDEM
		06/24/09	<0.50	<0.50	<0.50	<0.50	<0.50	
19	4008	11/18/08*	ND	ND	ND	ND	ND	Collected By IDEM Collected By IDEM
		11/18/08*	ND	ND	ND	ND	ND	
20	3998	11/18/08*	ND	ND	ND	ND	ND	Collected By IDEM
21	3980	12/10/08	<0.50	<0.50	<0.50	<0.50	<0.50	
22	3868	11/18/08*	ND	ND	ND	ND	<b>7.3</b>	Collected By IDEM
		12/10/08	<0.50	<0.50	<0.50	<0.50	<b>6.8</b>	

**Table 3 continued**  
**Comprehensive Summary of the Volatile Organic Compound Analyses**  
**Performed on the Potable Water Samples Collected since 2004**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**  
**(Results reported in micrograms per liter, ug/l)**

Map ID#	House Number	Sample Date	Chloroethane	cis 1,2 Dichloroethene	trans 1,2 Dichloroethene	Trichloroethene	Vinyl Chloride	Comments
<b>Houses located along North Old US Highway 31</b>								
23	3842	11/18/08*	ND	ND	ND	ND	<b>1.2</b>	Collected By IDEM
		12/10/08	<0.50	<0.50	<0.50	<0.50	<0.50	
		12/10/08	<0.50	<0.50	<0.50	<0.50	<b>1.4</b>	duplicate sample
24	3796	12/10/08	<0.50	<0.50	<0.50	<0.50	<b>11.0</b>	
		06/02/09	<0.50	<0.50	<0.50	<0.50	<b>6.6</b>	
30	3791	11/18/08*	ND	ND	ND	ND	<b>10.0</b>	Collected By IDEM
		12/10/08	<0.50	<0.50	<0.50	<0.50	<b>9.4</b>	
31	3719/3701	11/18/08*	ND	ND	ND	ND	ND	Collected By IDEM
32	3618	12/10/08	<0.50	<0.50	<0.50	<0.50	<0.50	
		05/11/10	<0.50	<0.50	<0.50	<0.50	<0.50	
33	3586	12/10/08	<0.50	<0.50	<0.50	<0.50	<0.50	
34	3597	11/18/08*	ND	<b>1.2</b>	ND	ND	ND	Collected By IDEM
		12/10/08	<0.50	<b>4.7</b>	<0.50	<0.50	<0.50	
		12/10/08	<0.50	<b>4.1</b>	<0.50	<0.50	<0.50	ms/msd sample
37	3394	12/11/08	<0.50	<0.50	<0.50	<0.50	<0.50	
64	4909	02/03/09	<0.50	<0.50	<0.50	<0.50	<0.50	
65	4910	02/03/09	<0.50	<0.50	<0.50	<0.50	<0.50	
66	4690	01/16/09	<0.50	<0.50	<0.50	<0.50	<0.50	
69	4833	04/29/09	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>Houses located along East 450N</b>								
54	116	04/29/09	<0.50	<0.50	<0.50	<0.50	<0.50	
55	120/128	02/03/09	<0.50	<0.50	<0.50	<0.50	<0.50	
79	1019	11/06/08	<0.50	<0.50	<0.50	<0.50	<0.50	
		11/18/08*	ND	ND	ND	ND	ND	Collected By IDEM
		06/02/09	<0.50	<0.50	<0.50	<0.50	<0.50	
73	1049	10/06/09	<0.50	<0.50	<0.50	<0.50	<0.50	
74	1125	10/06/09	<0.50	<0.50	<0.50	<0.50	<0.50	
75	1195	10/06/09	<0.50	<0.50	<0.50	<0.50	<0.50	
84	1995	02/11/09	<0.50	<0.50	<0.50	<0.50	<0.50	
89	1999	10/06/09	<0.50	<0.50	<0.50	<0.50	<0.50	House sample
		10/06/09	<0.50	<0.50	<0.50	<0.50	<0.50	Mobile home sample
90	2241	10/06/09	<0.50	<0.50	<0.50	<0.50	<0.50	
		10/06/09	<0.50	<0.50	<0.50	<0.50	<0.50	duplicate sample

**Table 3 continued**  
**Comprehensive Summary of the Volatile Organic Compound Analyses**  
**Performed on the Potable Water Samples Collected since 2004**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**  
**(Results reported in micrograms per liter, ug/l)**

Map ID#	House Number	Sample Date	Chloroethane	cis 1,2 Dichloroethene	trans 1,2 Dichloroethene	Trichloroethene	Vinyl Chloride	Comments
<b>Houses located along East 425N</b>								
7	782	05/11/10	<0.50	<0.50	<0.50	<0.50	<0.50	
		05/11/10	<0.50	<0.50	<0.50	<0.50	<0.50	duplicate sample
8	750	11/18/08*	ND	ND	ND	ND	ND	Collected By IDEM
9	682	11/18/08*	ND	ND	ND	ND	ND	Collected By IDEM
10	528	11/18/08*	ND	ND	ND	ND	ND	Collected By IDEM
11	501	11/18/08*	ND	ND	ND	ND	ND	Collected By IDEM
		05/27/09	<0.50	<0.50	<0.50	<0.50	<0.50	
		05/11/10	<0.50	<0.50	<0.50	<0.50	<0.50	
12	519	11/18/08*	ND	ND	ND	ND	ND	Collected By IDEM
13	537	11/18/08*	ND	ND	ND	ND	ND	Collected By IDEM
14	557	11/18/08*	ND	ND	ND	ND	ND	Collected By IDEM
15	581	11/18/08*	ND	ND	ND	ND	ND	Collected By IDEM
		04/12/09	--	--	--	--	--	Metals Non Detect <sup>3</sup>
16	719	11/18/08*	ND	ND	ND	ND	ND	Collected By IDEM
		05/26/09	<0.50	<0.50	<0.50	<0.50	<0.50	
17	781	11/18/08*	ND	ND	ND	ND	ND	Collected By IDEM
<b>Houses located along East 375N</b>								
25	1082	12/10/08	<0.50	<0.50	<0.50	<0.50	1.6	
26	972	12/18/08	<0.50	<0.50	<0.50	<0.50	<0.50	
27	966	12/11/08	<0.50	<0.50	<0.50	<0.50	<0.50	
28	948	12/10/08	<0.50	<0.50	<0.50	<0.50	<0.50	
29	908	12/11/08	<0.50	<0.50	<0.50	<0.50	<0.50	
38	343	12/11/08	<0.50	<0.50	<0.50	<0.50	<0.50	
		05/27/09	<0.50	<0.50	<0.50	<0.50	<0.50	
49	60	02/11/09	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>Houses located along East 350N</b>								
35	1302	12/11/08	<0.50	<0.50	<0.50	<0.50	<0.50	
		05/26/09	<0.50	<0.50	<0.50	<0.50	<0.50	
86	1387	12/11/08	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>Houses located along East 250N</b>								
91	5010	10/06/09	<0.50	<0.50	<0.50	<0.50	<0.50	

<sup>1</sup> 2004 concentrations obtained from 2004 Keramida report. Samples collected after 2004 were collected by MACTEC.

<sup>2</sup> House treatment system installed prior 11/20/08 sample collection

<sup>3</sup> Sample was only analyzed for metals (lead, chromium, copper, cadmium)

For a complete list of analyzed compounds please refer to the laboratory reports.

ND - IDEM did not specify detection limit

\* - IDEM sample. Collected on either 11/18/08 or 11/19/08. Laboratory reports are not available.

PB: WDG

CB: PJS

AMEC Electronic Signature



**Table 4**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
MW-1	05/04/09	840.48	36.48	804.00
	05/20/09		36.35	804.13
	08/24/09		36.89	803.59
	11/30/09		37.88	802.60
	04/05/10		38.25	802.23
	08/02/10		37.76	802.72
	12/06/10		39.18	801.30
MW-2	05/04/09	823.13	33.37	789.76
	05/20/09		33.18	789.95
	08/24/09		34.33	788.80
	11/30/09		35.29	787.84
	04/05/10		35.21	787.92
	08/02/10		35.04	788.09
	12/06/10		36.48	786.65
MW-3	05/04/09	805.45	18.82	786.63
	05/20/09		18.75	786.70
	08/24/09		19.25	786.20
	11/30/09		19.91	785.54
	04/05/10		19.81	785.64
	08/02/10		19.71	785.74
	12/06/10		20.88	784.57
MW-4	05/04/09	808.42	19.96	788.46
	05/20/09		19.98	788.44
	08/24/09		20.95	787.47
	11/30/09		21.65	786.77
	04/05/10		21.58	786.84
	08/02/10		21.29	787.13
	12/06/10		23.04	785.38
MW-5	05/04/09	807.89	17.88	790.01
	05/20/09		17.73	790.16
	08/24/09		18.96	788.93
	11/30/09		19.88	788.01
	04/05/10		19.80	788.09
	08/02/10		19.63	788.26
	12/06/10		19.62	788.27
MW-6B	05/04/09	810.49	26.04	784.45
	05/20/09		25.86	784.63
	08/24/09		26.29	784.20
	11/30/09		26.88	783.61
	04/05/10		26.92	783.57
	08/02/10		26.79	785.71
	12/06/10	812.50	25.88	786.62

**Table 4 continued**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
MW-6C	05/04/09	810.42	25.04	785.38
	05/20/09		25.02	785.40
	08/24/09		25.44	784.98
	11/30/09		26.06	784.36
	04/05/10		25.95	784.47
	08/02/10	811.43	25.92	785.51
	12/06/10		27.04	784.39
MW-7	05/04/09	888.05	51.26	836.79
	05/20/09		51.03	837.02
	08/24/09		50.81	837.24
	11/30/09		51.76	836.29
	04/05/10		52.73	835.32
	08/02/10		52.00	836.05
	12/06/10		53.03	835.02
MW-8	05/12/09	805.62	17.00	788.62
	05/20/09		16.78	788.84
	08/24/09		17.51	788.11
	11/30/09		18.49	787.13
	04/05/10		18.41	787.21
	08/02/10		18.21	787.41
	12/06/10		19.68	785.94
MW-9A	05/04/09	806.97	22.31	784.66
	05/20/09		22.11	784.86
	08/24/09		22.66	784.31
	11/30/09		23.33	783.64
	04/05/10	808.06	24.37	783.69
	08/02/10		24.23	783.83
	12/06/10		25.45	782.61
MW-9B	05/04/09	807.19	20.79	786.40
	05/20/09		20.78	786.41
	08/24/09		21.22	785.97
	11/30/09		21.85	785.34
	04/05/10	808.07	22.61	785.46
	08/02/10		22.58	785.49
	12/06/10		23.71	784.36
MW-9C	05/04/09	807.33	20.91	786.42
	05/20/09		20.92	786.41
	08/24/09		21.36	785.97
	11/30/09		22.98	784.35
	04/05/10	808.16	22.70	785.46
	08/02/10		22.66	785.50
	12/06/10		23.80	784.36
MW-10A	05/04/09	808.66	21.14	787.52
	05/20/09		20.78	787.88
	08/24/09		21.15	787.51
	11/30/09		21.71	786.95
	04/05/10		21.87	786.79
	08/02/10		21.71	786.95
	12/06/10		22.70	785.96

**Table 4 continued**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
MW-10B	05/04/09	810.43	22.98	787.45
	05/20/09		22.81	787.62
	08/24/09		23.18	787.25
	11/30/09		23.79	786.64
	04/05/10		23.90	786.53
	08/02/10		23.72	786.71
	12/06/10		24.78	785.65
MW-10C	05/04/09	810.87	23.06	787.81
	05/20/09		22.94	787.93
	08/24/09		23.67	787.20
	11/30/09		24.42	786.45
	04/05/10		24.36	786.51
	08/02/10		24.26	786.61
	12/06/10		25.58	785.29
MW-11	05/04/09	809.41	23.15	786.26
	05/20/09		23.05	786.36
	08/24/09		23.58	785.83
	11/30/09		24.15	785.26
	04/05/10		24.02	785.39
	08/02/10		24.00	785.41
	12/06/10		NM	NM
MW-12	05/04/09	808.46	22.16	786.30
	05/20/09		22.09	786.37
	08/24/09		22.58	785.88
	11/30/09		23.18	785.28
	04/05/10		23.05	785.41
	08/02/10		23.05	785.41
	12/06/10		NM	NM
MW-13	05/04/09	806.70	20.50	786.20
	05/20/09		20.41	786.29
	08/24/09		20.90	785.80
	11/30/09		21.47	785.23
	04/05/10		21.34	785.36
	08/02/10		21.35	785.35
	12/06/10		NM	NM
MW-14	05/04/09	802.70	16.78	785.92
	05/20/09		16.75	785.95
	08/24/09		17.08	785.62
	11/30/09		17.68	785.02
	04/05/10		17.52	785.18
	08/02/10		17.57	785.13
	12/06/10		18.58	784.12
MW-15	05/04/09	792.90	8.00	784.90
	05/20/09		7.97	784.93
	08/24/09		8.19	784.71
	11/30/09		8.75	784.15
	04/05/10		8.58	784.32
	08/02/10		8.67	784.23
	12/06/10		9.56	783.34

**Table 4 continued**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
MW-16	05/04/09	791.18	8.11	783.07
	05/20/09		8.14	783.04
	08/24/09		8.32	782.86
	11/30/09		8.77	782.41
	04/05/10		8.57	782.61
	08/02/10		8.69	782.49
	12/06/10		9.58	781.60
MW-17	05/04/09	784.41	ATOC <sup>(1)</sup>	Unknown
	05/20/09		1.75	782.66
	08/24/09		1.93	782.48
	11/30/09		2.39	782.02
	04/05/10		2.22	782.19
	08/02/10		2.27	782.14
	12/06/10		3.28	781.13
MW-18(38.6)	05/04/09	826.66	36.72	789.94
	05/20/09		36.51	790.15
	08/24/09		37.72	788.94
	11/30/09		38.67	787.99
	04/05/10		38.60	788.06
	08/02/10		38.44	788.22
	12/06/10		40.02	786.64
MW-18(63)	05/04/09	826.63	38.68	787.95
	05/20/09		38.27	788.36
	08/24/09		38.65	787.98
	11/30/09		39.20	787.43
	04/05/10		39.32	787.31
	08/02/10		39.21	787.42
	12/06/10		40.14	786.49
MW-18(164)	05/04/09	826.50	39.92	786.58
	05/20/09		39.51	786.99
	08/24/09		40.11	786.39
	11/30/09		40.51	785.99
	04/05/10		40.54	785.96
	08/02/10		40.36	786.14
	12/06/10		41.38	785.12
MW-19(33)	05/04/09	809.53	23.08	786.45
	05/20/09		23.06	786.47
	08/24/09		23.48	786.05
	11/30/09		24.10	785.43
	04/05/10		23.98	785.55
	08/02/10		24.01	785.52
	12/06/10		25.11	784.42
MW-19(53)	05/04/09	809.56	23.10	786.46
	05/20/09		23.08	786.48
	08/24/09		23.49	786.07
	11/30/09		24.11	785.45
	04/05/10		24.00	785.56
	08/02/10		24.02	785.54
	12/06/10		25.02	784.54

**Table 4 continued**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
MW-19(118)	05/04/09	809.56	22.95	786.61
	05/20/09		22.76	786.80
	08/24/09		23.21	786.35
	11/30/09		23.76	785.80
	04/05/10		23.84	785.72
	08/02/10		23.74	785.82
	12/06/10		24.81	784.75
MW-20(35)	05/04/09	810.42	24.03	786.39
	05/20/09		24.02	786.40
	08/24/09		24.43	785.99
	11/30/09		25.04	785.38
	04/05/10		24.92	785.50
	08/02/10		24.92	785.50
	12/06/10		26.02	784.40
MW-20(51)	05/04/09	810.41	24.03	786.38
	05/20/09		24.02	786.39
	08/24/09		24.41	786.00
	11/30/09		25.03	785.38
	04/05/10		24.91	785.50
	08/02/10		24.62	785.79
	12/06/10		26.08	784.33
MW-20(124)	05/04/09	810.45	25.43	785.02
	05/20/09		25.27	785.18
	08/24/09		25.83	784.62
	11/30/09		26.44	784.01
	04/05/10		26.41	784.04
	08/02/10		26.31	784.14
	12/06/10		27.46	782.99
MW-20(155)	05/04/09	810.44	25.20	785.24
	05/20/09		25.02	785.42
	08/24/09		25.54	784.90
	11/30/09		26.09	784.35
	04/05/10		26.15	784.29
	08/02/10		26.04	784.40
	12/06/10		27.19	783.25
MW-21(40.2)	05/04/09	810.33	24.11	786.22
	05/20/09		24.12	786.21
	08/24/09		24.58	785.75
	11/30/09		25.19	785.14
	04/05/10		25.07	785.26
	08/02/10		25.02	785.31
	12/06/10		26.18	784.15
MW-21(128)	05/04/09	810.30	25.79	784.51
	05/20/09		25.67	784.63
	08/24/09		26.20	784.10
	11/30/09		26.85	783.45
	04/05/10		26.76	783.54
	08/02/10		26.61	783.69
	12/06/10		29.91	780.39

**Table 4 continued**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
MW-21(155.3)	05/04/09	810.35	25.74	784.61
	05/20/09		25.58	784.77
	08/24/09		26.13	784.22
	11/30/09		26.78	783.57
	04/05/10		26.71	783.64
	08/02/10		26.54	783.81
	12/06/10		27.81	782.54
MW-22(37)	05/04/09	803.92	18.86	785.06
	05/20/09		18.69	785.23
	08/24/09		19.21	784.71
	11/30/09		19.82	784.10
	04/05/10		19.85	784.07
	08/02/10		19.76	784.16
	12/06/10		20.93	782.99
MW-22(67.7)	05/04/09	803.94	18.88	785.06
	05/20/09		18.72	785.22
	08/24/09		19.27	784.67
	11/30/09		19.86	784.08
	04/05/10		19.87	784.07
	08/02/10		19.81	784.13
	12/06/10		20.98	782.96
MW-22(130.7)	05/04/09	803.95	19.01	784.94
	05/20/09		18.84	785.11
	08/24/09		19.33	784.62
	11/30/09		19.92	784.03
	04/05/10		19.95	784.00
	08/02/10		19.86	784.09
	12/06/10		22.98	780.97
MW-23(39.9)	05/04/09	816.67	29.89	786.78
	05/20/09		29.78	786.89
	08/24/09		30.34	786.33
	11/30/09		30.97	785.70
	04/05/10		30.88	785.79
	08/02/10		30.92	785.75
	12/06/10		31.98	784.69
MW-23(105.6)	05/04/09	816.65	29.62	787.03
	05/20/09		29.52	787.13
	08/24/09		30.13	786.52
	11/30/09		30.79	785.86
	04/05/10		30.69	785.96
	08/02/10		30.69	785.96
	12/06/10		31.83	784.82
MW-23(122.7)	05/04/09	816.69	29.46	787.23
	05/20/09		40.46	776.23
	08/24/09		30.20	786.49
	11/30/09		30.79	785.90
	04/05/10		38.59	778.10
	08/02/10		36.98	779.71
	12/06/10		33.19	783.50

**Table 4 continued**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
MW-24(24.9)	05/04/09	804.92	19.06	785.86
	05/20/09		19.04	785.88
	08/24/09		19.36	785.56
	11/30/09		19.95	784.97
	04/05/10		19.79	785.13
	08/02/10		19.88	785.04
	12/06/10		20.86	784.06
MW-24(55.4)	05/04/09	804.94	19.04	785.90
	05/20/09		19.01	785.93
	08/24/09		19.32	785.62
	11/30/09		19.92	785.02
	04/05/10		19.77	785.17
	08/02/10		19.86	785.08
	12/06/10		20.91	784.03
MW-24(122.6)	05/04/09	804.93	20.21	784.72
	05/20/09		20.00	784.93
	08/24/09		20.53	784.40
	11/30/09		21.32	783.61
	04/05/10		21.12	783.81
	08/02/10		20.98	783.95
	12/06/10		23.26	781.67
MW-24(159.4)	05/04/09	804.93	20.05	784.88
	05/20/09		19.82	785.11
	08/24/09		20.41	784.52
	11/30/09		21.27	783.66
	04/05/10		21.02	783.91
	08/02/10		20.81	784.12
	12/06/10		22.09	782.84
MW-25(16.4)	05/04/09	791.93	6.70	785.23
	05/20/09		6.66	785.27
	08/24/09		6.91	785.02
	11/30/09		7.47	784.46
	04/05/10		7.27	784.66
	08/02/10		7.39	784.54
	12/06/10		8.29	783.64
MW-25(32.6)	05/04/09	791.92	6.68	785.24
	05/20/09		6.65	785.27
	08/24/09		6.89	785.03
	11/30/09		7.47	784.45
	04/05/10		7.28	784.64
	08/02/10		7.36	784.56
	12/06/10		8.33	783.59
MW-25(45.2)	05/04/09	791.91	7.02	784.89
	05/20/09		6.99	784.92
	08/24/09		7.21	784.70
	11/30/09		7.78	784.13
	04/05/10		7.59	784.32
	08/02/10		7.71	784.20
	12/06/10		8.64	783.27

**Table 4 continued**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
MW-25(82)	05/04/09	791.93	7.39	784.54
	05/20/09		7.21	784.72
	08/24/09		7.76	784.17
	11/30/09		8.54	783.39
	04/05/10		8.32	783.61
	08/02/10		8.19	783.74
	12/06/10		9.44	782.49
MW-25(145)	05/04/09	791.91	7.45	784.46
	05/20/09		7.25	784.66
	08/24/09		7.81	784.10
	11/30/09		8.58	783.33
	04/05/10		8.39	783.52
	08/02/10		8.25	783.66
	12/06/10		9.54	782.37
MW-26(17.5)	05/04/09	792.16	9.25	782.91
	05/20/09		9.23	782.93
	08/24/09		9.46	782.70
	11/30/09		9.87	782.29
	04/05/10		9.67	782.49
	08/02/10		9.78	782.38
	12/06/10		10.65	781.51
MW-26(28.8)	05/04/09	792.14	9.11	783.03
	05/20/09		9.09	783.05
	08/24/09		9.32	782.82
	11/30/09		9.77	782.37
	04/05/10		9.58	782.56
	08/02/10		9.68	782.46
	12/06/10		10.56	781.58
MW-26(58.2)	05/04/09	792.17	8.52	783.65
	05/20/09		8.51	783.66
	08/24/09		8.73	783.44
	11/30/09		9.24	782.93
	04/05/10		9.04	783.13
	08/02/10		6.12	786.05
	12/06/10		10.06	782.11
MW-26(114.8)	05/04/09	792.15	7.85	784.30
	05/20/09		7.67	784.48
	08/24/09		8.23	783.92
	11/30/09		8.98	783.17
	04/05/10		8.81	783.34
	08/02/10		5.67	786.48
	12/06/10		9.97	782.18
MW-26(143.6)	05/04/09	792.17	7.90	784.27
	05/20/09		7.68	784.49
	08/24/09		8.24	783.93
	11/30/09		8.99	783.18
	04/05/10		8.82	783.35
	08/02/10		5.69	786.48
	12/06/10		9.97	782.20



**Table 4 continued**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
MW-27(18)	05/04/09	785.82	3.30	782.52
	05/20/09		3.24	782.58
	08/24/09		3.39	782.43
	11/30/09		3.75	782.07
	04/05/10		3.57	782.25
	08/02/10		2.67	783.15
	12/06/10		4.55	781.27
MW-27(53.05)	05/04/09	785.84	2.21	783.63
	05/20/09		2.21	783.63
	08/24/09		2.38	783.46
	11/30/09		2.87	782.97
	04/05/10		2.69	783.15
	08/02/10		2.77	783.07
	12/06/10		3.69	782.15
MW-27(75.4)	05/04/09	785.88	2.09	783.79
	05/20/09		2.07	783.81
	08/24/09		2.25	783.63
	11/30/09		2.77	783.11
	04/05/10		2.59	783.29
	08/02/10		2.66	783.22
	12/06/10		3.62	782.26
MW-27(104.2)	05/04/09	785.84	1.55	784.29
	05/20/09		1.29	784.55
	08/24/09		1.88	783.96
	11/30/09		2.61	783.23
	04/05/10		2.49	783.35
	08/02/10		2.33	783.51
	12/06/10		3.62	782.22
MW-27(135)	05/04/09	785.85	1.55	784.30
	05/20/09		1.29	784.56
	08/24/09		1.88	783.97
	11/30/09		2.61	783.24
	04/05/10		2.49	783.36
	08/02/10		2.34	783.51
	12/06/10		3.62	782.23
MW-28(24.3)	05/04/09	790.47	5.80	784.67
	05/20/09		8.73	781.74
	08/24/09		9.04	781.43
	11/30/09		9.57	780.90
	04/05/10		9.42	781.05
	08/02/10		6.39	784.08
	12/06/10		10.71	779.76
MW-28(53.2)	05/04/09	790.58	8.49	782.09
	05/20/09		8.45	782.13
	08/24/09		5.79	784.79
	11/30/09		9.31	781.27
	04/05/10		9.16	781.42
	08/02/10		9.13	781.45
	12/06/10		10.36	780.22

**Table 4 continued**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
MW-28(117.7)	05/04/09	790.57	4.47	786.10
	05/20/09		4.41	786.16
	08/24/09		4.95	785.62
	11/30/09		5.48	785.09
	04/05/10		5.35	785.22
	08/02/10		5.38	785.19
	12/06/10		6.43	784.14
MW-28(138.1)	05/04/09	790.59	7.31	783.28
	05/20/09		7.02	783.57
	08/24/09		8.97	781.62
	11/30/09		8.56	782.03
	04/05/10		8.45	782.14
	08/02/10		8.41	782.18
	12/06/10		9.81	780.78
MW-29(82.5)	05/04/09	801.45	22.50	778.95
	05/20/09		22.41	779.04
	08/24/09		22.72	778.73
	11/30/09		23.88	777.57
	04/05/10		23.79	777.66
	08/02/10		23.59	777.86
	12/06/10		25.59	775.86
MW-29(103.3)	05/04/09	801.45	25.11	776.34
	05/20/09		24.95	776.50
	08/24/09		25.69	775.76
	11/30/09		26.53	774.92
	04/05/10		26.43	775.02
	08/02/10		26.33	775.12
	12/06/10		28.09	773.36
MW-29(132.8)	05/04/09	801.47	25.12	776.35
	05/20/09		24.95	776.52
	08/24/09		25.69	775.78
	11/30/09		26.53	774.94
	04/05/10		26.34	775.13
	08/02/10		26.33	775.14
	12/06/10		28.09	773.38
MW-30(41.1)	05/04/09	794.57	16.97	777.60
	05/20/09		16.97	777.60
	08/24/09		17.72	776.85
	11/30/09		18.57	776.00
	04/05/10		18.21	776.36
	08/02/10		18.11	776.46
	12/06/10		20.28	774.29
MW-30(120.2)	05/04/09	794.57	10.52	784.05
	05/20/09		10.34	784.23
	08/24/09		10.89	783.68
	11/30/09		11.54	783.03
	04/05/10		11.46	783.11
	08/02/10		11.31	783.26
	12/06/10		12.57	782.00

**Table 4 continued**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
MW-30(148)	05/04/09	794.58	31.55	763.03
	05/20/09		31.28	763.30
	08/24/09		32.87	761.71
	11/30/09		32.71	761.87
	04/05/10		32.45	762.13
	08/02/10		33.11	761.47
	12/06/10		33.72	760.86
MW-31(30.9)	05/04/09	781.48	6.40	775.08
	05/20/09		6.19	775.29
	08/24/09		6.55	774.93
	11/30/09		7.83	773.65
	04/05/10		7.48	774.00
	08/02/10		7.41	774.07
	12/06/10		9.65	771.83
MW-31(55.5)	05/04/09	781.47	6.78	774.69
	05/20/09		6.58	774.89
	08/24/09		6.96	774.51
	11/30/09		8.19	773.28
	04/05/10		7.90	773.57
	08/02/10		7.86	773.61
	12/06/10		9.98	771.49
MW-31(98.5)	05/04/09	781.46	13.61	767.85
	05/20/09		13.32	768.14
	08/24/09		14.93	766.53
	11/30/09		14.69	766.77
	04/05/10		14.42	767.04
	08/02/10		15.02	766.44
	12/06/10		15.80	765.66
MW-31(139.2)	05/04/09	781.48	19.21	762.27
	05/20/09		18.89	762.59
	08/24/09		20.57	760.91
	11/30/09		20.44	761.04
	04/05/10		20.29	761.19
	08/02/10		21.01	760.47
	12/06/10		21.55	759.93
MW-32(24.1)	05/04/09	787.80	18.34	769.46
	05/20/09		18.30	769.50
	09/03/09		19.47	768.33
	11/30/09		20.04	767.76
	04/05/10		19.49	768.31
	08/02/10		19.71	768.09
	12/06/10		21.28	766.52
MW-32(89)	05/04/09	787.85	33.49	754.36
	05/20/09		33.16	754.69
	09/03/09		34.76	753.09
	11/30/09		34.64	753.21
	04/05/10		34.25	753.60
	08/02/10		34.74	753.11
	12/06/10		35.36	752.49

**Table 4 continued**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
MW-32(110)	05/04/09	787.82	32.92	754.90
	05/20/09		33.14	754.68
	09/03/09		34.75	753.07
	11/30/09		34.64	753.18
	04/05/10		34.34	753.48
	08/02/10		34.74	753.08
	12/06/10		35.34	752.48
MW-33(23.1)	05/04/09	795.11	7.91	787.20
	05/20/09		7.94	787.17
	08/24/09		9.73	785.38
	11/30/09		10.52	784.59
	04/05/10		9.69	785.42
	08/02/10		9.84	785.27
	12/06/10		11.58	783.53
MW-33(70.9)	05/04/09	795.09	40.99	754.10
	05/20/09		40.69	754.40
	08/24/09		42.14	752.95
	11/30/09		42.15	752.94
	04/05/10		41.77	753.32
	08/02/10		42.27	752.82
	12/06/10		42.89	752.20
MW-33(129.1)	05/04/09	794.95	40.99	753.96
	05/20/09		40.56	754.39
	08/24/09		41.82	753.13
	11/30/09		42.02	752.93
	04/05/10		41.64	753.31
	08/02/10		42.16	752.79
	12/06/10		43.79	751.16
MW-33(208.9)	05/04/09	794.93	36.80	758.13
	05/20/09		36.52	758.41
	08/24/09		37.97	756.96
	11/30/09		37.89	757.04
	04/05/10		37.52	757.41
	08/02/10		38.02	756.91
	12/06/10		38.64	756.29
MW-34(37)	05/04/09	777.60	23.45	754.15
	05/20/09		23.11	754.49
	09/03/09		24.72	752.88
	11/30/09		24.62	752.98
	04/05/10		24.21	753.39
	08/02/10		24.44	753.16
	12/06/10		25.34	752.26
MW-34(85)	05/04/09	777.54	23.42	754.12
	05/20/09		23.10	754.44
	09/03/09		24.74	752.80
	11/30/09		24.62	752.92
	04/05/10		24.21	753.33
	08/02/10		24.71	752.83
	12/06/10		25.30	752.24

**Table 4 continued**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
MW-34(110)	05/04/09	777.58	23.47	754.11
	05/20/09		23.12	754.46
	09/03/09		24.74	752.84
	11/30/09		24.64	752.94
	04/05/10		24.24	753.34
	08/02/10		24.45	753.13
	12/06/10		25.35	752.23
MW-34(135)	05/04/09	777.57	23.44	754.13
	05/20/09		23.10	754.47
	09/03/09		24.72	752.85
	11/30/09		24.61	752.96
	04/05/10		24.21	753.36
	08/02/10		24.41	753.16
	12/06/10		25.32	752.25
MW-35(45)	05/04/09	781.38	27.43	753.95
	05/20/09		27.09	754.29
	08/24/09		28.60	752.78
	11/30/09		28.61	752.77
	04/05/10		28.21	753.17
	08/02/10		28.71	752.67
	12/06/10		29.32	752.06
MW-35(90)	05/04/09	781.37	27.42	753.95
	05/20/09		27.09	754.28
	08/24/09		28.58	752.79
	11/30/09		28.61	752.76
	04/05/10		28.21	753.16
	08/02/10		28.71	752.66
	12/06/10		29.28	752.09
MW-35(148)	05/04/09	781.34	27.40	753.94
	05/20/09		27.06	754.28
	08/24/09		28.50	752.84
	11/30/09		28.56	752.78
	04/05/10		28.16	753.18
	08/02/10		28.68	752.66
	12/06/10		29.29	752.05
MW-36(35.2)	05/04/09	770.03	16.30	753.73
	05/20/09		15.95	754.08
	08/24/09		17.42	752.61
	11/30/09		17.44	752.59
	04/05/10		17.05	752.98
	08/02/10		17.53	752.50
	12/06/10		18.20	751.83
MW-36(92.4)	05/04/09	770.06	16.30	753.76
	05/20/09		15.96	754.10
	08/24/09		17.42	752.64
	11/30/09		17.46	752.60
	04/05/10		17.10	752.96
	08/02/10		17.60	752.46
	12/06/10		18.20	751.86

**Table 4 continued**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
MW-36(124.5)	05/04/09	770.09	16.31	753.78
	05/20/09		15.94	754.15
	08/24/09		17.42	752.67
	11/30/09		17.48	752.61
	04/05/10		17.09	753.00
	08/02/10		17.59	752.50
	12/06/10		18.20	751.89
MW-37(23.3)	05/04/09	757.91	9.23	748.68
	05/20/09		8.56	749.35
	08/24/09		9.57	748.34
	11/30/09		9.53	748.38
	04/05/10		9.39	748.52
	08/02/10		9.82	748.09
	12/06/10		9.76	748.15
MW-37(70)	05/04/09	758.02	5.89	752.13
	05/20/09		5.27	752.75
	08/24/09		7.09	750.93
	11/30/09		7.35	750.67
	04/05/10		6.81	751.21
	08/02/10		7.46	750.56
	12/06/10		7.98	750.04
MW-37(98)	05/04/09	758.04	5.90	752.14
	05/20/09		5.27	752.77
	08/24/09		7.09	750.95
	11/30/09		7.35	750.69
	04/05/10		6.81	751.23
	08/02/10		7.45	750.59
	12/06/10		7.99	750.05
MW-38(20.8)	05/04/09	758.49	6.27	752.22
	05/20/09		5.84	752.65
	08/24/09		7.19	751.30
	12/01/09		7.18	751.31
	04/05/10		6.83	751.66
	08/02/10		7.34	751.15
	12/06/10		7.74	750.75
MW-38(29.1)	05/04/09	758.49	6.27	752.22
	05/20/09		5.83	752.66
	08/24/09		7.18	751.31
	12/01/09		7.18	751.31
	04/05/10		6.83	751.66
	08/02/10		7.34	751.15
	12/06/10		7.73	750.76
MW-38(69.9)	05/04/09	758.48	5.42	753.06
	05/20/09		4.97	753.51
	08/24/09		6.55	751.93
	12/01/09		6.70	751.78
	04/05/10		6.24	752.24
	08/02/10		6.78	751.70
	12/06/10		7.36	751.12

**Table 4 continued**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
MW-38(102.5)	05/04/09	758.50	5.45	753.05
	05/20/09		4.97	753.53
	08/24/09		6.55	751.95
	12/01/09		6.73	751.77
	04/05/10		6.24	752.26
	08/02/10		6.79	751.71
	12/06/10		7.37	751.13
MW-39(13)	05/04/09	754.88	3.68	751.20
	05/20/09		3.24	751.64
	08/24/09		4.29	750.59
	11/30/09		4.22	750.66
	04/05/10		3.99	750.89
	08/02/10		4.46	750.42
	12/06/10		4.66	750.22
MW-39(29.3)	05/04/09	754.91	3.26	751.65
	05/20/09		2.81	752.10
	08/24/09		4.04	750.87
	11/30/09		4.03	750.88
	04/05/10		3.43	751.48
	08/02/10		4.22	750.69
	12/06/10		4.54	750.37
MW-39(76.8)	05/04/09	754.87	2.58	752.29
	05/20/09		1.98	752.89
	08/24/09		3.73	751.14
	11/30/09		3.98	750.89
	04/05/10		3.73	751.14
	08/02/10		4.08	750.79
	12/06/10		4.62	750.25
MW-40 (198.8)	05/04/09	826.19	39.86	786.33
	05/20/09		39.49	786.70
	08/24/09		40.12	786.07
	11/30/09		40.64	785.55
	04/05/10		40.66	785.53
	08/02/10		40.48	785.71
	12/06/10		41.61	784.58
MW-41 (190)	05/04/09	810.44	24.68	785.76
	05/20/09		24.52	785.92
	08/24/09		26.31	784.13
	11/30/09	810.19	26.82	783.62
	04/05/10		26.63	783.56
	08/02/10		26.42	783.77
	12/06/10		27.98	782.21
MW-42 (175.3)	05/04/09	793.89	18.40	775.49
	05/20/09		7.80	786.09
	08/24/09		8.45	785.44
	11/30/09		11.55	782.34
	04/05/10		9.04	784.85
	08/02/10		5.56	788.33
	12/06/10		10.02	783.87

**Table 4 continued**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
MW-43 (190)	05/04/09	809.62	25.89	783.73
	05/20/09		25.75	783.87
	08/24/09		25.16	784.46
	11/30/09		25.80	783.82
	04/05/10		25.76	783.86
	08/02/10		25.60	784.02
	12/06/10		27.01	782.61
MW-44 (185.9)	05/04/09	804.02	20.27	783.75
	05/20/09		20.14	783.88
	08/24/09		20.97	783.05
	11/30/09		21.72	782.30
	04/05/10		21.61	782.41
	08/02/10		21.28	782.74
	12/06/10		22.64	781.38
MW-45 (185)	05/04/09	810.22	25.85	784.37
	05/20/09		25.69	784.53
	08/24/09		26.24	783.98
	11/30/09		26.89	783.33
	04/05/10		26.81	783.41
	08/02/10		26.65	783.57
	12/06/10		28.02	782.20
MW-46 (95.5)	05/04/09	814.41	57.71	756.70
	05/20/09		57.48	756.93
	08/24/09		64.87	749.54
	11/30/09		58.89	755.52
	04/05/10		58.50	755.91
	08/02/10		58.98	755.43
	12/06/10		59.62	754.79
MW-47(109.7)	05/04/09	818.47	35.85	782.62
	05/20/09		35.71	782.76
	08/24/09		36.28	782.19
	11/30/09		36.91	781.56
	04/05/10		36.85	781.62
	08/02/10		36.64	781.83
	12/06/10		37.18	781.29
MW-47(137.8)	05/04/09	818.46	35.79	782.67
	05/20/09		35.65	782.81
	08/24/09		36.22	782.24
	11/30/09		36.84	781.62
	04/05/10		37.79	780.67
	08/02/10		36.55	781.91
	12/06/10		37.78	780.68
MW48(56)	04/05/10	806.85	24.86	781.99
	08/02/10		24.82	782.03
	12/06/10		26.07	780.78
MW48(105)	04/05/10	806.92	26.28	780.64
	08/02/10		26.11	780.81
	12/06/10		27.67	779.25
MW48(129)	04/05/10	806.93	26.27	780.66
	08/02/10		26.14	780.79
	12/06/10		27.69	779.24



**Table 4 continued**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
MW48(159)	04/05/10	806.93	24.77	782.16
	08/02/10		24.76	782.17
	12/06/10		26.18	780.75
MW49(20)	04/05/10	792.30	11.88	780.42
	08/02/10		11.68	780.62
	12/06/10		13.52	778.78
MW49(45)	04/05/10	792.24	8.80	783.44
	08/02/10		5.85	786.39
	12/06/10		10.12	782.12
MW49(95)	04/05/10	792.12	9.31	782.81
	12/06/10		10.12	782.00
MW49(200)	04/05/10	792.26	32.64	759.62
	08/02/10		33.03	759.23
	12/06/10		33.71	758.55
MW50(45)	04/05/10	770.58	6.71	763.87
	08/02/10		7.01	763.57
	12/06/10		8.11	762.47
MW50(80)	04/05/10	770.61	7.72	762.89
	08/02/10		8.04	762.57
	12/06/10		9.06	761.55
MW50(130)	04/05/10	770.56	10.30	760.26
	08/02/10		11.02	759.54
	12/06/10		11.53	759.03
MW51(25)	04/05/10	757.19	3.53	753.66
	08/02/10		3.89	753.30
	12/06/10		4.26	752.93
MW51(70)	04/05/10	757.18	3.53	753.65
	08/02/10		3.89	753.29
	12/06/10		4.27	752.91
MW51(117)	04/05/10	757.19	4.48	752.71
	08/02/10		5.01	752.18
	12/06/10		5.58	751.61
MW52(55)	04/05/10	798.84	13.26	785.58
	08/02/10		13.11	785.73
	12/06/10		14.22	784.62
MW52(148)	04/05/10	798.81	14.51	784.30
	08/02/10		14.36	784.45
	12/06/10		15.54	783.27
MW53(41)	04/05/10	809.87	24.15	785.72
	08/02/10		24.15	785.72
	12/06/10		25.26	784.61
MW55(49)	04/05/10	799.24	12.41	786.83
	08/02/10		12.27	786.97
	12/06/10		13.46	785.78
MW56(50)	04/05/10	797.23	10.67	786.56
	08/02/10		10.56	786.67
	12/06/10		11.88	785.35
MW57(38)	04/05/10	795.51	7.59	787.92
	08/02/10		7.41	788.10
	12/06/10		6.01	789.50

**Table 4 continued**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
MW59(29)	04/05/10	799.57	13.89	785.68
	08/02/10		13.81	785.76
	12/06/10		15.02	784.55
MW59(46)	04/05/10	799.25	13.48	785.77
	08/02/10		13.39	785.86
	12/06/10		14.62	784.63
MW60(38)	04/05/10	798.51	12.59	785.92
	08/02/10		12.51	786.00
	12/06/10		13.72	784.79
MW61(26)	04/05/10	802.27	16.60	785.67
	08/02/10		16.49	785.78
	12/06/10		17.73	784.54
MW62(36)	04/05/10	810.71	25.25	785.46
	08/02/10		25.21	785.50
	12/06/10		26.34	784.37
MW65(32)	04/05/10	809.40	23.87	785.53
	08/02/10		23.85	785.55
	12/06/10		24.98	784.42
MW67(30)	04/05/10	809.53	23.61	785.92
	08/02/10		23.81	785.72
	12/06/10		24.99	784.54
MW68(32)	04/05/10	809.46	23.85	785.61
	08/02/01		23.76	785.70
	12/06/10		24.94	784.52
MW71(33)	04/05/10	809.15	23.55	785.60
	08/02/10		23.44	785.71
	12/06/10		24.61	784.54
MW72(32)	04/05/10	808.92	23.33	785.59
	08/02/10		23.24	785.68
	12/06/10		24.41	784.51
MW75(32)	04/05/10	809.39	23.93	785.46
	08/02/10		23.86	785.53
	12/06/10		25.02	784.37
SG-1	05/20/09	781.79	0.92	779.38
	08/24/09		0.94	779.40
	11/30/09		0.97	779.43
	04/05/10		0.98	779.44
	08/02/10		0.98	779.44
	08/24/09		1.69	784.09
	12/06/10		0.50	782.90
SG-2	05/20/09	785.73	1.00	783.40
	11/30/09		0.94	783.34
	04/05/10		1.20	783.60
	08/02/10		0.85	783.25
	12/06/10		0.80	783.20
SG-3	05/20/09	793.42	1.32	791.41
	08/24/09		1.23	791.32
	11/30/09		0.76	790.85
	04/05/10		0.69	790.78
	08/02/10		1.21	791.30
	12/06/10		0.12	790.21

**Table 4 continued**  
**Surveyed Elevation Data and Depth to Water for Monitoring Wells and Staff Gages**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well/Point ID	Date Measured	Top of Casing Elevation	Depth to Water (ftbtoc)	Ground Water Elevation
RG-1	08/24/09	764.29	18.91	745.38
	11/30/09		20.97	743.32
	04/05/10		20.35	743.94
	08/02/10		21.60	742.69
	12/06/10		21.51	742.78

MW- Monitoring well

NM - due to access issues

SG - Staff Gage

ftbtoc - feet below top of casing

RG - Rail Gage. Located on west side of bridge over Tippecanoe River.

<sup>(1)</sup> ATOC - (Above Top of Casing), Casing was extended on May 13, 2009.

<sup>(2)</sup> Reference Elevation on SG-1, SG-2, and SG-3 is 3.00 feet mark on Staff Gage

<sup>(3)</sup> For Staff Gages (SG-1, SG-2, and SG-3), Depth to Water measurement is observed level of water surface in contact w/ graduated markings on the staff gage

PB: JGS

CB: PJS   
AMEC Electronic Signature

**Table 5**  
**Comprehensive Summary of Metals Analyses**  
**Performed on the Unsaturated Soil Samples Collected from the Soil Borings Installed between February and March 2010**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**  
**(Results reported in milligrams per kilogram, mg/kg)**

Soil Boring Number	Field Sample ID	Sample Date	Cadmium	Chromium	Copper	Lead
B53	MTR-B53-S1012	02/27/10	0.083 J	8.4	8.0	7.6
	MTR-B53-S2426	02/27/10	0.046 J	3.8	4.5	2.8
B54	MTR-B54-S1012	03/09/10	0.11 J	5.8 J	4.5	12 J
	MTR-B54-S1012R	03/09/10	0.067 J	5.7 J	4.3	7.8 J
	MTR-B54-S2022	03/09/10	0.040 J	8.3 J	5.8	4.2 J
B55	MTR-B55-S1012	02/08/10	0.23 UJ	2.7 J	0.80 J	1.0 J
B56	MTR-B56-S0810	02/10/10	0.046 J	7.4 J	14 J	4.3 J
B57	MTR-B57-S0406	02/24/10	0.027 J	2.9	2.2	2.0
B58	MTR-B58-S0406	02/23/10	0.75	76 J	84	5.7
	MTR-B58-S0406R	02/23/10	0.95	48 J	63	5.8
B59	MTR-B59-S1012	02/12/10	0.035 J	7.7	5.1 J	5.0
B60	MTR-B60-S1012	02/16/10	0.19	43	9.0 J	2.8
	MTR-B60-S1012R	02/16/10	0.16 J	50	22 J	2.5
B61	MTR-B61-S1012	02/14/10	0.042 J	4.8	5.6 J	3.6
	MTR-B61-S1416	02/14/10	0.014 J	4.8	9.6 J	2.7
B62	MTR-B62-S1012	02/26/10	0.089 J	9.7	11	7.5
	MTR-B62-S2426	02/26/10	0.061 J	5.0	5.1	3.9
B63	MTR-B63-S1012	02/28/10	0.081 J	7.4	9.0	5.5
	MTR-B63-S1820	02/28/10	0.040 J	4.3	3.9	2.7
	MTR-B63-S1820R	02/28/10	0.048 J	4.7	3.8	2.8
B64	MTR-B64-S0204	02/25/10	0.085 J	8.1	5.6	5.9
	MTR-B64-S1820	02/25/10	0.049 J	3.3	2.6	2.2
B65	MTR-B65-S0204	02/23/10	0.051 J	3.0 J	2.1	4.0
	MTR-B65-S2224	02/23/10	0.063 J	6.2 J	6.7	4.7
B66	MTR-B66-S0204	02/12/10	0.090 J	3.9	2.0 J	3.1
	MTR-B66-S2426	02/12/10	0.048 J	5.7	5.5 J	4.3
B67	MTR-B67-S0204	02/15/10	0.14 J	15	3.5 J	4.9
	MTR-B67-S2224	02/15/10	0.096 J	6.4	6.9 J	4.7
B68	MTR-B68-S0204	02/14/10	0.014 J	2.3	1.3 J	1.4
	MTR-B68-S2426	02/14/10	0.060 J	4.7	5.8 J	4.1
B69	MTR-B69-S0204	02/22/10	0.067 J	7.4 J	6.3	4.8
	MTR-B69-S2224	02/22/10	0.071 J	6.6 J	9.1	5.4
B71	MTR-B71-S0204	02/16/10	0.13 J	4.3	8.0 J	2.5
	MTR-B71-S2022	02/16/10	0.097 J	6.3	8.7 J	5.7
B72	MTR-B72-S0204	02/13/10	0.11 J	3.4	17 J	1.5
	MTR-B72-S2024	02/13/10	0.073 J	5.5	7.8 J	6.2
B73	MTR-B73-S0204	02/24/10	0.014 J	3.8	2.4	2.8
	MTR-B73-S0204R	02/24/10	0.029 J	4.0	2.7	2.8
	MTR-B73-S1620	02/24/10	0.10 J	7.5	7.6	5.4
B74	MTR-B74-S0204	02/10/10	0.62 J	19 J	42 J	23 J
	MTR-B74-S2224	02/10/10	0.073 J	10 J	20 J	7.5 J
B75	MTR-B75-S0204	02/09/10	0.16 J	18 J	11 J	34 J
	MTR-B75-S1618	02/09/10	0.023 J	6.2 J	3.7 J	3.7 J
<b>IDEM RISC Default Closure</b>						
	Industrial		77	120	2,900	230

Notes:

mg/kg - milligram per kilogram

U - not detected, value is the detection limit

Concentration exceeds IDEM RISC residential default closure level

For a complete list of analyzed compounds and results please refer to the laboratory reports

R - replicate sample

J - value is estimated

PB: WDG

CB: PJS   
AMEC Electronic Signature

Table 6

**Comprehensive Summary of Volatile Organic Compound Analyses**  
**Performed on the Saturated Soil Samples Collected from the Soil Borings Installed Between February and March 2010**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

(Results reported in micrograms per kilogram, ug/kg)

Soil Boring Number	Field Sample ID	Sample Date	1,1-Dichloroethene	1,2-Dichloroethene, Total	Acetone	Chloroform	cis-1,2-Dichloroethene	Ethylbenzene	Methylene chloride	Tetrachloroethene	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride	Xylenes, Total
B59	MTR-B59-S2628	02/13/10	120	60420	210 U	27 U	60000	130	71 U	46 U	360	420	180	3700	620
B63	MTR-B63-S2022	02/28/10	0.26 U	38	4.3	0.25 U	38	0.48 U	0.66 U	0.43 U	0.35 U	0.31 U	0.61 U	0.3 U	1.4 U
B68	MTR-B68-S2426	02/14/10	27 U	13080	200 U	26 U	13000	49 U	68 U	61	36 U	80	62 U	920	140 U
	MTR-B68-S2628	02/14/10	49	346 J	2 U	1.8	290 J	0.48 U	0.94 U	5.6	3.1	56	3.9	9 J	1.4 U
B71	MTR-B71-S2628	02/16/10	6.5	100 J	5.3	2	89 J	0.49 U	1.1 U	0.44 U	28	11	1.5	42 J	1.4 U
B72	MTR-B72-S2428	02/13/10	99	127	3.1	1.8	44	0.47 U	0.98 U	7.7	19	83	13	6.7	1.4 U

Notes:

ug/kg - microgram per kilogram

NA - Not analyzed

NE - None established

R - replicate sample

U - not detected, value is the detection limit

Xylene mixed (total) used as a surrogate for Xylene, m/p.

J - value is estimated

N - uncertainty regarding result

H - additional analysis conducted on sample outside of hold time

For a complete list of analyzed compounds and results please refer to the laboratory reports

PB: WDG

CB: PJS

Table 7

**Groundwater Gradients Along Inferred Plume Centerline  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Locations	Distance Between Well Locations (feet)	Elevation Change Between Wells (feet)	Groundwater Gradient (foot/foot)	Effective Porosity	Hydraulic Conductivity (cm/s)	Hydraulic Conductivity (ft/day)	Groundwater Velocity (ft/day)	Groundwater Velocity (ft/yr)
MW- 59(29) to MW- 67(30)	102	0.04	<b>0.0004</b>	0.26	0.0163	46.2	<b>0.07</b>	<b>25.4</b>
MW- 67(30) to MW- 68(32)	19	0.02	<b>0.0011</b>	0.26	0.0163	46.2	<b>0.19</b>	<b>70.1</b>
MW- 68(32) to MW- 6C	117	0.19	<b>0.0016</b>	0.26	0.0163	46.2	<b>0.29</b>	<b>105.7</b>
MW- 6C to MW- 12	91	0.10	<b>0.0011</b>	0.26	0.0163	46.2	<b>0.20</b>	<b>71.7</b>
MW- 12 to MW- 13	112	0.06	<b>0.0005</b>	0.26	0.0163	46.2	<b>0.10</b>	<b>34.7</b>
MW- 12 to MW- 14	242	0.28	<b>0.0012</b>	0.26	0.0163	46.2	<b>0.21</b>	<b>75.0</b>
MW- 14 to MW- 27(18)	373	1.98	<b>0.0053</b>	0.26	0.0163	46.2	<b>0.94</b>	<b>344.2</b>
MW- 27(18) to MW- 17	113	1.01	<b>0.0089</b>	0.26	0.0163	46.2	<b>1.59</b>	<b>579.6</b>
MW- 17 to MW- 30(24.1)	837	5.68	<b>0.0068</b>	0.26	0.0163	46.2	<b>1.21</b>	<b>440.1</b>
MW- 30(41.1) to MW- 34(37)	1,585	23.30	<b>0.0147</b>	0.26	0.0163	46.2	<b>2.61</b>	<b>953.3</b>
MW- 34(37) to MW- 38(20.8)	1,350	2.01	<b>0.0014</b>	0.26	0.0163	46.2	<b>0.25</b>	<b>92.5</b>
		<b>Average:</b>	<b>0.0039</b>	<b>0.26</b>	<b>0.0163</b>	<b>46.2</b>	<b>0.70</b>	<b>253.9</b>

Notes:

Groundwater elevations calculated from depth to water measurements (Table 3) obtained on August 2, 2010.

GW Velocity calculated by  $V=iK/ne$

i= gradient

K = hydraulic conductivity

ne= effective porosity

Prepared By: RJC

Checked By:  RJC

**Table 8**  
**Monitoring Well Network for Annual Groundwater Monitoring**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well ID	Justification
MW-1	Up-gradient well with trace VOCs
MW-3	Cross-gradient of Source Area Impacted Well
MW-6C	Impacted Well in Plume with Elevated Concentrations
MW-9B	Cross-gradient of Source Area Non-Impacted Well
MW-9C	Cross-gradient of Source Area Impacted Well
MW-11	Down-gradient Impacted Well
MW-12	Down-gradient Impacted Well
MW-13	Down-gradient Impacted Well
MW-14	Down-gradient Impacted Well
MW-15	Down-gradient Impacted Well
MW-16	Down-gradient Impacted Well
MW-17	Down-gradient Impacted Well
MW-19(53)	Impacted Well in Plume with Elevated Concentrations
MW-20(35)	Down-gradient Impacted Well
MW-20(51)	Down-gradient Impacted Well
MW-20(124)	Down-gradient of Source Area - Recommended by IDEM
MW-20(155)	Down-gradient of Source Area - Recommended by IDEM
MW-24(55.4)	Down-gradient Impacted Well
MW-25(16.4)	Down-gradient Impacted Well
MW-25(32.6)	Down-gradient Impacted Well
MW-25(82)	Down-gradient Impacted Well
MW-26(17.5)	Down-gradient Impacted Well
MW-26(58.2)	Down-gradient Impacted Well
MW-27(18)	Down-gradient Impacted Well
MW-27(53.05)	Down-gradient Impacted Well
MW-27(75.4)	Down-gradient Impacted Well
MW-27(104.2)	Down-gradient Impacted Well
MW-29(82.5)	Sentinel Well
MW-29(103.3)	Sentinel Well
MW-29(132.8)	Sentinel Well
MW-30(41.1)	Down-gradient Impacted Well
MW-31(30.9)	Sentinel Well
MW-31(55.5)	Sentinel Well
MW-31(98.5)	Sentinel Well
MW-31(139.2)	Sentinel Well
MW-32(24.1)	Down-gradient Impacted Well
MW-32(89)	Down-gradient Impacted Well
MW-32(110)	Down-gradient Impacted Well
MW-34(37)	Down-gradient Impacted Well
MW-34(85)	Down-gradient Impacted Well
MW-34(110)	Sentinel Well
MW-35(45)	Sentinel Well
MW-35(90)	Sentinel Well
MW-35(148)	Sentinel Well
MW-36(35.2)	Sentinel Well
MW-36(92.4)	Sentinel Well
MW-36(124.5)	Sentinel Well

Table 8 continued

**Monitoring Well Network for Annual Groundwater Monitoring  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well ID	Justification
MW-37(23.3)	Sentinel Well
MW-37(70)	Sentinel Well
MW-37(98)	Sentinel Well
MW-38(20.8)	Sentinel Well
MW-38(29.1)	Sentinel Well
MW-38(69.9)	Sentinel Well
MW-38(102.5)	Sentinel Well
MW-39(13)	Sentinel Well
MW-39(29.3)	Sentinel Well
MW-39(76.8)	Sentinel Well
MW-45 (185)	Bedrock Well - Recommended by IDEM
MW48(159)	Sentinel Well
MW50(45)	Sentinel Well
MW50(80)	Sentinel Well
MW51(25)	Sentinel Well
MW51(70)	Sentinel Well
MW52(55)	Sentinel Well
MW52(148)	Sentinel Well
MW53(41)	Sentinel Well
MW55(49)	Sentinel Well
MW56(51)	Sentinel Well
MW57(38)	Sentinel Well
MW59(29)	Source Area Well
MW59(46)	Source Area Well
MW60(38)	Cross-gradient Impacted Well
MW62(36)	Cross-gradient Impacted Well
MW65(32)	Cross-gradient Impacted Well
MW67(30)	Source Area Well
MW68(32)	Source Area Well
MW71(33)	Source Area Well
MW72(32)	Source Area Well
MW75(32)	Cross-gradient Impacted Well

Prepared By: WDG

Checked By: PJS

  
AMEC Electronic Signature



**Table 9**  
**Remedial Technology Screening and Process Options - Groundwater Plume**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

General Response Action	Remedial Technology	Process Option	Screening Comments	Effectiveness	Implementability	Cost	Retained
No Action	No Action	Natural degradation, dispersion, adsorption, dilution and volatilization	Not recommended	NA	Very easy.	Very Low	For comparison only
Risk & Hazard Management	Institutional Controls	Limit access to groundwater	Applicable when combined with other remedial actions	Effective in reducing risks to human health. Difficult to control all off-site affected areas.	Implementable.	Low	Yes
	Engineering Controls	Provide affected properties with whole-house treatment systems or municipal-supplied drinking water	Applicable when combined with other remedial actions	Effective in reducing risks to human health.	Implementable.	Low to High	Yes
Monitored Groundwater Natural Attenuation	Groundwater Monitoring, groundwater sampling, and modeling	Natural degradation, dispersion, adsorption, dilution and volatilization	Applicable when combined with other remedial actions	NA	Implementable.	Low	Yes
Containment	Groundwater Pump & Treat	Groundwater extraction and ex-situ treatment	Applicable - Cleanup goals hard to attain without polishing with an other technology	Effective	Implementable.	High	Yes
	Treatment Walls	Permeable Reactive Barrier (PRB)	Applicable when combined with other remedial actions	This method would offer short-term prevention of further migration by treating groundwater moving through the PRB. However, would not treat the source area groundwater.	Implementable.	High	Yes <sup>(1)</sup>
In-Situ Treatment	Air Sparge/Soil Vapor Extraction	Air Sparge/Soil Vapor Extraction	Applicable for upper water bearing zone where silts and clays do not require remediation.	Effective in sand and gravel formations where silts and clays are not present. Not effective for low permeable silts and clays.	Implementable for source area above aquitards but not below aquitards or at off-site locations under artesian conditions and low permeable vadose zone soils	Moderate	Yes <sup>(1)</sup>
		Oxygen Release Compounds	Not applicable for PCE	Limited effectiveness on PCE/TCE	Implementable.	Moderate	No
	Aerobic Remediation	Bio Air Sparge	Not applicable for PCE	Limited effectiveness on PCE/TCE	Implementable.	Moderate	No
		Cometabolic Air Sparge	Applicable where VOCs are not toxic to bacteria (i.e. high concentrations)	Effective in sand and gravel formations where silts and clays are not present. Not effective for low permeable silts and clays.	Implementable for source area above aquitards but not below aquitards or at off-site locations under artesian conditions and low permeable vadose zone soils	Moderate	No
		Cometabolic Low-Flow Oxygen Sparge	Applicable where VOCs are not toxic to bacteria (i.e. high concentrations)	Effective	Implementable.	Moderate	Yes
		Hydrogen Release Compounds (Regenesis 3DME)	Applicable	Effective	Implementable.	Low to Moderate*	Yes
	Anaerobic Remediation	Hydrogen Release Compounds (Lactate Based Material)	Applicable	Effective	Implementable.	Low to Moderate*	Yes
		Hydrogen Release Compounds (EOS Product)	Applicable	Effective	Implementable.	Low to Moderate*	Yes
		Zero-Valent Iron (ZVI)	Applicable	Effective	Implementable.	Moderate High*	Yes
		Fenton's Reagent, Persulfate or Permanganate	Applicable	Effective	Implementable at down-gradient locations but not beneath the Plant for safety reasons.	High	No
		Perozone Injection	Applicable	Effective	Implementable.	Moderate to High	Yes
Removal/ Treatment	Excavation	Excavation and off-site disposal	Not Applicable for groundwater treatment	Effective	Not implementable due to above ground features	High	No

\* = Cost will increase with multiple injections

(1) = Retained based on using combined technologies

Prepared By: RJC


Checked By: PJS 

Table 10

**Alternative Descriptions - Groundwater Plume**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**


Alternative Number	Alternative Description	Alternative Summary
1	No Action	No Action
2	In-Situ Chemical Oxidation at Source Area/Off-Site Treatment Areas, Institutional / Engineering Controls, and Monitored Natural Attenuation (MNA)	Source area/off-site treatment areas using perozone injections; Whole-house treatment systems or municipal supplied drinking water on affected properties; ERCs at affected properties; Groundwater monitoring and reporting
3	Anaerobic ISCR/Biostimulation at Source Area/Off-Site Treatment Areas, Institutional / Engineering Controls, and MNA	Source area treatment using anaerobic ISCR and biostimulation through reductive dechlorination and down-gradient treatment using biostimulation only); Whole-house treatment systems or municipal supplied drinking water on affected properties; ERCs at affected properties; Groundwater monitoring and reporting
4	Anaerobic Biostimulation and ZVI Reactive Zones at Source Area and Down-Gradient Treatment Areas, Institutional / Engineering Controls, and MNA	Source area and down-gradient treatment using biostimulation through reductive dechlorination combined with two ZVI Reactive Zones at the source area and leading edge of the down-gradient treatment area; Whole-house treatment systems or municipal supplied drinking water on affected properties; ERCs at affected properties; Groundwater monitoring and reporting
5	Pump and Treat at Source Area/Off-Site Treatment Areas,, Institutional / Engineering Controls, and MNA	Pump & treat at source area/off-site treatment area locations; Whole-house treatment systems or municipal supplied drinking water on affected properties; ERCs at affected properties; Groundwater monitoring and reporting
6	Source Area Air Sparge and SVE, Off-Site Aerobic Biodegradation, Institutional / Engineering Controls, and Monitored Natural Attenuation	Source area and on-site limited treatment areas using air sparge and SVE; Off-site treatment area using aerobic biodegradation; Whole-house treatment systems or municipal supplied drinking water on affected properties; ERCs at affected properties; Groundwater monitoring and reporting

ERCs = Environmental Restrictive Covenant

Source of municipal water: City of Rochester

ISCR = Insitu Chemical Reduction via zero-valent iron (ZVI) application

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**Table 11**  
**Monitoring Well Network for MNA and Remediation Progress Monitoring**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well ID	Justification
MW-6C	Remediation Performance Indicator Well
MW-11	Sentinel Well
MW-12	Remediation Performance Indicator Well
MW-13	Remediation Performance Indicator Well
MW-14	Remediation Performance Indicator Well
MW-15	Remediation Performance Indicator Well
MW-16	Remediation Performance Indicator Well
MW-17	Remediation Performance Indicator Well
MW-20(35)	Remediation Performance Indicator Well
MW-24(55.4)	Remediation Performance Indicator Well
MW-25(16.4)	Remediation Performance Indicator Well
MW-25(32.6)	Remediation Performance Indicator Well
MW-26(17.5)	Remediation Performance Indicator Well
MW-26(58.2)	Remediation Performance Indicator Well
MW-27(18)	Remediation Performance Indicator Well
MW30(41.1)	Remediation Performance Indicator Well
MW34(85)	Remediation Performance Indicator Well
MW59(29)	Remediation Performance Indicator Well
MW59(46)	Remediation Performance Indicator Well
MW60(38)	Remediation Performance Indicator Well
MW61(26)	Remediation Performance Indicator Well
MW62(36)	Remediation Performance Indicator Well
MW65(32)	Remediation Performance Indicator Well
MW67(30)	Remediation Performance Indicator Well
MW68(32)	Remediation Performance Indicator Well
MW71(33)	Remediation Performance Indicator Well
MW72(32)	Remediation Performance Indicator Well
MW75(32)	Remediation Performance Indicator Well

Prepared By: WDG

Checked By: PJS   
AMEC Electronic Signature

**Table 12**  
**Monitoring Well Network for Closure Stability Monitoring**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Monitoring Well ID	Justification
MW-6C	Messenger Well
MW-11	Messenger Well
MW-12	Messenger Well
MW-13	Messenger Well
MW-14	Perimeter of Compliance Well
MW-15	Perimeter of Compliance Well
MW-16	Perimeter of Compliance Well
MW-17	Perimeter of Compliance Well
MW-20(35)	Perimeter of Compliance Well
MW-24(55.4)	Perimeter of Compliance Well
MW-25(16.4)	Perimeter of Compliance Well
MW-25(32.6)	Perimeter of Compliance Well
MW-26(17.5)	Perimeter of Compliance Well
MW-26(58.2)	Perimeter of Compliance Well
MW-27(18)	Perimeter of Compliance Well
MW-30(41.1)	Perimeter of Compliance Well
MW-32(24.1)	Sentinel Well
MW-32(89)	Sentinel Well
MW-34(85)	Sentinel Well
MW-34(110)	Sentinel Well
MW75(32)	Messenger Well


Prepared By: WDG

Checked By: PJS   
AMEC Electronic Signature

**Table 13**  
**Detailed Analyses of Alternatives - Groundwater Plume**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Alternative Number	Alternative Description	Advantages	Disadvantages
1	No Action	Lowest cost compared to other alternatives	Will not address source area and off-site treatment areas
			Will extend groundwater monitoring term
			Will not meet RAO's
2	In-Situ Chemical Oxidation of Source Area and Off-Site Treatment Areas, Institutional / Engineering Controls, and MNA	Will meet RAO's	Oxidation process is non-selective and other organic matter can act as oxidant scavengers
		Oxidation process destroys VOCs rather than convert them to other VOCs (i.e. Reductive Dechlorination)	Requires fixed infrastructure to treat source area, operation and maintenance, and consumes energy (electric) when compared to Alternatives 3 and 4
		Low-volume perozone injections in the source area will minimize mounding and VOC migration compared to aggressive air sparging (i.e. Alternative 6)	Requires tighter well or injection point spacing. May not be feasible inside facility due to on-going plant operations
		Secondary benefits of ISCO include aerobic degradation. Cis-1,2-DCE and vinyl chloride are easier degraded aerobically than anaerobically (i.e. Alternative 3 and 4)	Perozone is short-lived and therefore oxidation ROI's can be limited to areas immediately surrounding the injection point
		MNA is less intrusive than other remedies for the areas down-gradient of the down-gradient treatment zones (Figure 27)	Longer source area and down-gradient clean up times than combined anaerobic biostimulation/ISCR (Alternative 3 and Alternative 4)
		IC/EC Limits Exposure from VOCs in groundwater	
		Shorter source area clean up time than pump and treat technology (Alternative 5)	
3	Anaerobic Biostimulation/ISCR of Source Area and Biostimulation of Down-Gradient Treatment Areas, Institutional / Engineering Controls, and Monitored Natural Attenuation	Will meet RAO's	ISCR requires tighter well or injection point spacing. May not be feasible inside facility due to on-going plant operations
		Same benefits for MNA and IC/EC listed in Alt 2	
		Does not require fixed infrastructure such as capital equipment, treatment facilities and ancillary piping (excluding injection wells)	Reductive dechlorination (without ZVI) processes can convert cis-1,2-DCE to vinyl chloride. The vinyl chloride transformation process is slow compared to aerobic/oxidation processes (Alternative 2 and 6)
		No long-term O&M	A second injection is proposed to treat the source area. Additional injections maybe required
		ISCR treatment of the source area is a more aggressive approach to treating VOCs than reductive dechlorination (i.e. Alternative 4)	Costs for ISCR treatments using ZVI are expensive.
		No utility use	Extended source area cleanup time with multiple injections
		Anaerobic degradation has and is occurring at the source area and down-gradient treatment areas. Enhancement of Anaerobic degradation requires less energy when compared to other technologies that alter aquifer states (i.e. anaerobic to aerobic environment).	
4	Anaerobic Biostimulation of Source Area and Down-Gradient Treatment Areas combined with ZVI Reactive Zones, Institutional / Engineering Controls, and Monitored Natural Attenuation	Will meet RAO's	Requires tighter well or injection point spacing when compared to Alternative 5
		Same benefits for MNA and IC/EC listed in Alt 2	
		Does not require fixed infrastructure such as capital equipment, treatment facilities and ancillary piping (excluding injection wells)	The reductive dechlorination (without ZVI) process to convert cis-1,2-DCE to vinyl chloride and vinyl chloride to non-toxic by-products is a very slow process compared to aerobic/oxidation processes (Alternative 2 and 6).
		No long-term O&M	Multiple injections (3) will be required to treat source area and down-gradient treatment areas
		VOC plume migration reduction through ISCR PRBs	Costs for ISCR treatments using ZVI are expensive.
		Constructing ZVI Reactive Zones outside of the building is more feasible than implementing ISCR inside the building in Alternative 3.	
		No utility use	
5	Pump and Treat of Source Area and Down-Gradient Treatment Areas, Institutional / Engineering Controls, and MNA	Pump and treat provides gradient control	Higher cost compared to other alternatives
		Plume migration is limited compared to other Alternatives	Higher energy use
		Will meet RAO's	long term O&M associated with pump and treat
		Same benefits for MNA and IC/EC listed in Alt 2	Additional O&M cost (i.e. carbon replacement and air stripper cleaning)
			Requires fixed infrastructure to treat source area, operation and maintenance, and consumes energy (electric) when compared to Alternatives 3 and 4
6	Air Sparge/SVE of Source Area and Aerobic Biodegradation of Off-Site Treatment Areas, Institutional / Engineering Controls, and MNA	Will meet RAO's	Higher costs associated with combined source area treatment technologies than above alternatives
		Same benefits for MNA and IC/EC listed in Alt 2	Higher energy costs associated with vapor treatment
		Cis-1,2-DCE and vinyl chloride are easier degraded aerobically than anaerobically (i.e. Alternative 3 and 4)	O&M costs associated with air sparge and iSOC gas infusion system
		Air sparging and SVE generally has lower capital cost compared to other fixed-based treatment technologies	Air sparging requires fixed infrastructure to treat source area, operation and maintenance, and consumes energy (electric) when compared to Alternatives 3 and 4
		No utility costs for off-site treatment areas	Air sparging is more likely to create contaminant spreading along the treatment area than Alternative 3, 4, or 5 due to aggressive air injection volumes (5 cfm to 10 cfm per point)
			Vapor recovery is problematic beneath Aquitards

ZVI = Zero-Valent Iron  
ISCR = In Situ Chemical Reduction (ZVI application)  
O&M = Operation and Maintenance  
IC/EC = Institutional and Engineering Controls  
PRBs = Permeable Reactive Barriers

Prepared By: RJC  
Checked By:   
AMEC E&I, Inc.

**Table 14**  
**Comparative Analyses of Alternatives - Groundwater Plume**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Comparative Criteria	Alt. 1 (No Action) Ranking	Alt. 2 <sup>(1)</sup> (ISCO) <sup>(2)</sup> Ranking	Alt. 3 <sup>(1)</sup> (ISCR/Bio) <sup>(2)</sup> Ranking	Alt. 4 <sup>(1)</sup> (Bio/ZVI Reactive Zones) <sup>(2)</sup>	Alt. 5 <sup>(1)</sup> (P&T) <sup>(2)</sup> Ranking	Alt. 6 <sup>(1)</sup> (Sparge/Aerobic) <sup>(2)</sup> Ranking	Comments
Overall Protection of Human Health and the Environment	1	4	5	5	4	4	See Report Section 8.1 - Implementing institutional and engineering controls would restrict contact and exposure to VOCs in groundwater. Alt. 3 and Alt. 4 would reduce source area mass quicker than the other alternatives.
Compliance with ARARs	1	3	3	3	3	3	See Report Section 8.2 - Implementing institutional and engineering controls would restrict contact and exposure to VOCs in groundwater.
Long-Term Effectiveness and Permanence	1	3	4	4	2	3	See Report Section 8.3 - Alt. 3 and Alt. 4 would provide the quickest destruction of VOCs.
Reduction of Toxicity, Mobility, or Volume through Treatment	1	4	4	4	4	3	See Report Section 8.4 - Alt. 3 and Alt.4 would provide the quickest destruction of VOCs (toxicity) in the source area. Alt. 5 would take longer to remove mass volume by treatment but provide less chance of chemical mobility. Cis-1,2-DCE and VC are more persistent anaerobically treated (Alt.3/Alt.4) than aerobically treated, but the addition of ZVI will reduce the transformation process of cis-1,2-DCE to VC.
Short-Term Effectiveness	1	3	5	5	3	4	See Report Section 8.5 - Alt. 3 and Alt.4 are anticipated to have the greatest short-term effectiveness with respect to meeting RAO's in the source area. Due to the infrastructure and method of treatment, implementing and operating Alt. 2, 5 and 6 would require more time than Alt. 3 and Alt. 4
Implementability	5	3	2	4	3	4	See Report Section 8.6
State and Community Acceptance	1	3	4	4	4	4	See Report Section 8.8
Cost	5	3	4	3	1	4	See Report Section 8.7. Alt. 4 cost includes 3 batch injections.
<b>Total Score:</b>	16	26	31	32	24	29	

(1) = Alternative includes implementing institutional and engineering controls and monitored natural attenuation for the VOC groundwater plume

(2) = Source area treatment and limited off-site treatment (Figure 19). The remaining VOC plume will be addressed using monitored natural attenuation

ARARs = Applicable or Relevant and Appropriate Requirements

NA = Natural Attenuation

Bio = Biostimulation using carbon substrate

Ranking = 5 is highest ranking; 1 is lowest ranking

Aerobic = Aerobic Biodegradation

ISCO = In-Situ Chemical Oxidation

P&T = Groundwater Pump and Treat

ISCR = In-Situ Chemical Reduction via zero-valent iron (ZVI) application

Prepared By: RJC

Checked By: PJS

AMEC Electronic Signature



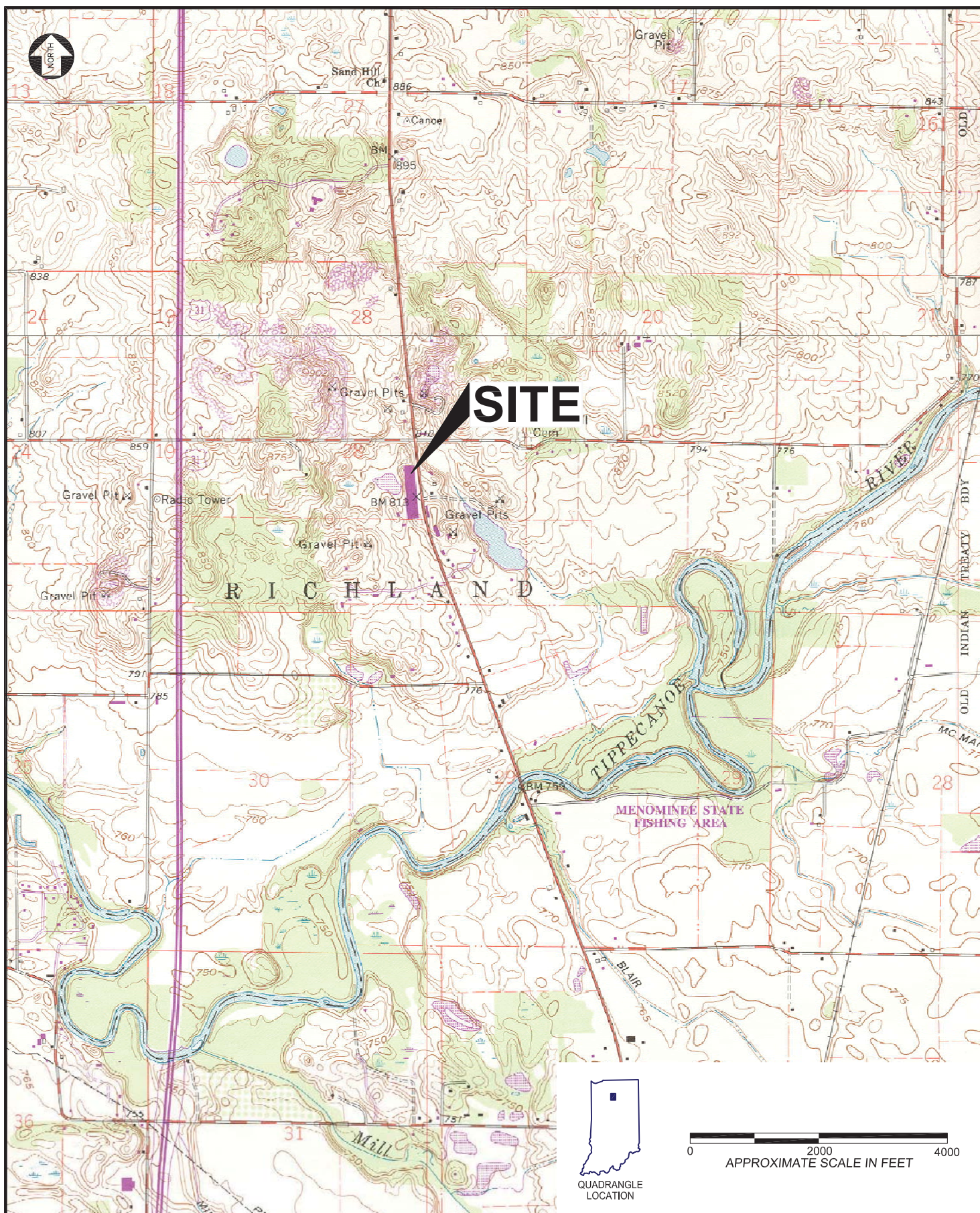
Textron, Inc.  
TORX Facility, Rochester, Indiana  
Remediation Feasibility Study


## **APPENDIX B**

### **FIGURES**

- Figure 1 Site Location Map
- Figure 2 Site Features
- Figure 3 Site Plan
- Figure 4 December 2010 Site-Related VOC Concentrations in Groundwater
- Figure 5 Approximate Location of Residential Wells
- Figure 6 Locations of Geologic Cross-Sections
- Figure 7 Geologic Cross-Section A-A', North to South
- Figure 8 Geologic Cross-Section A'-A'', North to South
- Figure 9 Geologic Cross-Section B-B', North to South
- Figure 10 Geologic Cross-Section C-C', West to East
- Figure 11 Geologic Cross-Section D-D', Northwest to Southeast
- Figure 12 Geologic Cross-Section E-E', Northwest to Southeast
- Figure 13 Geologic Cross-Section F-F', West to East
- Figure 14 Geologic Cross-Section G-G', North to South
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- Figure 16 Groundwater Contour Map, Shallow Overburden Wells, December 6, 2010
- Figure 17 Groundwater Contour Map, Deep Overburden Wells, December 6, 2010
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- Figure 19 Site Plan Enlarged Facility Area
- Figure 20 cis-1,2-Dichloroethene Isopleth Concentration Map, Zone 1 (765-786 ft), December 2010
- Figure 21 Trichloroethene Isopleth Concentration Map, Zone 1 (765-786 ft), December 2010
- Figure 22 Vinyl Chloride Isopleth Concentration Map, Zone 1 (765-786 ft), December 2010
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- Figure 27 Alternative #2 Proposed Perozone System and Injection Points
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- Figure 30 Alternative #5 Proposed Pump and Treat System and Extraction Well Locations
- Figure 31 Alternative #6 Proposed Air Sparge and Soil Vapor Extraction (SVE) / Aerobic Biodegradation
- Figure 32 Proposed Pilot Test Injection Point Locations





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APPROVED BY		DATE
	AMEC Electronic Signature	08/08/2011
SOURCE USGS topographic quadrangles of Argos, IN, 1994 and Rochester, IN, 1992.		
PROJECT NO.	SCALE	
3359 09 2469	SEE ABOVE	

**TORX FACILITY  
4366 NORTH OLD US HIGHWAY 31  
ROCHESTER, INDIANA**



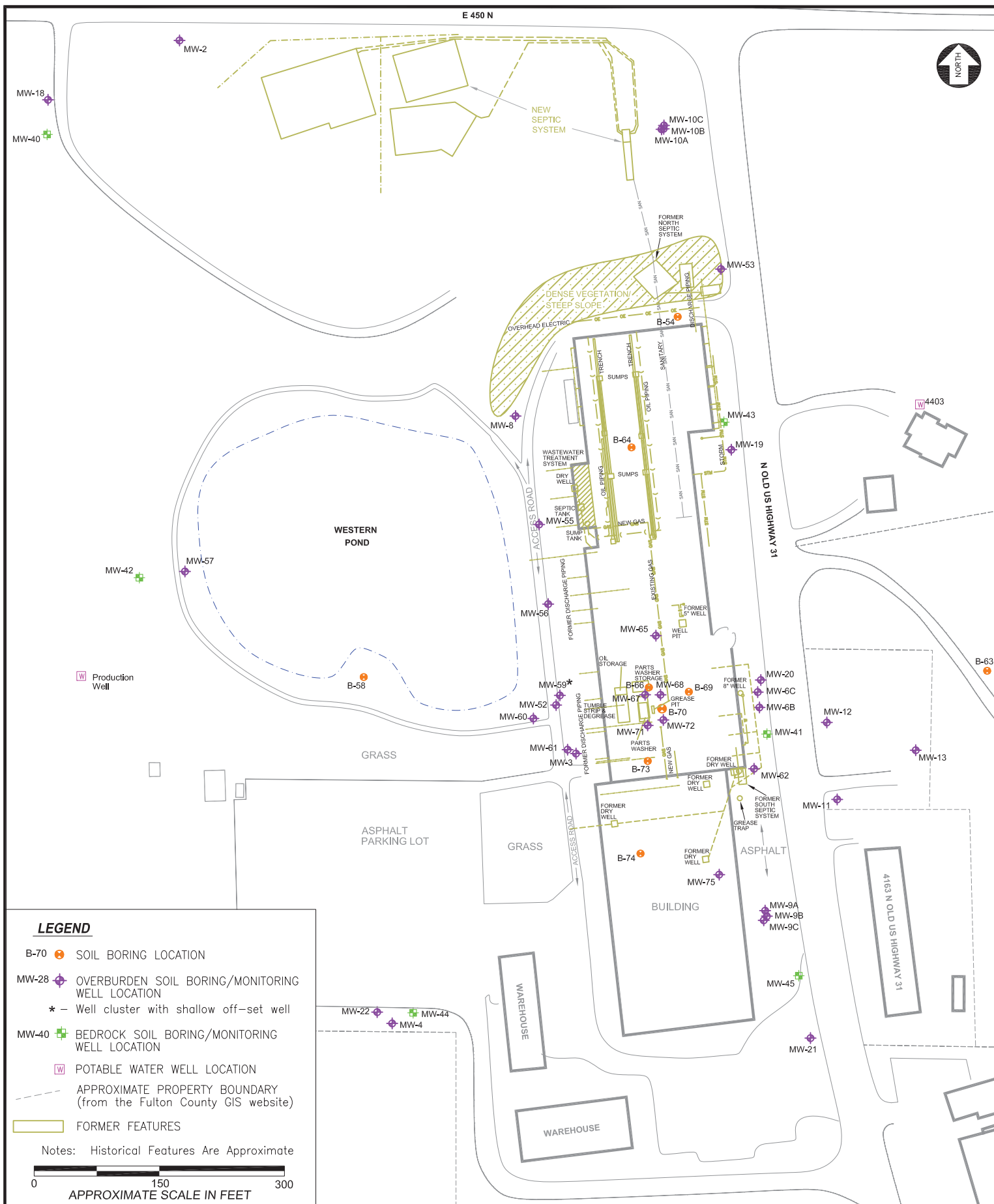
## SITE LOCATION MAP

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**1**

SHEET 1 of 1





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09/08/2011  
SOURCE Wells surveyed by Territorial Engineering, 2009;  
Fulton County, IN GIS, 2005; historical maps from Texttron  
PROJECT NO. SCALE  
3359 09 2469 SEE ABOVE

**TORX FACILITY**  
**4366 NORTH OLD US HIGHWAY 31**  
**ROCHESTER, INDIANA**

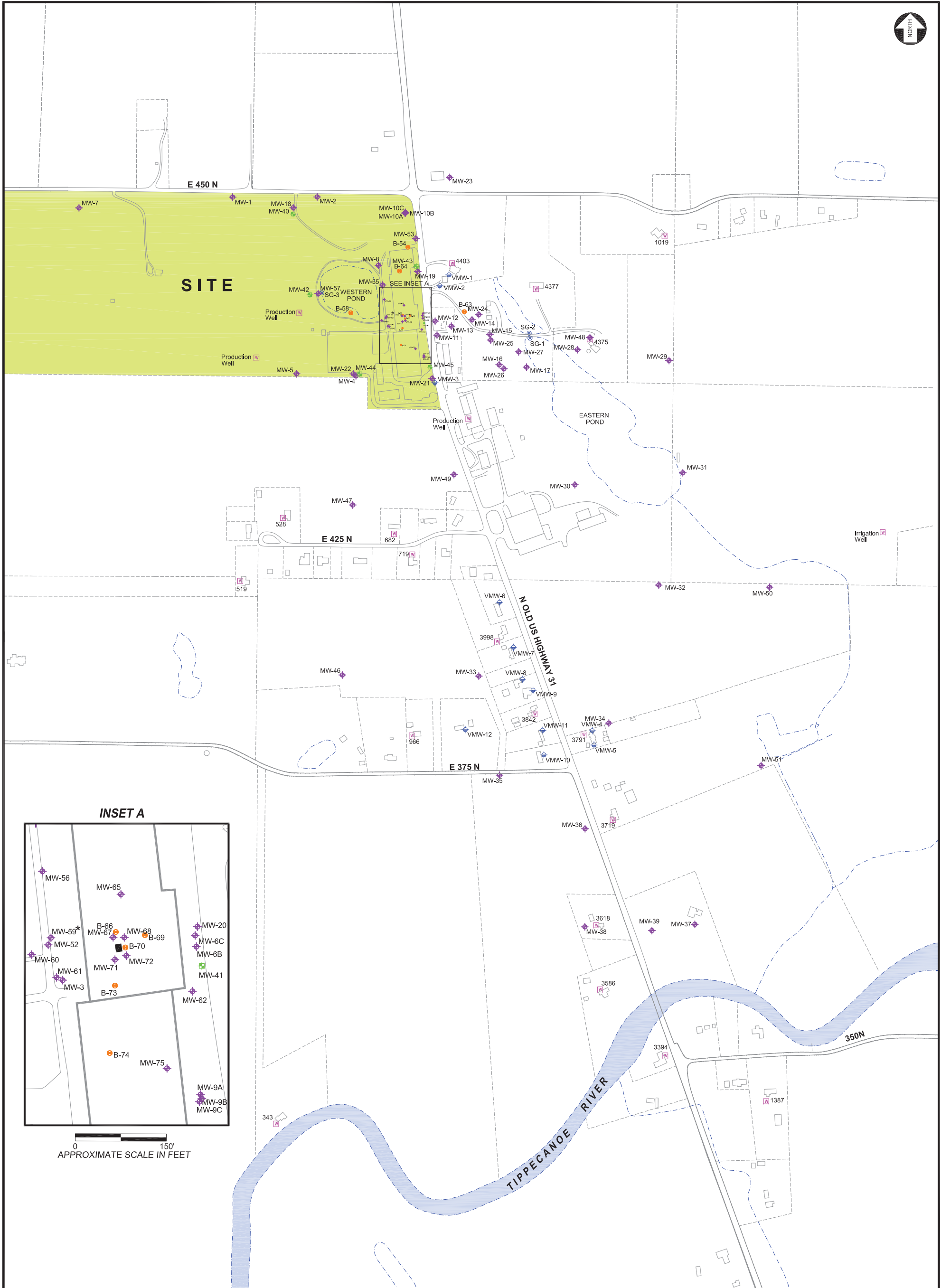


**SITE FEATURES**

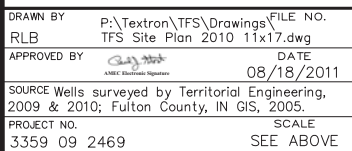
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SHEET 1 of 1



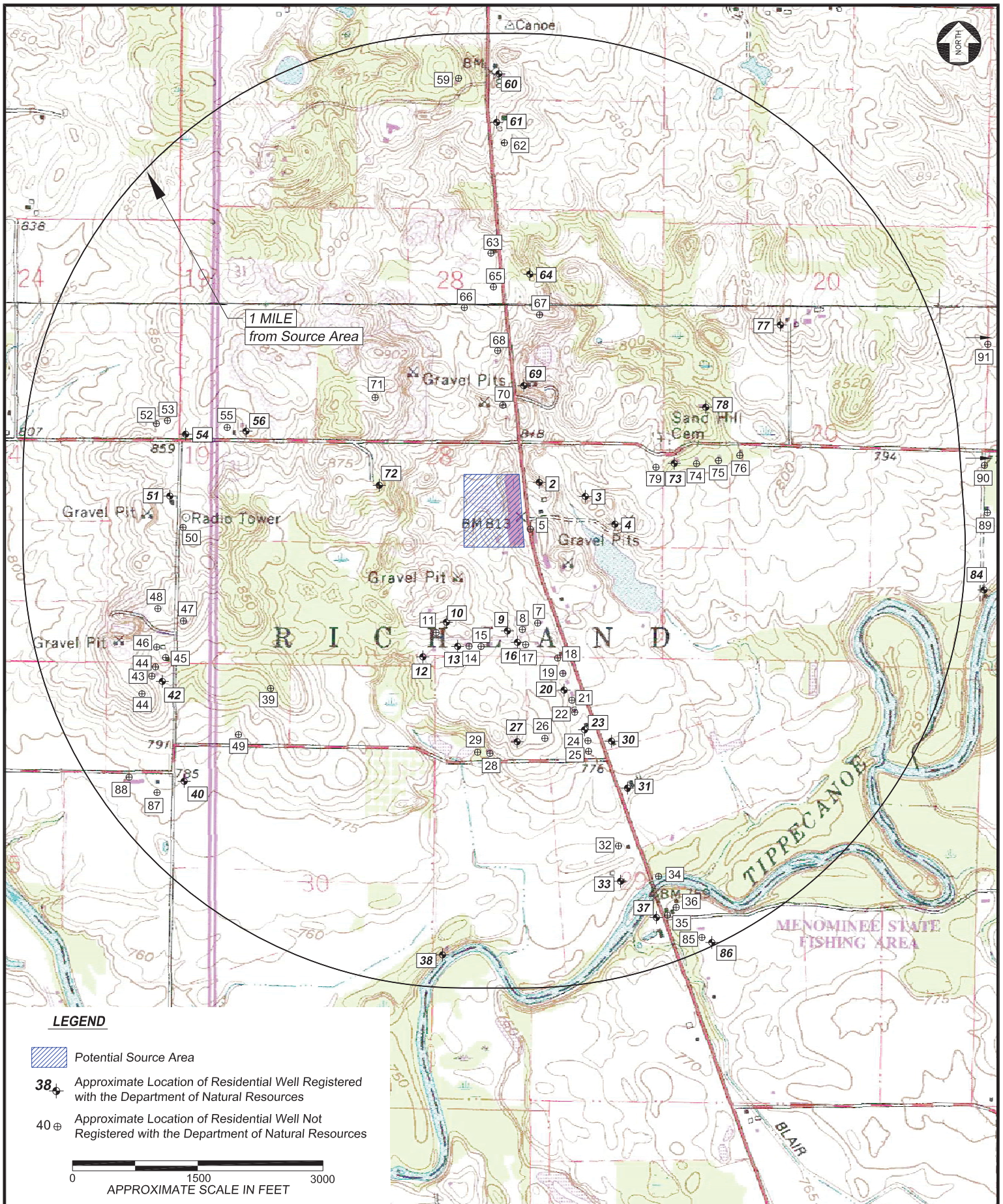
\* WELL CLUSTER WITH SHALLOW OFF-SET WELL



SHEET 1 of 1







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08/12/2011  
SOURCE USGS Topographic maps of Rochester, Argos,  
Pershing, and Rutland, Indiana  
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**TORX FACILITY**  
4366 NORTH OLD US HIGHWAY 31  
ROCHESTER, INDIANA

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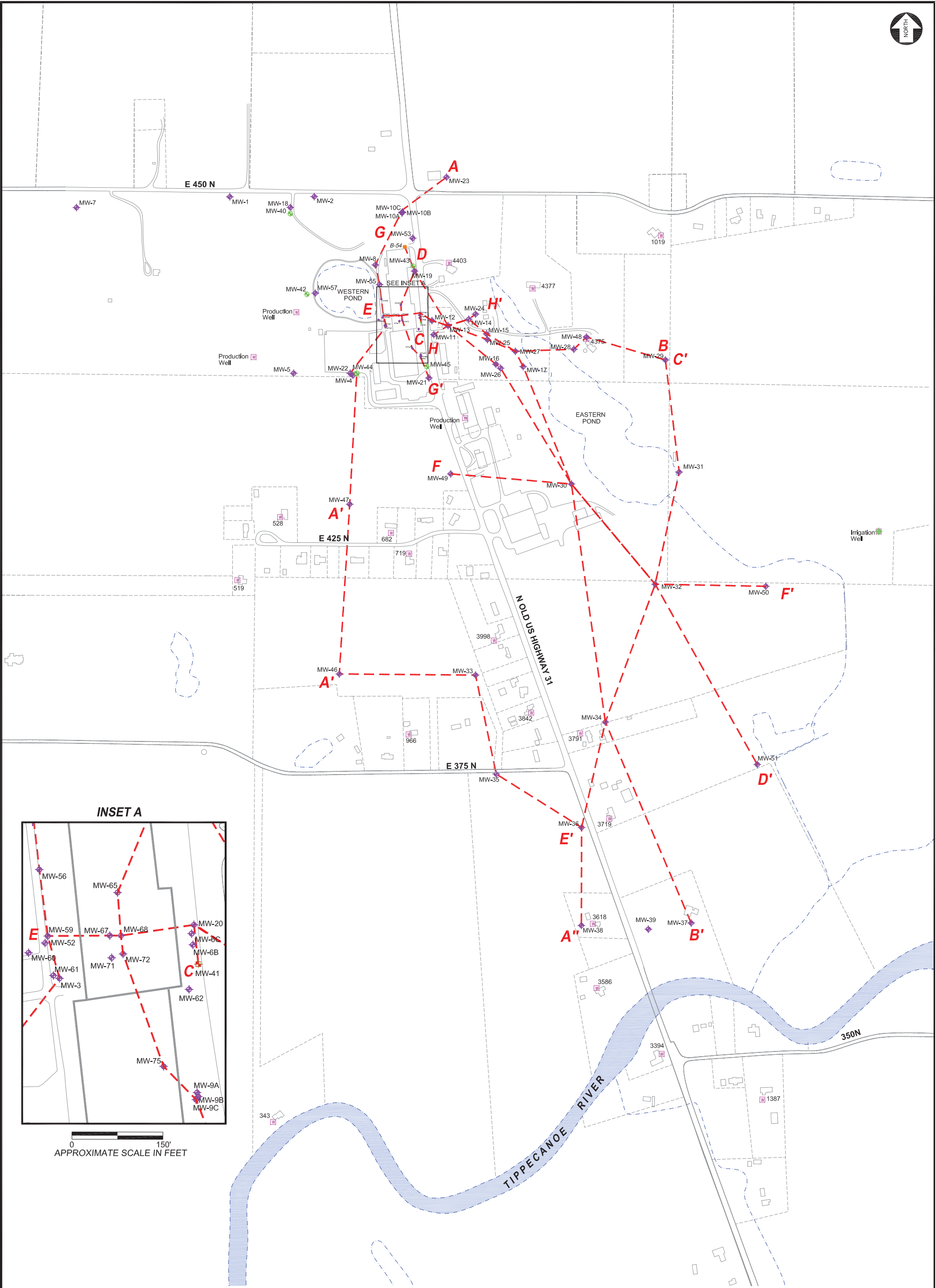
**APPROXIMATE  
LOCATIONS OF  
RESIDENTIAL WELLS**

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SHEET 1 of 1





**LEGEND**

- MW-28 OVERBURDEN MONITORING WELL LOCATION
- MW-40 BEDROCK MONITORING WELL LOCATION
- 3618 POTABLE WATER WELL LOCATION
- A---A' CROSS SECTION TRAVERSE LOCATION
- APPROXIMATE PROPERTY BOUNDARY (from the Fulton County GIS website)

0 600 1200  
APPROXIMATE SCALE IN FEET

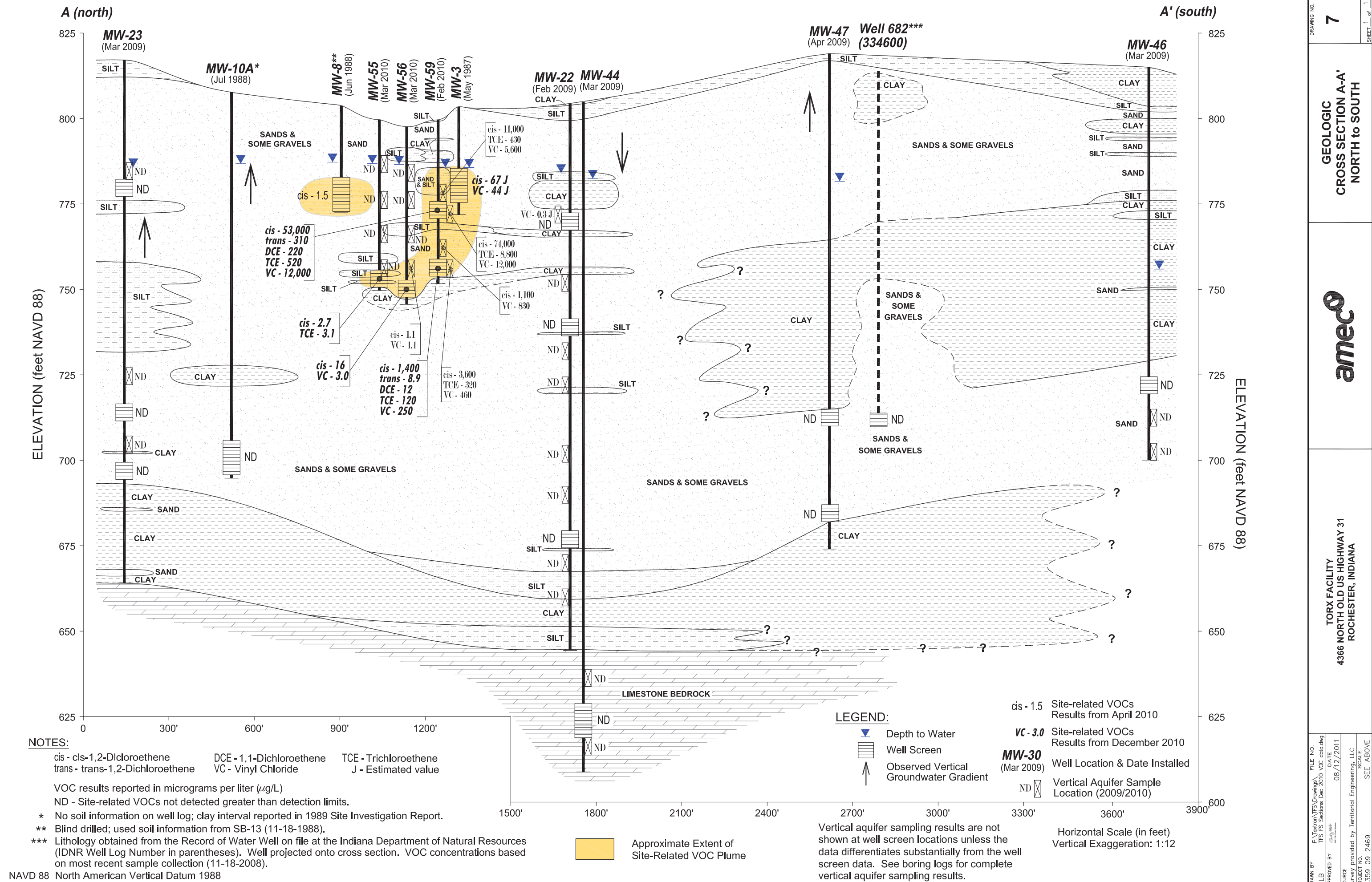
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SOURCE Wells surveyed by Territorial Engineering,  
2009 & 2010; Fulton County, IN GIS, 2005.  
PROJECT NO. SCALE  
3359 09 2469 SEE ABOVE

**TORX FACILITY**  
**4366 NORTH OLD US HIGHWAY 31**  
**ROCHESTER, INDIANA**

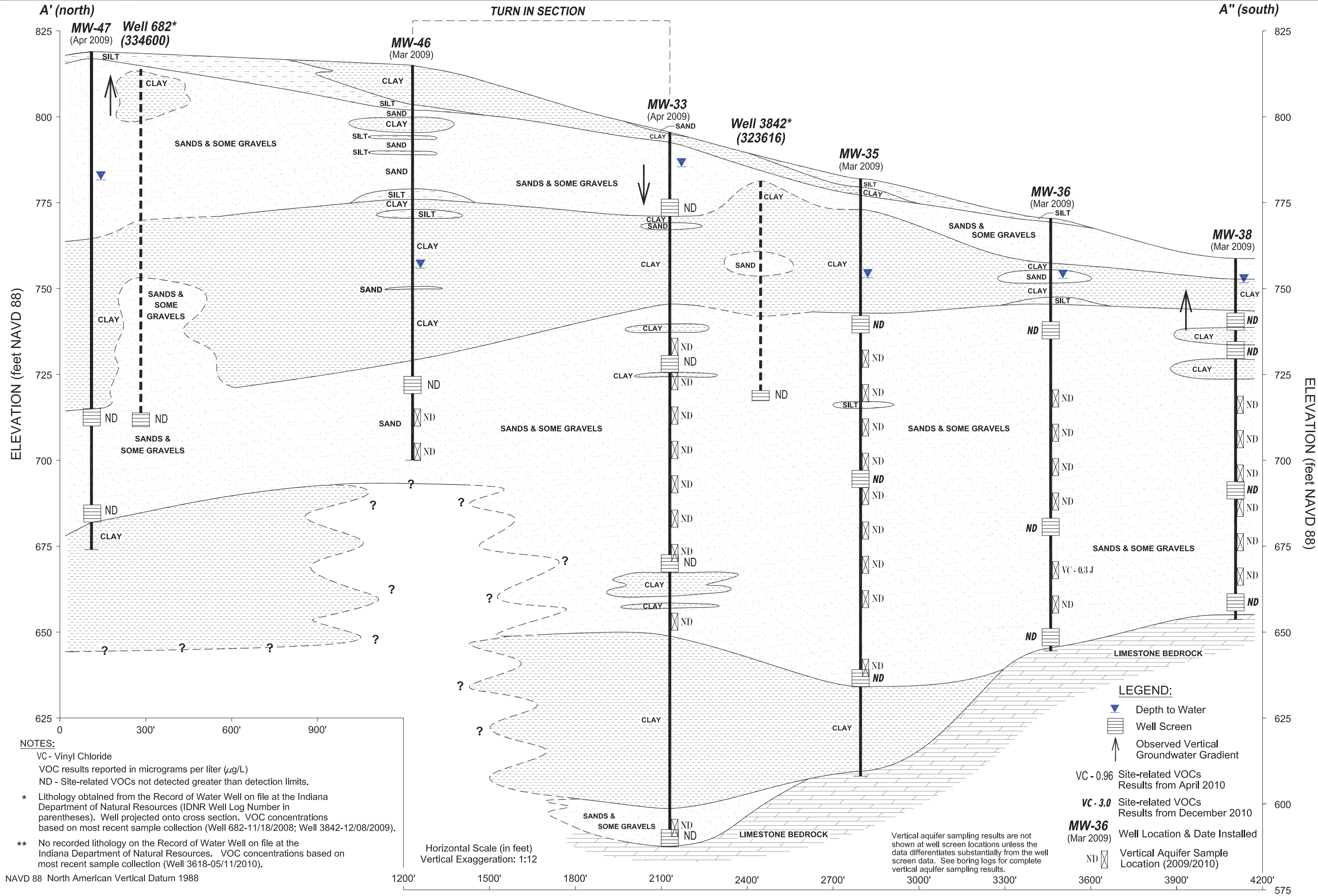


**LOCATION OF**  
**GEOLOGIC CROSS SECTIONS**

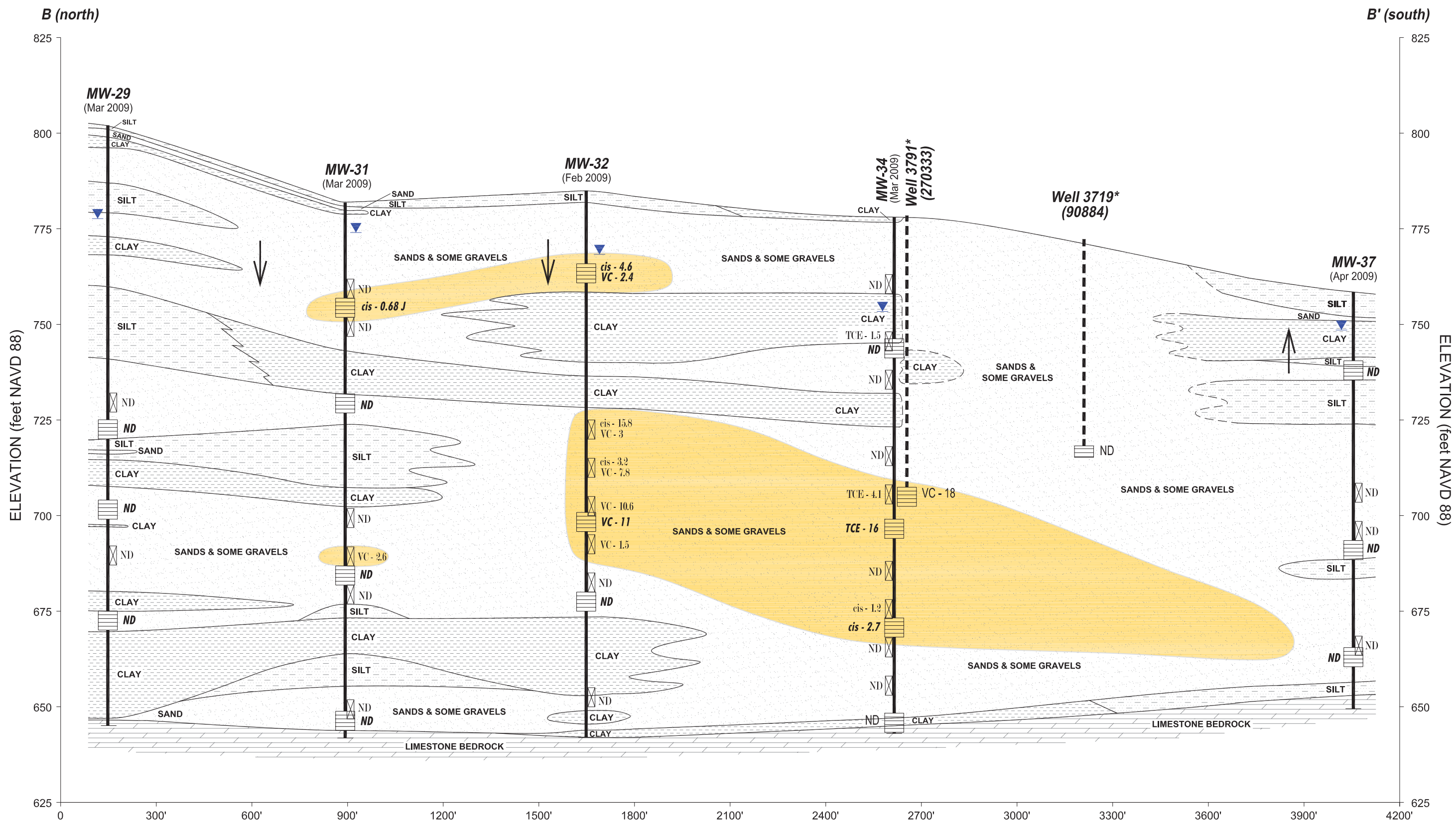
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**6**  
SHEET 1 of 1











**NOTES:**

cis - cis-1,2-Dichloroethene      TCE - Trichloroethene  
trans - trans-1,2-Dichloroethene      VC - Vinyl Chloride

VOC results reported in micrograms per liter ( $\mu\text{g/L}$ )  
ND - Site-related VOCs not detected greater than detection limits.  
J - Estimated value

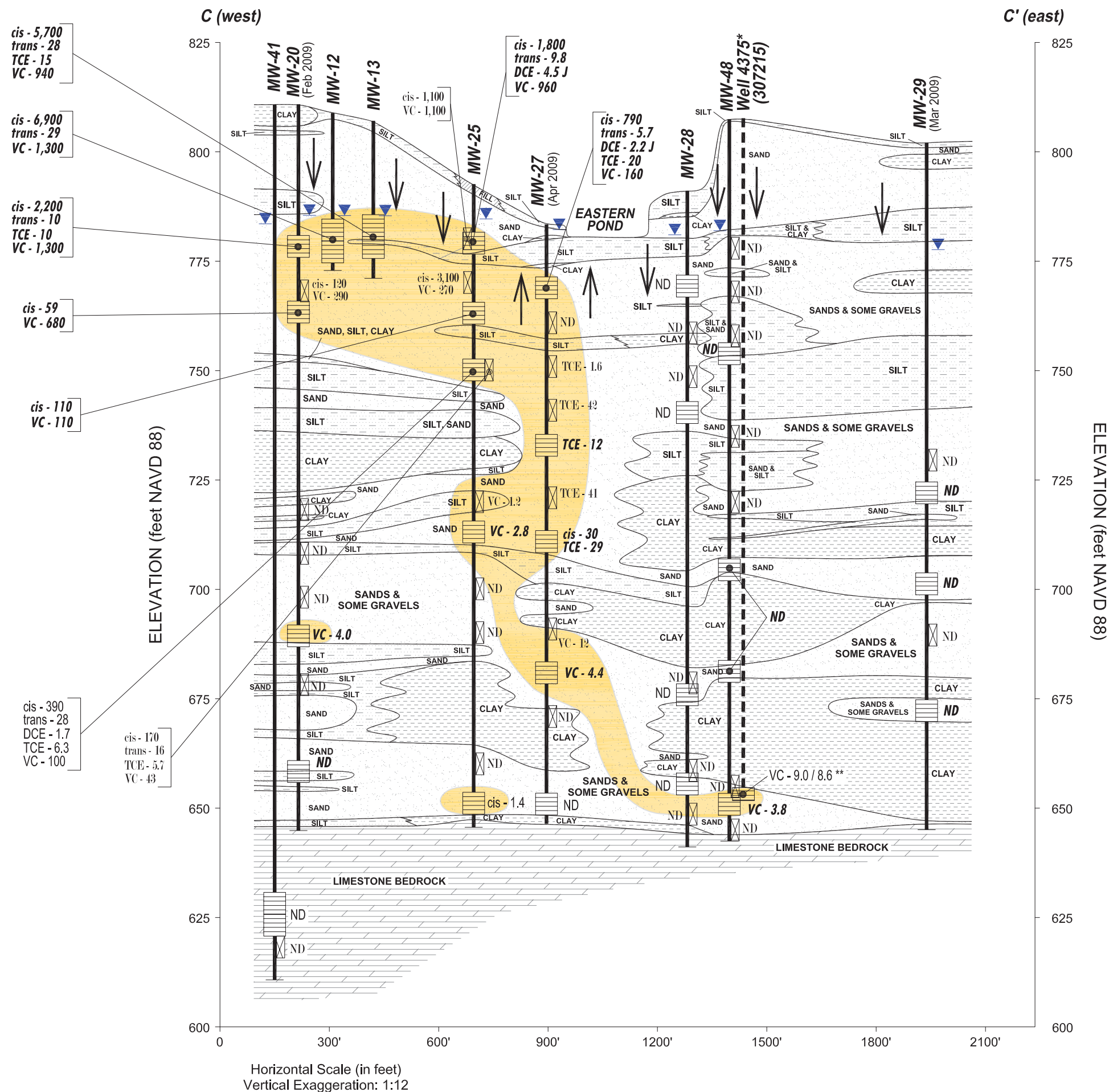
\* Lithology obtained from the Record of Water Well on file at the Indiana Department of Natural Resources (IDNR Well Log Number in parentheses). Well projected onto cross section. VOC concentrations based on most recent sample collection (Well 3791 - 03/10/2010; Well 3719 - 11/18/2008).

Horizontal Scale (in feet)  
Vertical Exaggeration: 1:12

Vertical aquifer sampling results are not shown at well screen locations unless the data differentiates substantially from the well screen data. See boring logs for complete vertical aquifer sampling results.

- LEGEND:**
- Depth to Water
  - Well Screen
  - Observed Vertical Groundwater Gradient
  - Approximate Extent of Site-Related VOC Plume

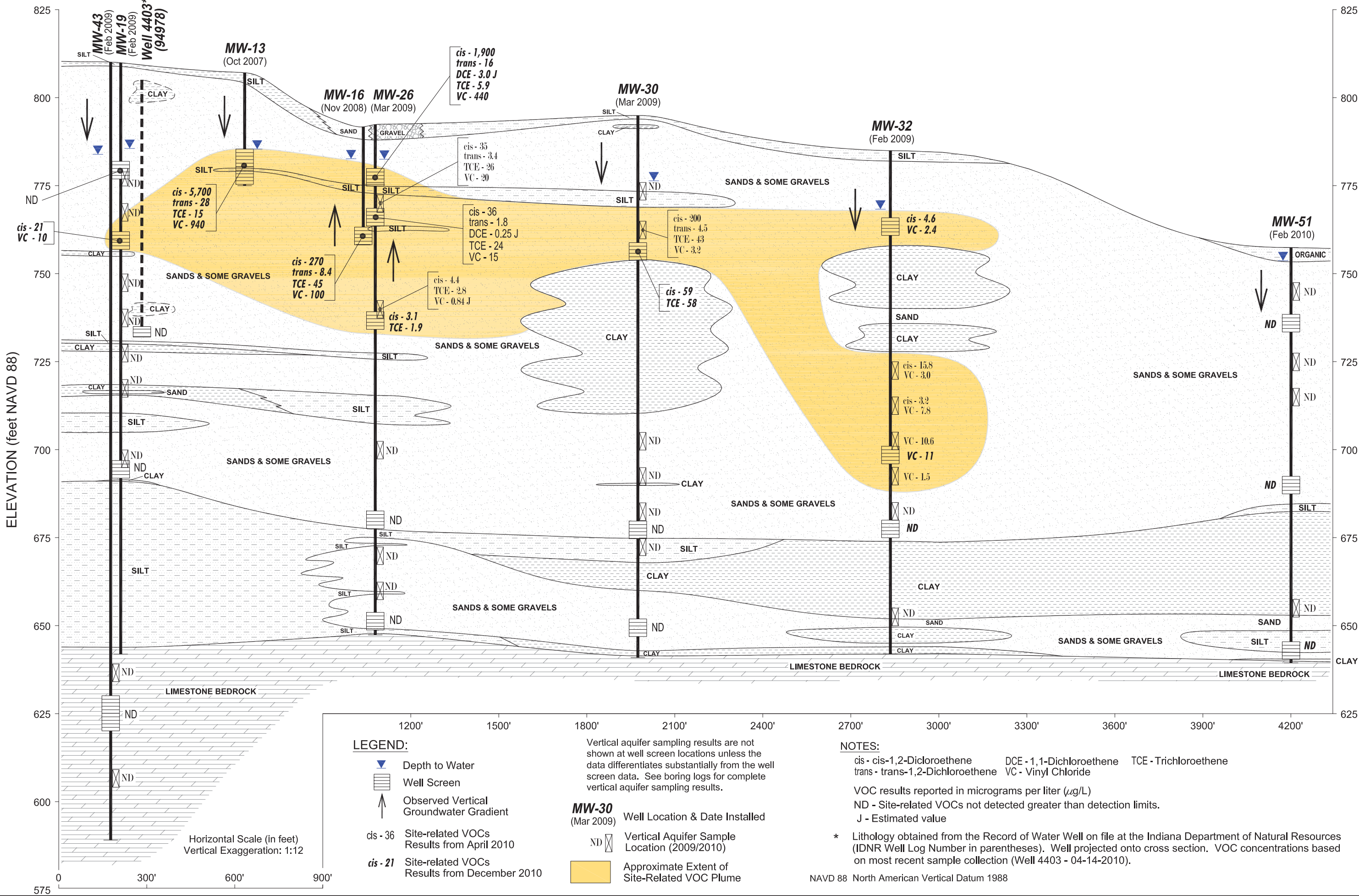
cis - 3.1      Site-related VOCs Results from April 2010  
cis - 2.7      Site-related VOCs Results from December 2010  
**MW-32** (Feb 2009)      Well Location & Date Installed  
ND      Vertical Aquifer Sample Location (2009/2010)





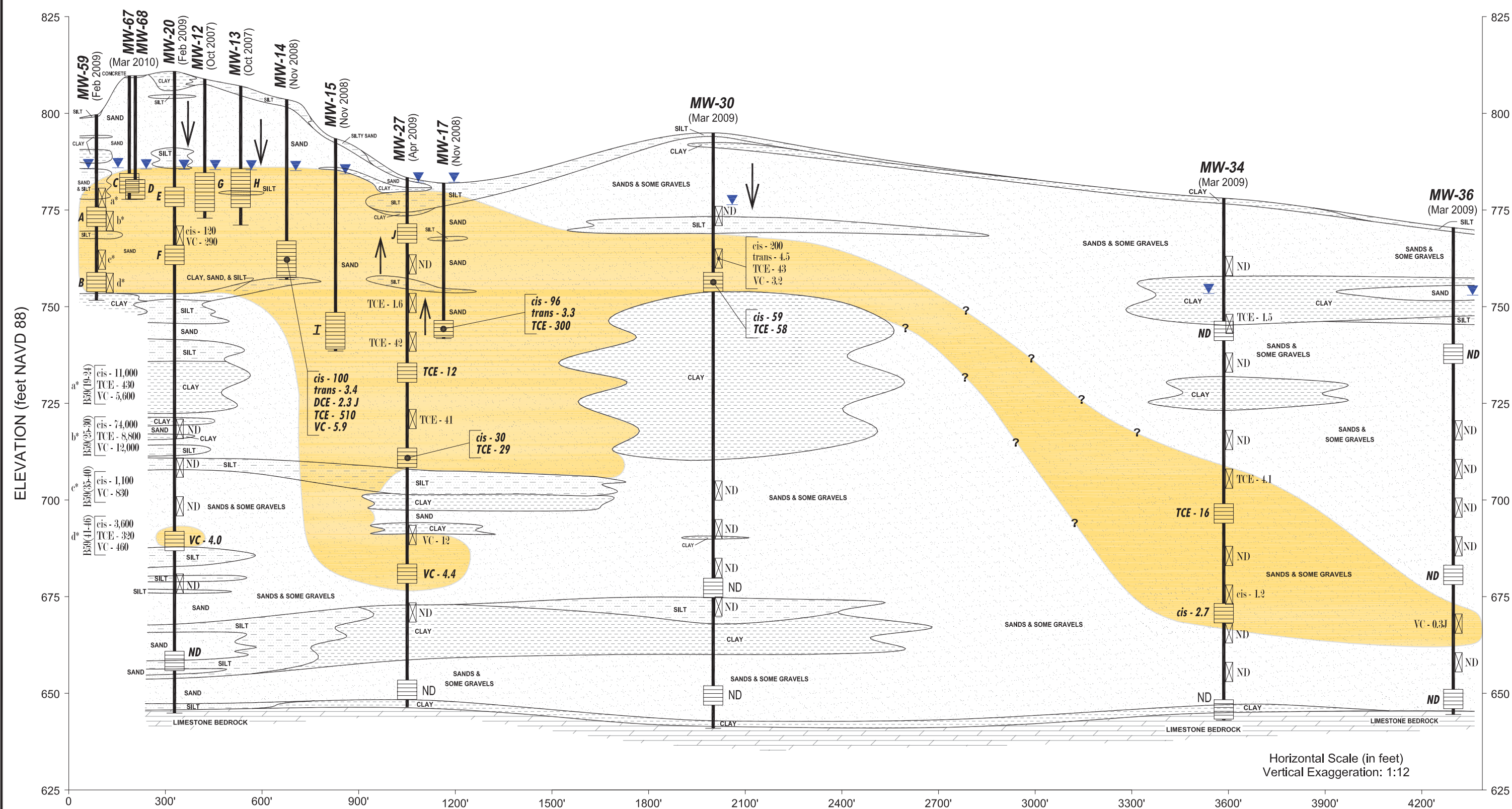
D (northwest)

D' (southeast)



E (northwest)

E' (southeast)



ELEVATION (feet NAVD 88)

Horizontal Scale (in feet)  
Vertical Exaggeration: 1:12

LEGEND:

- Depth to Water
- Well Screen
- Observed Vertical Groundwater Gradient
- ND Site-related VOCs Results from April 2010
- VC - 4.4 Site-related VOCs Results from December 2010

**MW-30**  
(Mar 2009) Well Location & Date Installed

ND Vertical Aquifer Sample Location (2009/2010)

Vertical aquifer sampling results are not shown at well screen locations unless the data differentiates substantially from the well screen data. See boring logs for complete vertical aquifer sampling results.

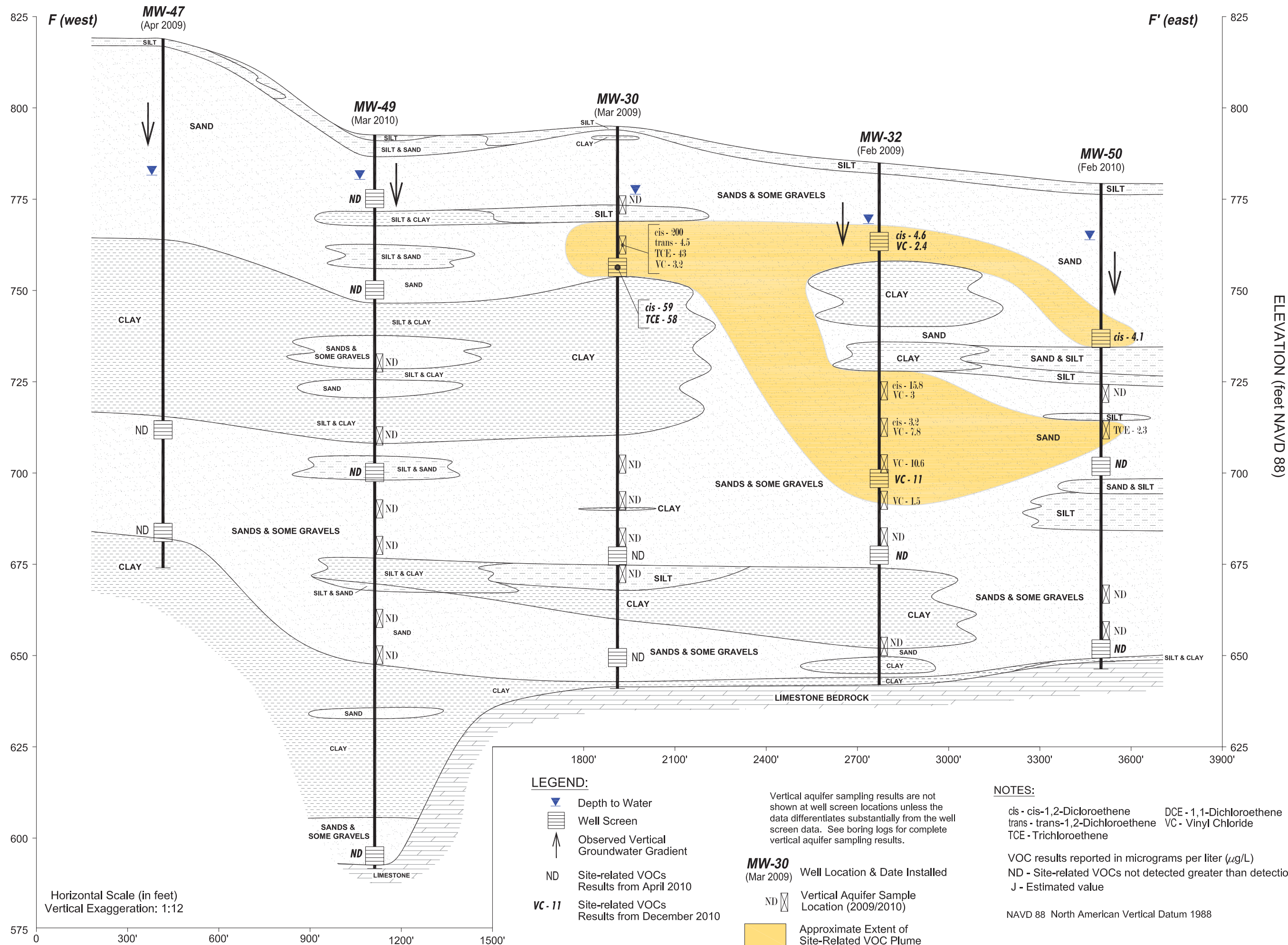
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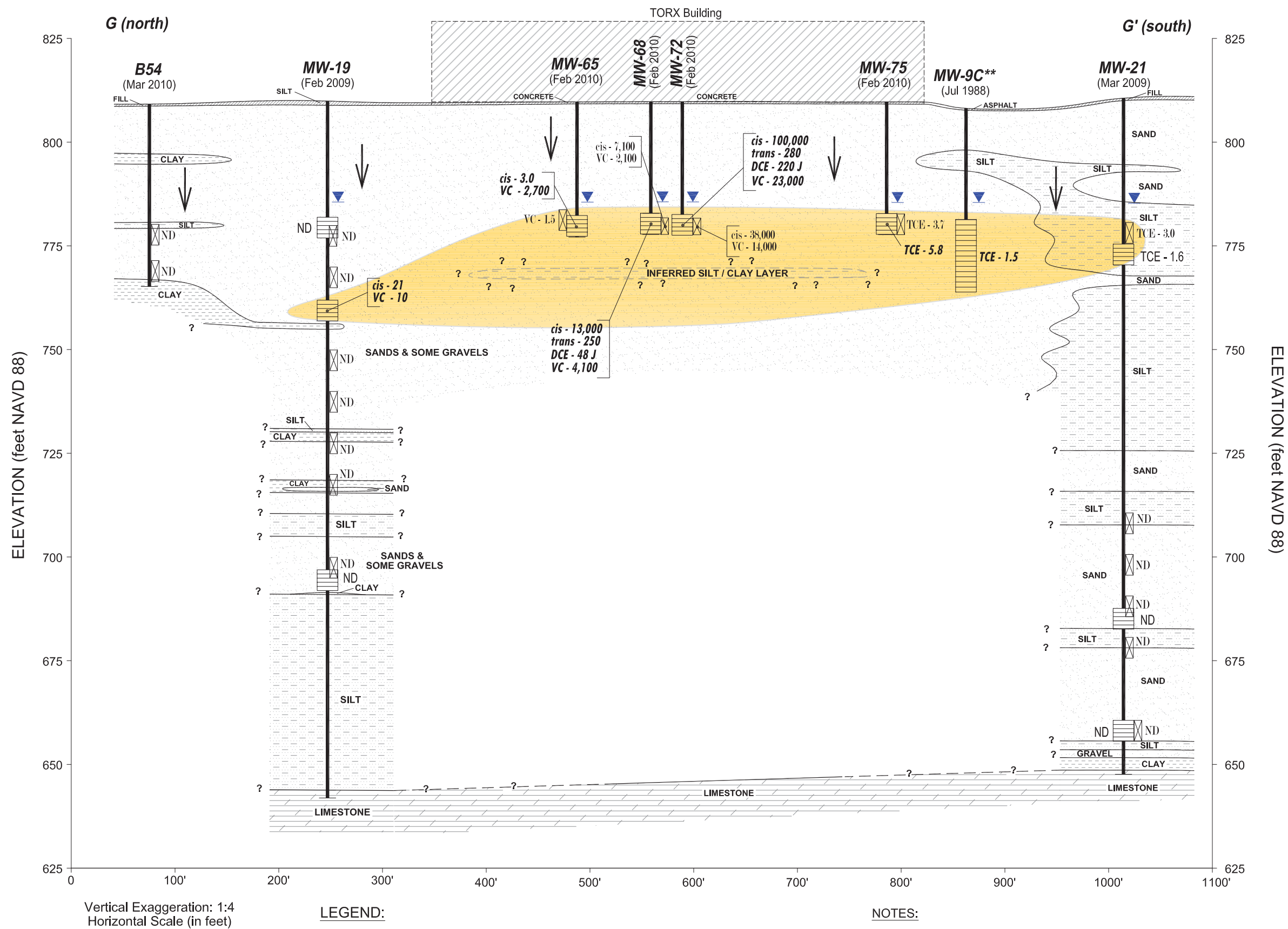
- cis - cis-1,2-Dichloroethene
- trans - trans-1,2-Dichloroethene
- TCE - Trichloroethene
- DCE - 1,1-Dichloroethene
- VC - Vinyl Chloride
- VOC results reported in micrograms per liter ( $\mu\text{g/L}$ )
- ND - Site-related VOCs not detected greater than detection limits.
- J - Estimated value
- NAVD 88 North American Vertical Datum 1988
- Approximate Extent of Site-Related VOC Plume

- |  |   |   |   |   |
|--|---|---|---|---|
| <b>A</b> MW-59(29)<br>cis - 53,000<br>trans - 310<br>DCE - 220<br>TCE - 520<br>VC - 12,000 | <b>C</b> MW-67(30)<br>cis - 9,300<br>trans - 99<br>DCE - 20 J<br>VC - 1,400   | <b>E</b> MW-20(35)<br>cis - 2,200<br>trans - 10<br>DCE - 10<br>VC - 1,300 | <b>G</b> MW-12<br>cis - 6,900<br>trans - 29<br>VC - 1,300           | <b>I</b> MW-15<br>cis - 3,000<br>trans - 64<br>DCE - 15<br>TCE - 37<br>VC - 560       |
| <b>B</b> MW-59(46)<br>cis - 1,400<br>trans - 8.9<br>DCE - 12<br>TCE - 120<br>VC - 250      | <b>D</b> MW-68(32)<br>cis - 13,000<br>trans - 250<br>DCE - 48 J<br>VC - 4,100 | <b>F</b> MW-20(51)<br>cis - 59<br>VC - 680                                | <b>H</b> MW-13<br>cis - 5,700<br>trans - 28<br>TCE - 15<br>VC - 940 | <b>J</b> MW-27(18)<br>cis - 790<br>trans - 5.7<br>DCE - 2.2 J<br>TCE - 20<br>VC - 160 |

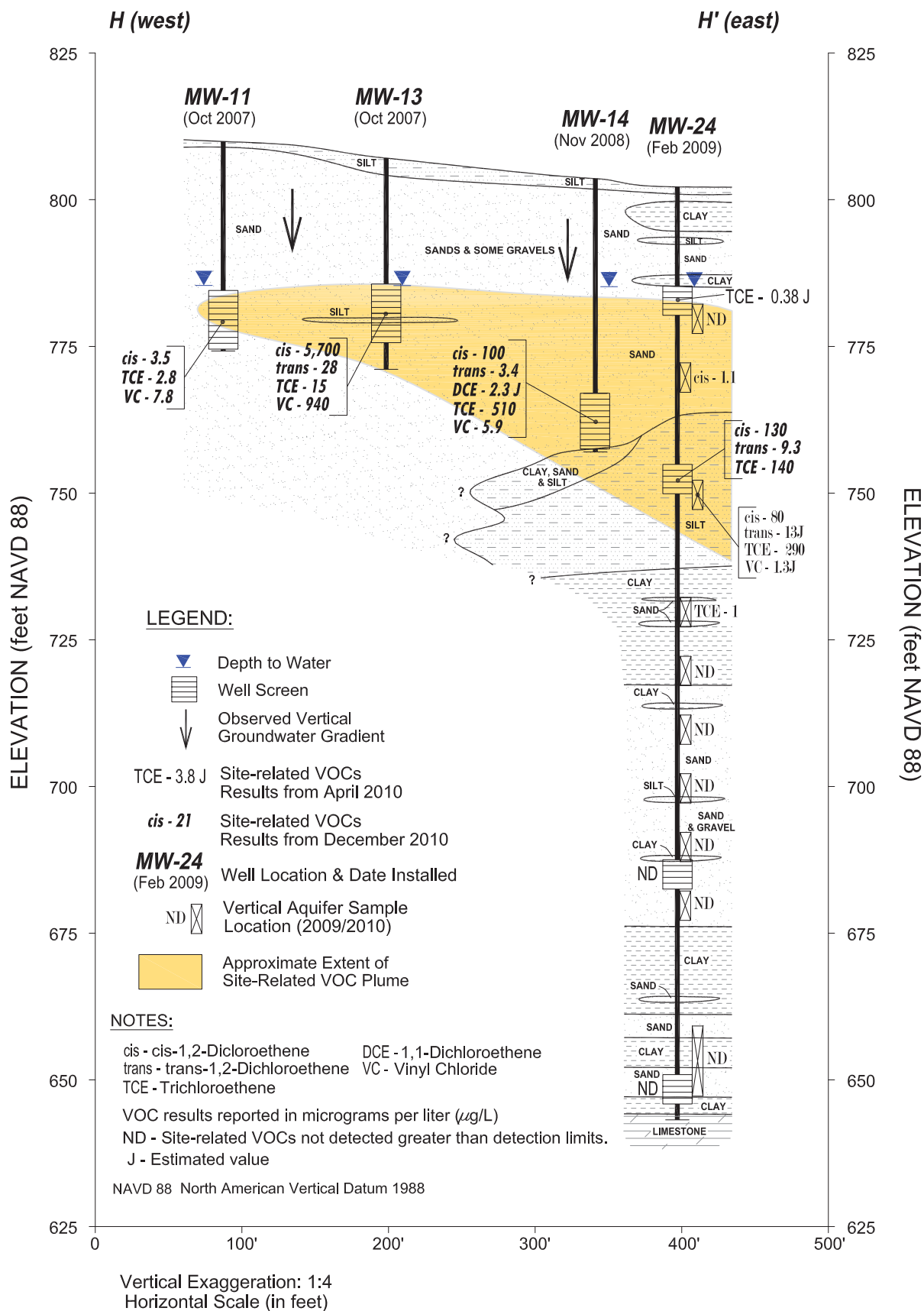


ELEVATION (feet NAVD 88)

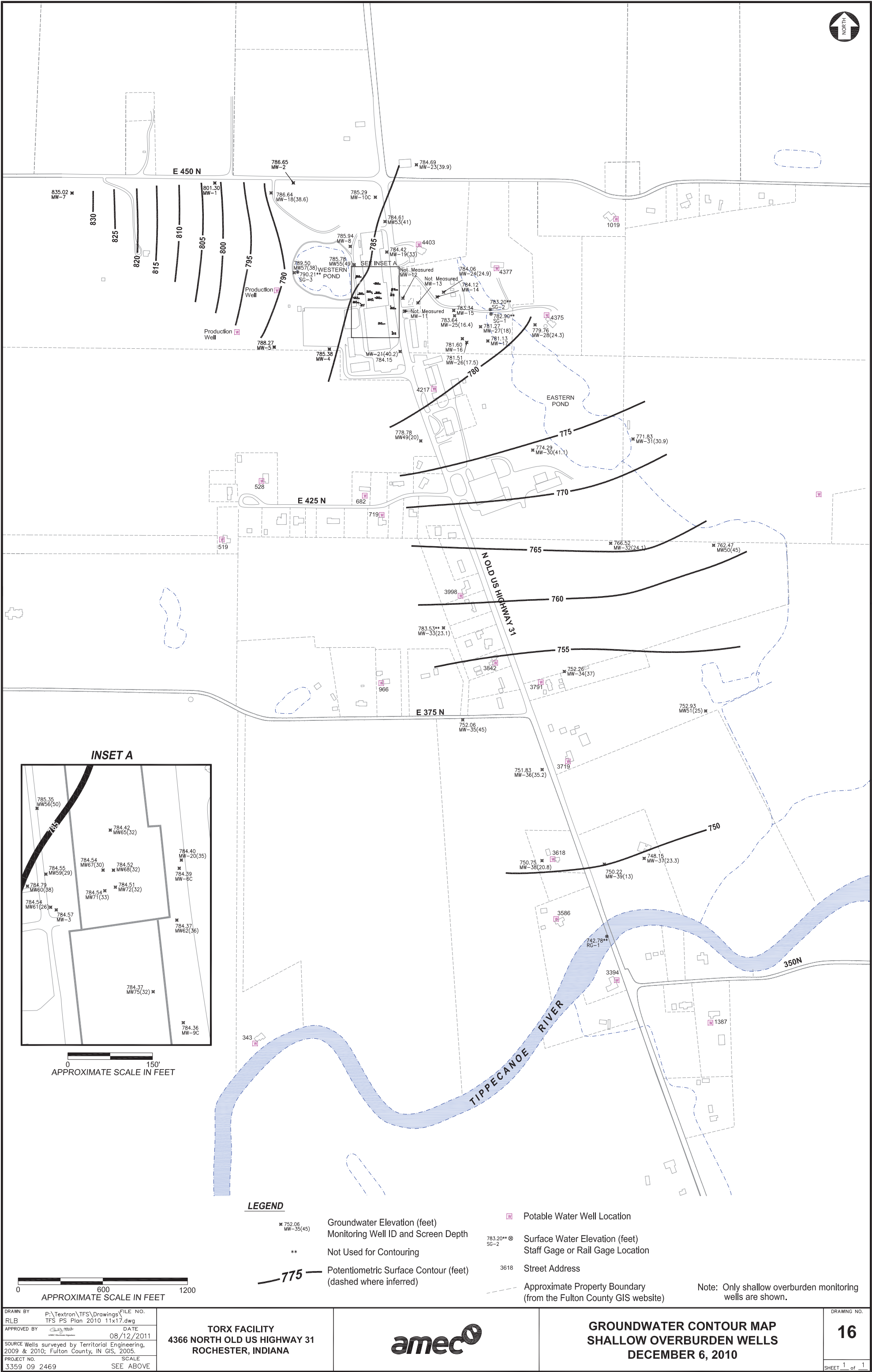


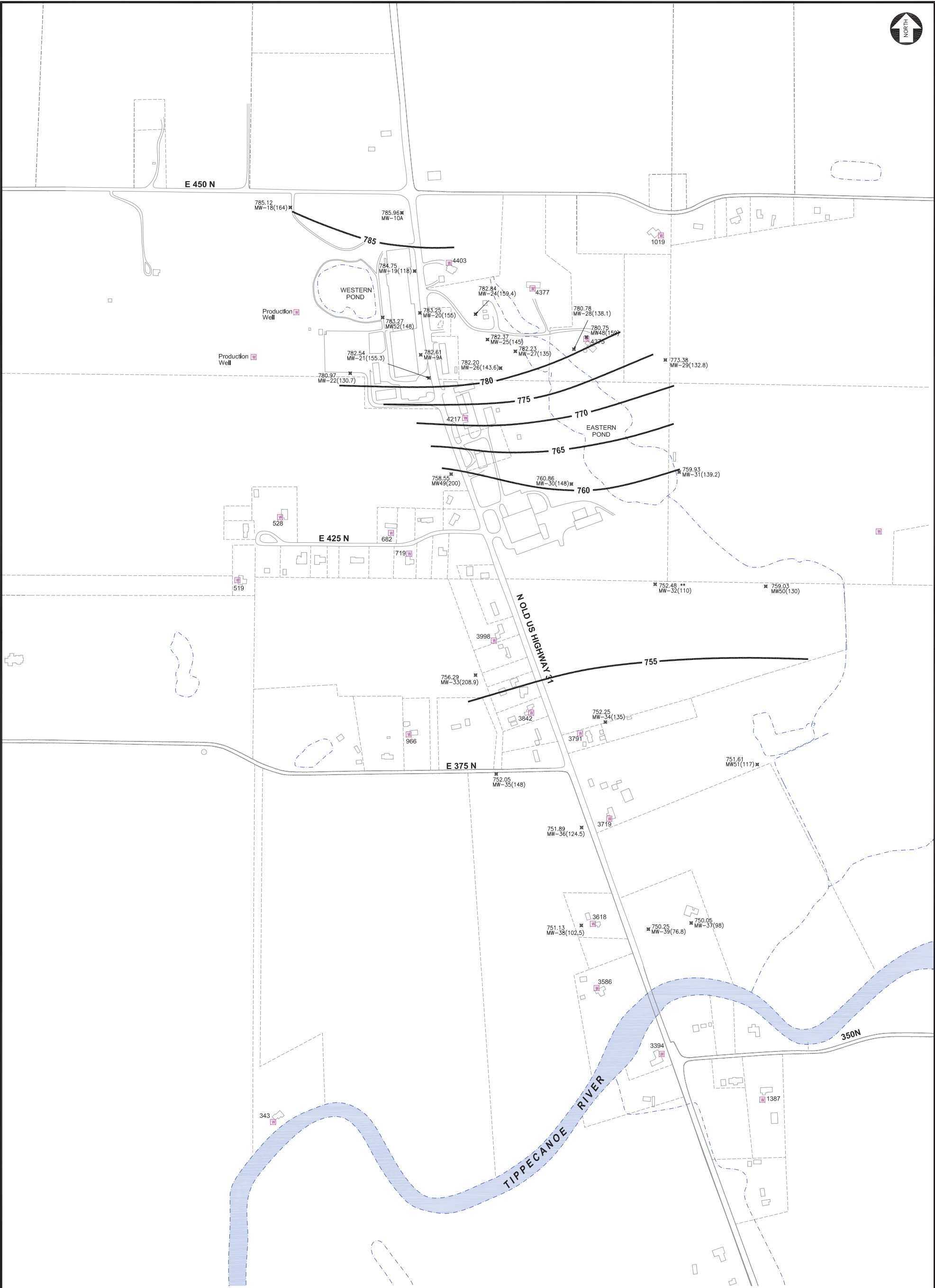


**NOTE:**  
A silt/clay layer is inferred at an elevation of 770 ft. beneath the TORX building based on the difference of VOC concentrations detected above 770 ft. versus VOC concentrations below 770 ft.









**LEGEND**

✱ 750.05  
MW-37(98)

Groundwater Elevation (feet)  
Monitoring Well ID and Screen Depth

\*\*

Not Used for Contouring

— 775 —

Potentiometric Surface Contour (feet)  
(dashed where inferred)

✱

Potable Water Well Location

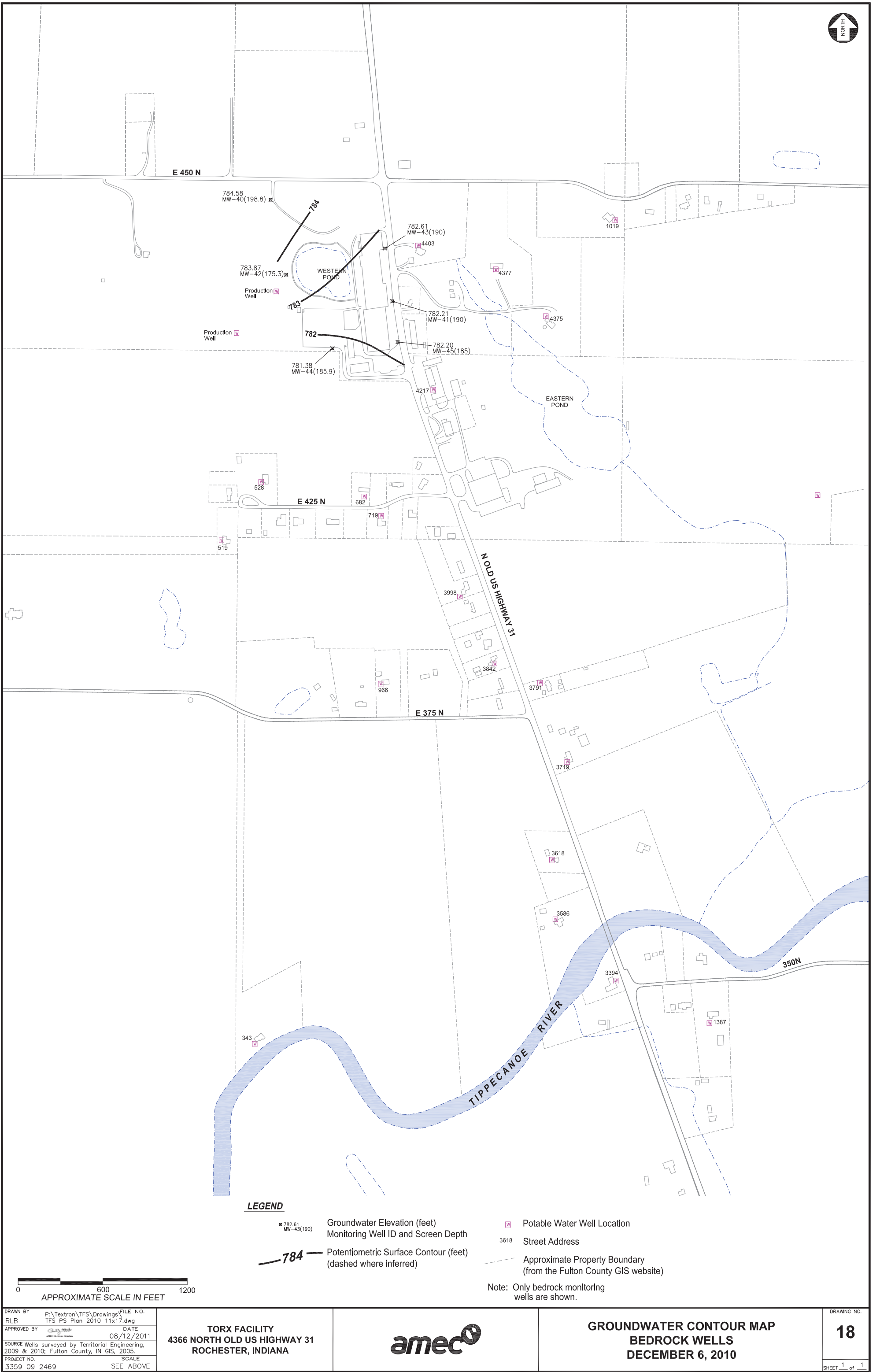
3618

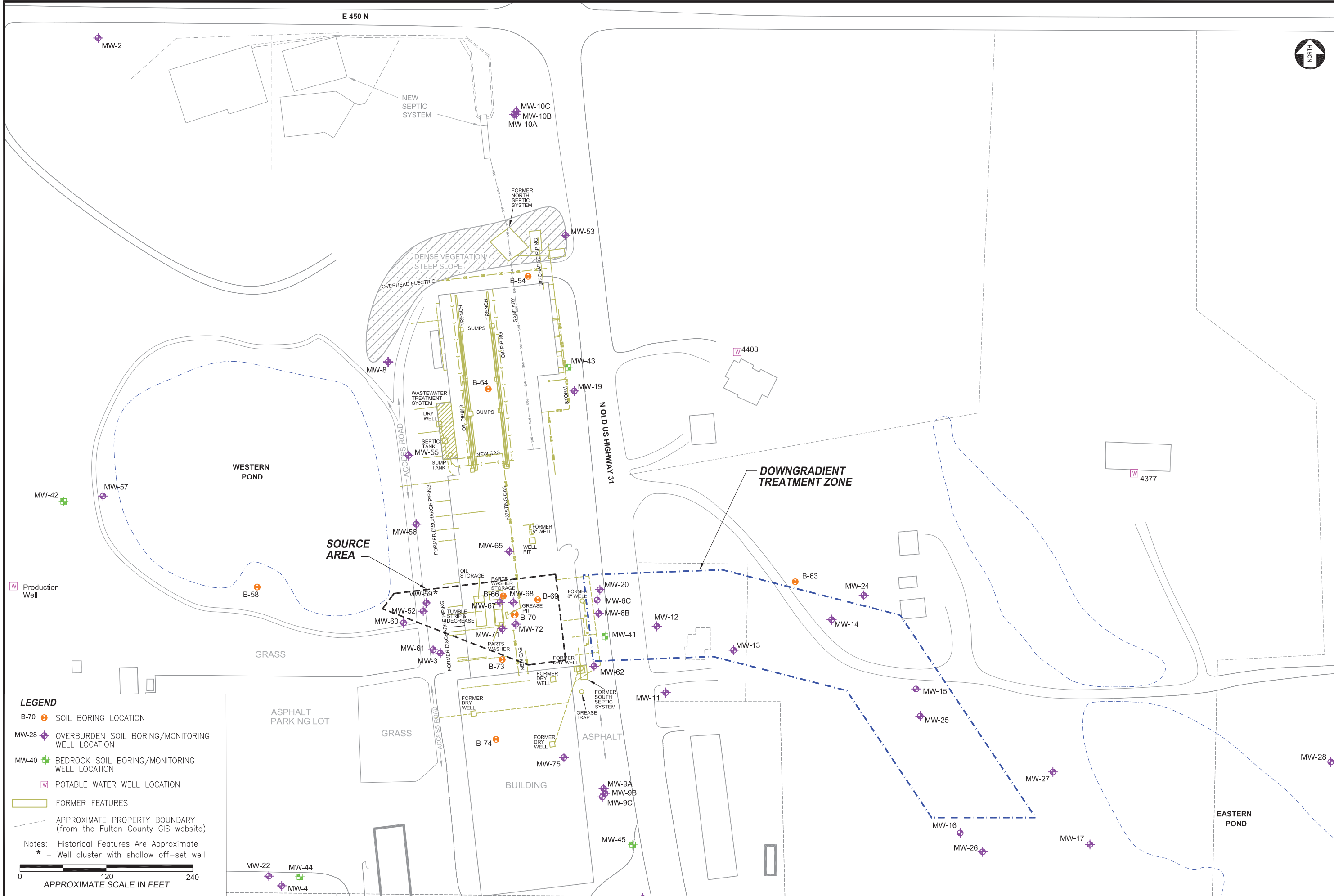
Street Address

- - -

Approximate Property Boundary  
(from the Fulton County GIS website)

Note: Only deep overburden monitoring wells are shown.





**LEGEND**

- B-70 SOIL BORING LOCATION
- MW-28 OVERBURDEN SOIL BORING/MONITORING WELL LOCATION
- MW-40 BEDROCK SOIL BORING/MONITORING WELL LOCATION
- POTABLE WATER WELL LOCATION
- FORMER FEATURES
- APPROXIMATE PROPERTY BOUNDARY (from the Fulton County GIS website)

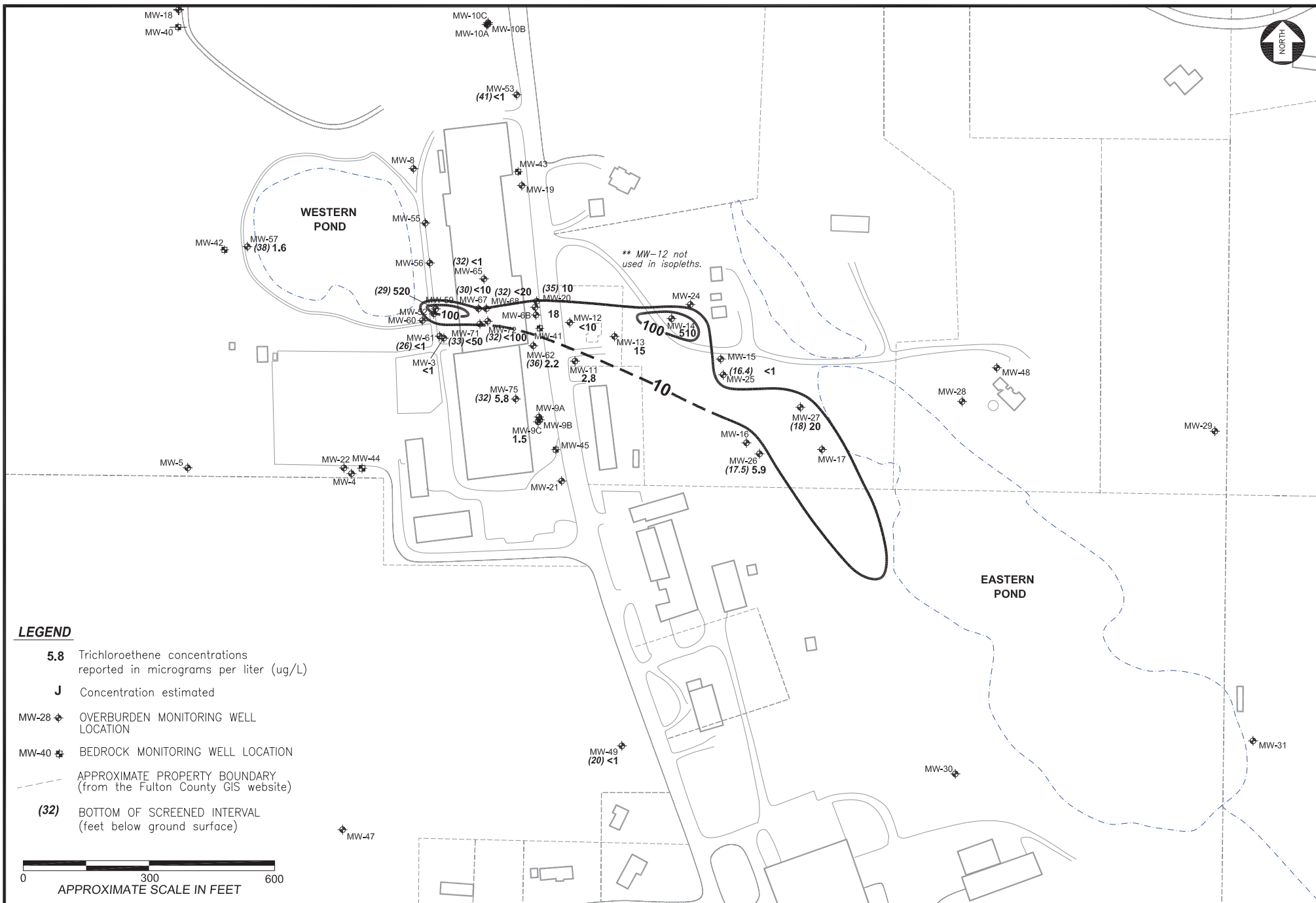
Notes: Historical Features Are Approximate  
\* - Well cluster with shallow off-set well



DRAWING NO.	19
SITE PLAN ENLARGED FACILITY AREA	
ameco	
TORX FACILITY 4366 NORTH OLD US HIGHWAY 31 ROCHESTER, INDIANA	
DRAWN BY	P:\Texton\ITS\
RLB	Drawings\ITS Site Plan-2_2010.dwg
APPROVED BY	DATE
	09/08/2011
SOURCE Wells surveyed by Territorial Engineering, Fulton City, IN GIS 2005; historical maps from Texton.	
PROJECT NO.	SCALE
3359_09_2469	SEE ABOVE







DRAWN BY P:\Tetron\TFS\ FILE NO.  
RLB Drawings\TFS Isopleths Dec 2010.dwg  
APPROVED BY DATE  
08/12/2011  
SOURCE Wells surveyed by Territorial Engineering,  
2009 & 2010; Fulton County, IN GIS, 2005.  
PROJECT NO. SCALE  
3359 09 2469 SEE ABOVE

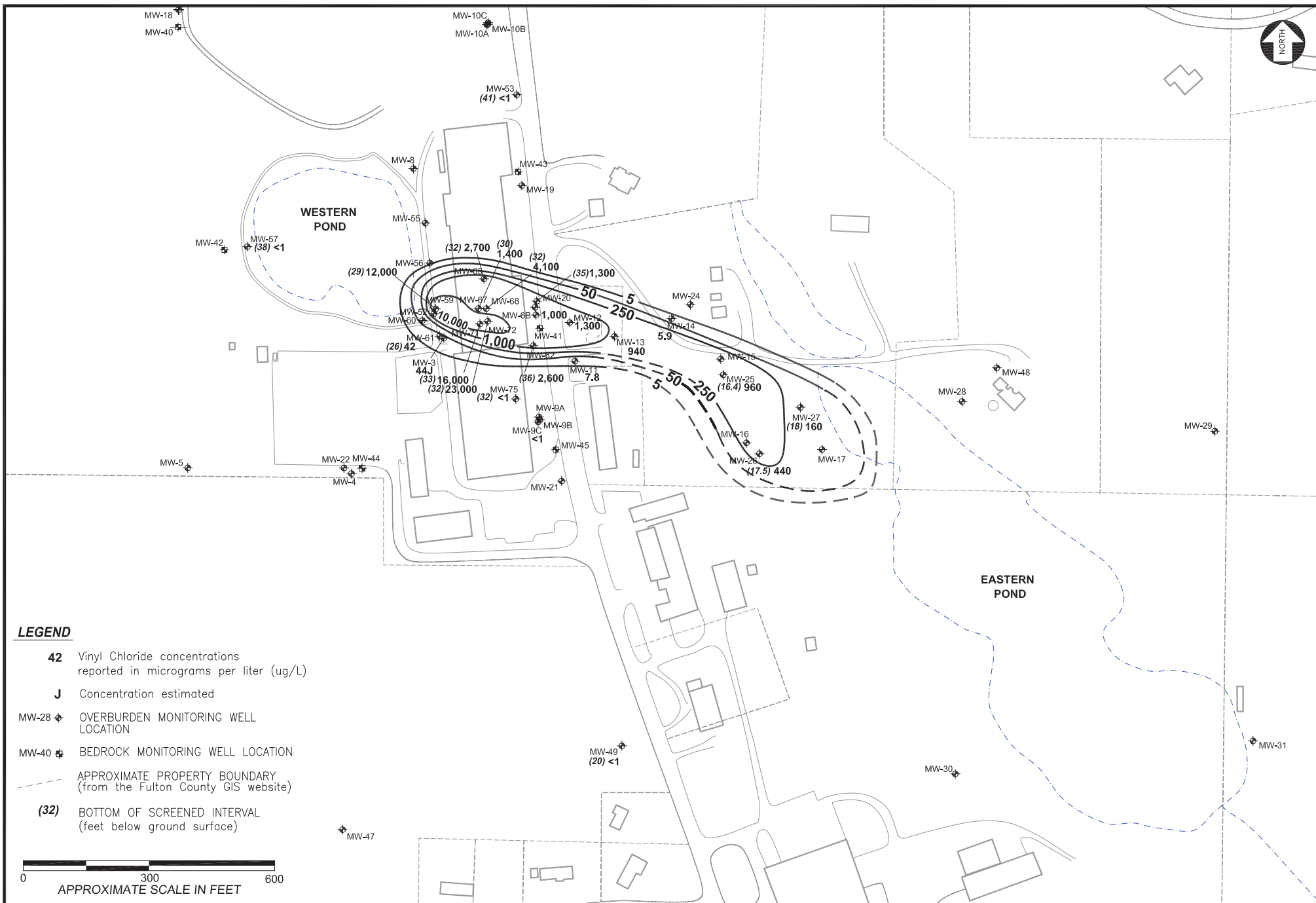
**TORX FACILITY**  
4366 NORTH OLD US HIGHWAY 31  
ROCHESTER, INDIANA

**amec**

**Trichloroethene Isopleth  
Concentration Map  
Zone 1 (765 - 786 ft)  
December 2010**

DRAWING NO.  
**21**  
SHEET 1 of 1





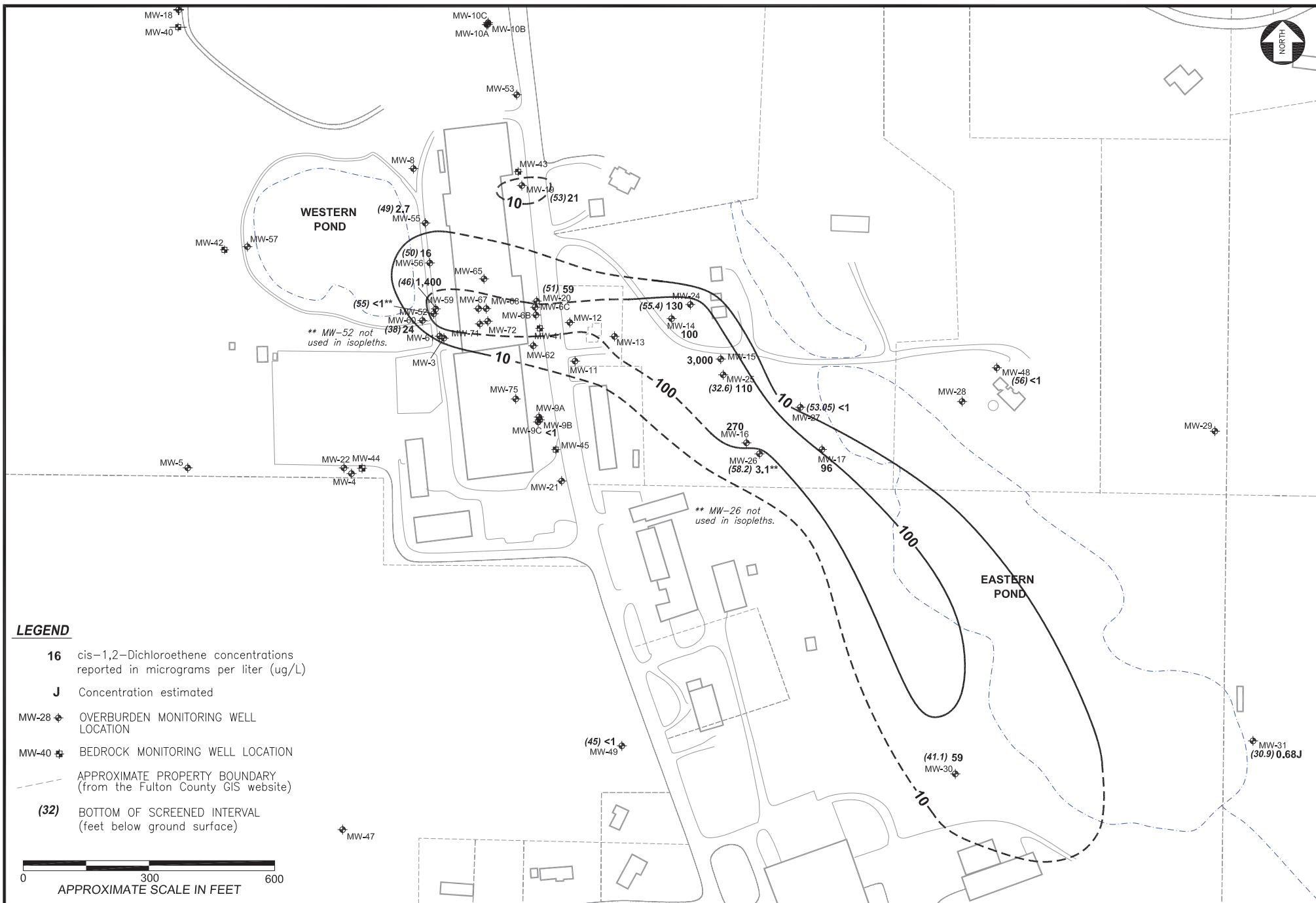
DRAWN BY P:\Tetron\TFS\ FILE NO.  
 RLB Drawings\TFS Isopleths Dec 2010.dwg  
 APPROVED BY DATE  
 08/12/2011  
 SOURCE Wells surveyed by Territorial Engineering,  
 2009 & 2010; Fulton County, IN GIS, 2005.  
 PROJECT NO. SCALE  
 3359 09 2469 SEE ABOVE

**TORX FACILITY**  
**4366 NORTH OLD US HIGHWAY 31**  
**ROCHESTER, INDIANA**

**amec**

**Vinyl Chloride Isopleth**  
**Concentration Map**  
**Zone 1 (765 - 786 ft)**  
**December 2010**

DRAWING NO.  
**22**  
 SHEET 1 of 1



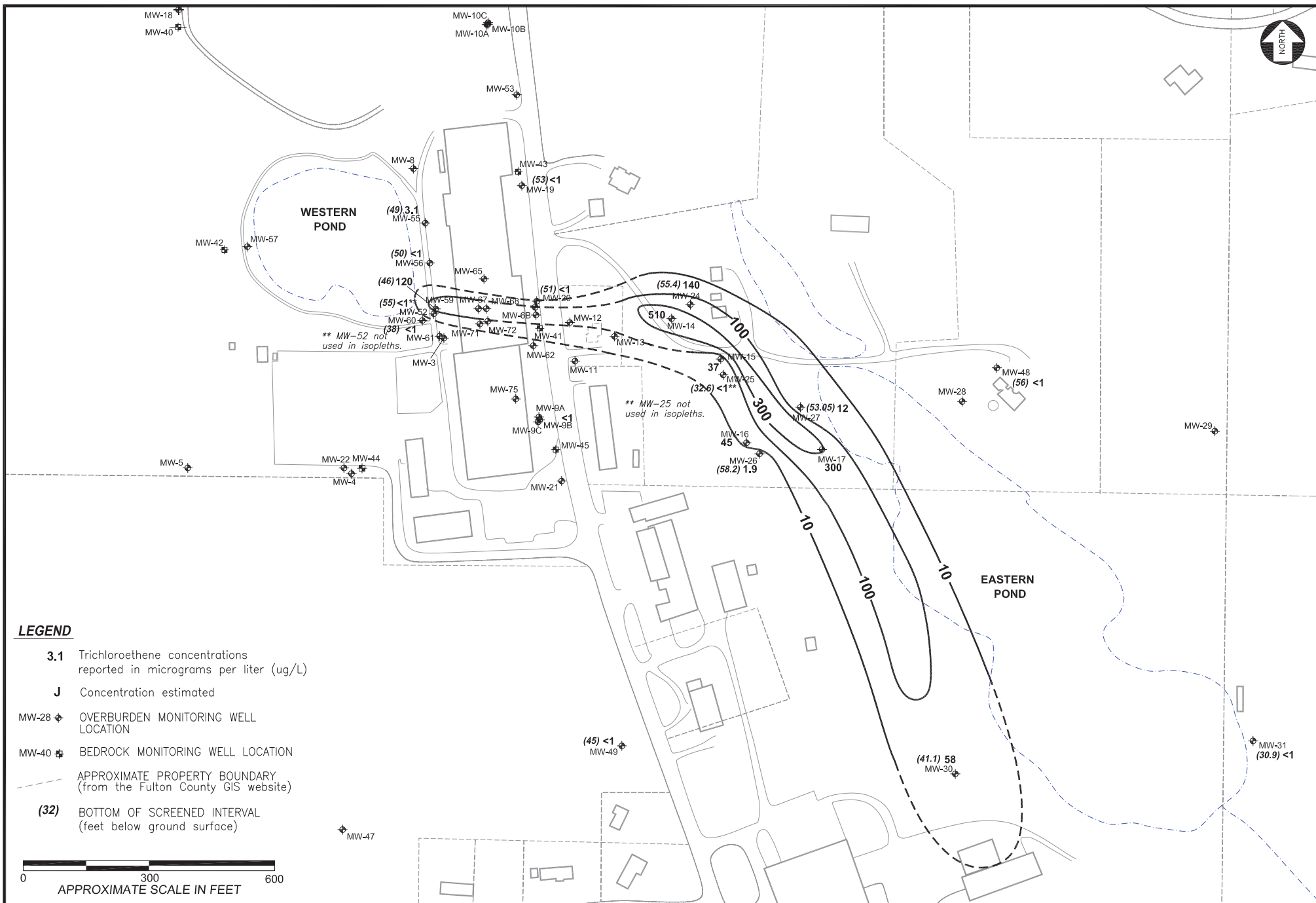
DRAWN BY P:\Textron\TFS\ FILE NO.  
RLB Drawings\TFS Isopleths Dec 2010.dwg  
APPROVED BY DATE  
08/12/2011  
SOURCE Wells surveyed by Territorial Engineering,  
2009 & 2010; Fulton County, IN GIS, 2005.  
PROJECT NO. SCALE  
3359 09 2469 SEE ABOVE

**TORX FACILITY**  
**4366 NORTH OLD US HIGHWAY 31**  
**ROCHESTER, INDIANA**

**amec**

**cis-1,2-Dichloroethene Isopleth**  
**Concentration Map**  
**Zone 2 (730 - 765 ft)**  
**December 2010**

DRAWING NO.  
**23**  
SHEET 1 of 1



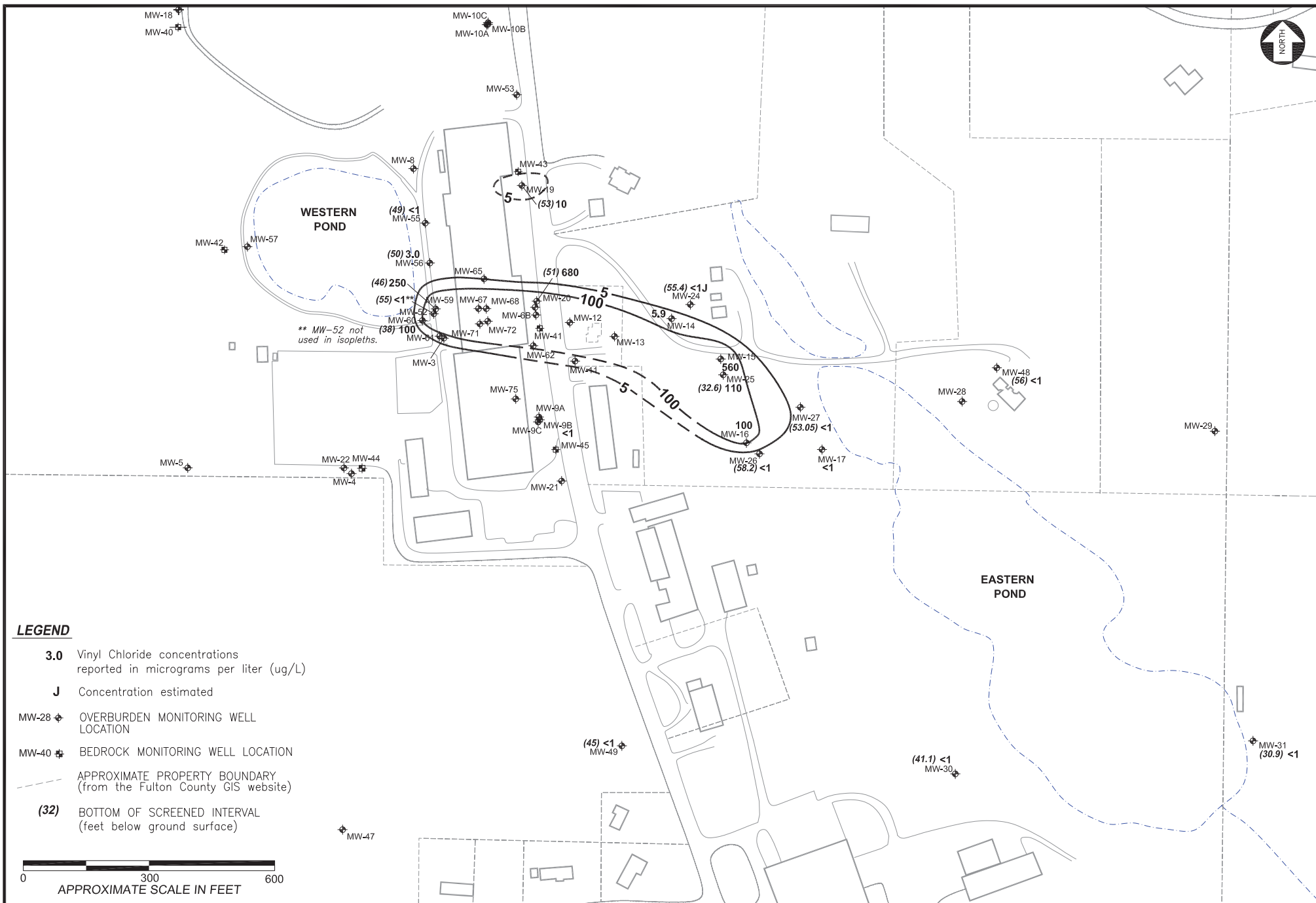
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APPROVED BY DATE  
08/12/2011  
SOURCE Wells surveyed by Territorial Engineering,  
2009 & 2010; Fulton County, IN GIS, 2005.  
PROJECT NO. SCALE  
3359 09 2469 SEE ABOVE

**TORX FACILITY**  
4366 NORTH OLD US HIGHWAY 31  
ROCHESTER, INDIANA

**amec**

**Trichloroethene Isopleth**  
**Concentration Map**  
**Zone 2 (730 - 765 ft)**  
**December 2010**

DRAWING NO.  
**24**  
SHEET 1 of 1



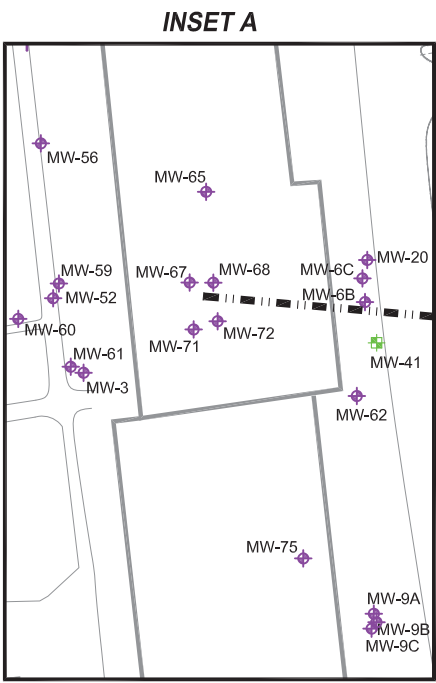
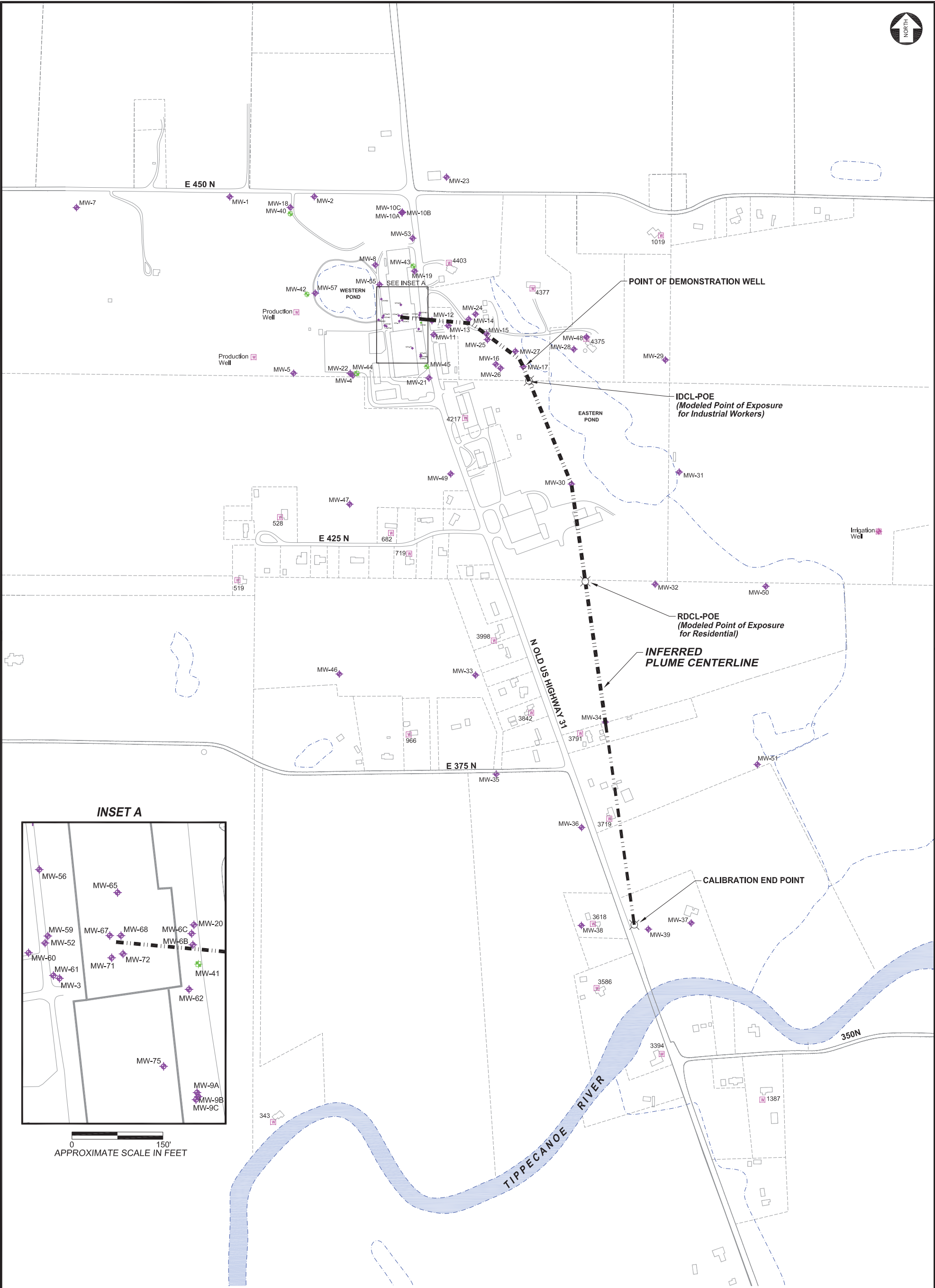
DRAWN BY P:\Tetron\TFS\ FILE NO.  
RLB Drawings\TFS Isopleths Dec 2010.dwg  
APPROVED BY DATE  
08/12/2011  
SOURCE Wells surveyed by Territorial Engineering,  
2009 & 2010; Fulton County, IN GIS, 2005.  
PROJECT NO. SCALE  
3359 09 2469 SEE ABOVE

**TORX FACILITY**  
4366 NORTH OLD US HIGHWAY 31  
ROCHESTER, INDIANA

**amec**

**Vinyl Chloride Isopleth**  
**Concentration Map**  
**Zone 2 (730 - 765 ft)**  
**December 2010**

DRAWING NO.  
**25**  
SHEET 1 of 1



**LEGEND**

- |   |  |  |
|---|--|--|
| MW-28 ◆ OVERBURDEN MONITORING WELL LOCATION | — — — — — INFERRED CENTERLINE OF PLUME                                       | <b>POE</b> POINT OF EXPOSURE   |
| MW-40 ◆ BEDROCK MONITORING WELL LOCATION    | - - - - - APPROXIMATE PROPERTY BOUNDARY (from the Fulton County GIS website) | <b>IDCL</b> INDUSTRIAL DEFAULT CLOSURE LEVELS (Established by IDEM)  |
| 3618 □ POTABLE WATER WELL LOCATION          |  | <b>RDCL</b> RESIDENTIAL DEFAULT CLOSURE LEVELS (Established by IDEM) |

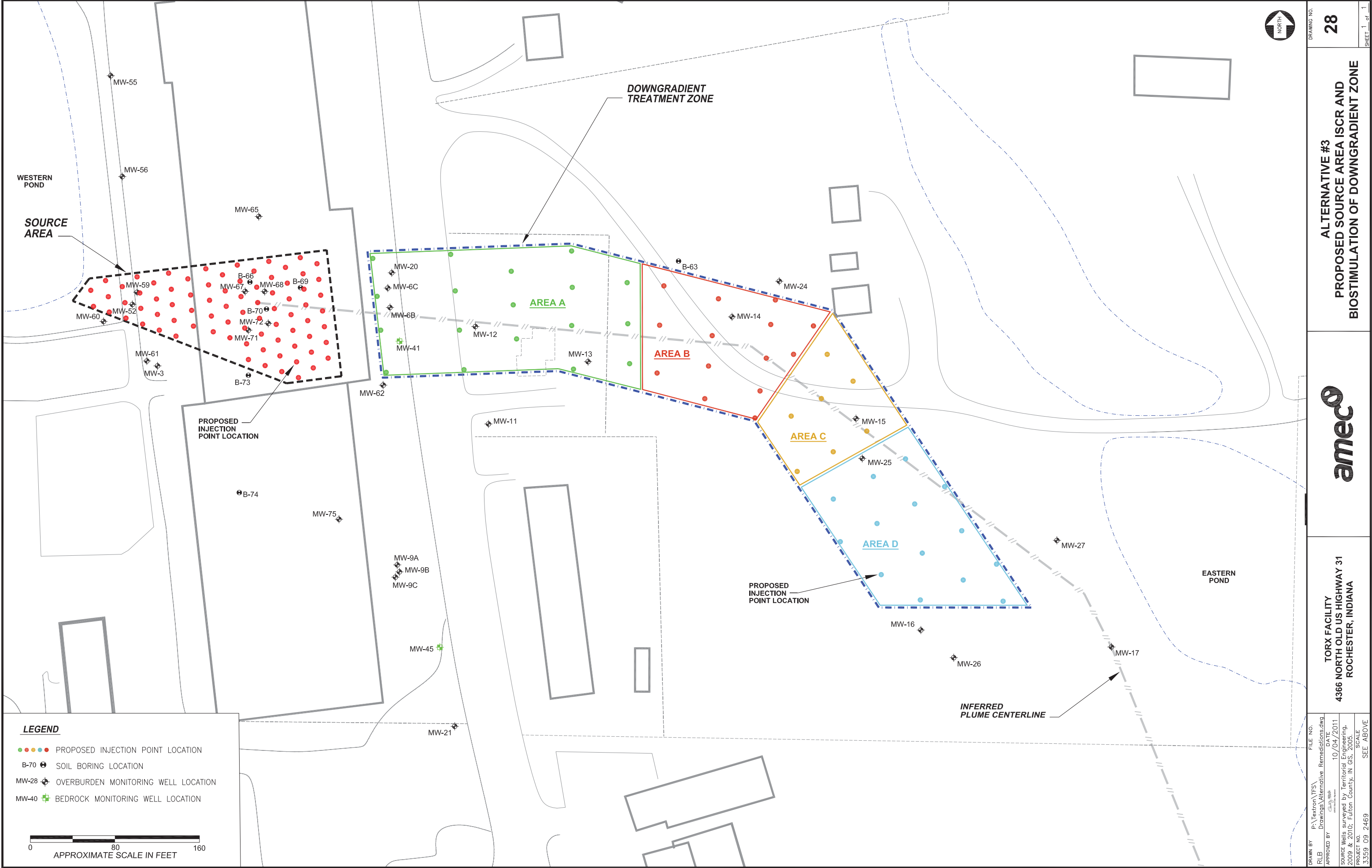


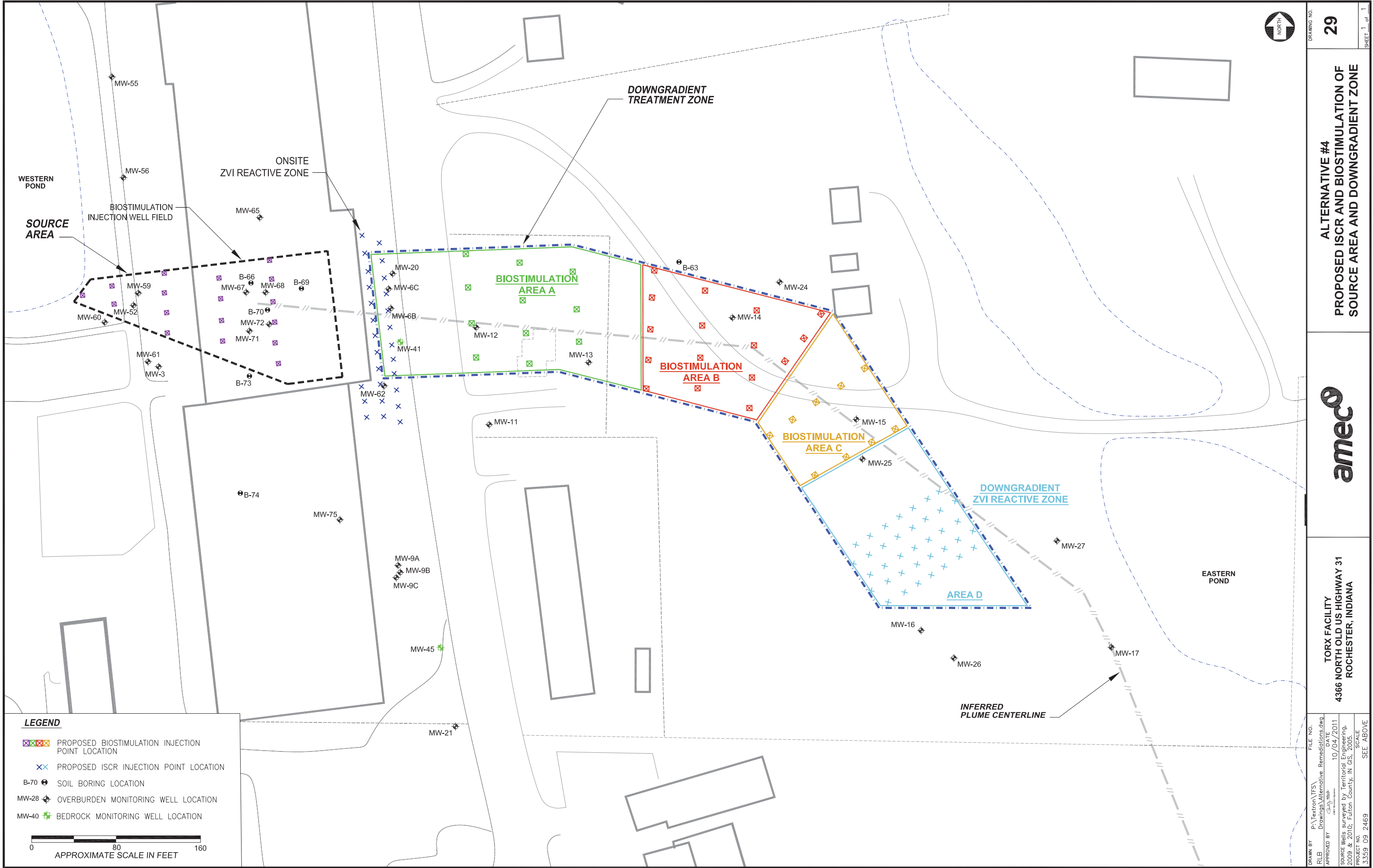




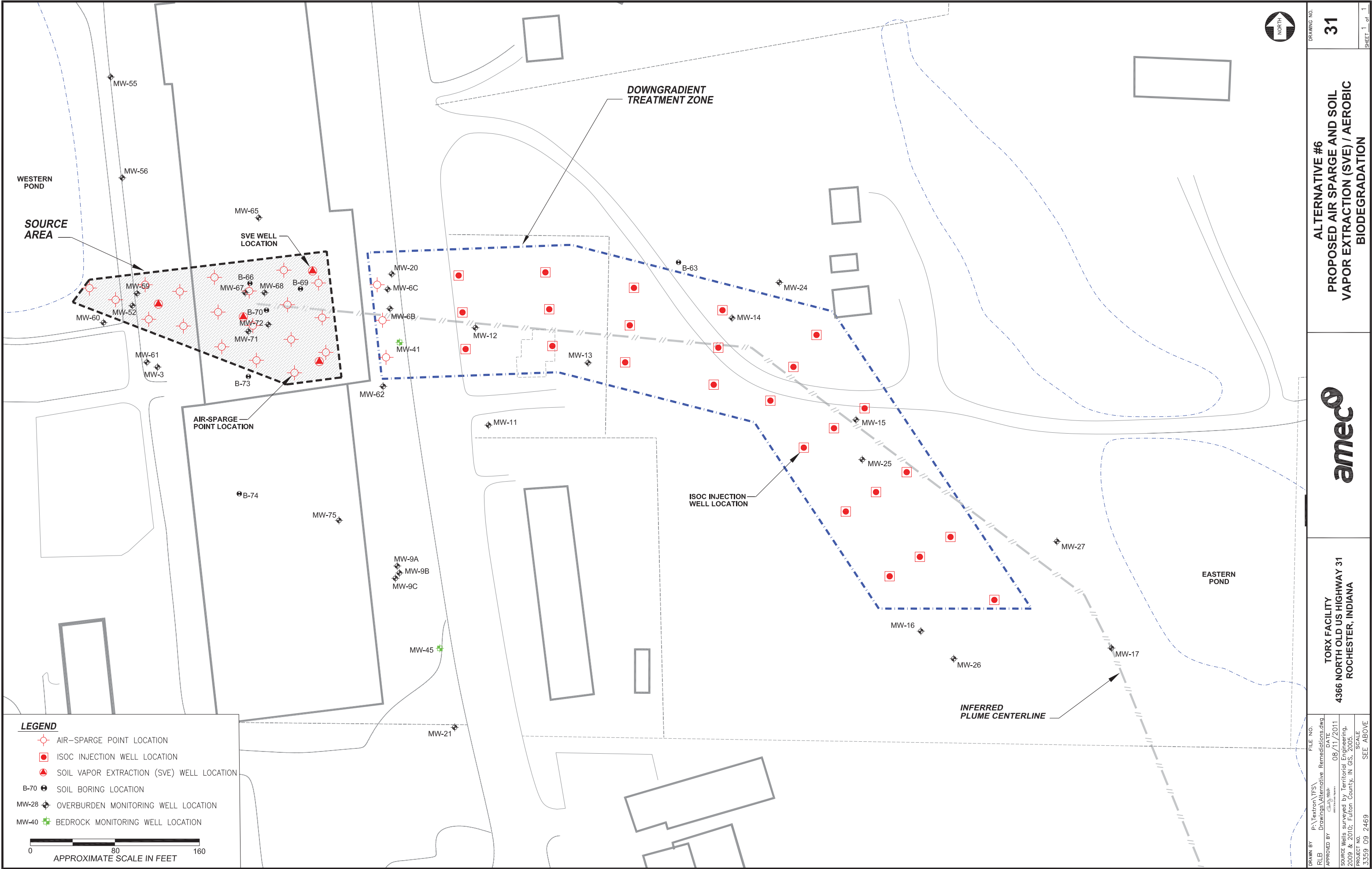
DRAWING NO. 27	
SHEET 1 of 1	
ALTERNATIVE #2 PROPOSED PEROZONE SYSTEM AND INJECTION POINTS	
ameco	
TORX FACILITY 4366 NORTH OLD US HIGHWAY 31 ROCHESTER, INDIANA	
DRAWN BY RLB	FILE NO. P:\Textron\TFS Drawings\Alternative Remediations.dwg
APPROVED BY [Signature]	DATE 08/11/2011
SOURCE Wells surveyed by Territorial Engineering, 2009 & 2010; Fulton County, IN GIS, 2005.	
PROJECT NO. 3359.09.2469	SCALE SEE ABOVE



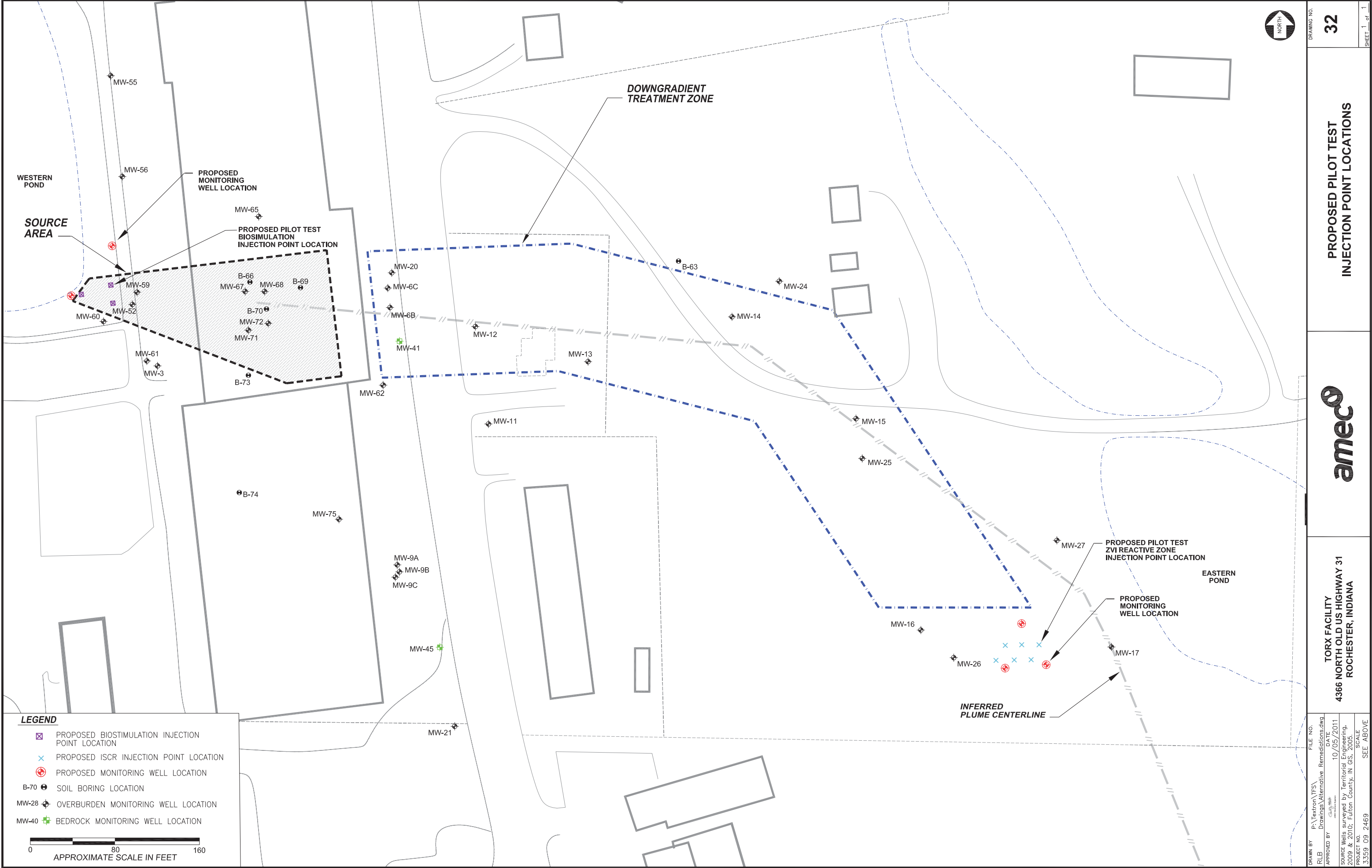














Textron, Inc.  
TORX Facility, Rochester, Indiana  
Remediation Feasibility Study

## **APPENDIX C**

### **AIRVAC PRODUCTION WELL EVALUATION**



## **AIRVAC PRODUCTION WELL EVALUATION**

### **INTRODUCTION**

AMEC Environment & Infrastructure (AMEC) has prepared this evaluation in response to a request from Mr. Kevin Houppert with the Indiana Department of Environmental Management (IDEM). Mr. Houppert has requested that AMEC evaluate and offer an opinion in regards to the AIRVAC production well(s) influencing the dissolved-phase volatile organic compounds (VOC) plume associated with the TORX facility located at 4366 North Old US Highway 31 in Rochester, Fulton County, Indiana (Site). This evaluation includes discussion on well construction data inconsistencies reported on several well logs and AMEC's opinion on AIRVAC's production well use influencing the dissolved-phase VOC plume. This evaluation is included in Appendix C of the Remediation Feasibility Report (FS) prepared by AMEC for the Site.

### **BACKGROUND**

Based on communications with Mr. Mark Jones, President of AIRVAC, only two production wells have been installed at the AIRVAC property. According to Mr. Jones, the original production well was abandoned when the existing production well (herein referred to as the AIRVAC production well) was installed. In addition, Mr. Jones stated that the capacity of the AIRVAC production well during installation was determined to be approximately 300 gallons per minute (GPM). The location of the AIRVAC production well is shown as number 6 on Figure C1.

Based on the well log that AMEC obtained from the Indiana Department of Natural Resources Water (IDNR) Well Record online database, the AIRVAC existing production well was installed in 1983 and was screened from 148 feet below grade to 158 feet below grade in a coarse gravel using stainless steel, wire-wrap screen. Limestone was encountered in the boring for the existing production well at a depth of approximately 166 feet below grade. Mr. Jones has confirmed that the well log obtained from IDNR is for the existing production well. Mr. Jones' confirmation and the well log are included as Attachment 1.

According to Mr. Ralph Spaeth with IDNR, AIRVAC has submitted four production well updates to IDNR since 1985. The information reported to IDNR is summarized in Attachment 2. The information reported is not consistent with the IDNR well log or the information received from Mr. Jones. Since a new production well has not been installed at the AIRVAC facility since 1985, it appears that information reported to IDEM is not entirely correct and is most likely the result of unintentional reporting errors. For example, the diameter of the existing production well is 8-inches; however, in 1985 the diameter was

reported as 10-inches. In addition, the aquifer type was correctly reported as sand and gravel in 1985 and 1989 but was incorrectly reported as limestone in 1990 and 1997. The responsible reporting personnel in 1990 and 1997 may have mistakenly entered limestone as the aquifer type since limestone is listed on the well log as the last lithologic formation encountered. The difference in pumping capacity could be a definition issue. In 1985, 1989, and 1990, the pumping capacity was reported as 120 GPM and in 1997, the pumping capacity was reported as 300 GPM. Mr. Jones states that the pumping capacity of the existing production well is approximately 300 GPM. However, according to Mr. Jones, AIRVAC does not pump the production well at that capacity. The capacities reported in 1985, 1989, and 1990 appear to be the maximum pumping rates for those years and not the pumping capacity of the existing production well.

### **AIRVAC PRODUCTION WELL USAGE**

According to AIRVAC personnel, the existing production well is used daily for onsite potable water and operations water. However, the water needed for operations is taken from the onsite storage tanks, which are filled once or twice per month depending upon operations. During storage tank filling, the maximum production rate is typically 100 GPM for two hours or 12,000 gallons per day for each day the storage tanks are filled (once or twice per month). The average daily water production rate for potable water use is approximately 500 gallons per day (GPD).

Based on the monthly water withdraw data table for years 1985 through 2009 (Attachment 2) that was provided by AIRVAC, the AIRVAC production well had an estimated daily use of approximately 7,300 gallons per work day (i.e. 250 work days per year) and the water is withdrawn from the deep overburden aquifer at a rate of approximately 100 GPM in 2009.

### **AIRVAC PRODUCTION WELL LOCATION IN RELATION TO VOC PLUME**

The AIRVAC production well (Figure C2) appears to be located on the edge of the VOC plume (Figure 4 of the FS). However, the inferred VOC plume in groundwater (Figure 4 of the FS) nearest the AIRVAC property is within the shallow overburden aquifer not the deep aquifer where the AIRVAC production well is screened.

As depicted on Figure C3, a thick silt layer was observed beneath the source area (Monitoring Well nest MW-21) that appears to transition into an even thicker clay layer (approximately 690 feet to 760 feet North American Vertical Datum, NAVD 88) beneath the AIRVAC property (AIRVAC potable well). As shown on Figure C3, VOCs have not detected in the groundwater samples collected from the deep overburden

monitoring wells (well nest MW-21), the deep overburden vertical aquifer samples collected from the MW-21 boring, or the AIRVAC production well (which is screened beneath the thick clay layer).

## SUMMARY OF PREVIOUSLY PERFORMED WORK

To evaluate the potential effect that the AIRVAC production well may have on the VOC plume migration in groundwater, we evaluated the following results, which have been presented since the completion of the Phase 1 Further Site Investigation (FSI).

1. The horizontal and vertical extent of plume migration (within and downgradient of the source area) is influenced by the direction of groundwater flow, the direction of vertical hydraulic gradients, and lithology.
2. The vertical hydraulic gradient in the vicinity of the AIRVAC well is downward (Figure 19 of the Phase 2 FSI).
3. North of the AIRVAC property, groundwater in the shallow aquifer beneath the Site (source area) flows in a southeasterly toward the Eastern Pond and then flows south toward the Tippecanoe River (Figure 16 of the FS).
4. North of the AIRVAC property, groundwater in the deep overburden aquifer beneath the Site flows in a southerly direction toward the Tippecanoe River (Figure 17 FS).
5. Analytical tests performed on water samples obtained from the AIRVAC production well system have not reported VOCs in the potable water.
6. Analytical tests performed on groundwater samples obtained from an up-gradient monitoring well nest (MW-21) that is located between the source area and the AIRVAC property has not reported VOCs in the deep overburden aquifer groundwater samples (128 feet and 155 feet NAVD 88).
7. Analytical tests performed on water samples obtained from a residential water well (4163 Old US Highway 31) located north and adjacent to the AIRVAC property have not reported VOCs in groundwater.
8. As described in Section 2.6 of the FS, the concentration of TCE in groundwater along an inferred plume centerline (Figure 26 in the FS) indicates that natural attenuation is occurring between MW-14 and MW-34. As shown on Graph C-1 in Attachment 3, the TCE concentration follows a decreasing trend line that is indicative of uniform decreasing concentrations throughout the study area. The uniform decreasing concentrations suggest that the TCE plume is not captured by a pumping well and further attenuates to less than detectable concentrations north of the Tippecanoe River.
9. As described in Section 2.6 of the FS, the concentration versus distance of cis-1,2 DCE and VC in groundwater versus distance along an inferred plume centerline (Figure 26 in the FS) indicates natural attenuation is occurring between the source area and MW-34. As shown on Graph C-2 in Attachment 3, cis-1,2 DCE and VC concentrations follow a decreasing trend line that is indicative of uniform decreasing concentrations throughout the study area. The uniform decreasing concentrations suggest that the combined plume is not captured by a pumping well and further attenuates to less than detectable concentrations north of the Tippecanoe River.

## **INFLUENCE OF THE AIRVAC PRODUCTION WELL ON VOC PLUME MIGRATION**

Based on our evaluation of the AIRVAC production well records and previously performed investigations, the horizontal and vertical extent of plume migration (within and downgradient of the source area) is influenced by the direction of groundwater flow, the direction of vertical hydraulic gradients, and lithology, not the periodic pumping of the AIRVAC production well.

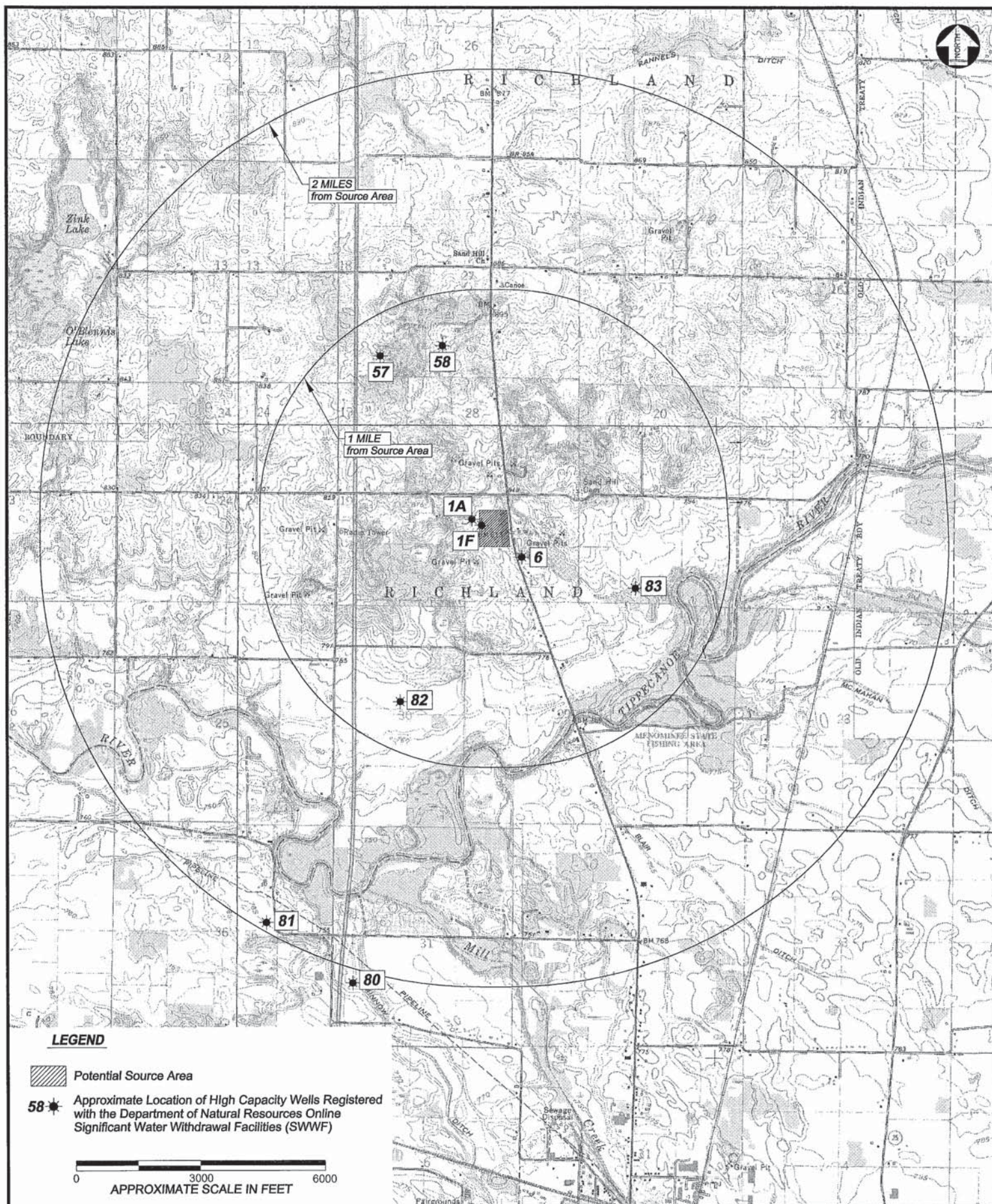
Although there is a downgradient vertical hydraulic gradient in the vicinity of the AIRVAC property, the low permeability layers that separate the shallow overburden aquifer from the deep overburden aquifer beneath the Site (monitoring well nest 21) and AIRVAC (AIRVAC production well) appear to be inhibiting the migration of the VOC plume into the deep overburden aquifer. Therefore, the VOC plume located in the shallow overburden aquifer north of the AIRVAC property is following the horizontal direction of groundwater flow (toward the Eastern Pond) in the shallow overburden aquifer and is not migrating into the deeper overburden aquifer.

## **ADDITIONAL WORK**

Our evaluation of the AIRVAC production well is limited to the spatial distribution and depth of monitoring wells east of the Site and north of the AIRVAC property. Additional monitoring wells are proposed to be installed north of the AIRVAC facility (see Section 2.5.2 of the FS). This data will provide more information regarding the distribution of VOCs and the direction of groundwater flow immediately north of the AIRVAC facility.

## **Figures**






# **LEGEND**

 Potential Source Area

**58**  Approximate Location of High Capacity Wells Registered with the Department of Natural Resources Online Significant Water Withdrawal Facilities (SWWF)

0 3000 6000  
APPROXIMATE SCALE IN FEET

DRAWN BY P:\Textron\TFS\ FILE NO.  
RLB Drawings\TFS Topo Area.dwg  
APPROVED BY  DATE  
AMEC Electronic Signature 08/15/2011  
SOURCE USGS Topographic maps of Rochester, Argos, Pershing, and Rutland, Indiana  
PROJECT NO. 3359 09 2459 SCALE  
SEE ABOVE

TORX FACILITY  
4366 NORTH OLD US HIGHWAY 31  
ROCHESTER, INDIANA

**amec**

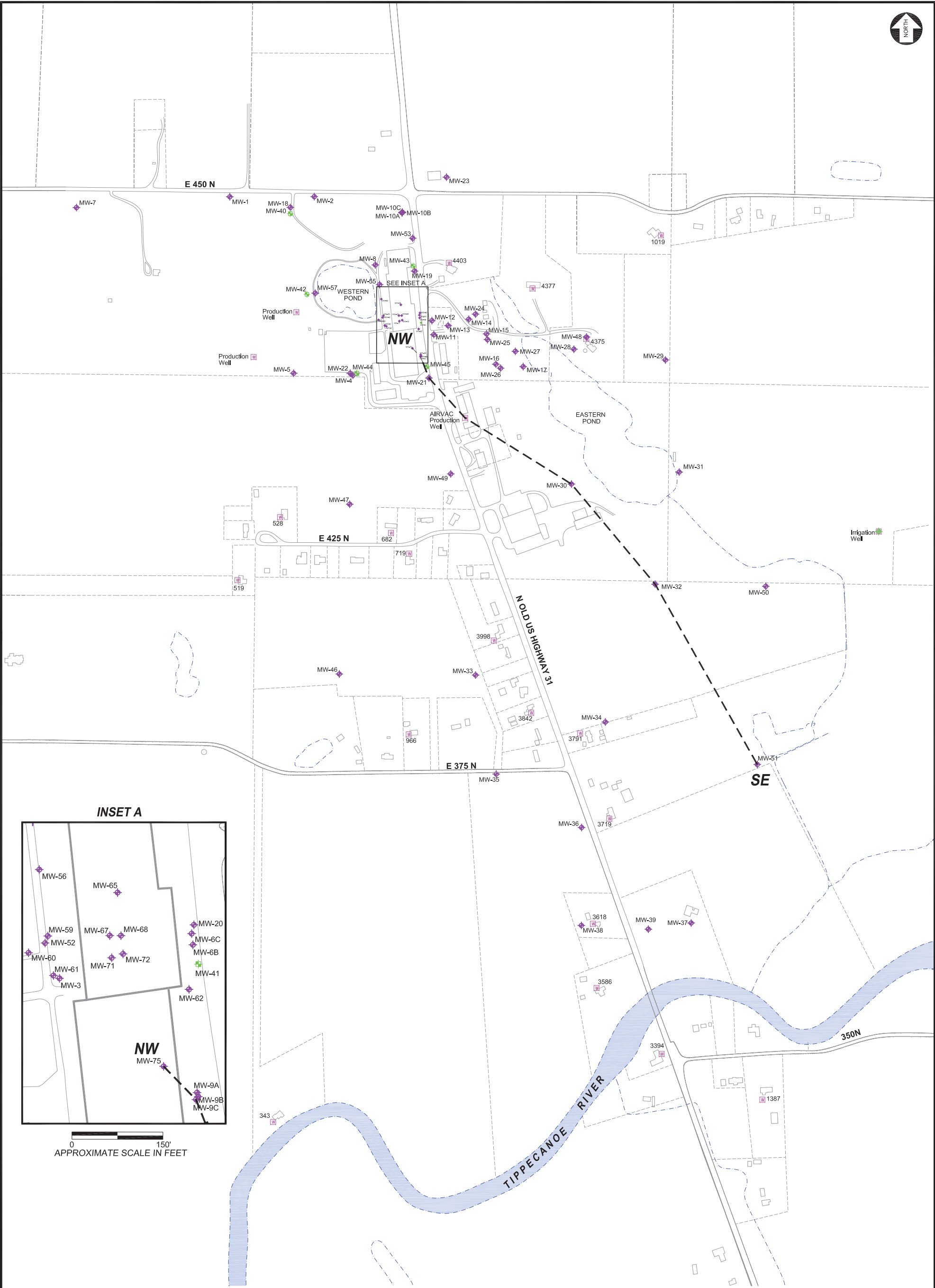
APPROXIMATE LOCATION  
OF SIGNIFICANT WATER  
WITHDRAWAL FACILITIES

DRAWING NO.

**C1**

SHEET 1 of 1





**LEGEND**

- MW-28 ◆ OVERBURDEN MONITORING WELL LOCATION
- MW-40 ◆ BEDROCK MONITORING WELL LOCATION
- 3618 ◆ POTABLE WATER WELL LOCATION
- NE---SW CROSS SECTION TRAVERSE LOCATION
- APPROXIMATE PROPERTY BOUNDARY (from the Fulton County GIS website)

0 600 1200  
APPROXIMATE SCALE IN FEET

DRAWN BY P:\Textron\TFS\Drawings\FILE NO.  
RLB TFS Site Plan 2010 11x17.dwg  
APPROVED BY DATE  
08/15/2011  
SOURCE Wells surveyed by Territorial Engineering,  
2009 & 2010; Fulton County, IN GIS, 2005.  
PROJECT NO. SCALE  
3359 09 2469 SEE ABOVE

**TORX FACILITY**  
**4366 NORTH OLD US HIGHWAY 31**  
**ROCHESTER, INDIANA**

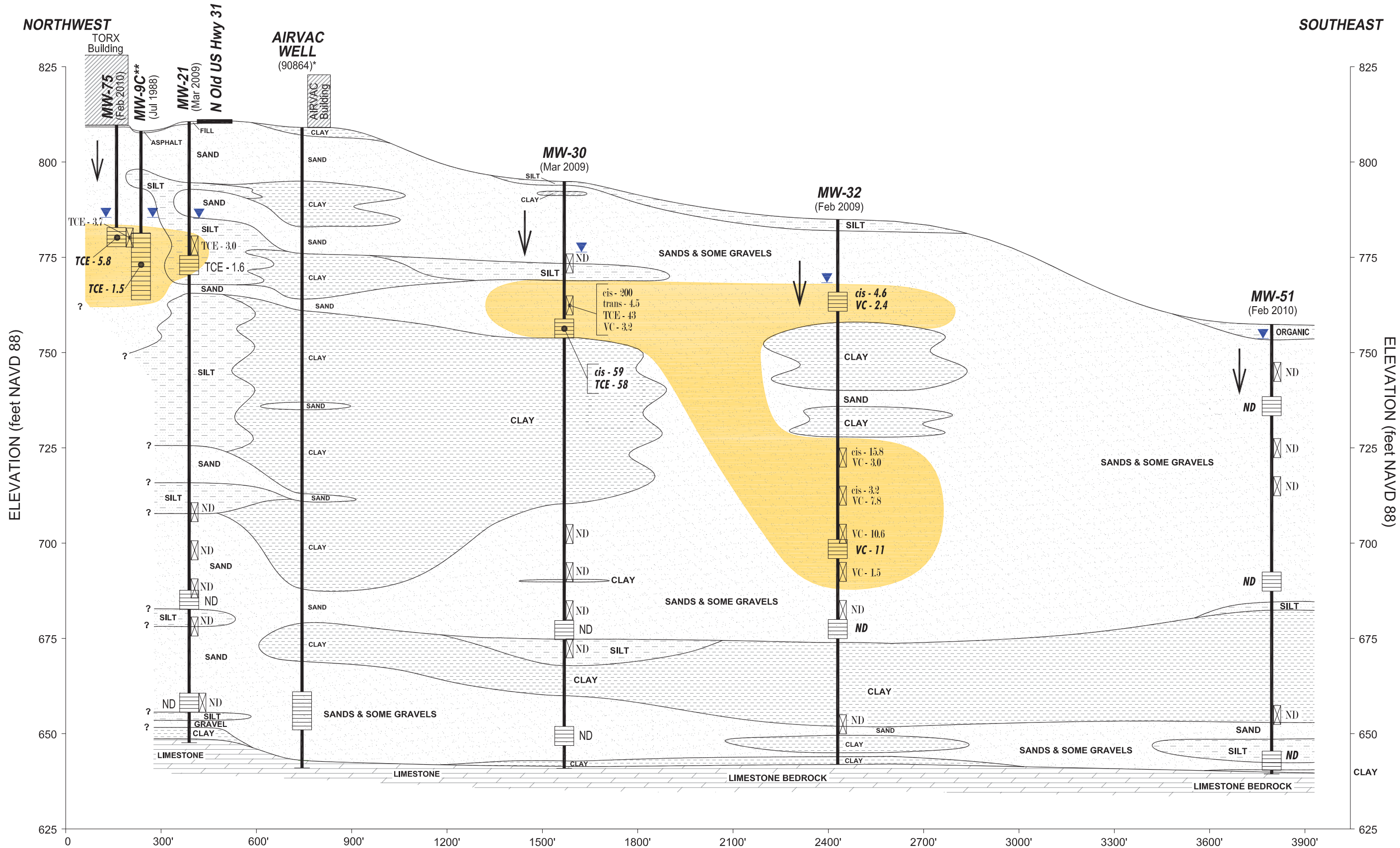


**LOCATION OF**  
**GEOLOGIC CROSS SECTION**  
**THROUGH AIRVAC WELL**

DRAWING NO.

**C2**

SHEET 1 of 1



Horizontal Scale (in feet)  
Vertical Exaggeration: 1:12

Vertical aquifer sampling results are not shown at well screen locations unless the data differentiates substantially from the well screen data. See boring logs for complete vertical aquifer sampling results.

**LEGEND:**

- Depth to Water
- Well Screen
- Observed Vertical Groundwater Gradient

**MW-30**  
(Mar 2009)

Well Location & Date Installed

- cis - 36 Site-related VOCs Results from April 2010
- cis - 21 Site-related VOCs Results from December 2010
- ND Vertical Aquifer Sample Location (2009/2010)

Approximate Extent of Site-Related VOC Plume

**NOTES:**

cis - cis-1,2-Dichloroethene TCE - Trichloroethene J - Estimated value  
trans - trans-1,2-Dichloroethene VC - Vinyl Chloride

VOC results reported in micrograms per liter ( $\mu\text{g/L}$ )

ND - Site-related VOCs not detected greater than detection limits.

\* Lithology obtained from the Record of Water Well on file at the Indiana Department of Natural Resources (IDNR Well Log Number in parentheses).

\*\* Lithology estimated from boring log of MW-9A.

NAVD 88 North American Vertical Datum 1988

**Attachment 1  
AIRVAC Well Construction**

## Marhelski, Megan

---

**From:** Stork, Paul  
**Sent:** Wednesday, March 16, 2011 9:35 AM  
**To:** Marhelski, Megan  
**Subject:** FW: Production Well at AIRVAC

---

**From:** Mark Jones [<mailto:MarkJ@airvac.com>]  
**Sent:** Wednesday, March 16, 2011 9:26 AM  
**To:** Stork, Paul  
**Subject:** RE: Production Well at AIRVAC

Dear Paul

I can confirm that the well shown on the enclosed map, is the same well we use today for AIRVAC's process water.

I am out of the office, but should be back next week. If you anything else please contact us.

Mark

---

**From:** Stork, Paul [<mailto:PJStork@mactec.com>]  
**Sent:** Tuesday, March 15, 2011 4:07 PM  
**To:** Mark Jones  
**Subject:** Production Well at AIRVAC

Dear Mr. Jones,

We would like to verify your well log for your production well at your facility. Greg Myroth relayed to me that you mentioned the shallow production well at AIRVAC was abandoned when the existing production well was installed. We downloaded a well log for the AIRVAC property from the Indiana Department of Natural Resources. The well log is attached for your reference. Will you please confirm that the attached well log is for the existing production well at the AIRVAC property?

Regards, Paul

**Paul Stork** | Office Manager\Principal Geologist  
MACTEC Engineering and Consulting, Inc. | Miamisburg, OH  
**Office** 937.859.3600 | **Mobile** 937.671.7573 | **Fax** 937.859.7951  
**Email** [pjstork@mactec.com](mailto:pjstork@mactec.com) | **Web** [www.mactec.com](http://www.mactec.com)

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NOTICE: This message and all attachments transmitted with it may contain confidential, sensitive, or protected information intended solely for the use of the addressee(s). If you are not the intended recipient, you are hereby notified that any reading, dissemination, distribution, copying, or other use of this message or its attachments is strictly prohibited. If you have received this message in error, please notify the sender immediately by telephone or electronic mail and immediately delete this message and all copies and backups thereof.



## Record of Water Well

## Indiana Department of Natural Resources

<b>Reference Number</b>	<b>Driving directions to well</b>	<b>Date completed</b>
<b>90864</b>	T31N R3E SEC20	Nov 14, 1983

<b>Owner-Contractor</b>	<b>Name</b>	<b>Address</b>	<b>Telephone</b>
Owner	AIR VAC		
Driller	ORTMAN DRILLING, INC.	241N CR300W KOKOMO, IN	
Operator	NED O,JOHN W, FRED K, MIKE N	License: null	
Company	BURTON PLBG & HTG	312 MAIN ST, ROCHESTER IN	

**Construction Details**

<b>Well</b>	<b>Use:</b>	<b>Drilling method:</b> Rotary	<b>Pump type:</b>
	<b>Depth:</b>	<b>Pump setting depth:</b>	<b>Water quality:</b>
<b>Casing</b>	<b>Length:</b> 148.0	<b>Material:</b>	<b>Diameter:</b> 8.0
<b>Screen</b>	<b>Length:</b> 10.0	<b>Material:</b>	<b>Diameter:</b> Slot size: .045 J SSWW

<b>Well Capacity Test</b>	<b>Type of test:</b> Air	<b>Test rate:</b> 550.0 gpm for hrs.	<b>BailTest rate:</b> gpm for hrs.
	<b>Drawdown:</b> ft.	<b>Static water level:</b> 30.0 ft.	<b>Bailer Drawdown</b> ft.

<b>Grouting Information</b>	<b>Material:</b>	<b>Depth:</b> from to
	<b>Installation Method:</b>	<b>Number of bags used:</b>

<b>Well Abandonment</b>	<b>Sealing material:</b>	<b>Depth:</b> from to
	<b>Installation Method:</b>	<b>Number of bags used:</b>

<b>Administrative</b>	<b>County:</b> FULTON	<b>Township:</b> 31N Range: 3E
	<b>Section:</b> NE of the SW of the SE of Section 28	<b>Topo map:</b> ROCHESTER
	<b>Grant Number:</b>	
	<b>Field located by:</b> MFC	<b>on:</b> Aug 01, 1984
	<b>Courthouse location by:</b>	<b>on:</b>
	<b>Location accepted w/o verification by:</b>	<b>on:</b>
	<b>Subdivision name:</b>	<b>Lot number:</b>
	<b>Ft W of EL:</b> 1500.0	<b>Ft N of SL:</b> 1350.0
	<b>Ft E of WL:</b>	<b>Ft S of NL:</b>
	<b>Ground elevation:</b> 820.0	<b>Bedrock elevation:</b> 654.0
	<b>Depth to bedrock:</b> 166.0	<b>Aquifer elevation:</b> 654.0
	<b>UTM Easting:</b> 564999.0	<b>UTM Northing:</b> 4551822.0

<b>Well Log</b>	<b>Top</b>	<b>Bottom</b>	<b>Formation</b>
	0.0	2.0	RED CLAY
	2.0	8.0	S & G FINE
	8.0	14.0	SAND FINE
	14.0	26.0	SANDY RED CLAY
	26.0	33.0	S & G
	33.0	45.0	GRAY CLAY
	45.0	48.0	S & G

48.0	55.0	SOFT GRAY CLAY
55.0	72.0	GRAY CLAY
72.0	74.0	S & G
74.0	96.0	GRAY CLAY
96.0	98.0	S & G
98.0	110.0	GRAY CLAY
110.0	121.0	CLAY & SAND
121.0	130.0	S & G MED FINE
130.0	140.0	GRAY CLAY SANDY
140.0	150.0	S & G MED
150.0	160.0	GRAV CRS
160.0	166.0	S & G MED FINE
166.0	168.0	LIMESTONE

**Comments**

EMPLOYEE VERIFIED 8' S OF SW CORNER OF BLDG MRL 28 OVERLAPPING 31N-3E-SEC19; WELL IS 158.5' DEEP; SCREENING & DEVELOPING 7 HRS. 18 HRS.

---





# WATER WELL RECORD

State Form 35680

FIGURE 10

Mail completed record within 30 days to:  
DIVISION OF WATER  
INDIANA DEPARTMENT OF NATURAL RESOURCES  
605 STATE OFFICE BUILDING  
INDIANAPOLIS, INDIANA 46204  
PHONE (317) 232-4160

WELL LOCATION (Fill in completely)	
County where drilled Fulton	
Civil Township Richland	
Driving directions to the well location (Include county road names, numbers, subdivisions, lot number with consideration to intersecting roads and trip origination) There is space for a map on reverse side. T31N R3E Sec 20 60E 420N on East side	

OWNER — CONTRACTOR	
Well owner Air Vac	
Address	
Building contractor Burton Plumbing & heating	
Address 312 Main St Rochester, In 46975	
Drilling contractor Ortman Drilling, Inc.	
Address 241N Co Rd 300W Kokomo, In	
Equipment operator Ned O., John W., Fred K. Mike N.	
Completion date Nov 14, 1983	

CONSTRUCTION DETAILS	
Type of well: <input checked="" type="checkbox"/> Drilled <input type="checkbox"/> Gravel pack <input type="checkbox"/> Driven <input type="checkbox"/> Other	
Use of well: <input type="checkbox"/> Home <input type="checkbox"/> Industry <input type="checkbox"/> Test <input type="checkbox"/> Irrigation <input type="checkbox"/> Public supply <input type="checkbox"/> Stock <input type="checkbox"/> Other (specify) _____	
Method of drilling: <input type="checkbox"/> Cable tool <input checked="" type="checkbox"/> Rotary <input type="checkbox"/> Jet <input type="checkbox"/> Rev. rotary <input type="checkbox"/> Bucket rig	
Casing length 148 feet	Diameter 8" steel inches
Screen length 10' feet	Diameter sch 40 inches
Screen slot size Johnson SS WW .045	
Depth of pump setting	
Type of pump <input type="checkbox"/> Submersible <input type="checkbox"/> Shallow-well jet <input type="checkbox"/> Deep-well jet <input type="checkbox"/> Other (specify) _____	

WELL LOG		
Formations: type of material	From	To
Red clay	0 ft.	2 ft.
Sand & gravel fine	2	8
Sand fine	8	14
Sandy red clay	14	26
Sand & gravel	26	33
Gray clay	33	45
Sand & gravel	45	48
Soft gray clay	48	55
Gray clay	55	72
Sand & gravel	72	74
Gray clay	74	96
Sand & gravel	96	98
Gray clay	98	110
Clay & sand	110	121
Sand & gravel med fine	121	130
Gray clay sandy	130	140
Sand & gravel med	140	150
Gravel coarse	150	160
Sand & gravel med fine	160	166
limestone	166	168
Well is 158 1/2 ft deep screening & developing 7 hrs.		
18 hrs.		

(Additional space for Well Log on reverse side)

WELL CAPACITY TEST	
(Check one) <input type="checkbox"/> Bailing <input type="checkbox"/> Pumping Air	
Test rate 550+gpm hrs	Drawdown feet
Static level depth to water 30	feet
Water quality (clear, cloudy, odor, etc.)	

Signed Ortman Drilling, Inc. Date 11-28-83

**Attachment 2**  
**AIRVAC Production Well Operation**

**Marhelski, Megan**

**From:** Gross, Dwayne  
**Sent:** Thursday, February 17, 2011 11:41 AM  
**To:** Schiff, Jamieson  
**Cc:** Stork, Paul; Marhelski, Megan  
**Subject:** Airvac Potable Water Well - Attorney-Client Privileged - Prepared at the Request of Counsel  
**Attachments:** Airvac Residential Drinking Water results 01172011.pdf; AIRVAC WELL LOG 90864.pdf

Attorney-Client Privileged - Prepared at the Request of Counsel

Dear Jamie,

MACTEC Engineering and Consulting, Inc. (MACTEC) has prepared this correspondence to present information related to the potable water wells installed at the AIRVAC facility located at 4217/4081 North Old Us Highway 31 in Rochester, IN. This information includes well details obtained from the AIRVAC - Operations Manager (John Grooms), a well log obtained from the Indiana Department of Natural Resources (IDNR) online well log search database, and historical well details obtained from Ralph Spaeth (Environmental Specialist) at the IDNR - Division of Water (IDNR-Water). In addition to details related to the AIRVAC potable water wells at the AIRVAC facility, a summary of the two most recent potable water samples collected by MACTEC at the AIRVAC facility is presented.

**IDNR ONLINE WATER WELL DATABASE**

MACTEC completed an IDNR well log search through the IDNR online water well database. One well log was obtained (Reference Number 90864). The well was drilled by Ortman Drilling, Inc. on November 14, 1983 to a total depth of 168 feet below ground surface. Bedrock was encountered at 166 feet below ground surface. The completed well has 148-feet of eight-inch diameter casing. The screen is ten feet in length and has a slot size of 0.045-inches. The referenced well log for RN 90864 is attached.

**AIRVAC POTABLE WATER WELL DETAILS**

In order to collect information on the current well in use at the AIRVAC facility, John Grooms (Operations Manager) was contacted on August 24, 2010. Mr. Grooms informed MACTEC that there is one well currently in use at the facility. The current well has an 8-inch diameter casing and was installed in January 2003. The depth of the well is 158.5 feet below ground surface. According to Mr. Grooms, a screen length was not included on his information sheet. He said the screen field was blank and that the aquifer type was "gravel". Reportedly, the well has a 4-inch diameter drop pipe that extends 105 feet into the well. Mr. Grooms said the well is installed at the BZ1 building. Mr. Grooms said "the old shallow well" was not used anymore and has not been used for years. Mr. Grooms did not indicate how many wells had been drilled at the AIRVAC property or if the previous wells had been abandoned. In comparing the well details from Mr. Grooms with the details presented on the well log from the IDNR well search database (RN 90864), the well mentioned by Mr. Grooms is not the same as the well listed in the IDNR online water well database.

**IDNR TELEPHONE CONVERSATION**

In addition to speaking with Mr. John Grooms at AIRVAC, we telephoned Mr. Ralph Spaeth, an Environmental Specialist at IDNR-Water. Mr. Spaeth was able to give MACTEC the wells reported by AIRVAC (or "Burton Mechanical Contractors, a division of AIRVAC, Inc.") to IDNR-Water. Ralph informed MACTEC that since 1985, AIRVAC has submitted four updates on their potable water well. The information from Ralph is presented below.

1

Reported Year	Pumping Capacity (Gallons per Minute)	Depth of Well (feet below ground surface)	Diameter of Well (inches)	Aquifer Type
1985	120	150	10	Sand & Gravel
1989	120	250	8	Sand & Gravel
1990	120	250	8	Limestone
1997	300	250	8	Limestone

**POTABLE WATER SAMPLES COLLECTION**

MACTEC collected potable water well samples from a spigot located on the main supply line in between the well and the water holding tanks at the AIRVAC facility on November 3, 2008 and May 11, 2010. Volatile organic compounds (VOCs) were not detected at concentrations greater than the laboratory detection limits in either sample. The attached table summarizes the results of the two potable water samples.

If you have any questions or comments, please contact us at (937) 859-3600.

*W. Dwayne Gross*

Staff Geo-Scientist - Dayton

MACTEC Engineering and Consulting, Inc.

Office 937-859-3600 Work Cell 937-248-9846 Fax 937-859-7951

Email [wdgross@mactec.com](mailto:wdgross@mactec.com) Web [www.mactec.com](http://www.mactec.com)

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2



AirVac High Capacity Water Withdrawal Data  
1985 - 2009

RgstrnId	Year	Pumpd Jan	Pumpd Feb	Pumpd Mar	Pumpd Apr	Pumpd May	Pumpd Jun	Pumpd Jul	Pumpd Aug	Pumpd Sep	Pumpd Oct	Pumpd Nov	Pumpd Dec	Yearly Total
00352	1985	3,000	3,000	3,000	3,000	3,000	3,000	5,800	3,000	3,000	3,000	3,000	3,000	38,800
00352	1986	2,000	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,000	2,000	2,100	28,100
00352	1987	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	90,000	90,000	65,500	335,500
00352	1988	72,841	72,000	60,000	50,000	80,000	100,000	100,000	100,000	70,000	60,000	60,000	49,259	874,100
00352	1989	2,000	2,000	2,000	2,000	2,000	2,000	2,000	25,000	50,000	20,000	10,000	4,800	123,800
00352	1990	19,750	19,750	19,750	19,750	19,750	19,750	19,750	19,750	19,750	19,750	19,750	19,750	237,000
00352	1991	48,666	48,666	48,666	48,666	48,666	48,666	48,666	48,666	48,666	48,666	48,666	48,666	583,992
00352	1992	54,633	54,633	54,633	54,633	54,633	54,633	54,633	54,633	54,633	54,633	54,633	54,633	655,596
00352	1993	55,085	55,085	55,085	55,085	55,085	55,085	55,085	55,085	55,085	55,085	55,085	55,085	661,020
00352	1994	55,000	55,000	55,000	65,000	65,000	55,000	77,000	84,000	85,000	86,000	84,000	84,000	850,000
00352	1995	25,000	25,000	36,800	49,000	56,800	56,000	58,100	62,100	47,000	60,100	53,000	65,300	594,200
00352	1996	65,300	66,300	83,600	72,500	81,000	78,700	94,200	96,800	91,600	97,800	87,400	89,300	1,004,500
00352	1997	81,300	118,600	130,200	106,300	101,200	113,500	105,100	97,600	96,400	105,300	113,700	101,500	1,270,700
00352	1998	94,900	102,900	96,500	84,600	43,900	56,100	78,500	82,900	83,300	78,600	33,500	30,300	866,000
00352	1999	31,000	36,000	47,000	61,000	94,000	118,000	123,000	114,000	126,000	103,000	92,000	61,000	1,006,000
00352	2000	53,000	55,000	104,000	155,000	127,000	124,000	181,000	135,000	138,000	141,000	167,000	141,000	1,521,000
00352	2001	141,000	132,000	159,000	133,000	149,000	169,000	158,000	142,000	142,000	152,000	148,000	145,000	1,770,000
00352	2002	119,000	118,000	119,000	122,000	121,000	120,000	131,000	126,000	117,000	120,000	118,000	123,000	1,454,000
00352	2003	120,600	122,300	120,700	198,900	189,900	194,600	185,300	195,400	192,500	191,400	189,800	194,100	2,095,500
00352	2004	192,900	198,600	185,800	201,300	218,600	230,800	224,900	219,700	239,400	206,300	222,100	220,800	2,561,200
00352	2005	199,400	243,200	246,200	232,100	204,600	198,200	239,200	251,800	227,900	230,400	234,500	232,300	2,739,800
00352	2006	231,400	237,600	230,500	234,800	83,600	82,100	83,900	84,000	81,200	82,600	79,100	80,500	1,591,300
00352	2007	81,900	79,900	91,200	124,800	153,100	149,000	135,700	142,900	125,600	133,800	140,300	152,600	1,510,800
00352	2008	136,800	140,700	141,800	138,900	140,700	142,300	141,600	140,400	142,600	144,500	139,400	142,200	1,691,900
00352	2009	143,200	139,300	142,500	163,200	161,900	164,600	164,300	163,100	168,700	162,500	162,400	160,200	1,895,900

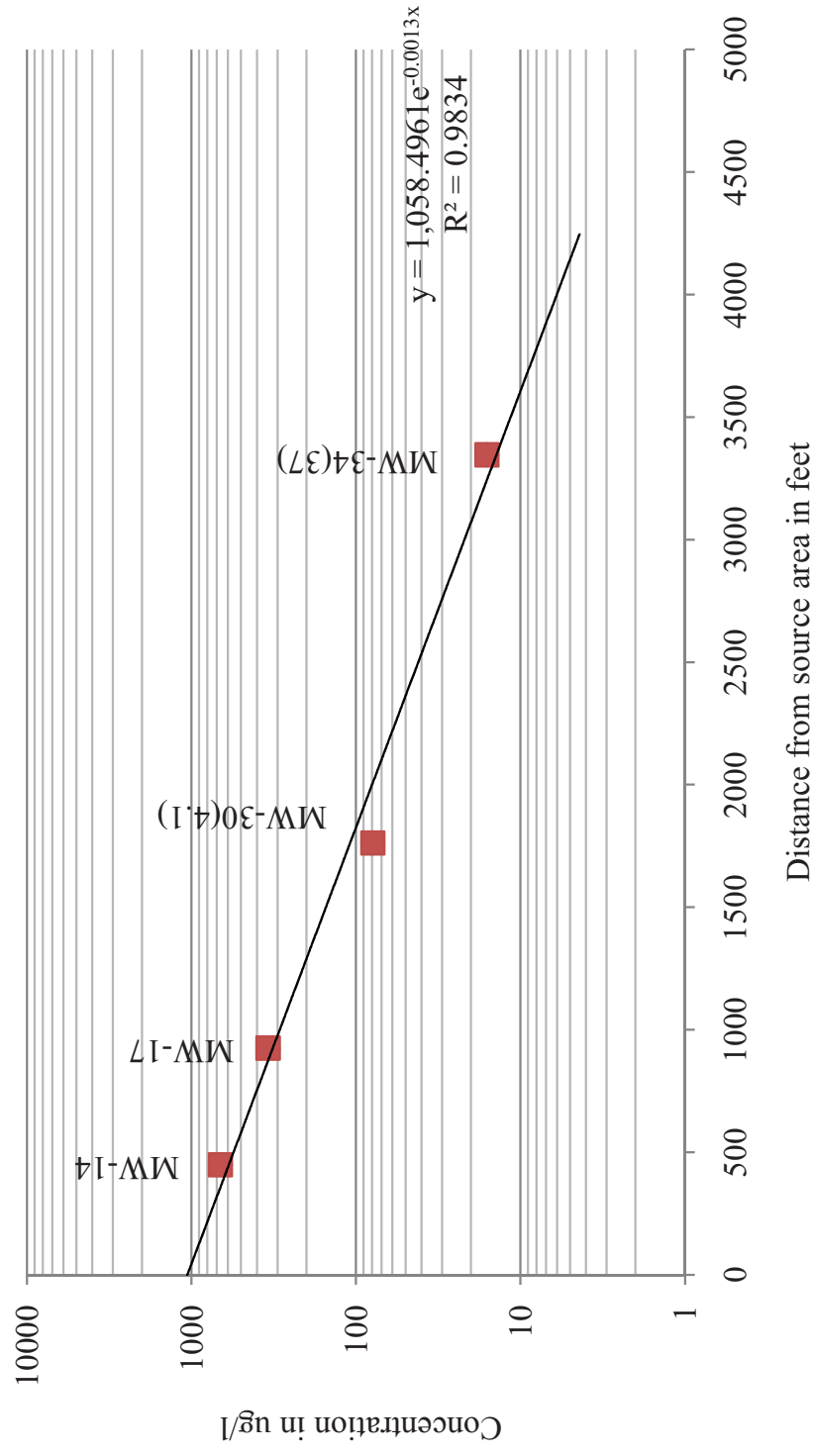
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**Attachment 3**  
**Concentration verses Distance Graphs**

# Graph - C1

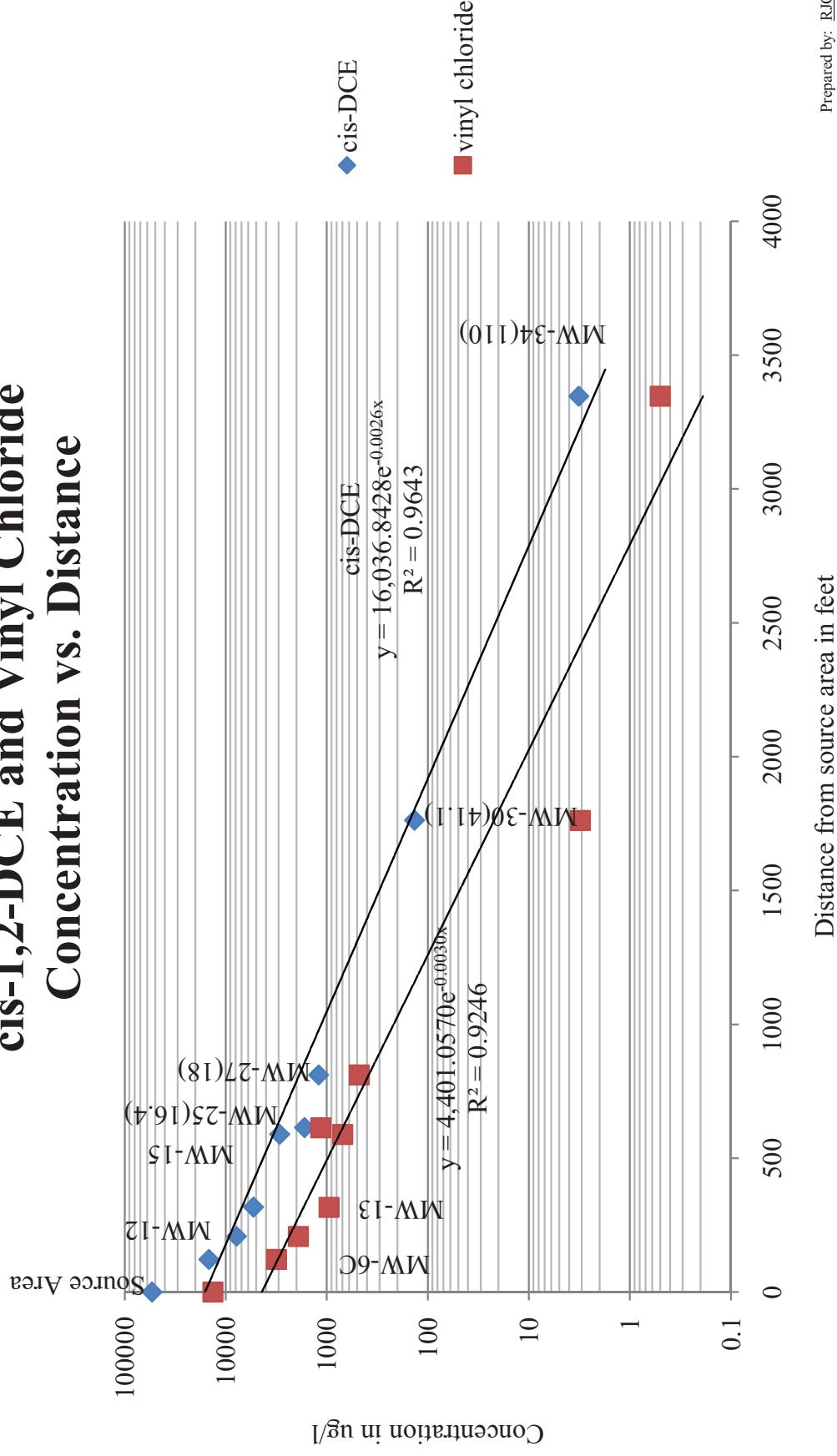
## Trichloroethene Concentration vs. Distance





# Graph - C2

## cis-1,2-DCE and Vinyl Chloride Concentration vs. Distance





Textron, Inc.  
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Remediation Feasibility Study

## **APPENDIX D**

### **DISTANCE-CONCENTRATION GRAPHS**

### **TIME SERIES-CONCENTRATION GRAPHS**

Figure D1

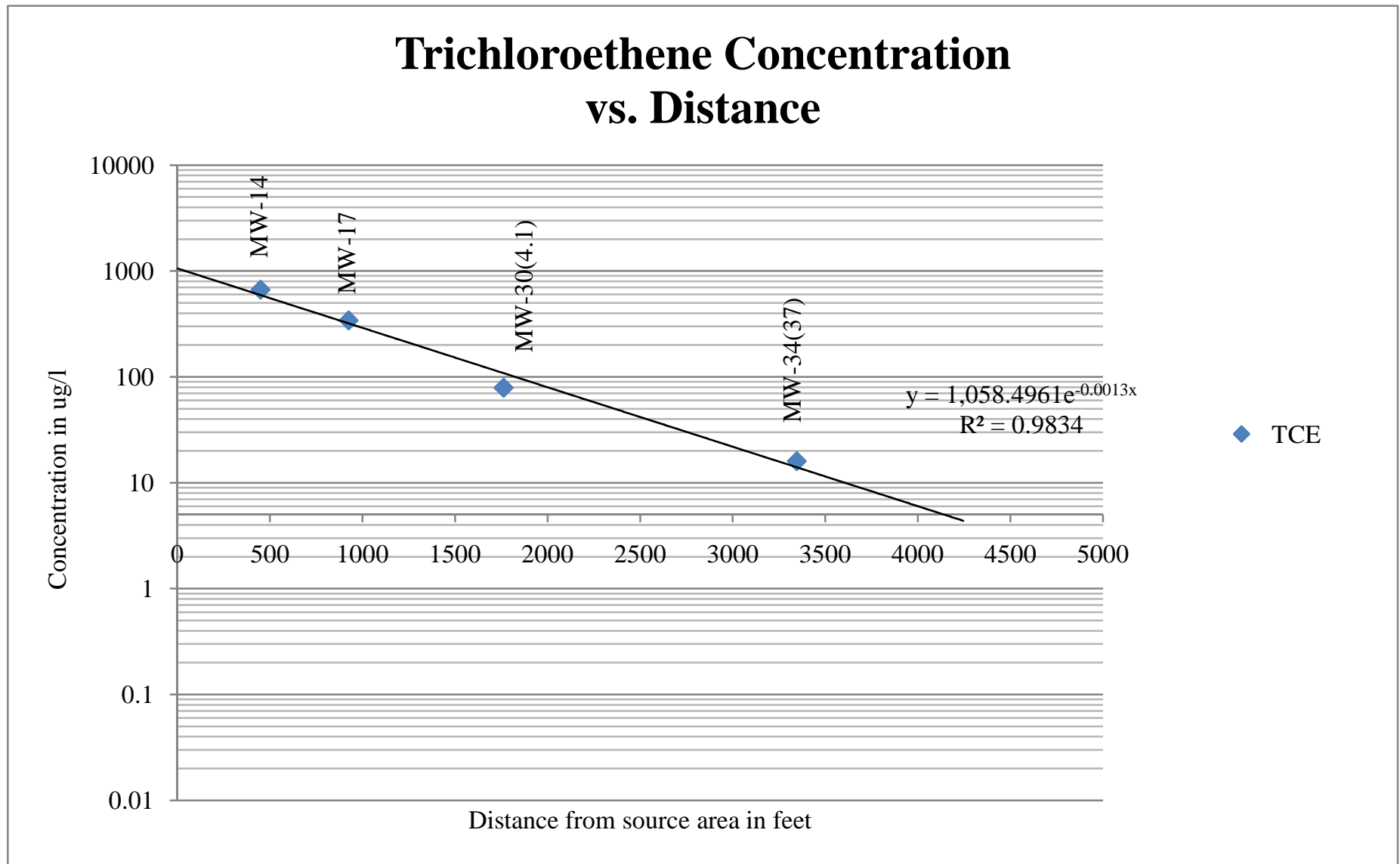


Figure D2

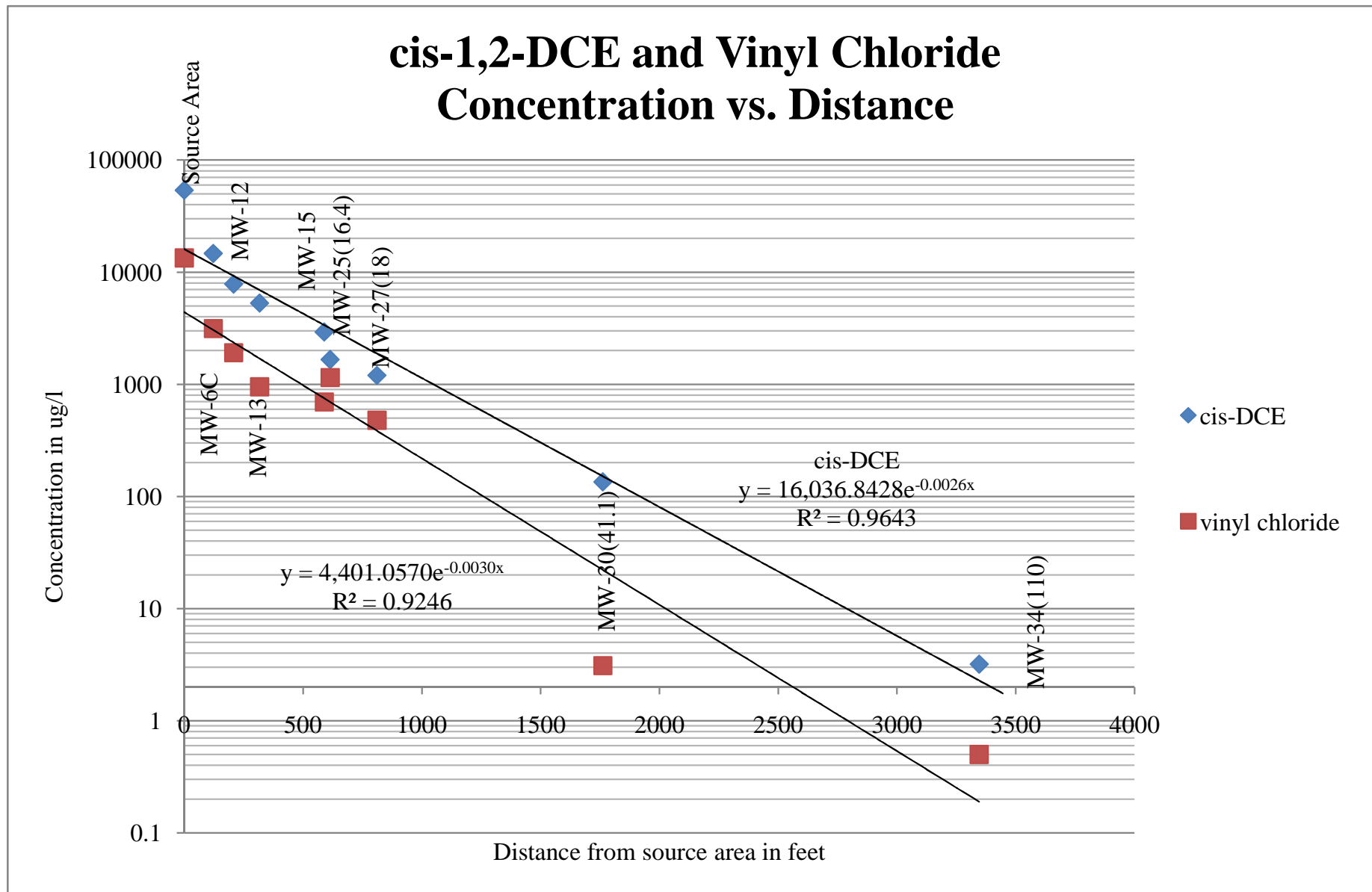


Figure D3

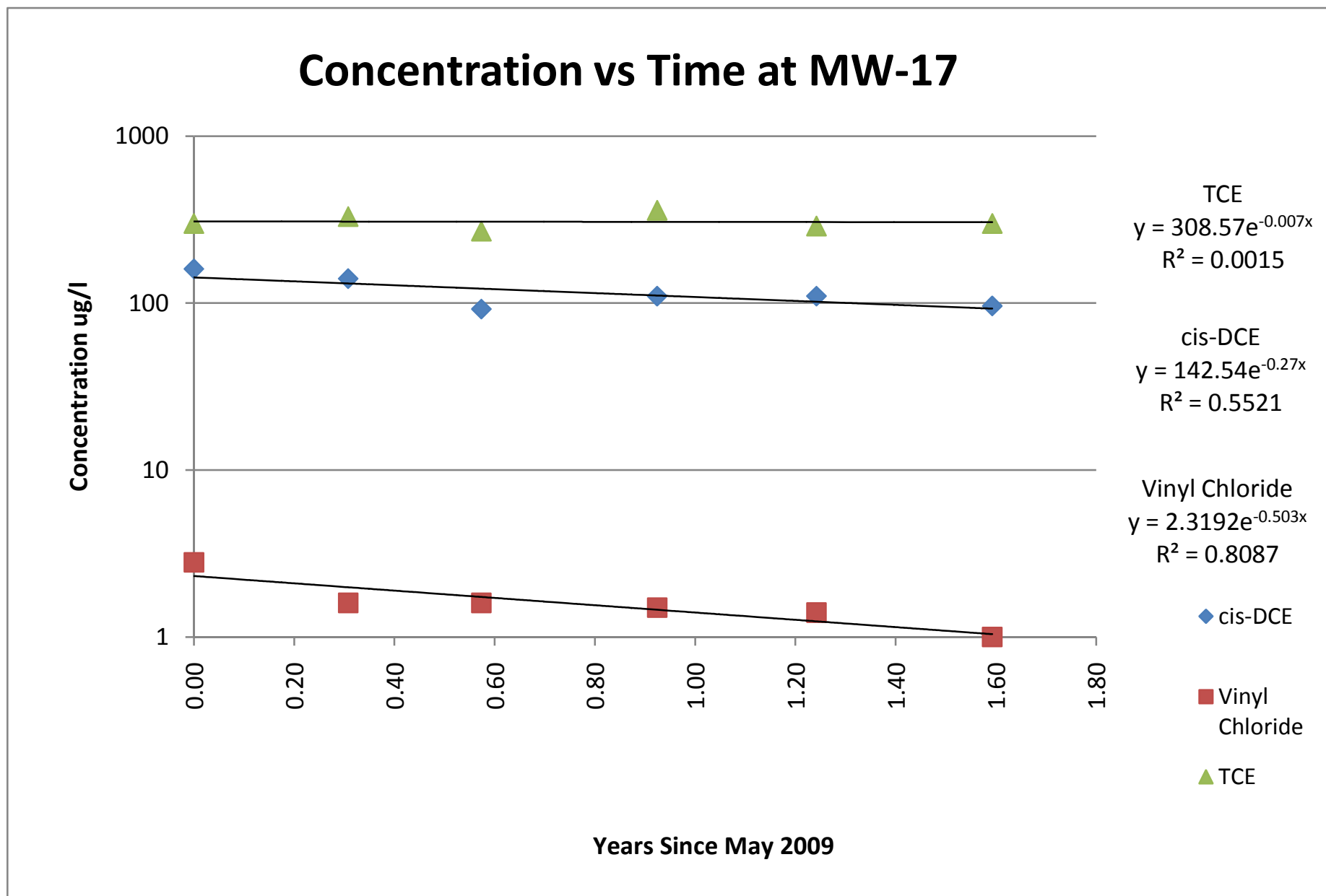


Figure D4

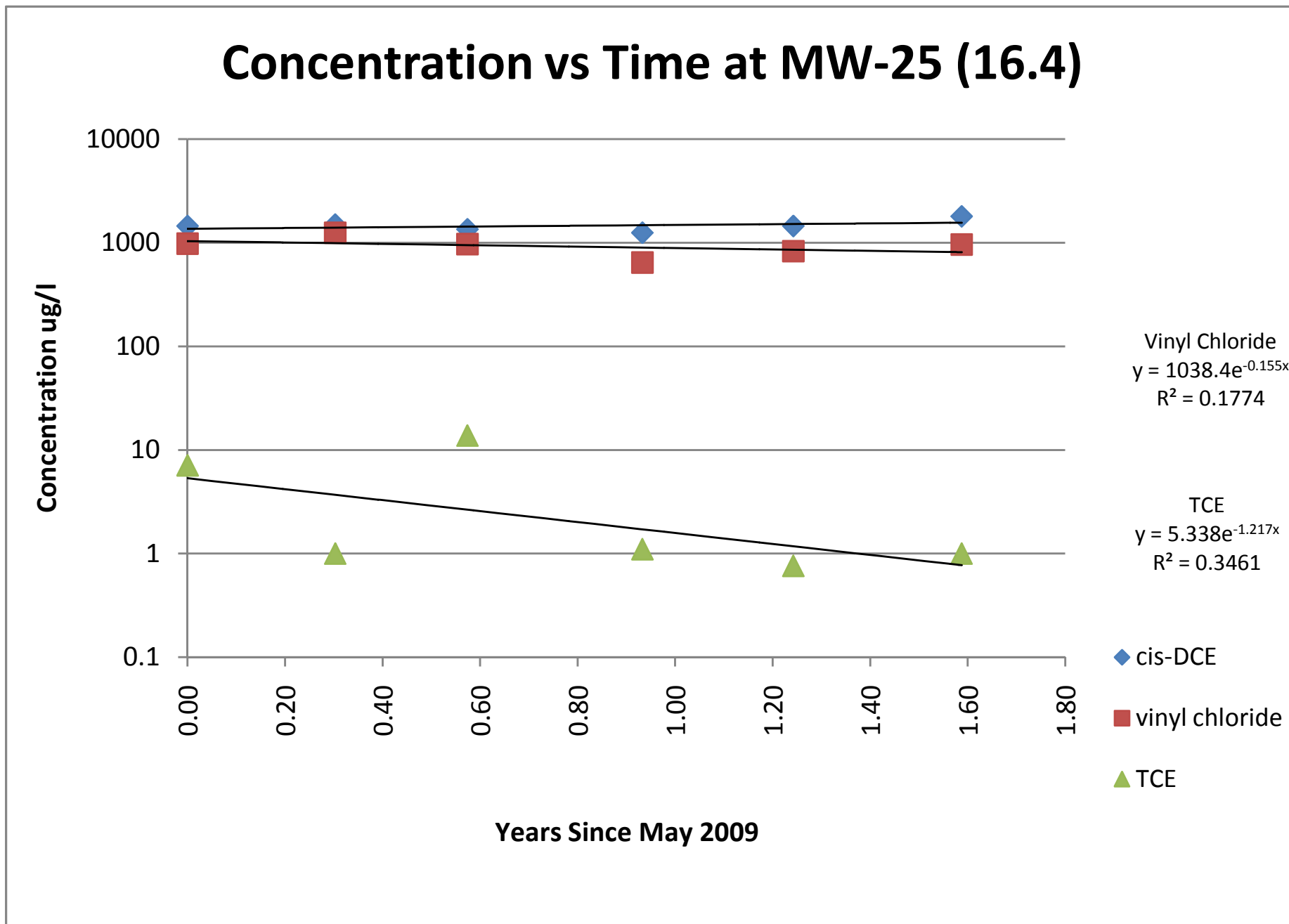




Figure D5

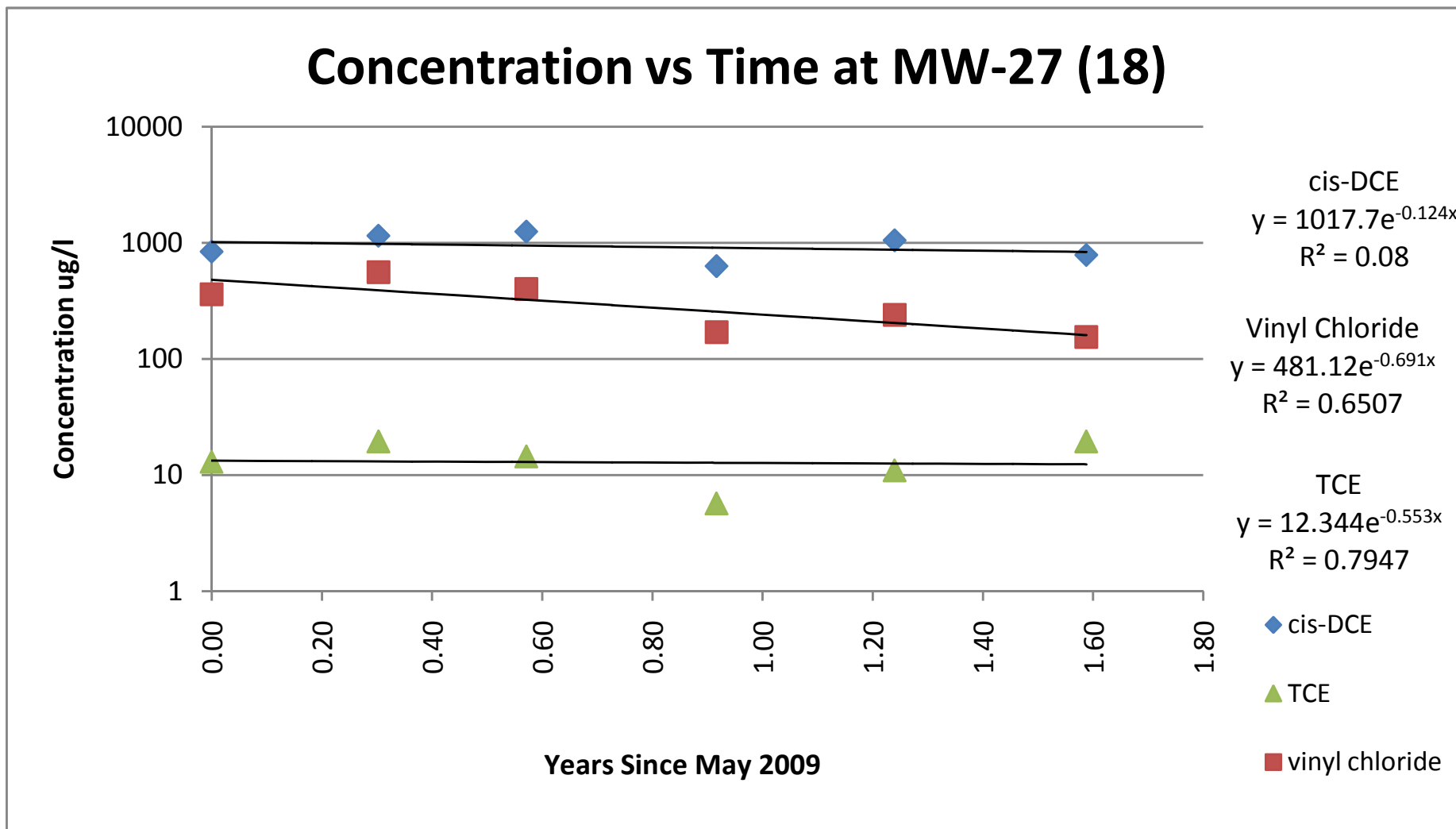


Figure D6

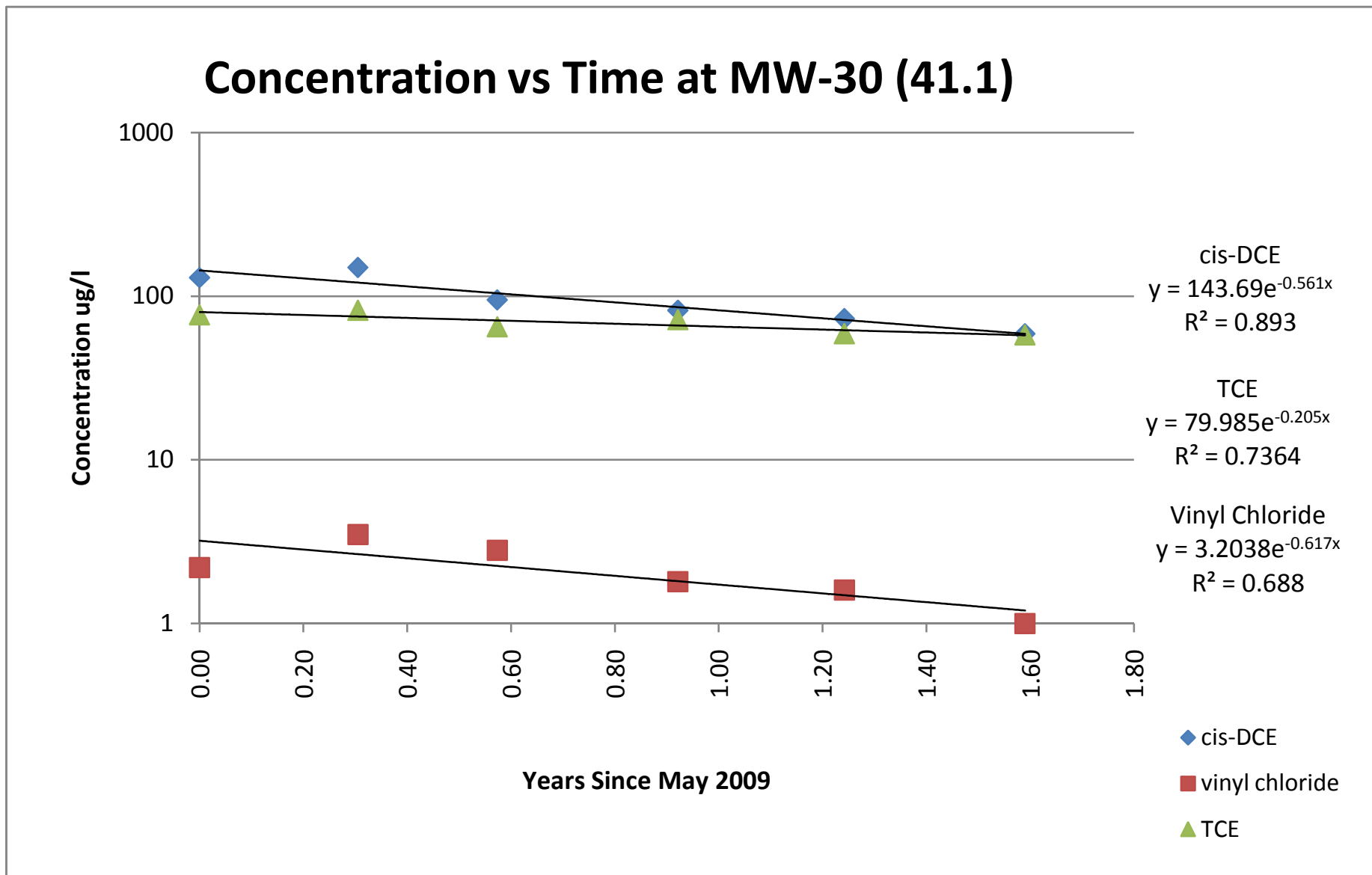


Figure D7

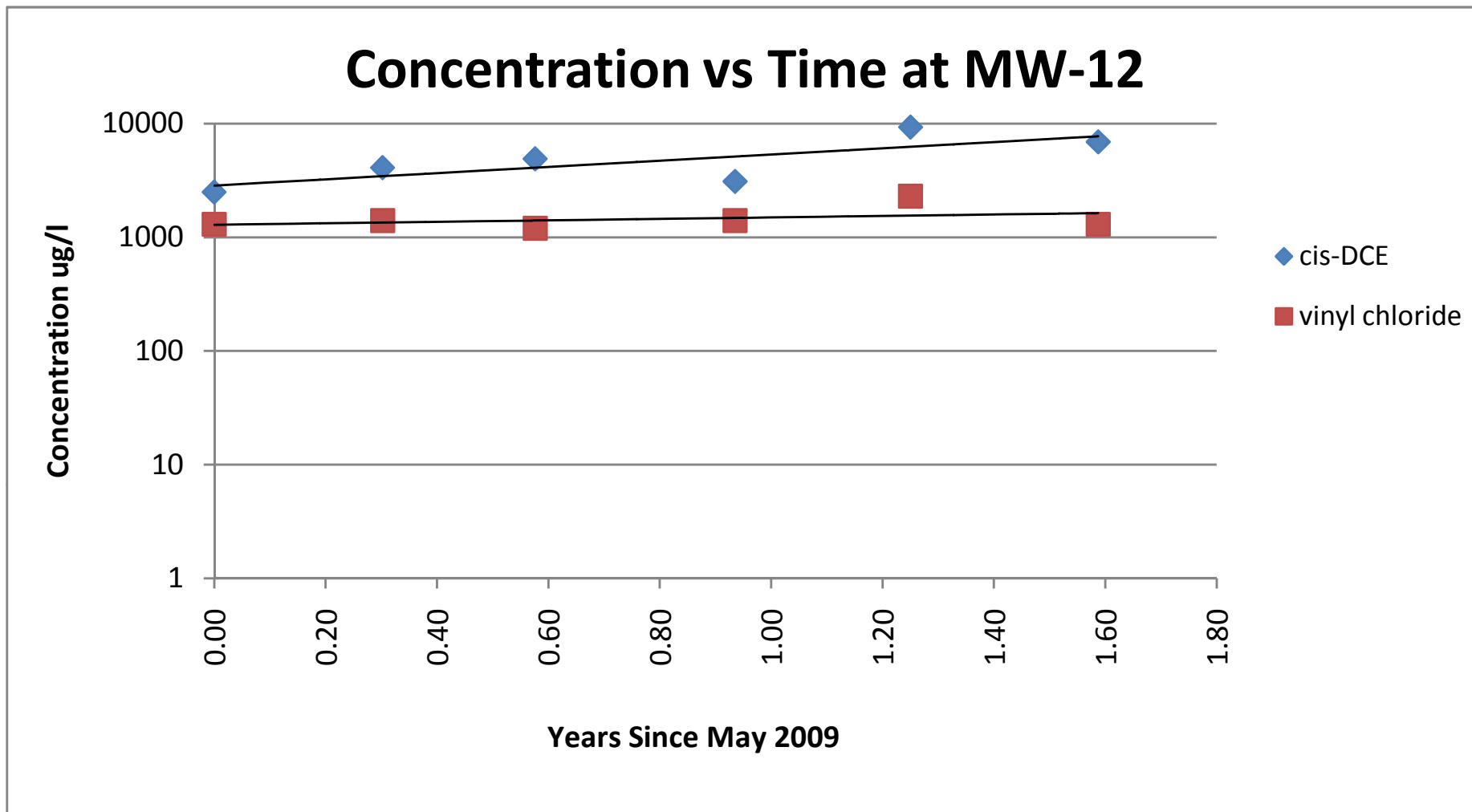


Figure D8

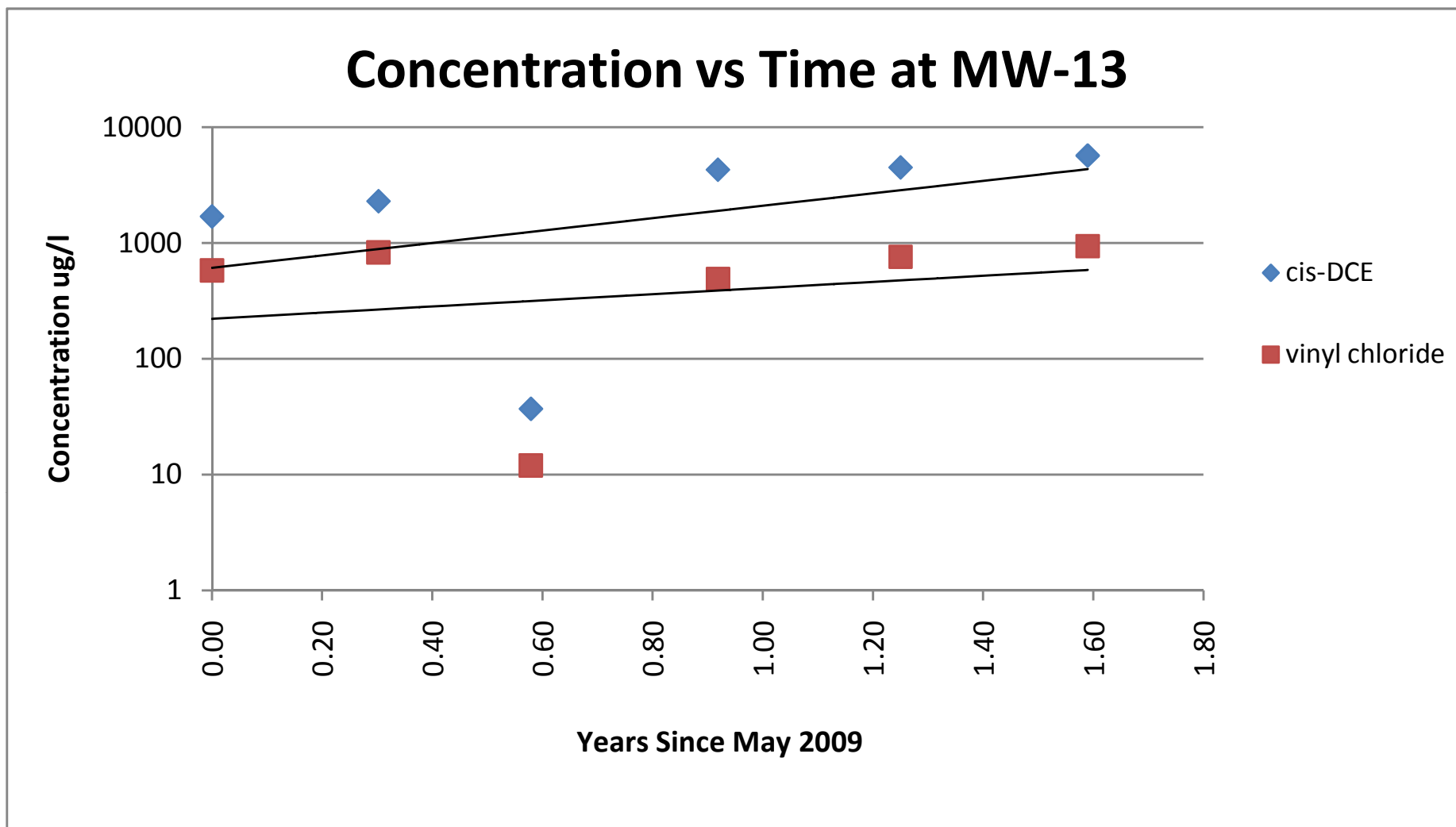


Figure D9

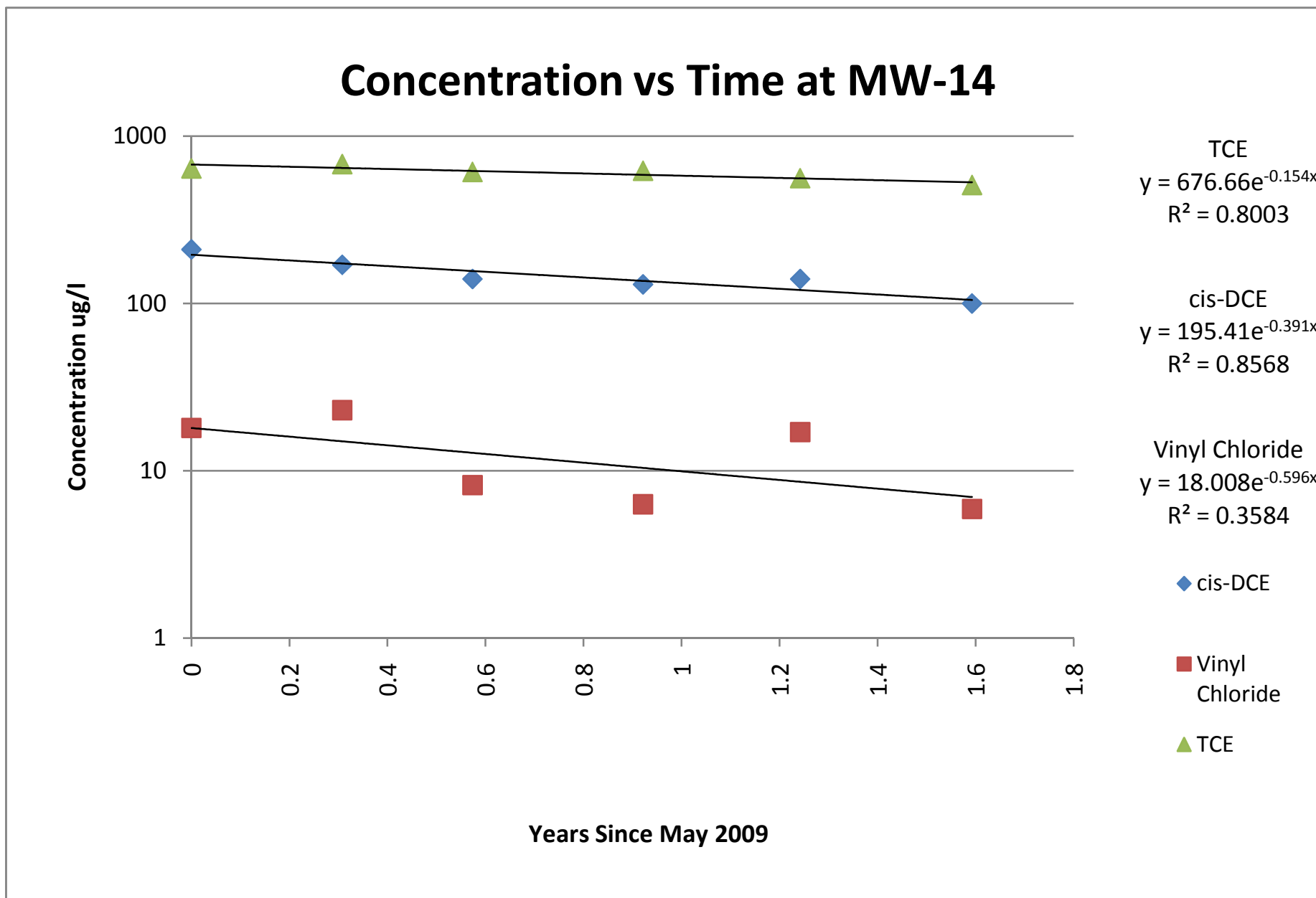
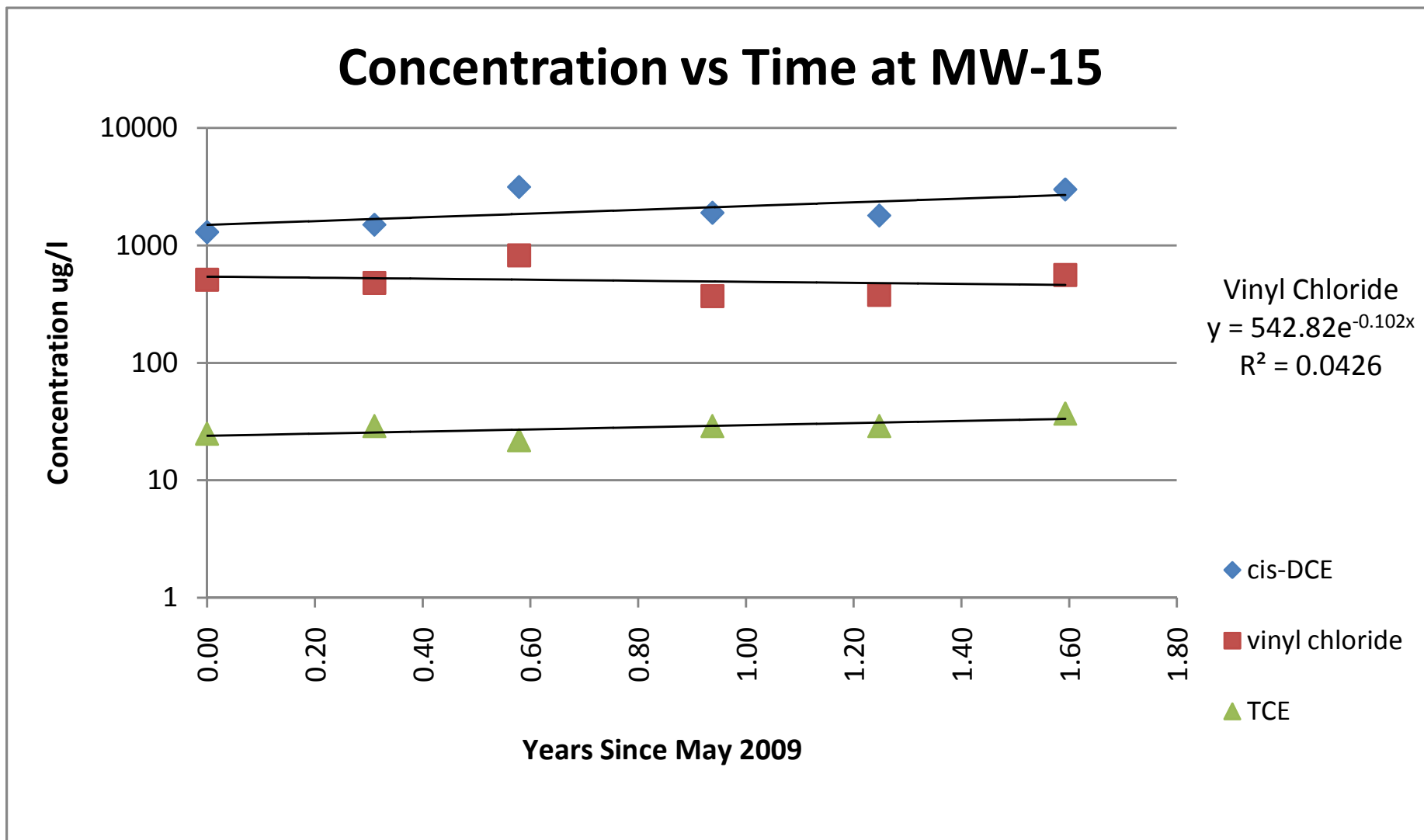


Figure D10







Textron, Inc.  
TORX Facility, Rochester, Indiana  
Remediation Feasibility Study

## **APPENDIX E**

### **HUMAN HEALTH RISK ASSESSMENT**

# **HUMAN HEALTH RISK ASSESSMENT**

**TORX FACILITY  
4366 NORTH OLD US HIGHWAY 31  
ROCHESTER, INDIANA**

*Submitted to:*

**Indiana Department of Environmental Management  
100 North Senate Avenue  
Indianapolis, Indiana 46204**

*Under Contract to:*

**Textron, Inc.  
40 Westminister Street  
Providence, RI 02903**

*Prepared by:*

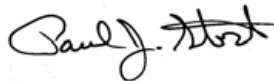
**AMEC Environment & Infrastructure  
107 Audubon Road, Suite 301  
Wakefield, MA 01880  
(781) 245-6606**

**October 2011**

**HUMAN HEALTH RISK ASSESSMENT**  
**TORX FACILITY, ROCHESTER, INDIANA**

Prepared for:

**TEXTRON, INC.**



**AMEC Electronic Signature**

---

**Paul Stork**  
**Project Manager**



---

**Michael Murphy**  
**Principal Risk Assessor**

**October 2011**

**Project Number: 3359-09-2469**

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## LIST OF ACRONYMS AND ABBREVIATIONS

AAC <sub>i</sub>	Average Air Concentration
ABS	Absorption Factor
ADD	Average Daily Dose
ADD <sub>C</sub>	Average Daily Dose, Chronic
ADD <sub>dermal</sub>	Average Daily Dose, Dermal Contact
ADD <sub>dermal absorption</sub>	Average Daily Dose, Dermal Contact with COPCs
ADD <sub>ingestion</sub>	Average Daily Dose, Ingestion
ADD <sub>s</sub>	Average Daily Dose, Subchronic
ADD <sub>soil</sub>	Average Daily Dose, Soil Direct Contact
AF	Mass of soil adhered to the unit surface area of skin exposed
AT	Average Time
B	Permeability Coefficient Ratio
BW	Body Weight
C	Conversion Factor
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CDI <sub>i</sub>	Chronic Daily Intake of Chemical <i>i</i>
COCs	Chemicals of Concern
COPC	Constituents of Potential Concern
COPC <sub>air</sub>	Constituents of Potential Concern in air
COPC <sub>soil</sub>	Constituents of Potential Concern in soil
COPC <sub>water</sub>	Constituents of Potential Concern in water
CRAVE	Cancer Risk Assessment Verification Endeavor
CSF <sub>i</sub>	Cancer Slop Factor of Chemical <i>i</i>
CSM	Conceptual Site Model
DA <sub>event</sub>	Dose of COPC absorbed during each exposure event
DCE	Dichloroethene
EA	Exposure Area
ED	Exposure Duration
EF	Exposure Frequency
EPC	Exposure Point Concentration
ET	Exposure Time
EV	Event Frequency
FA	Fraction Absorbed
FDA	Food and Drug Administration
FS	Feasibility Study
FSI	Further Site Investigation
HEA	House Enrolled Act
HHRA	Human Health Risk Assessment
IDEM	Indiana Department of Environmental Management
HI	Hazard Index
HQ <sub>i</sub>	Hazard Quotient of Chemical <i>i</i>
IDEM	Indiana Department of Environmental Management
IR	Ingestion rate
IRIS	Integrated Risk Information System
Kp	Permeability Constant
LAC <sub>i</sub>	Lifetime Air Average Concentration of Chemical <i>i</i>
LADD	Lifetime Average Daily Dose
mg/kg/day	milligrams per kilogram per day

mg/L	milligrams per Liter
NAVD	North American Vertical Datum
NCP	National Contingency Plan
NOAEL	No Observable Adverse Effect Level
PCE	Tetrachloroethene
PRGs	Preliminary Remediation Goals
PRTV	Peer reviewed toxicity values
RAGS	Risk Assessment Guidance for Superfund
RBC	Risk Based Concentration
RfC	Reference Concentration
RfC <sub>i</sub>	Reference Concentration for Chemical <i>i</i>
RfD	Reference Dos
RfD <sub>s</sub>	Subchronic Reference Dose
RfD <sub>i</sub>	Reference Dose for Chemical <i>i</i>
RISC	Risk Integrated System of Closure
Risk <sub>i</sub>	Risk related to chemical <i>i</i>
RME	Reasonable Maximum Exposure
SA	Skin Surface Area
SF	Slope Factor
SQL	Sample Quantification Limit
STSC	Superfund Technical Support Center
t*	Time to reach steady state
t <sub>event</sub>	Time in numbers of hours per day
τ <sub>event</sub>	Lag Time per event
TCE	Trichloroethene
UCL	Upper Confidence Limit
UF	Uncertainty Factor
µg/L	micrograms per Liter
UR	Unit Risk
URinh <sub>i</sub>	Inhalation Unit Risk for chemical <i>i</i>
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound



## EXECUTIVE SUMMARY

This Human Health Risk Assessment (HHRA) was prepared to evaluate and quantify the potential for adverse effects to human health arising from exposure to site-related constituents identified at the TORX Facility located at 4366 North Old US Highway 31 in Rochester, Fulton County, Indiana (Site). The following activities were performed in the order listed below to complete this HHRA.

1. Prepared a Conceptual Site Model (CSM) using the environmental data associated with previous investigations at the Site to evaluate current and potential future human exposures to environmental media associated with the Site
2. Evaluated the chemicals of potential concern (COPC) associated with each environmental media associated with the Site
3. Assessed the toxicity of each COPC
4. Characterized the risk of each COPC at each current and potential future human exposure point

The CSM evaluated some of the potential exposure pathways qualitatively or semi-quantitatively (no risk calculations). Based on in-place institutional controls and the results of sampling analyses, the following pathways were determined to be incomplete during the CSM, and therefore risk calculations were not performed.

- Drinking water ingestion at residential properties that have operating activated carbon treatment systems that effectively remove VOCs.
- Drinking water ingestion at residential and industrial properties where Site-related VOCs have not been detected in the potable water samples.
- Casual contact or recreational contact associated with the surface water associated with Pond A (Property 15), a stream (Property 15), and a tile drain (Property 8)
- Fish consumption and livestock use associated with Pond A.

The results of this HHRA indicate that the calculated risks for individuals living and/or working near the Site are within or below the cancer Allowable Risk Range and equal to or below the threshold hazard index value of one for the following exposure medium and potential exposure routes.

- Surface Water – Direct Contact
- Sediment – Direct Contact
- Potable Water (Treatment System installed) – Ingestion
- Potable Water (COPCs not detected) – Ingestion
- Indoor Air – Inhalation

Based on the results of this HHRA and our evaluation of the plume stability in the Feasibility Study (FS) completed in 2011, the incomplete exposure pathways identified above will remain incomplete for the foreseeable future for the properties located greater than 500 feet from the source area. Additional work has been proposed in the FS to evaluate the stability of the plume in relation to the one residential property located within 500 feet of the source area (Property 37).

## 1.0 INTRODUCTION

AMEC Environment & Infrastructure (AMEC), formerly MACTEC Engineering & Consulting, Inc. (MACTEC), prepared this Human Health Risk Assessment (HHRA) as an attachment to the Feasibility Study (FS) for the TORX Facility, located at 4366 North Old Highway 31, in Rochester, Indiana (herein referred to as “the Site”). A Site location map is provided as **Figure 1**. A layout of the Site, including important Site features, and the surrounding area is provided as **Figure 2**.

The goal of this HHRA is to evaluate and quantify the potential for adverse effects to human health arising from exposure to Site-related constituents. The HHRA analyzes the potential for adverse human health effects under both current and reasonably anticipated future conditions, assuming that the current institutional and engineering controls are maintained. Currently, there are agreements in place that limit the withdrawal of groundwater for residential or industrial purposes at the Site (Property 41) and at Property 15. Refer to **Figure 3** for property locations. Additionally, water treatment systems have been installed on potable wells located at Properties 2, 4, 6A, 7, 8, 11 through 13, 15 through 30, 32 through 35A, and 38 through 40 (**Figure 3**).

This HHRA evaluates current and potential future human health risks associated with the identified impacted environmental media at the Site and in the surrounding environment. This HHRA has been prepared in the context of the Indiana General Assembly’s House Enrolled Act 1162 (HEA 1162) also referred to as Public Law 78-2009 and the Indiana Department of Environmental Management (IDEM) House Enrolled Act 1162 Interim Implementation Document dated December 7, 2009. The HHRA is a site-specific risk assessment that documents the development of the risk-based remediation objectives that are discussed in the FS. HEA 1162 provides for the development of risk-based remedial objectives that are based on site-specific risk assessments that “take into account site specific factors, including remedial measures, restrictive covenants, and environmental restrictive ordinances that” manage risk and control complete or potential exposure pathways. The Interim Implementation Document identifies acceptable target risk levels as the National Contingency Plan (NCP) risk range of  $10^{-4}$  to  $10^{-6}$  and the IDEM default of  $10^{-5}$  and systemic hazard levels (hazard quotient or hazard index) of 1.0. The HHRA has been prepared in a manner generally consistent with United States Environmental Protection Agency (USEPA) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also known as Superfund) risk assessment guidance for site-specific risk assessments

and the technical approaches that have been utilized in developing the IDEM 2001 Risk Integrated System of Closure (RISC) Technical Resource Guidance Document (Tech Guide). The USEPA guidance documents that have been consulted in the preparation of the HHRA are detailed in Section 9.0.

## **1.1 DESCRIPTION OF STUDY AREA**

The study area incorporates numerous residential properties and two industrial properties. For easier comprehension and evaluation, each property within the study area has been assigned an arbitrary number for this assessment. The location of each property and its corresponding number designation are shown on **Figure 3**, and the address for each property is listed in **Table A-1** of **Appendix A**. A detailed Site description is included in the FS (MACTEC, 2011).

## **1.2 BACKGROUND AND INVESTIGATION HISTORY**

Available information suggests that operations prior to 1968 utilized trichloroethene (TCE), which resulted in releases that are now present within groundwater beneath the facility and downgradient properties. During the Phase 2 Further Site Investigation (FSI), the source of the Site-related volatile organic compounds (VOCs) has been identified as the area in the vicinity of the former degreaser pit and the area immediately west of the former degreaser pit between the building and the Western Pond (see **Figure 3, Property 41**). The Site investigations have identified the nature and extent of impacts to environmental media (both at the Site and on the surrounding off-Site properties) that are likely associated with historical releases of VOCs.

Historical investigations identified chlorinated solvents in sediments of the Western Pond, which is located onsite and shown on **Figure 3**. In response to these detections, two separate remedial actions were completed. In October and November of 1989, 1,643 tons of sediment was removed from the inlet cove of the pond and disposed of off-Site in accordance with applicable regulatory requirements. This removal was in response to detections of petroleum, tetrachloroethene (PCE), trans-1,2-dichloroethene (DCE), cis-1,2-DCE, and TCE in sediment samples. From June to September of 1992, another 17,882 tons of sediment was removed and transported off-Site for disposal. There is no indication that there are any chlorinated VOCs in surface soils at the facility.

Several regulatory submittals have documented previous investigation and remedial activities for the Site. These documents can be consulted with respect to details of previous investigations and remedial activities. The information contained in the documents prepared for previous investigations will not be presented here in its entirety. The documents related to previous investigations and remedial activities are as follows:

Process Engineering Group, Inc. 1988. "Site Assessment/Hydrogeological Assessment Report, TORX Products, Rochester, Indiana"; April 4.

Heritage Remediation Engineering, Inc. 1989. "Site Investigation Report, TORX Products, Rochester, Indiana"; March 20.

Beacon Environmental Services, Inc., 2007. "Passive Soil-Gas Survey, Textron Site, Rochester, Indiana", October 5.

MACTEC 2008a. "Vapor Intrusion Evaluation Work Plan, Former TORX Facility, Rochester, Indiana"; December 19.

MACTEC 2008b. "Site Investigation Report, Former TORX Facility, Rochester, Indiana"; December.

MACTEC 2009a. "Investigation Work Plan, Former TORX Facility, Rochester, Indiana"; January.

MACTEC 2009b. "Vapor Monitoring Report, Former TORX Facility, Rochester, Indiana"; April 14.

MACTEC 2009c. "Further Site Investigation Report, Former TORX Facility, Rochester, Indiana"; August 13.

MACTEC 2010. "Phase 2 Further Site Investigation Report, Former TORX Facility, Rochester, Indiana"; July 14.

MACTEC 2011. "December 2010 Groundwater Monitoring Event at the TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana"; May 9.

The environmental data associated with previous investigations have been utilized to identify a Conceptual Site Model (CSM) and to characterize current and potential future human exposures to environmental media associated with the Site. The CSM and exposure pathways associated with this assessment are detailed in Section 3.0.

### **1.3 SUMMARY OF INVESTIGATION RESULTS**

The investigation activities and monitoring activities that have been conducted by MACTEC to date include:

- Passive soil gas survey;
- Comprehensive soil boring and vertical groundwater quality profiling;
- Installation of a groundwater monitoring well network and comprehensive groundwater sampling and analysis programs;
- Comprehensive water well survey;
- Sampling and analysis of private water wells used for potable use (industrial and residential properties);
- Installation of in-home water treatment systems with continuing sampling and analysis of the potable water to demonstrate the on-going effectiveness of the treatment systems;
- Residential vapor intrusion investigation, including the installation of soil gas monitoring wells adjacent to several residences and soil gas and indoor air sampling and analysis at one residence;
- Vapor intrusion investigation at the facility, including sub-slab soil gas sampling and analysis and indoor air sampling and analysis;
- Sampling and analysis of surface water and/or sediments in two ponds and a stream; and
- Sampling of sediments and surface water in the wetlands located on a residential property.

In addition to the field investigations, there have been evaluations of the stability of the groundwater plume, and modeling has been conducted to evaluate potential future plume conditions and potential future groundwater quality.

#### **1.3.1 Source Area**

Available information indicates chlorinated solvents were historically released during former industrial operations at the TORX facility. Historical investigations identified chlorinated solvents in sediments of the Western Pond, as described in Section 1.2. The remediation of the pond was conducted well after the last known use of TCE at the facility. Due to the remediation of sediments in the Western Pond, the pond itself is not considered a potential exposure point for the purposes of the HHRA. Likewise, chlorinated VOCs have not been detected in the surface soil at the Site and there is no potential for exposure to VOCs in surface soil. Chlorinated VOCs have been detected in soil and groundwater beneath the degreaser pit located in the central portion of the Site. The chlorinated VOCs associated with the Site (Site-related VOCs) include TCE, cis-1,2-DCE, 1,1-DCE, and vinyl chloride.

#### **1.3.1.1 Degradation of TCE**

In the subsurface environment, chlorinated VOCs are subject to degradation as they migrate with groundwater. The following subsection describes the typical degradation pathway for TCE and summarizes the typical degradation products.

Transformation of TCE in the groundwater environment occurs via biologically mediated degradation processes. Reductive dechlorination of TCE occurs in low oxygen (anaerobic) conditions as bacteria use it as a final electron acceptor, typically with naturally occurring organic carbon as the electron donor (carbon source). When TCE is released to groundwater in an environment favorable to anaerobic degradation, it is common to initially see TCE in the release area, and the degradation products predominate in the area downgradient of the original release. TCE may degrade to cis-1,2-DCE, trans-1,2-DCE and/or 1,1-DCE. TCE preferentially degrades to cis-1,2-DCE, with trans-1,2-DCE and 1,1-DCE as secondary and tertiary pathways, respectively. The DCE degradation products are less attractive as an electron acceptor than TCE, and will tend to be more resistant to degradation. Upon degradation, DCE is transformed to vinyl chloride, also via reductive dechlorination. Since chlorinated VOCs are subject to degradation as they migrate with groundwater flow, it is common to see cis-1,2-DCE and vinyl chloride downgradient of the source area.

Vinyl chloride is less susceptible to anaerobic degradation, and is more likely to degrade in environments with more oxygen or via natural physical mechanisms (dispersion and dilution). Under aerobic conditions, vinyl chloride is used by the bacteria as an electron donor (carbon source) rather than as an electron acceptor. Upon degradation, vinyl chloride may be dechlorinated to ethene or undergo direct mineralization to carbon dioxide, water, and chloride. Ethene may degrade to ethane by breaking the double carbon bond prior to complete mineralization.

#### **1.3.1.2 Occurrence of VOCs in On- and Off-Site Media**

Chlorinated VOCs have been detected in subsurface soils near the degreaser pit in soil samples (B-1, B-2, B-3, SB-16, SB-17, and SB-18) collected in 1988. Investigation activities have confirmed that chlorinated VOCs have infiltrated to groundwater beneath the facility and have migrated vertically and horizontally in groundwater.



A Further Site Investigation (FSI) of the TORX Facility was completed in multiple phases of monitoring well installation and groundwater sampling. The FSI identified a source area of VOCs in groundwater beneath the TORX facility and a plume of VOCs migrating toward the east, extending to the eastern pond. The plume then turns south, toward the Tippecanoe River.

The geologic stratigraphy consists of high permeability sand and gravel zones with interbedded, low-permeability silt and clay layers. The silt and clay layers appear to be laterally discontinuous, allowing increased vertical flow in some locations. Analysis of the information gathered during the FSI indicates that the hydrostratigraphic relationships of multiple relatively permeable zones, separated by lower-permeability, fine grained units, are complex. Individual high permeability zones appear to convey impacted groundwater independently of lower permeability zones. Interconnections between high permeability zones separated by lower permeability zones are evident due to the presence of VOCs in deeper zones. However in some areas of the VOC plume footprint, deeper zones do not contain VOCs. The aquifer is therefore determined to be an unconsolidated, non-homogeneous, unconfined to semi-confined aquifer of glacial and fluvial depositional composition. Bedrock underlies the aquifer system at depths of approximately 150 feet below ground surface near the TORX Facility.

Flow zones within the unconsolidated sediments tend to be sand and coarser grained material, locally separated by fine grained, lower permeability layers, which, where present, impede vertical flow. Analysis of vertical flow components indicates that the predominant vertical flow component is downward with exception of the areas surrounding the Eastern Pond and Tippecanoe River.

A fate and transport evaluation was completed as part of the FS to determine whether the VOC plume is expanding or static. Based on the results of the evaluation completed and discussed above, the VOC plume appears to be stable at distances greater than 500 feet from the source area.

Because the shallowest flow zone (Zone 1, 765 feet above mean sea level [ft-amsl] to 786 ft-amsl relative to the 1988 North America Vertical Datum, [NAVD88]) has been documented to contain the highest concentrations of VOCs, the fate and transport evaluation in the FS focused on the shallowest flow zone. It is important to note that the distribution of VOCs illustrated on **Figure 4** includes the total vertical distribution of VOCs detected. While VOCs are present in lower

saturated zones, the concentrations tend to be relatively low (compared to the shallow flow zone) and therefore, analysis of the shallow flow zone (referred to as “shallow overburden groundwater” in this document) presents the worst-case analysis.

Groundwater samples were collected from monitoring wells over a period of approximately 18 months (May 2009 through December 2010). Based on the analysis of samples collected during those sampling events, the lateral limits of TCE, cis-1,2,-DCE, and vinyl chloride have been determined. **Figure 4** provides the lateral limits of TCE, 1,1-DCE, cis-1,2-DCE, TCE, trans 1,2-DCE, and vinyl chloride in groundwater. Based on the analytical results, the lateral limits of TCE, trans-1,2-DCE and 1,1-DCE are within the limits of cis-1,2,-DCE and vinyl chloride. Groundwater sampling during the FSI also indicated that the apparent source of cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE and vinyl chloride is the degradation of the TCE released from the source area. TCE was detected in the greatest concentrations in the source area (MW-59(29)) and approximately 450 feet downgradient of the TORX facility (MW-14).

Downgradient groundwater has been impacted through the transport and degradation of TCE from the source area. Evidence suggests that VOCs originating in the source area have migrated east to Property 40 and south to Property 8, which is located just north of the Tippecanoe River (**Figure 3** shows the location of these properties and features). Groundwater sampling and fate and transport modeling indicate that the plume appears stable at distances greater than 500 feet from the source area and VOCs have not reached the river.

The following potential migration pathways have been identified and considered during the identification of exposure media, exposure points, potential receptors, and exposure routes:

- Dissolved phase transport in groundwater during advective flow. The groundwater flow direction is eastward from the source area and then in a general southerly or southwesterly direction. The boundaries of groundwater impact are shown on **Figure 4**.
  - Within the area of impacted groundwater, there are numerous private residences and two industrial properties (Site and Property 36) that utilize groundwater for potable and non-potable (process water, irrigation, livestock) purposes.
  - Activated carbon water treatment systems have been installed at 31 residential properties and a comprehensive monitoring program has demonstrated that the systems effectively eliminate exposure to chlorinated VOCs associated with potable uses of the groundwater. However, VOCs have only been detected in the untreated potable water samples collected from six of the 31 residential properties.

- IDEM indicated that homes that are connected to the future public water supply may continue to utilize existing private wells for irrigation and other non-potable uses.
- Potential dissolved phase transport in shallow groundwater to wetland surface water and wetland soil at Property 38.
- Dissolved phase transport in shallow groundwater to surface water and sediment of the Eastern Pond at Properties 39, 36, and 40.
- Potential dissolved phase transport in shallow groundwater to surface water of the pond at Property 15.
  - Potential accumulation of VOCs in fish and other aquatic organisms (no chlorinated VOCs detected in the surface water)
  - Potential exposure to sediment and/or surface water by recreational receptors (wading, swimming) - (no chlorinated VOCs detected in the surface water)
- Potential vapor intrusion from shallow groundwater to indoor air in occupied industrial (Property 41 and Property 36) and residential buildings within the impacted area.
- There is no indication that chlorinated VOC impacts to soil extend beyond the Site property. Therefore, no migration pathways are associated with surface soil.

### 1.3.2 Summary of Data Selection for the Risk Assessment

The available data for the Site have been reviewed and evaluated, and the data potentially representative of current and potential future exposures for human and environmental receptors have been selected for use in the risk assessment. In the following bullets, Site analytical data are identified, use of the data in the risk assessment is identified, and the reader is directed to presentations of the data. **Table A-2 in Appendix A** lists samples that have been utilized in the risk assessment. Overall, recent data (collected since November 2008) are utilized in the risk assessment.

- **Passive soil gas survey** – the data from the 2007 survey were collected primarily on the Site (Property 41) and more recent soil gas and indoor/outdoor air data have been collected. The survey utilized sorbent tubes inserted 30 inches into the soil, left to incubate, removed and submitted to the laboratory for analysis by USEPA SW-846 Method 8260B. The results were reported in nanograms per tube rather than as soil gas concentrations. The passive soil gas survey results were presented in the survey report (Beacon Environmental Services, Inc., 2007). The more recent indoor/outdoor air data (discussed below) are used in the risk assessment to evaluate the vapor intrusion pathway at the facility.
- **Comprehensive soil boring and vertical groundwater quality profiling** – selected data have been used in constructing the CSM and in identifying the migration and exposure pathways for the Site.

- **Groundwater monitoring well installation and sampling** – The risk assessment relies on the previous data interpretations (MACTEC, 2008, 2009a, 2009c, 2009d, 2010, and the FS), which have concluded that the horizontal and vertical extent of the groundwater plume has been delineated and that the plume appears stable (i.e. not expanding) at distances greater than 500 feet from the source area. In addition, the risk assessment has relied upon selected groundwater monitoring well data as input values for vapor intrusion modeling. The groundwater monitoring well data used for that purpose are presented in **Table A-3 (Appendix A)**. Locations of monitoring wells are identified in **Figure 2**.
- **Comprehensive water well survey** – the survey did not generate analytical data, but it is essential to the evaluation of the drinking water pathway.
- **Sampling and analysis of private, potable water wells** – the analytical data for potable private water wells have been collected and reported in recent Site investigation documents (MACTEC, 2008, 2009a, 2009c, 2009d, 2010) as well as in historical documents. The VOC analytical data collected by MACTEC and considered in the risk assessment for samples collected from private residential wells are presented in **Table A-4 (Appendix A)** and the recent VOC analytical data (November 19, 2008 and May 11, 2010) from the industrial facility at Property 36 are presented in **Table A-5 (Appendix A)**. One or more VOCs have been detected in potable water samples from eight residences (Properties 8, 16A, 17, 18, 19, 20, 39, and 40). The location of the potable water wells that tested positive for VOCs are marked with an asterisk on **Figure 5**. Water treatment systems have been installed at six of the eight properties (Properties 8, 16A, 17, 18, 19, and 20) and treated water is sampled quarterly. Water treatment systems have not been installed at properties 39 and 40 because they are no longer used for residential purposes and the potable water wells are not utilized as a drinking water source. Treatment systems have also been installed in several residences where VOCs have not been detected in potable water samples. No VOCs were detected in the samples from Property 36 (reporting limits of 0.5 micrograms per Liter, ug/L). The systems are effective in removing the VOCs as shown by the results for the treated samples as shown in **Table A-7**. The VOC analytical data from four sampling events (April 2002, April 2005, March 2008, and May 2009) for potable water at the industrial facility at Property 41 are presented in **Table A-6**. No VOCs were detected in the samples collected from Property 41 (reporting limits of 0.5 ug/L).
- **Residential vapor intrusion investigation** – The residential vapor intrusion investigation, including the installation of soil gas monitoring wells adjacent to several residences and soil gas and indoor air sampling and analysis at one residence – **Figure 2** identifies the locations of the vapor monitoring wells. **Table A-8A** presents the analytical data for the soil gas samples collected in December 2008 from vapor monitoring wells VMW-1 through VMW-10 and VMW-12, and **Table A-8B** presents the analytical data for the soil gas samples collected in December 2010 from vapor monitoring wells VMW-4 through VMW-5. VMW-11 could not be sampled in December 2008. The soil gas data were compared to the IDEM Residential Soil Gas Screening Levels as described in the Vapor Monitoring Report (MACTEC, 2009b). Based on this comparison, the 2009 report concluded the vapor intrusion pathway was not significant in the vicinity of the vapor monitoring wells. The vapor monitoring wells were installed on the properties indicated below.
  - VMW-1, VMW-2 – Property 38
  - VMW-3 – Property 41

- VMW-4, VMW-5 – Property 16A
- VMW-6 – Property 23
- VMW-7 – Property 21
- VMW-8, VMW-9 – Property 20
- VMW-10 – Property 17
- VMW-11 – Property 18
- VMW-12 - Property 14

**Table A-9** presents the analytical data for the sub-slab soil gas, indoor air, and outdoor air samples collected in February 2010 at Property 15. As a supplemental support to the vapor intrusion evaluation, the Johnson & Ettinger Vapor Intrusion Model was applied, using site-specific physical and geological information, to further evaluate the potential for vapor intrusion and to provide information concerning the level of risk that might be associated with that pathway. The Johnson & Ettinger Vapor Intrusion Model was applied to Properties 8, 16A, 17, 18, 19, 20, 21, 23, 36, 37, 38, and 39. The results of the Johnson & Ettinger Vapor Intrusion Model are presented in Section 5 and Appendix B.

- **Facility vapor intrusion investigation** – The vapor intrusion investigation at the facility, including sub-slab soil gas sampling and analysis and indoor and outdoor air sampling and analysis – **Figure 6** identifies the location of these samples at Property 41. **Table A-10 and Table A-11** presents the analytical data for the May 2010 and February 2011 indoor air samples, respectively.
- **Pond surface water/sediment sampling** – The sampling and analysis of surface water and/or sediments in two ponds (Eastern Pond located on Properties 36, 39, and 40 and Pond A located on Property 15), and a stream (Property 15) and a tile drain feature (Property 8). **Figure 7** shows the location of these surface water and sediment samples. **Table A-12** presents the analytical data for the Eastern Pond surface water samples collected in April 2009 and **Table A-13** presents the analytical data for the Pond A, stream, and tile drain surface water samples collected in January 2009. **Table A-14** presents the analytical data for the Eastern Pond sediment samples collected in April 2009; and
- **Wetland surface water/sediment sampling** – Sampling of surface water and sediments in the wetlands located on a residential property (Property 38). **Table A-15** presents the analytical data for the surface water sample collected in May and June 2009. **Table A-16** presents the analytical data for the Property 38 wetland sediment samples collected in June 2009.

## 1.4 ORGANIZATION OF REPORT

This HHRA report is presented in seven sections and generally follows the outline suggested in the USEPA RAGS Part A (USEPA, 1989) guidance document. Section 1.0 is this introduction. Section 2.0; provides the hazard identification, and Section 3.0 provides the exposure assessment, including receptor identification, development of exposure profiles and exposure point concentrations (EPCs). Section 4.0 contains the toxicity assessment, and Section 5.0,

provides the risk characterization, which discusses the results of the quantitative risk assessment. Section 6.0 contains the uncertainty analysis, which identifies areas of uncertainty and their potential effect on the risk assessment results. Section 7.0 provides the conclusions that can be drawn from the risk assessment results and recommendations for further work (if necessary). Appendix A documents the samples and analytical data considered in the risk assessment. Appendix B contains the documentation of the vapor intrusion modeling activities. The Outdoor Water Use Risk Assessment (non-potable use of existing potable wells) is presented in **Appendix C**.

The table numbering in this report is consistent with the numbering of Tables in the USEPA's *Risk Assessment Guidance for Superfund (RAGS): Volume I - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting and Review of Superfund Risk Assessments) Final* (USEPA, 2001c). That guidance includes standardized tables (with a specific numbering scheme) for reporting risk assessment activities. For each group of tables (such as Tables 2.1 through 2.16, which present the selection of constituents of potential concern, [COPCs]), the tables are numbered according to the RAGS Part D convention (Table 2), followed by a consecutive number (1 through 16).



## **2.0 HAZARD IDENTIFICATION**

The objective of the hazard identification is to present an orderly compilation of the available sampling data on the hazardous substances present at the Site, identify data sets suitable for use in a quantitative risk evaluation, and identify COPCs upon which the quantitative assessment of risk will be based. Summaries of the analytical data have been generated using Risk Assessment Guidance for Superfund (RAGS) Part D standard Table 2s, for each constituent detected in groundwater, sediment, surface water, wetland soils, soil gas, and indoor air. Table 2s include the minimum and maximum concentrations (including locations of the latter), minimum and maximum data qualifiers, concentration units, frequency of detection, range of detection limits, concentration used for screening, screening toxicity value, potential regulatory criteria (i.e., Food and Drug Administration (FDA) levels, state standards), whether a contaminant is chosen as a COPC, and the rationale for that choice.

All analytes detected during sampling efforts, not just site-related analytes have been considered in the selection of COPCs for the human health evaluation. This approach results in a total estimate of risk (including risks associated with background or ambient conditions in the area) to the receptors potentially exposed to groundwater, sediment, surface water, wetland soil, and/or indoor air. If actionable risks were identified, the risks associated with only the Site-related COPCs could be calculated and compared to total risks to provide perspective for risk management decisions.

### **2.1 SELECTION OF CHEMICALS OF POTENTIAL CONCERN**

This section identifies the chemicals present at the Site; the process and criteria used for the selection of COPCs; and the COPCs for each environmental medium.

#### **2.1.1 COPC Selection Procedure and Criteria**

COPCs are constituents for which data of sufficient quality are available, and which may pose more than a *de minimus* health risk. All compounds that were detected in each environmental medium were carried forward as COPCs and were quantitatively evaluated in the HHRA.

The COPCs for each medium at each exposure area are summarized in Tables 2.1 through 2.16. Tables 2.1 and 2.2 identify COPCs for wetland soil and surface water for the wetlands associated

with Eastern Pond on Property 38. Tables 2.3 and 2.4 identify COPCs for the Eastern Pond, as present on Properties 36, 39, and 40. Tables 2.5 and 2.6 identify COPCs for industrial air (potential vapor intrusion) at Property 36. Tables 2.7 through 2.16 identify COPCs for residential air (potential vapor intrusion) at Properties 8, 16A, 17, 18-19, 20, 21, 23, 37, 38, and 39. Indoor air sampling and analysis was conducted at Property 15 in February 2010 and at Property 41 in May 2010 and February 2011. The data for those sampling events are presented in **Table A-9** (residential Property 15) and **Tables A-10 and A-11** (industrial Property 41). All detected compounds from those indoor air sampling events have been identified as COPCs.

### **2.1.2 COPC Selection Results**

The COPC selection for each medium in each of the groupings is discussed below and documented in Tables 2.1 through 2.16. Because the Site investigation activities were focused on VOCs, the selected COPCs in the various media are limited to VOCs. Because so few compounds were detected, the risk-based screening has not been conducted – rather, all detected VOCs in each medium have been identified as COPCs and have been evaluated in the HHRA. This is a very conservative approach because only TCE, 1,1-DCE, cis-1,2-DCE, and vinyl chloride are Site-related VOCs. However, this conservative approach results in a complete evaluation of the potential risks associated with all detected compounds.

**Table 2.1** identifies COPCs for wetland soil on Property 38. COPCs include acetone, 2-butanone, carbon disulfide, and toluene. Acetone and 2-butanone can be generated by the reaction of sample preservatives with organic material, and they are common laboratory contaminants, which could indicate that these detections might be an artifact of the sample collection or laboratory analysis processes. In addition, carbon disulfide has been shown to be generated by moist soils with a low humic content, similar to those that may be found in a wetland. However, as a conservative measure, all compounds have been retained as COPCs. No Site-related VOCs were reported in wetland soil samples from the Property 38 area.

**Table 2.2** identifies COPCs for in surface water on Property 38. Only toluene was detected in surface water samples and that compound was selected as a COPC for surface water at Property 38. No Site-related VOCs were reported in surface water samples collected from Property 38.

**Table 2.3** identifies COPCs for sediment on Properties 36, 39 and 40. COPCs include acetone, 2-butanone, cis-1,2-DCE and toluene. The only Site-related VOC detected in the sediment samples was cis-1,2-DCE.

**Table 2.4** identifies COPCs for surface water on Properties 36, 39 and 40. Only cis-1,2-DCE, which is a Site-related VOC, was detected and that compound was retained as a COPC.

**Table 2.5** identifies COPCs for soil vapor to estimate indoor air quality at Property 36 (industrial land use). Since a vapor monitoring well is not located at Property 36, as a conservative measure, vapor monitoring well VMW-3(4.5-5), which is located at the Site (Property 41) was used to identify COPCs and estimate indoor air quality for the vapor intrusion pathway at Property 36. COPCs include acetone, benzene, 2-butanone, carbon disulfide, chlorobenzene, dichlorodifluoromethane, ethylbenzene, hexane, methylene chloride, toluene, trichlorofluoromethane, 1,2,4-Trimethylbenzene (1,2,4-TMB), and xylenes. No Site-related VOCs were reported in soil vapor samples collected from VMW-3(4.5–5).

**Table 2.6** identifies COPCs for groundwater (used to identify COPCs and estimate indoor air quality for the vapor intrusion pathway) at Property 36. COPCs include 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, TCE and vinyl chloride. This is a secondary approach for evaluating the vapor intrusion pathway – the primary approach is to use the soil vapor data. TCE, 1,1-DCE, cis-1,2-DCE, and vinyl chloride are Site-related VOCs.

**Table 2.7** identifies the COPCs for groundwater in monitoring wells MW-37 and MW-39 and the Property 8 potable water well (used to identify COPCs and estimate indoor air quality for the vapor intrusion pathway) at the residential Property 8. No VOCs were detected in groundwater samples from the monitoring wells. However, cis-1,2 DCE, which is a Site-related VOC, was detected in the potable water samples collected from Property 8. Therefore, cis-1,2-DCE is a COPC for Property 18.

**Table 2.8** identifies COPCs for adult and child residents in indoor air on Property 16A. COPCs include acetone, benzene, 2-butanone, chlorobenzene, ethylbenzene, hexane, methylene chloride, toluene, PCE, 1,2,4-TMB, and xylenes. None of the COPCs are Site-related VOCs.

**Table 2.9** identifies COPCs for adult and child residents in indoor air on Property 17. COPCs include benzene, hexane, methylene chloride, toluene, 1,2,4-TMB, and xylenes. None of the COPCs are Site-related VOCs.

**Table 2.10** identifies COPCs for adult and child residents in indoor air on Properties 18 and 19. Property 18 had a soil gas well installed that could not be sampled due to ice build-up in the protective cover; no soil gas wells were installed on Property 19. Therefore, the COPCs for Properties 18 and 19 have been determined by using the maximum groundwater concentrations underlying these properties. Vinyl chloride, which is a Site-related VOC, is a COPC for Properties 18 and 19.

**Table 2.11** identifies COPCs for adult and child residents in indoor air on Property 20. COPCs include benzene, 2-butanone, carbon disulfide, Freon 113, hexane, methylene chloride, toluene, 1,2,4-TMB, and xylenes. None of the COPCs are Site-related VOCs.

**Table 2.12** identifies COPCs for indoor air on Property 21. COPCs include benzene, carbon disulfide, ethylbenzene, Freon 113, hexane, methylene chloride, toluene, 1,2,4-TMB, 1,3,5-TMB and xylenes. None of the COPCs are Site-related VOCs.

**Table 2.13** identifies COPCs for indoor air on Property 23. COPCs include acetone, benzene, 2-butanone, carbon disulfide, chlorobenzene, 1,2-dichlorobenzene, dichlorodifluoromethane, ethylbenzene, Freon 113, hexane, 4 methyl-2-pentanone, methylene chloride, toluene, 1,2,4-TMB, 1,3,5-TMB and xylenes. None of the COPCs are Site-related VOCs.

**Table 2.14** identifies COPCs for adult and child residents in indoor air on Property 37. COPCs include cis-1,2-DCE, TCE and vinyl chloride and are all Site-related VOCs.

**Table 2.15** identifies COPCs for indoor air on Property 38. The most shallow soil vapor probe installed at Property 38 is VMW-2(4.5-5). Therefore, the soil gas sample collected from VMW-2(4.5-5) was used to evaluate the COPCs for Property 38. COPCs include acetone, benzene, 2-butanone, chlorobenzene, toluene, and xylenes. None of the COPCs are Site-related VOCs.

**Table 2.16** identifies COPCs for indoor air on Property 39. COPCs include TCE, which is a Site-related VOC.

### **3.0 EXPOSURE ASSESSMENT**

As defined by the USEPA (USEPA, 1989a), exposure to a chemical is the contact of that chemical with the outer boundary of the body (i.e., skin and openings such as mouth, nostrils, or punctures and lesions). An exposure assessment is the quantitative or qualitative evaluation of that contact. It describes the intensity, frequency, and duration of contact, as well as the rates at which the chemical crosses the boundary (chemical intake or uptake rates), the route by which it crosses the boundary, and the resulting amount of chemical that actually crosses the boundary (a dose) and the amount absorbed (internal dose).

The objective of the exposure assessment is to estimate the type and magnitude of exposures to COPCs at or migrating from the site. The exposure assessment is conducted to: 1) characterize the populations of humans potentially exposed via inhalation of indoor air overlying impacted groundwater and via direct contact with surface water and sediment at and adjacent to the Eastern Pond (Properties 36, 39 and 40) and associated wetlands (Property 38) as well as Pond A on Property 15; 2) identify the mechanisms by which receptors may be exposed; and 3) identify the intake, or dose, of COPCs that receptors may receive through the identified exposure pathways. The exposure assessment includes the following components:

- Characterization of the exposure setting (including current and future land use);
- Identification of exposure pathways (including receptor identification and exposure scenarios, and exposure points);
- Identification of EPCs;
- Quantification of exposures; and
- A summary of exposures by receptor and exposure point.

Present and future potential exposures to site contaminants include the inhalation of indoor air overlying the impacted groundwater by potential human receptors and direct contact with surface water and sediment, and include an evaluation of sensitive receptors. Narrative descriptions and summary tables of exposure scenarios are provided in this section. The exposure scenarios for current and future potential scenarios are summarized in RAGS Part D Table 4s.

### 3.1 CHARACTERIZATION OF EXPOSURE SETTING

As discussed in the previous reports, the study area has been segregated into specific exposure areas (EAs) as defined by property boundaries (see **Figure 3**). The address for each EA and corresponding map designation are detailed on **Table A-1** in **Appendix A**.

### 3.2 CONCEPTUAL SITE MODEL

The CSM identifies potential source areas from which VOCs, including TCE, may have been released, the migration pathways through which they may have been transported and/or translocated to other environmental media, and where possible exposure may occur. The CSM provides a framework for understanding sources of VOCs, migration pathways, identification of potential receptors, and development of exposure profiles. The CSM is presented graphically in **Figure 8**.

#### 3.2.1 Potential Human Receptors

**Table 3.1** indicates which receptors and exposure pathways were evaluated. Consistent with USEPA objectives, the following pathways are evaluated for the HHRA, as summarized in **Table 3.2**:

- 1) Potential child and adult resident exposure to COPCs via direct contact (incidental ingestion and dermal contact) with wetland soils on Property 38;
- 2) Potential child and adult resident exposure to COPCs via direct contact (incidental ingestion and dermal contact) with surface water and sediments on Properties 36, 39, and 40. There is no evidence that the surface water or sediment of the pond on Property 15 are or will be impacted by Site-related VOCs. Therefore, no exposure assessment has been conducted for angling or other recreational activities at those ponds or for any exposures potentially related to livestock drinking from those ponds;
- 3) Potential industrial worker exposure to COPCs via inhalation of indoor air (potential vapor intrusion pathway) on Property 41 (indoor air data);
- 4) Potential industrial worker exposure to COPCs via inhalation of indoor air (potential vapor intrusion pathway) on Property 36 (potential indoor air concentrations estimated via modeling);
- 5) Potential resident exposure to COPCs via inhalation of indoor air (potential vapor intrusion pathway) at residential properties within the groundwater impact area. Those properties at which soil vapor monitoring wells were installed, sampled, and analyzed for VOCs (Property 16A, 17, 20, 21, 23 and 38) have previously been evaluated as reported in the April 14, 2009 Vapor Monitoring Report, Former TORX Facility (MACTEC, 2009). That report concluded “the vapor intrusion exposure pathway is considered incomplete. Therefore, indoor air sampling at the residences is not warranted.”; and

- 6) There is no ongoing potable use of untreated, impacted groundwater at any location within the groundwater impact area. All impacted private wells (six total) have operating activated carbon treatment systems. In other words, engineering controls have eliminated that exposure pathway. Therefore, no current potable use exposure scenario has been evaluated quantitatively for residential properties. Two industrial facilities located within the groundwater impact area (Property 36 and Property 41) utilize groundwater for potable purposes. However, sampling and analysis results for those potable water systems have not detected Site-related VOCs. Tables A-4 and A-5 (located in Appendix A) present recent analytical data for the potable water samples at Properties 36 and 41, respectively. No VOCs have been reported in those potable water samples. Therefore, there is not a current exposure pathway, and no quantitative exposure assessment has been conducted for potable use of groundwater at those two facilities. If VOCs are detected in future potable water samples collected from Properties 36 or 41, then engineering controls will be implemented. The engineering controls will include the installation of a water treatment system or connection to the public water system. Therefore, it would be expected there would not be a complete exposure pathway with respect to the wells at those two industrial properties.

### **3.3 IDENTIFICATION OF EXPOSURE PATHWAYS, POTENTIAL RECEPTORS, AND EXPOSURE POINTS**

This subsection describes the receptors, exposure pathways, exposure parameters and exposure points for the industrial worker and the neighborhood resident receptors.

This step involves the identification of all relevant exposure pathways through which specific populations may be exposed (current and future) to contaminants at the site. An exposure pathway consists of four necessary elements: 1) a source or mechanism of chemical release; 2) a transport or retention medium; 3) a point of human contact; and 4) a route of exposure at the point of contact (USEPA, 1989a). **Table 3.2** is the exposure pathway summary table. This table identifies the receptor populations, exposure media and pathways, and exposure points for this HHRA.

Exposures were evaluated based on the reasonable maximum exposure (RME) scenario. The RME is the highest exposure that is reasonably expected to occur at a site. The RME scenario is characterized by coupling the contaminant concentrations with conservative exposure parameters developed for each exposure scenario. The RME scenario is summarized in RAGS Part D Table 4s, and is discussed in Sections 3.2.1 and 3.2.2 below; results are described in the text. Exposure parameters are obtained from USEPA guidance (USEPA, 1997a) and other USEPA-approved sources. In general, RME parameters represent 95<sup>th</sup> percentile values.



### 3.3.1 Receptor Exposure Scenarios for Surface Water and Sediment

Using the information summarized in **Table 3.2**, receptor exposure scenarios were compiled. The following paragraphs discuss the receptor exposure scenarios.

Exposure parameters for the RME were selected from USEPA guidance documents (USEPA, 1994; 1997; and 2001) and were based on professional judgment considering the site-specific exposure conditions. This subsection describes the exposure scenarios and parameters in detail.

#### Property 38 Resident with Wetlands Associated with Eastern Pond

A resident who lives at the Property 38 may visit the wetlands associated with Eastern Pond for recreational walking, hunting, and wading. It is assumed that area residents include young children (ages 1 through 6), older children (ages 7 through 18), and adults (assumed ages 19 through 30). Potential exposures to wetland soils by incidental ingestion and dermal contact may occur during walking, hunting, or wading. The RME exposure parameters for wetland soils are presented in **Table 4.1**.

*Exposure Duration.* For the RME scenario, it is assumed that an area resident is raised at and remains at the same residence over a 30-year period (USEPA, 1994). The 30-year duration is segregated into two age periods: young child (ages 1 through 6) for 6 years; and adolescent/adult (ages 7 through 18 and ages 19 through 30, respectively) for 24 years.

*Exposure Frequency.* It is assumed that an area resident visits the wetlands for walking/exploring or hunting three times a week from May through October. The exposure frequency assumes that walking/exploring banks and hunting would each occur on the same day, such that a total of three visits to the water bodies occur each week.

*Body Weight.* Body weight values for young children and adults are based on values recommended in USEPA guidance (USEPA, 1994).

*Incidental Ingestion Rate and Fraction Ingested.* The incidental ingestion rates for wetland soil are the default ingestion rate values for soil recommended in USEPA (1994) guidance; the ingestion rate for adults is applied to older children who are less likely than young children to place soil-covered hands in the mouth. The fraction ingested parameter for wetland soil is 100%.

As the wetland soil is likely to be saturated and/or beneath standing water, the exposure parameters used for sediment are likely more appropriate than those for soil. Human exposure parameter values specifically applicable to sediment are not provided in USEPA national guidance. Since incidental ingestion exposure to soil (or sediment) primarily occurs through hand-to-mouth transfer of material that has adsorbed to the skin, it is unlikely that ingestion exposure to COPCs in submerged sediment would occur through hand-mouth contact because sediment would wash off of the hand while the hand was being removed from the water. Nonetheless, it is possible that some sediment would adhere to the skin when leaving a water body (i.e., some sediment may not wash off), and it is possible that sediment entrained in the surface water could be ingested if surface water is incidentally ingested.

Incidental ingestion values for soil may be used for sediment. However, values for soil are generally considered conservative for sediment because: 1) The mechanism of exposure to sediment is different from soil, resulting in less particle adherence to the skin and lower dermal and ingestion exposures, as outlined above; and 2) soil incidental ingestion rate values are based on daily intakes from all sources of soil and sediment; it is not generally appropriate to assume that a receptor's total daily intake of soil and sediment is derived from sediment on the days of sediment exposure. Nonetheless, it is possible that the residents could spend most of their outdoor recreational time in the wetland area of the property. Given these considerations, the soil ingestion rates published by USEPA) are used as sediment ingestion rates, and the fraction ingested parameter for sediment of 100% is applied.

*Dermal Surface Area and Adherence Factor.* Exposures to wetland soil that may be submerged beneath standing water are unlikely to be substantial. In order for dermal absorption of COPCs from wetland soils to occur, the material must adhere to the skin (USEPA, 2001). Soils that are submerged would not adhere to skin, as the surrounding surface water would prevent binding of the soil to the skin. In addition, when a body part that contacts wetland soil is removed from the surface water body, the majority of soil would wash off, thereby preventing adherence of the material. Hence, although dermal exposures to COPCs in wetland soil are likely to be negligible, they are quantified to account for the possibility that some wetland soil may remain adhered to the skin following contact with surface water.

The dermal surface area and adherence factor values for wetland soil are based on the IDEM RISC default values for residential exposures to soil.

Property 36, 39 and 40 Resident with Eastern Pond

A resident who lives at Property 39 or 40 may visit the Eastern Pond either on their property or on the adjacent Property 36 for wading. Swimming is considered unlikely due to the shallow nature of the Eastern Pond. It is assumed that area residents include young children (ages 1 through 6), older children (ages 7 through 18), and adults (assumed ages 19 through 30). Potential exposures to surface water and aquatic (submerged) sediment by incidental ingestion and dermal contact may occur during wading. However, Properties 39 and 40 are no longer used for residential purposes and the potable water wells are not utilized as a drinking source.

Cancer and non-cancer risk estimates are calculated separately for each of the exposure media and exposure points identified in **Table 3.2**. The risks for each medium at each exposure point summed to derive a total risk for surface water and sediment. The exposure parameters for surface water are presented in **Table 4.2** and for sediment in **Table 4.3**.

*Exposure Duration.* It is assumed that an area resident is raised at and remains at the same residence over a 30-year period (USEPA, 1994). The 30-year duration is segregated into two age periods: young-child (ages 1 through 6) for 6 years; and adolescent/adult (ages 7 through 18 and ages 19 through 30, respectively) for 24 years.

*Exposure Frequency.* It is assumed that an area resident visits the Eastern Pond for wading three times a week from May through October.

*Exposure Time and Event Frequency.* Exposures to surface water during wading activities are assumed to occur 1 hour per event, 1 event per day (i.e., 1 hour per day), based on the recommended exposure time for recreational swimming (USEPA, 1997).

*Body Weight.* Body weight values for young children and adults are based on values recommended in USEPA guidance (USEPA, 1994).

*Incidental Ingestion Rate and Fraction Ingested.* The incidental ingestion rate for surface water is based on the recommended value for incidental ingestion of water during swimming of 50 ml per hour (USEPA, 1988). The fraction ingested parameter for surface water is 100%, indicating that 100% of surface water intake on the day-exposed is assumed to occur at the Site.

The incidental ingestion rates for sediment are the default ingestion rate values for soil recommended in USEPA (1994) guidance; the ingestion rate for adults is applied to older children who are less likely than young children to place soil-covered hands in the mouth. The fraction ingested parameter for wetland soil is 100%.

Human exposure parameter values specifically applicable to sediment are not provided in USEPA national guidance. Since incidental ingestion exposure to soil (or sediment) primarily occurs through hand-to-mouth transfer of material that has adsorbed to the skin, it is unlikely that ingestion exposure to COPCs in submerged sediment would occur through hand-mouth contact because sediment would wash off of the hand while the hand was being removed from the water. Nonetheless, it is possible that some sediment would adhere to the skin when leaving a water body (i.e., some sediment may not wash off), and it is possible that sediment entrained in the surface water could be ingested if surface water is incidentally ingested.

Incidental ingestion values for soil may be used for sediment. However, values for soil are generally considered conservative for sediment because: 1) The mechanism of exposure to sediment is different from soil, resulting in less particle adherence to the skin and lower dermal and ingestion exposures, as outlined above; and 2) soil incidental ingestion rate values are based on daily intakes from all sources of soil and sediment; it is not generally appropriate to assume that a receptor's total daily intake of soil and sediment is derived from sediment on the days of sediment exposure. Nonetheless, it is possible that the residents could spend most of their outdoor recreational time in the Eastern Pond area. Given these considerations, the soil ingestion rates published by USEPA are used as sediment ingestion rates, and the fraction ingested parameter for sediment of 100% is applied.

*Dermal Surface Area and Adherence Factor.* Wading exposures would involve contact with the lower legs, feet, and hands, with values provided by IDEM.

Exposures to sediment that may be submerged beneath standing water are unlikely to be substantial. In order for dermal absorption of COPCs from sediment to occur, the material must adhere to the skin (USEPA, 2001). Sediment that is submerged would not adhere to skin, as the surrounding surface water would prevent binding of the sediment to the skin. In addition, when a body part that contacts sediment is removed from the surface water body, the majority of

sediment would wash off, thereby preventing adherence of the material. Hence, although dermal exposures to COPCs in sediment are likely to be negligible, they are quantified to account for the possibility that some sediment may remain adhered to the skin following contact with surface water.

Exposure parameter values for soil may be used for sediment. However, exposure parameter values for soil are generally too conservative for sediment as outlined above. The dermal surface area and adherence factor values for bank surface soil are based on the RAGS Part E (USEPA, 2001c) default values for residential exposures to soil.

### **3.3.2 Receptor Exposure Scenarios for Indoor Air**

Using the information summarized in **Table 3.2**, receptor exposure scenarios were compiled. The following paragraphs discuss the receptor exposure scenarios.

Exposure parameters for the RME were selected from USEPA guidance documents (USEPA, 1994; 1997; and 2001) and were based on professional judgment considering the site-specific exposure conditions. This subsection describes the exposure scenarios and parameters in detail.

Industrial/commercial workers at Property 36 and Property 41 and residents who live on any of the properties overlying the impacted groundwater will potentially be exposed to impacted groundwater via the inhalation of indoor air containing COPCs that may have volatilized from groundwater and migrated through the subsurface into the buildings.

Cancer and non-cancer risk estimates are calculated separately for each of the exposure points identified in **Table 3.2**. The exposure parameters for industrial workers are presented in **Table 4.4** and for residents in **Table 4.5**.

### **3.3.3 Exposure Points**

The site exposure points are defined by property boundaries, as shown on **Figure 3**.

#### Exposure Point Concentrations

A single concentration is selected as representative of the actual concentration for each COPC in a given medium for a given exposure point. This value, called the EPC, is used in the estimates

of health risks at the site. An EPC is selected for every COPC identified in the screening process described earlier.

The maximum detected COPC concentration has been used for each media at each exposure point. **Tables 3.3 through 3.20** documents the identification of EPCs for all media evaluated. Each table contains all of the EPCs for each of the exposure points for that medium.

### 3.4 QUANTIFICATION OF EXPOSURES

The next step is to calculate COPC intakes, via inhalation of indoor air and direct contact with surface water, sediment, and wetland soil for each of the potentially exposed populations. Population-related variables have been selected that describe the characteristics associated with individual receptors in that population.

#### 3.4.1 Estimation of Chemical-Specific Intakes

The chemical-specific intake, or the average daily dose (ADD), is the amount of COPC absorbed into the body. When appropriate, it is the product of the average daily exposure and an absorption factor (ABS). Chemical-specific intakes were calculated in a manner consistent with USEPA guidance for risk assessment (USEPA, 1989a; 2001a).

A Lifetime Average Daily Dose (LADD) is calculated in order to estimate carcinogenic risk. The Averaging Time (AT) over which the total intake of COPC is averaged is 70 years for carcinogenic effects (USEPA, 1989a).

For noncarcinogenic effects, depending on the duration of the exposure period, an Average Daily Dose, Chronic (ADD<sub>c</sub>) for long-term exposure (seven years or longer) or Average Daily Dose, Subchronic (ADD<sub>s</sub>) for exposure periods from a month up to seven years may be calculated.

#### Soil and Sediment Direct Contact Exposures

The ADD received by a receptor via direct contact with soil (ADD<sub>soil</sub>) is the sum of the ADDs for exposure via the routes of dermal contact with the contaminated soil and ingestion of the contaminated soil. The same approach is used for evaluation of sediment contact. Possible inhalation exposures are evaluated as described below. Thus,

$$ADD_{soil} = ADD_{dermal} + ADD_{ingestion}$$

Dermal Contact. The ADD due to dermal contact with COPC-contaminated soil (ADD<sub>dermal absorption</sub>) may be calculated:

$$ADD_{\text{dermal absorption}} = \frac{DA_{\text{event}} * SA * EF * ED}{BW * AT}$$

and:

$$DA_{\text{event}} = [COPC]_{\text{soil}} * AF * ABS * C$$

Where:

ADD <sub>dermal absorption</sub>	=	Average daily dose of COPC received through dermal contact with soil during the period of exposure (dimensions: mass/mass×time, typical units: mg/kg×day).
DA <sub>event</sub>	=	Dose of COPC absorbed during each exposure event (dimensions: mg/cm <sup>2</sup> )
[COPC] <sub>soil</sub>	=	EPC of COPC in the soil at the exposure point during the period of exposure (dimensions: mg/kg)
SA	=	Skin surface area in contact with the soil on days exposed (dimensions: cm <sup>2</sup> /day)
AF	=	Mass of soil adhered to the unit surface area of skin exposed (dimensions: mg/cm <sup>2</sup> )
ABS	=	Absorption Factor; represents the fraction of COPC that may be absorbed through the skin from soil (unitless)
EF	=	Exposure Frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (dimensions: days/year)
ED	=	Exposure Duration: the period of time over which exposure may occur (dimension: years)
BW	=	Body Weight of the receptor of concern during the exposure duration dimension: kg)
AT	=	Averaging Time (dimension: days)
C	=	Appropriate units conversion factor(s)

Ingestion. The ADD due to the incidental ingestion of COPC contaminated soil (ADD<sub>ingestion</sub>) may be calculated:

$$ADD_{\text{ingestion}} = \frac{[COPC]_{\text{soil}} * IR * EF * ED * C}{BW * AT}$$

Where:

ADD <sub>ingestion</sub>	=	Average daily dose of COPC received through the ingestion of soil during the period of exposure (dimensions: mass/mass×time, typical units: mg/kg×day).
[COPC] <sub>soil</sub>	=	EPC of the COPC in soil (dimensions: mass/mass, typical units: mg/kg).
IR	=	Daily soil ingestion rate on days exposed during the exposure period (dimensions: mass/time, typical units: mg/day)



EF	=	Number of exposure events during the exposure period divided by the number of days in the exposure period (dimensions: events/time, typical units: days/year).
ED	=	Duration of the exposure period (dimensions: time, typical units: years).
C	=	Appropriate units conversion factor(s)
BW	=	Body weight of the receptor of concern during the averaging period (dimensions: mass, typical units: kg).
AT	=	Averaging Time (dimension: time, typical units: days).

### Inhalation Exposures

Receptors at the Site, under certain conditions, have the potential to be exposed via inhalation to COPC that may migrate from groundwater to indoor air.

The methodology for evaluating inhalation exposures differs from that used for other exposure pathways in that the toxicity values used are reference concentrations (RfCs) and unit risks (URs) instead of reference doses (RfDs) and slope factors (SFs). Because concentration and not dose is the basis for these toxicity values, body weight (BW), and respiration rate (IR) are not used in calculating potential risk estimates for carcinogenic and noncarcinogenic chemicals. Therefore, an average air concentration, rather than an ADD, is calculated.

The general equation for estimating the average air concentration due to inhalation is as follows:

$$COPC_{air} = \frac{[CA]_{air} * ET * EF * ED}{C * AT}$$

Where:

[COPC] <sub>air</sub>	=	Representative concentration of OHM in the air at the Exposure Point during the period of exposure (dimensions: mass/volume)
[CA] <sub>air</sub>	=	Measured or modeled EPC (dimensions: mass/volume, typical units: ug/m <sup>3</sup> )
EF	=	Number of exposure events during the exposure period divided by the number of days in the exposure period (dimensions: events/time, typical units: days/year).
ET	=	Number of hours per day the exposure occurs (dimensions: time, typical units: hours/day)
ED	=	Duration of the exposure period (dimensions: time, typical units: years).
C	=	Appropriate units conversion factor(s) (24 hours per day)
AT	=	Averaging Time (dimension: time, typical units: days).

### Water Direct Contact Exposures

Use of surface water for wading includes incidental ingestion and dermal contact exposures. Exposures are quantified in accordance with USEPA guidance (USEPA, 1989a; 1995; and 2004).

Ingestion. The ADD due to the incidental ingestion of COPC contaminated surface water (ADD<sub>ingestion</sub>) may be calculated:

$$ADD_{ingestion} = \frac{[COPC]_{water} * IR * EF * ED * C}{BW * AT}$$

Where:

ADD <sub>ingestion</sub>	=	Average daily dose of COPC received through the ingestion of surface water during the period of exposure (dimensions: mass/mass×time, typical units: mg/kg×day).
[COPC] <sub>water</sub>	=	EPC of the COPC in surface water (dimensions: mass/mass, typical units: milligrams per Liter, mg/L).
IR	=	Daily water ingestion rate on days exposed during the exposure period (dimensions: mass/time, typical units: L/day)
EF	=	Number of exposure events during the exposure period divided by the number of days in the exposure period (dimensions: events/time, typical units: days/year).
ED	=	Duration of the exposure period (dimensions: time, typical units: years).
C	=	Appropriate units conversion factor(s).
BW	=	Body weight of the receptor of concern during the averaging period (dimensions: mass, typical units: kg).
AT	=	Averaging Time (dimension: time, typical units: days).

Dermal. The ADD for dermal contact with COPCs in surface water(ADD<sub>dermal absorption</sub>) may be calculated:

$$ADD_{dermalabsorption} = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

For Inorganics:

$$DA_{event} = K_p \times [COPC]_{water} \times t_{event}$$

For Organics when  $t_{event} \leq t^*$ :

$$DA_{event} = 2 \times FA \times K_p \times [COPC]_{water} \times \sqrt{\left[ \frac{6 \times \tau_{event} \times t_{event}}{\pi} \right]}$$

For Organics when  $t_{event} > t^*$ :

$$DA_{event} = FA \times K_p \times [COPC]_{water} \times \left[ \frac{t_{event}}{1+B} + 2 \times \tau_{event} \times \left( \frac{1+3 \times B+3 \times B^2}{(1+B)^2} \right) \right]$$

Where:

$ADD_{\text{dermal absorption}}$	=	Average daily dose of COPC received through dermal contact with water during the period of exposure (dimensions: mass/mass $\times$ time, typical units: mg/kg $\times$ day).
$[COPC]_{\text{water}}$	=	EPC of COPC in the water at the exposure point during the period of exposure (dimensions: mg/L)
$DA_{\text{event}}$	=	Dose absorbed per event (mg/cm <sup>2</sup> -event)
SA	=	Skin surface area in contact with the water on days exposed (dimensions: cm <sup>2</sup> /day)
Kp	=	Permeability Constant; represents the amount of COPC that may be absorbed through the skin from water (units: cm/hr)
$t_{\text{event}}$	=	Number of hours per day the exposure occurs (dimensions: time, typical units: hours/event)
$\tau_{\text{event}}$	=	Lag time per event (hr/event)
FA	=	Fraction absorbed (unitless)
$t^*$	=	Time to reach steady state (hr)
B	=	Ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the epidermis (dimensionless)
EF	=	Exposure Frequency: the number of exposure events during the exposure period divided by the number of days in the exposure period (dimensions: days/year)
EV	=	Event Frequency: the number of exposure events per day (dimensions: events/day)
ED	=	Exposure Duration: the period of time over which exposure may occur (dimension: years)
BW	=	Body Weight of the receptor of concern during the exposure duration dimension: kg)
AT	=	Averaging Time (dimension: days)

Values for FA, Kp,  $\tau_{\text{event}}$ ,  $t_{\text{event}}$ ,  $t^*$ , and B were obtained from RAGS Part E (USEPA, 2004).

The daily chemical intakes have been calculated separately for non-cancer and cancer endpoints using the EPCs presented in Tables 3.3 through 3.20 and the exposure parameters and intake equations shown in Tables 4.1 through 4.5. The daily intakes for all receptors, all age-groups, and all media are calculated in Tables 7.1 through 7.19. Each of those tables shows all daily intake calculations for all exposure media for a receptor group/age-group/exposure point combination.

## 4.0 TOXICITY ASSESSMENT

### 4.1 TOXICITY ASSESSMENT

The purpose of the toxicity assessment is to characterize the relationship between the dose of COPC administered or received and the incidence of adverse health effects in the exposed population. From this quantitative dose-response relationship, toxicity values (e.g. slope factors, reference dose values, or reference concentrations) are derived that can be used to estimate the likelihood of adverse effects as a function of human exposure to an agent. These toxicity values are used in the risk characterization process to estimate the potential for adverse effects occurring in humans at different exposure levels.

The dose-response relationship(s) for each chemical that has been selected as a COPC is presented in this section. The dose-response information may be divided into two major categories:

- Toxicity information associated with threshold (non-carcinogenic) health effects.
- Toxicity information concerning carcinogenicity, either from human epidemiologic data or from laboratory studies.

All the chemicals selected as COPCs are evaluated for potential *non-carcinogenic* health effects. In addition, any substance considered to be a *known*, *probable*, or *possible* human carcinogen is also evaluated for its potential carcinogenic effects. The classification of a chemical as a carcinogen does not preclude an evaluation of that same chemical for potential non-carcinogenic health risks, as all potentially carcinogenic chemicals may also exert non-carcinogenic health effects.

#### 4.1.1 Dose-Response Assessment for Carcinogenic Effects

It has been generally assumed historically that carcinogenic effects are non-threshold effects. This means that any dose, no matter how small, has been assumed to pose a finite probability of generating a response. Thus, no dose of a carcinogen has been thought to be risk-free. More contemporary evaluations that focus on the mechanisms of action by which a chemical may cause cancer have, for some chemicals, identified threshold doses below which carcinogenesis does not occur. In consideration of the nature of the toxicological data that are available for a given chemical, USEPA uses one or more of several different models to identify the relationship

between the dose of the chemical and a carcinogenic response. For carcinogenic effects, USEPA uses a two-part evaluation in which the substance is first assigned a weight-of-evidence classification, and then a slope factor (SF) or unit risk (UR) is calculated to reflect the carcinogenic potency.

The weight-of-evidence evaluation involves determining the likelihood that the agent is a human carcinogen. USEPA has developed a system for characterizing the overall weight of evidence for a chemical's carcinogenicity based on the availability of animal, human, and other supportive data (USEPA, 1989a). The weight-of-evidence classification rates the likelihood that an agent is a human carcinogen. It qualitatively affects the interpretation of potential health risks. Three major factors are considered in characterizing the overall weight-of-evidence for carcinogenicity: (1) the quality of evidence from human studies, (2) the quality of evidence from animal studies, and (3) other supportive information, such as mutagenicity data and structure-activity data.

Historically, USEPA's classification of the overall weight-of-evidence has included the following five categories:

Group A - Human Carcinogen. This category indicates there is sufficient evidence from epidemiological studies to support a causal association between an agent and human cancer.

Group B - Probable Human Carcinogen. This category generally indicates there is at least limited evidence from epidemiologic studies of carcinogenicity to humans (Group B1) or that, in the absence of data on humans, there is sufficient evidence of carcinogenicity in animals (Group B2).

Group C - Possible Human Carcinogen. This category indicates that there is limited evidence of carcinogenicity in animals in the absence of data on humans.

Group D - Not Classified. This category indicates that the evidence for carcinogenicity in animals is inadequate.

Group E - No Evidence of Carcinogenicity to Humans. This category indicates that there is evidence of non-carcinogenicity in at least two adequate animal tests in different species or in both epidemiologic and animal studies.

In the revised Guidelines for Carcinogenic Risk Assessment (USEPA, 2005a), USEPA revised the approach to describing the carcinogenic potential of an agent from an alphanumeric system to a weight-of-evidence-based descriptive narrative. Descriptors are as follows:

Carcinogenic to Humans. This descriptor indicates strong evidence of human carcinogenicity, and is appropriate A) when there is convincing epidemiologic evidence of a causal association between human exposure and cancer; or B) when all of the following conditions are met: (a) there is strong evidence of an association between human exposure and either cancer or the key precursor events of the agent's mode of action but not enough for a causal association, and (b) there is extensive evidence of carcinogenicity in animals, and (c) the mode(s) of carcinogenic action and associated key precursor events have been identified in animals, and (d) there is strong evidence that the key precursor events that precede the cancer response in animals are anticipated to occur in humans and progress to tumors, based on available biological information.

Likely to Be Carcinogenic to Humans. This descriptor is appropriate when the weight of the evidence is adequate to demonstrate carcinogenic potential to humans but does not reach the weight of evidence for the descriptor “Carcinogenic to Humans”. The use of the term “likely” as a weight of evidence descriptor does not correspond to a quantifiable probability. Supporting data for this descriptor may include: an agent demonstrating a plausible (but not definitively causal) association between human exposure and cancer, in most cases with some supporting biological, experimental evidence, though not necessarily carcinogenicity data from animal experiments; an agent that has tested positive in animal experiments in more than one species, sex, strain, site, or exposure route, with or without evidence of carcinogenicity in humans; a positive tumor study that raises additional biological concerns beyond that of a statistically significant result, for example, a high degree of malignancy, or an early age at onset; a rare animal tumor response in a single experiment that is assumed to be relevant to humans; or a positive tumor study that is strengthened by other lines of evidence, for example, either plausible (but not definitively causal) association between human exposure and cancer or evidence that the agent or an important metabolite causes events generally known to be associated with tumor formation (such as DNA reactivity or effects on cell growth control) likely to be related to the tumor response in this case.

Suggestive Evidence of Carcinogenic Potential. This descriptor is appropriate when the weight of evidence is suggestive of carcinogenicity; a concern for potential carcinogenic effects in humans

is raised, but the data are judged not sufficient for a stronger conclusion. This descriptor covers a spectrum of evidence associated with varying levels of concern for carcinogenicity, ranging from a positive cancer result in the only study on an agent to a single positive cancer result in an extensive database that includes negative studies in other species.

Data Inadequate for an Assessment of Human Carcinogenic Potential. This descriptor is appropriate when available data are judged inadequate for applying one of the other descriptors.

Not Likely to be Carcinogenic in Humans. This descriptor is appropriate when the available data are considered robust for deciding that there is no basis for human hazard concern. In some instances, there can be positive results in experimental animals when there is strong, consistent evidence that each mode of action in experimental animals does not operate in humans. In other cases, there can be convincing evidence in both humans and animals that the agent is not carcinogenic.

The weight of evidence classification for a given chemical may reflect either of the two classification schemes identified above, depending on when USEPA most recently reviewed and revised the carcinogenicity assessment for any given chemical.

The ability of a chemical to increase the incidence of cancer in a target population is described by one of two values: the carcinogenic SF or the UR. Cancer SFs or URs are typically calculated for chemicals in Groups A, B1, and B2. Cancer dose-response values for chemicals in Group C are calculated on a case-by-case basis.

The cancer SF for a chemical is derived by the USEPA's Cancer Risk Assessment Verification Endeavor (CRAVE). Using data derived from animal studies, the SF is an estimate of the upper 95% Confidence Limit of the slope of the dose-response curve extrapolated to low doses.

For some chemicals, human epidemiologic data are the basis of an estimate of the carcinogenic potency, although the most common basis of these values is an animal study. The SF is given in units of  $(\text{mg/kg/day})^{-1}$ , and is based upon the concept of a lifetime average daily dose. Oral SFs are used to estimate the risks associated with exposure to carcinogens via ingestion. No SFs are available for the dermal route of exposure, but are instead calculated from oral SFs using the methodology described in Section 4.1.3.



The dose-response data used in this HHRA for carcinogenic effects, including SF and UR values, are presented in **Table 6.1** (oral/dermal) and **Table 6.2** (inhalation).

#### **4.1.2 Dose-Response Assessment for Non-carcinogenic Effects**

In contrast to carcinogens, non-carcinogens are believed to have threshold exposure levels, below which, adverse effects are not expected. USEPA has derived standards and guidelines based on acceptable levels of exposure for such compounds. Non-carcinogenic effects of concern on which many of the standards and guidelines are based include liver toxicity, reproductive effects, neurotoxicity, teratogenicity, and other chronic toxicities. Various criteria have been developed from experiments that can be used to estimate the dose-response relationship of non-carcinogens. Some of the same uncertainties involved in deriving cancer risk estimates (namely, selection of an appropriate data set and extrapolation of high-dose animal data to low-dose human exposure) are also involved in deriving non-carcinogenic dose-response criteria. Dose-response values used most often to evaluate non-carcinogenic effects are reference doses (RfDs).

The RfD, expressed in units of mg/kg/day, is defined as an estimate (with uncertainty spanning perhaps an order of magnitude or greater) of a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects during a lifetime (USEPA, 1989). When available, the RfD is the dose-response criterion most appropriate for quantitatively estimating non-carcinogenic effects. The RfD is derived from the following equation:

$$RfD \text{ (mg/kg/day)} = \frac{NOAEL \text{ or } LOAEL}{UF \times MF}$$

The No Observable Adverse Effect Level (NOAEL) represents the dose of a chemical at which there are no statistically or biologically significant differences in the frequency of an adverse effect between the exposed population and its appropriate control. The Lowest Observable Adverse Effect Level (LOAEL) represents the lowest dose at which a statistically significant difference in the frequency of an effect is noted. Both the NOAEL and the LOAEL are reported in terms of mg/kg/day. An uncertainty factor (UF) of ten per type of uncertainty (e.g. extrapolation from animal sensitivity to human sensitivity, relationship between lowest adverse effect level and no adverse effect level) is used to account for inter- and intraspecies differences; severity of the adverse effect; whether the dose was an NOAEL or an LOAEL; and the adequacy

of the data. The magnitude of the UF will therefore vary from chemical to chemical, ranging from 10 to 10,000. A modifying factor (MF), ranging from less than 1 to 10 may also be added to reflect qualitative uncertainties not explicitly addressed in the UFs. The toxicity endpoint upon which the RfD is derived and the UF and/or MF used in the calculation are presented in the dose-response tables. No RfDs are available for the dermal route of exposure but are instead calculated from oral RfDs using the methodology described below (USEPA, 2001b).

The dose-response data for noncarcinogenic effects (RfDs) and their critical toxic effects are presented in **Table 5.1** (oral/dermal) and **Table 5.2** (inhalation).

#### 4.1.3 Dermal Dose-Response Values

Cancer SFs and non-cancer RfDs were developed to evaluate risk associated with the dermal contact exposure route. In accordance with USEPA guidance (USEPA, 2004), dermal dose-response values are calculated from oral dose-response values using an oral absorption factor. The oral absorption factor represents the amount of substance that is absorbed from the gastrointestinal tract following oral administration of a substance. The absorbed dose represents the amount of substance that is potentially available for biological interaction; it is this dose-response relationship by which the toxicity of a dermally absorbed substance must be evaluated. Thus, for potentially carcinogenic substances, the dermal dose-response value is calculated as follows:

$$SF_d = \frac{SF_{oral}}{Oral\ ABS}$$

The dermal dose-response value for evaluating non-carcinogenic effects is calculated as follows:

$$RfD_d = RfD_{oral} \times ORAL\ ABS$$

The Oral Absorption Factor (ABS) is the fraction of contaminant absorbed in the gastrointestinal tract (dimensionless) in the critical toxicity study. Chemical-specific Oral ABS values are published by USEPA (USEPA, 2001b). In accordance with USEPA guidance (USEPA, 2001b), oral dose-response values are only adjusted using an Oral ABS value if the COPC has an oral ABS value less than 50%. Otherwise, the oral dose-response value is used as the dermal dose-response value. Dermal SFs and RfDs are presented in **Tables 6.1 and 5.1**, respectively.

#### 4.1.4 Sources of Dose-Response Values

The following hierarchy of sources for dose-response values has been utilized in identifying dose-response values for this HHRA.

*Tier 1- IRIS* (<http://www.epa.gov/iris/>). In accordance with USEPA guidance, the main source of dose-response values is the USEPA Integrated Risk Information System (IRIS), which is a database established by USEPA containing all validated data on many toxic substances found at hazardous waste Sites. This database was used to identify the SFs and RfDs applied in this risk assessment (USEPA, 2003a).

*Tier 2- NCEA's peer reviewed toxicity values (PRTVs)*. NCEA's PRTVs are developed by the Superfund Technical Support Center (STSC) for the EPA Superfund program. STSC's reassessment of HEAST toxicity values, as well as development of PRTVs in response to Regional or Headquarters Superfund program requests, are consistent with Agency practices on toxicity value development, use the most recent scientific literature, and are supported by both internal and external peer review, providing a high level of confidence in the use of these values in the Superfund Program.

*Tier 3 - Other toxicity values*

- Cal EPA's toxicity values. Cal EPA develops toxicity values for both cancer and non-cancer effects. Cal EPA toxicity values are obtained on the Cal EPA website at <http://www.oehha.ca.gov/risk/chemicalDB//index.asp>.
- ATSDR's MRLs address non-cancer effects only, and are available on the ATSDR website at <http://www.atsdr.cdc.gov/mrls.html>.
- Toxicity values remaining in current versions of HEAST (1997a).

In this HHRA, the majority of dose-response values used are published in IRIS. For some Site-related COPCs required dose-response data are only available as NCEA provisional values or from CAL-EPA. These dose-response values were used in this HHRA in order to provide a more complete evaluation of potential risks.

Uncertainties related to the absence of dose-response data, particularly for COPCs for which the exposure pathway, which represents the only pathway or most significant exposure pathway, has no toxicity criterion, will be discussed in the risk assessment uncertainty analysis.

## 5.0 RISK CHARACTERIZATION

### 5.1 RISK CHARACTERIZATION

The final step of the risk assessment is the risk characterization. This step involves the integration of the exposure and toxicity assessment into quantitative expressions of potential human health risks associated with COPC exposure. Quantitative estimates of both carcinogenic and non-carcinogenic risks are made for each COPC and each exposure point.

#### *Cancer Risks*

Carcinogenic risks associated with exposure to individual chemicals are estimated, for oral and dermal exposure, by multiplying the chemical intake for each carcinogen by its CSF, and for inhalation exposure, by multiplying the representative air concentration by the inhalation unit risk (UR). The cancer risk represents an upper bound of the probability of an individual developing cancer over a lifetime as the result of exposure to a chemical. For each receptor and each exposure pathway (exposure to a specific medium), the chemical-specific risks for all carcinogenic compounds will be summed to determine the lifetime cancer risk for that receptor for that medium. The following equations are used to estimate the chemical- and pathway-specific cancer risks.

Chemical-Specific Excess Lifetime Cancer Risk for oral or dermal exposures:

$$Risk_i = CDI_i \times CSF_i$$

where:

$Risk_i$	=	unitless probability of an individual developing cancer as the result of exposure to a chemical $i$
$CDI_i$	=	chronic daily intake of chemical $i$ averaged over 70 years (mg/kg-day)
$CSF_i$	=	USEPA cancer slope factor for chemical $i$ (mg/kg-day) <sup>-1</sup>

Chemical-Specific Excess Lifetime Cancer Risk for inhalation exposures:

$$Risk_i = LAC_i \times UR_{inh_i}$$

where:

$Risk_i$	=	unitless probability of an individual developing cancer as the result of exposure to a chemical $i$
$LAC_i$	=	lifetime average air concentration of chemical $i$ (ug/m <sup>3</sup> )
$UR_{inh_i}$	=	Inhalation Unit Risk for chemical $i$ (ug/m <sup>3</sup> ) <sup>-1</sup>

The results from the carcinogenic risk assessment are compared to acceptable risk ranges established by the USEPA. The USEPA's guidelines, established in the National Hazardous Substances and Pollution Contingency Plan (NCP) identify acceptable exposure levels as those concentration levels "that represent an excess upper bound lifetime cancer risk to an individual of between  $10^{-4}$  and  $10^{-6}$  using information on the relationship between dose and response" (USEPA 1990).

#### *Non-cancer Risks*

Non-cancer risk estimates will be calculated, for oral and dermal exposures, by dividing specific chemical intake by the appropriate RfD, and for inhalation exposures, dividing the representative air concentration by the RfC. The resultant quotient is called the hazard quotient (HQ). The HQs for individual compounds within an exposure pathway are summed to obtain the hazard index (HI) for that particular pathway.

Following are the equations used to determine the chemical-specific HQs and pathway-specific HIs.

The following equation is used to determine the hazard quotient:

$$HQ_i = \frac{CDI_i}{RfD_i} \text{ or } \frac{AAC_i}{RfC_i}$$

where:

HQ <sub>i</sub>	=	hazard quotient of chemical <i>i</i>
CDI <sub>i</sub>	=	average chronic daily intake of chemical <i>i</i> over the exposure period (mg/kg-day)
RfD <sub>i</sub>	=	reference dose for chemical <i>i</i> corresponding to the same exposure duration as the intake (mg/kg-day)
AAC <sub>i</sub>	=	average air concentration over the exposure period (mg/m <sup>3</sup> )
RfC <sub>i</sub>	=	reference concentration for chemical <i>i</i> (mg/m <sup>3</sup> )

The following equation is used to determine the pathway-specific hazard index:

$$HI = \sum HQ_i$$

where:

HI	=	potential for non-carcinogenic effects from multiple chemical exposures
HQ <sub>i</sub>	=	hazard quotient for each chemical <i>i</i>

An HI of less than 1 indicates that non-carcinogenic toxic effects are unlikely. An HI greater than 1 indicates a greater possibility of a non-carcinogenic toxic effects. Generally, as the HI increases, so does the likelihood that adverse effects might be associated with exposure. However, the relationship between larger HI values and increased hazard may not be linear.

#### Calculation of Non-cancer and Cancer Risks

RAGS Part D Table 7s are used to present the risk calculations. In simplistic terms, for a given receptor/age-group, cancer risks are calculated for each chemical in each medium (e.g. air) and exposure route (e.g. inhalation, ingestion, dermal contact). Risks across exposure routes are summed to yield the risk for that medium. For a given receptor (by age-group), the non-cancer Hazard Index is calculated for each chemical, and exposure route for a given medium. Hazard Index values associated with all exposure media for that receptor/age-group are summed to yield the screening cumulative Hazard Index for that receptor/age-group. This summing of Hazard Index values across chemicals and exposure media is a conservative screening approach. Because chemicals can have different target organs, non-cancer risks are not necessarily additive.

The analytical data collected to date have indicated that there are some hypothetical exposure pathways that are currently not complete and are expected to remain incomplete in the foreseeable future (such as ingestion, dermal, and inhalation associated potable use of groundwater for residences and industrial facilities where potable water samples have not shown site-related VOCs and at residences where there are operating water treatment systems) or have been determined to be insignificant (the vapor intrusion pathway for residences in the area of vapor monitoring wells that were installed, sampled, and analyzed in 2008). No calculation of cancer risk or Hazard Index was necessary to characterize the risk associated with those exposure pathways (those risks have been evaluated qualitatively). The available information indicates the current and reasonably foreseeable risks for those pathways are negligible.

For other exposure pathways that are complete or are potentially complete (as identified in **Table 3.1**), potential exposure levels and risks have been evaluated quantitatively. Risks have been quantified for receptors and media as discussed in previous sections of this risk assessment. The calculated cancer risks and Hazard Index values are presented in **Tables 7.1 through 7.19**. The RAGS Part D Table 7s document the risk calculations by identifying the COPCs, exposure point concentrations, daily chemical intakes by chemical for both cancer and non-cancer endpoints, the CSFs and RfDs, and the calculated cancer risk and Hazard Quotient for each chemical in each

exposure medium. Further, the Table 7s present summed risks for each medium/exposure route combination and each medium. Table 11, the risk summary table, summarizes, by receptor, the risks that are calculated in the Table 7s.

Table 7s are presented in the order discussed below, and are presented by exposure point.

- **Tables 7.1 and 7.2** evaluate sediment exposure in the wetland at Property 38;
- **Tables 7.3 and 7.4** evaluate sediment and surface water exposure at the Eastern Pond;
- **Tables 7.5 and 7.6** present calculated potential risks for the vapor intrusion pathway for the industrial Property 36, based on the application of the Johnson & Ettinger vapor intrusion model to soil vapor data from vapor monitoring wells and groundwater data associated with shallow groundwater samples, respectively, in order to estimate potential indoor air concentrations. The EPCs presented in those spreadsheets are the soil vapor and groundwater concentrations that were the inputs to the Johnson & Ettinger model spreadsheets that are presented in Appendix B. The spreadsheets in Appendix B identify estimated indoor air concentrations and the associated cancer risk and non-cancer hazard quotient for each compound. These calculations are provided as supplemental support for the conclusions of the 2008 vapor intrusion evaluation that utilized IDEM soil vapor screening levels to evaluate soil vapor concentrations measured in samples collected from eleven vapor monitoring wells installed in the source area and downgradient industrial and residential areas. That evaluation concluded the vapor intrusion pathway was not of concern.
- **Tables 7.7 through 7.15 and Table 7.19** present calculated potential risks for indoor air (the vapor intrusion pathway) for 11 residential properties (Properties 8, 16A, 17, 18, 19, 20, 21, 23, 37, 38, and 39) and one commercial property (Property 36), based on the application of the Johnson & Ettinger vapor intrusion model to either soil vapor data from vapor monitoring wells or groundwater data associated with shallow groundwater samples in order to estimate potential indoor air concentrations. The EPCs presented in those spreadsheets are the soil vapor and groundwater concentrations that were the inputs to the Johnson & Ettinger model spreadsheets that are presented in Appendix B. The spreadsheets in Appendix B identify estimated indoor air concentrations and the associated cancer risk and non-cancer hazard quotient for each compound at each of the residences. These calculations are provided as supplemental support for the conclusions of the 2008 vapor intrusion evaluation that utilized IDEM soil vapor screening levels to evaluate soil vapor concentrations measured in samples collected from eleven vapor monitoring wells installed in the source area and downgradient industrial and residential areas. That evaluation concluded the vapor intrusion pathway was not of concern.
- **Table 7.16** presents calculated potential risks for indoor air (the vapor intrusion pathway) for the residential Property 15 based on indoor air data (from a basement sample and a first floor sample) collected in February 2010 respectively. The EPCs shown in this table are the maximum detected concentration of each compound among the samples collected from the basement and the first floor of the residence.
- **Tables 7.17 and 7.18** present calculated potential risks for indoor air (the vapor intrusion pathway) for industrial Property 41 based on indoor air data collected in May 2010 and February 2011 respectively. The VOC source area has been identified within the footprint of the industrial facility at this property. The EPCs shown in these tables



are the maximum detected concentration of each compound among the samples collected on a given sampling date.

There are no RAGS Part D Table 8s for this HHRA. Table 8s are specifically for the calculation of radiological risks. No radiological COPCs were identified in this assessment. Therefore, no Table 8s are required.

#### Summary of Non-cancer and Cancer Risks

RAGS Part D Table 7s document risk calculations and summarize the risk calculations. RAGS Part D **Tables 7.1 through 7.19** summarize the risk calculations for this HHRA.

#### Summary of Calculation of Receptor Risks

**Table 11** is the risk summary table. The table presents the medium-specific and route-specific risks for each receptor/age-group combination. The risk summary in **Table 11** indicates that the cancer risk and non-cancer hazard index for all scenarios evaluated are within or below the Superfund Allowable Risk Range and equal to or below the non-cancer hazard index threshold of one. There were no carcinogenic compounds detected in surface water or sediment in the wetlands or the Eastern Pond – therefore, no cancer risk was identified with the exposure scenarios for those media. The hazard index values for the wetlands and Eastern Pond were very low, orders of magnitude below the threshold value of one.

The vapor intrusion pathway was evaluated for several properties (Properties 8, 16A, 17, 18, 19, 20, 21, 23, 36, 37, 38, and 39) by the application of the Johnson & Ettinger vapor intrusion model (Published by USEPA) to soil vapor data from vapor monitoring wells, groundwater monitoring wells, and a private potable well, to supplement the previous 2008 screening evaluation for the vapor intrusion pathway. **Table 11** indicates the potential cancer risk and non-cancer hazard index associated with the hypothetical vapor intrusion pathway for all of those properties evaluated are within or below the Superfund Allowable Risk Range and equal to or below the non-cancer hazard index threshold of one. At those properties evaluated using the soil vapor data from vapor monitoring wells, Site –related VOCs were not detected compounds.

Cancer and non-cancer hazards were calculated for indoor air exposure at Property 15. The indoor air data (basement family room and first floor living space) were collected in February 2010. As shown in **Table 11**, the estimated cancer risk ( $3 \times 10^{-6}$ ) was within the Superfund

Allowable Risk Range and the hazard index (1) was equal to the hazard index threshold of one. As shown in **Table 7.16**, the estimated cancer risk was associated predominantly with benzene and tetrachloroethene and the predominant contributors to the hazard index were xylene compounds. None of the Site-related VOCs were detected in indoor air at Property 15. The results of the sampling, analysis, and risk calculations for this property provide further support for the previous and current evaluations of the vapor intrusion pathway, which concluded this pathway is not of concern.

Risks were also characterized for industrial worker exposures to indoor air at Property 41. Indoor air was sampled in May 2010 and February 2011. As shown in **Table 11**, the estimated cancer risks for the two sampling events ( $3 \times 10^{-6}$  and  $2 \times 10^{-5}$ ) were within the Superfund Allowable Risk Range and the hazard index values (0.3 and 0.1) were below the hazard index threshold of one.

#### Identification of Chemicals of Concern

Typically, if either or both the cancer risk for a given medium is above the Superfund Risk Range ( $10^{-6}$  to  $10^{-4}$ ) or the Hazard Index is above one, those COPCs that contribute significantly to the risks are identified as Chemicals of Concern (COCs), and the COCs are typically the focus of remedial alternatives considered in the FS to reduce health risks. However, as shown in **Table 11**, the cancer risk and Hazard Index values for all media and receptors evaluated in this HHRA are within or below the risk range and equal to or below a value of one, respectively. Therefore, it is not necessary to identify COCs based on the results of this HHRA.

## 6.0 UNCERTAINTY ANALYSIS

This section includes a discussion of major limitations of the analyses, any sources of uncertainties, and, if possible, any indication as to whether these uncertainties and limitations may have resulted in and over- or under-estimation of risk. The uncertainty section may also include unusual site conditions or extenuating circumstances that may be pertinent to risk management decisions. Other factors such as the inadequacy of toxicity factors to describe all possible COPC-receptor interactions and individual differences within the human population are included in this section. Uncertainties in the quantification of risk associated with the site are identified and their impacts on risk estimates are discussed below.

### Hazard Identification

The extensive environmental investigations have provided a substantial body of information that has been utilized in the HHRA. The identification of COPCs has been conducted in a very conservative manner, retaining all detected constituents, regardless of their concentration, frequency of detection, or relationship to the Site.

### Exposure Assessment

The selection of receptors is conservative and health-protective for the conditions identified at the Site. The values for receptor-specific exposure parameters such as soil, sediment, and surface water contact rates and soil and sediment ingestion rates have been identified in a conservative manner. Values have been identified based on available guidance and professional judgment. In risk assessment, when values are assigned in lieu of actual measurements, there is some uncertainty in the values, and that uncertainty may have an impact on the results of the risk assessment. In that context, the exposure estimates and associated risk estimates in this assessment would likely be overestimated rather than underestimated. Some factors that were not specifically addressed in the calculations could result in lower risk estimates.

The exposure points have been identified geographically. In other words, each of the properties has been identified as an exposure point. In this HHRA, all wetland soils and submerged sediments have been included in the exposure assessment and risk characterization for potential human sediment contact. Those sediments under shallow water would typically represent those sediments that have a greater potential for human contact during wading and other recreational activities. The exposure assessment and risk calculations have included all detected compounds

(not only Site-related compounds). In that respect, the risk characterization will overestimate, rather than underestimate, the health risks associated with the Site. In addition, maximum detected concentrations (not averages or other measures of central tendency) have been used to characterize exposure and risk. This also indicates the HHRA tends to overestimate, rather than underestimate the health risks.

#### Toxicity Assessment

The toxicity assessment has been conducted consistently with available USEPA guidance. Dose-response information has been obtained from the IRIS database, NCEA, CAL-EPA, and USEPA's Health Effects Assessment Summary Tables. These sources of dose-response values are commonly used for regulatory risk assessment activities and are generally considered to be conservative in nature. The use of surrogate toxicity values for chemicals lacking US EPA recommended values is conservative since it is likely that the chemical specific toxicity would be lower than those exhibited by their surrogate.

#### Risk Characterization

Overall, the risk characterization provides conservative estimates of non-cancer and cancer risks consistent with USEPA risk assessment guidance (USEPA, 1989).

## 7.0 CONCLUSIONS

Some potential exposure pathways have been evaluated qualitatively or semi-quantitatively (no risk calculations). These pathways include:

- All residences where historical private well samples contained Site-related VOCs now have operating activated carbon treatment systems that effectively remove VOCs. A continuing drinking water monitoring program has documented that the systems are effectively removing the VOCs, and there is not currently a complete exposure pathway for domestic use of the water in those residences.
- Domestic wells at all additional residences in the area of groundwater impact have been tested and Site-related VOCs have not been detected. There is currently not a complete exposure pathway for domestic use of the water in those residences.
- Potable water obtained from wells has been tested regularly at the two industrial properties within the groundwater impact area (Properties 36 and 41). Site-related VOCs have not been detected in drinking water samples from these properties. There is not currently a complete exposure pathway for domestic use of the water in those residences.
- Site-related VOCs were not detected in the surface water samples collected from Pond A (Property 15), a stream (Property 15), and a tile drain (Property 8). There is not currently a complete exposure pathway for casual contact with or recreational use (Pond A only) of the water at those locations. There is also not currently a complete exposure pathway associated with consumption of fish that might be caught from Pond A (the pond is stocked annually). There is also not currently a complete exposure pathway associated with livestock use of the pond or stream as a source of drinking water (no VOCs detected in the water samples).
- A separate evaluation of the potential outside use of untreated, non-potable water from private wells at residential properties has also been conducted (Appendix C – Outdoor Water Use Risk Assessment). This pathway is not currently a complete exposure pathway, but the pathway has been evaluated to assist in the identification and evaluation of remedial requirement and alternatives. Given the reported concentrations of Site-related VOCs in private residential wells, this pathway does not appear to be of concern.

The FS included a fate and transport evaluation that concluded that the plumes of TCE, cis-1,2-DCE, and vinyl chloride appear to be stable 500 feet from the source area and that Site-related VOCs have not reached river. Based on this conclusion, it is further concluded, that for the foreseeable future, the incomplete exposure pathways identified above will remain incomplete for all properties except Property 37, which is a residential property located within 500 feet of the source area. For properties greater than 500 feet from the source area, the human health risks associated with those potential, but incomplete pathways, are expected to remain negligible. Additional work has been proposed in the FS to evaluate the stability of the plume in relation to Property 37. The results of the additional work will be utilized to evaluate whether the current

incomplete exposure pathways at Property 37 will continue to be incomplete in the foreseeable future.

This HHRA has quantitatively evaluated complete and potentially complete exposure pathways in order to characterize current and foreseeable future risks associated with surface water, sediment, and wetland soils and with indoor air (associated with a potential vapor intrusion pathway). The calculated risks have been evaluated using the USEPA Superfund (CERCLA) Allowable Risk Range (for cancer risk) and the USEPA Superfund threshold value of one for non-cancer hazard index.

The HHRA results indicate that the calculated risks for current/future residential and recreational exposure to wetland soils/sediments and Eastern Pond surface water and sediments and for potential and actual exposures to VOCs in indoor air at several residences and the two industrial properties within the area of groundwater impact are within or below the cancer Allowable Risk Range and equal to or below the threshold hazard index value of one.

Therefore, it is concluded that with the continuation of the residential water treatment system operation and maintenance (including monitoring of system effectiveness), no human health risks have been identified that would require the identification and evaluation of remedial alternatives designed to reduce or eliminate human health risks.

## **8.0 CALCULATION OF PRELIMINARY REMEDIATION GOALS**

The calculation of Preliminary Remediation Goals is not necessary because the calculated risks are below regulatory thresholds.



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## **TABLES**

**Table 2.1**  
**Occurrence, Distribution and Selection of Chemicals of Potential Concern**  
**Property 38 Wetland Soil**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future
Medium: Wetland Soil
Exposure Medium: Wetland Soil

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Sample ID of Maximum Concentration	Detection Frequency	Range of Reporting Limits Min-Max	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (3)	Potential ARAR/TBC Value (4)	Potential ARAR/TBC Source	Retain as COPC?	Rationale for Contaminant Deletion or Selection
	<b>Volatile Organics</b>															
78-93-3	2-Butanone	36		200		µg/Kg	MTR-4403NOHWY31-SS004(1.0-1.5)-062409	10 / 13	0.53-0.55	NA	NA	NA	NA	NA	Yes	NA
95-63-6	Acetone	13		1300		µg/Kg	MTR-4403NOHWY31-SS005(1.0-1.5)-062409 MTR-4403NOHWY31-SS006(0.5-1.0)-062409 MTR-4403NOHWY31-SS006(1.0-1.5)-062409	13 / 13	NA	NA	NA	NA	NA	NA	Yes	NA
75-15-0	Carbon disulfide	3.9		20		µg/Kg	MTR-4403NOHWY31-SS003(1.0-1.5)-062409	8 / 13	1.4-2.6	NA	NA	NA	NA	NA	Yes	NA
108-88-3	Toluene	0.59		0.92		µg/Kg	MTR-4403NOHWY31-SS001(1.0-1.5)-062409	2 / 13	0.36 - 9.6	NA	NA	NA	NA	NA	Yes	NA

- (1) Minimum or maximum concentration detected in exposure area.  
 (2) The concentration used for screening is the maximum detected concentration.  
 (3) Values were not screened. All detected concentrations were considered COPC.  
 (4) There are no applicable ARAR values for sediment.

NA = Not applicable  
 Samples collected from locations SS001 through SS006 were used.  
 µg/Kg = micrograms per kilogram  
 COPC = chemical of potential concern

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**Table 2.2**  
**Occurrence, Distribution and Selection of Chemicals of Potential Concern**  
**Property 38 Surface Water**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

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

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Sample ID of Maximum Concentration	Detection Frequency	Range of Reporting Limits Min-Max	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (3)	Potential ARAR/TBC Value (4)	Potential ARAR/TBC Source	Retain as COPC?	Rationale for Contaminant Deletion or Selection
	<b>Volatile Organics</b>															
108-88-3	Toluene	1		1		µg/L	MTR-4403NOHWY31-SW003-051209 MTR-4403NOHWY31-SW003-051209R	2 / 4	1	NA	NA	NA	NA	NA	No	NA

- (1) Minimum or maximum concentration detected in exposure area.  
 (2) The concentration used for screening is the maximum detected concentration.  
 (3) Values were not screened. All detected concentrations were considered COPC.  
 (4) There are no applicable ARAR values for surface water.

NA = Not applicable  
 Samples collected from locations SW001 through SW003 were used.

µg/L = micrograms per liter  
 COPC = chemical of potential concern

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**Table 2.3**  
**Occurrence, Distribution and Selection of Chemicals of Potential Concern**  
**Eastern Pond Sediment**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

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

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Sample ID of Maximum Concentration	Detection Frequency	Range of Reporting Limits Min-Max	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (3)	Potential ARAR/TBC Value (4)	Potential ARAR/TBC Source	Retain as COPC?	Rationale for Contaminant Deletion or Selection
	<b>Volatile Organics</b>															
78-93-3	2-Butanone	29		29		µg/Kg	MTR-EP008-SS(7.6)040809	1 / 8	3.7 - 8.1	NA	NA	NA	NA	NA	Yes	NA
156-59-2	cis-1,2-Dichloroethene	8.3		8.3		µg/Kg	MTR-EP007-SS(6.5)040809	1 / 8	1.6 - 2.8	NA	NA	NA	NA	NA	Yes	NA
67-64-1	Acetone	19		330		µg/Kg	MTR-EP008-SS(7.6)040809	4 / 8	12 - 24	NA	NA	NA	NA	NA	Yes	NA
108-88-3	Toluene	1.7	J	1.7	J	µg/Kg	MTR-EP008-SS(7.6)040809	1 / 8	3.7 - 8.1	NA	NA	NA	NA	NA	Yes	NA

- (1) Minimum or maximum concentration detected in exposure area. Samples included in data set are provided in Appendix A.  
 (2) The concentration used for screening is the maximum detected concentration.  
 (3) Values were not screened. All detected concentrations were considered COPC.  
 (4) There are no applicable ARAR values for sediment.

NA = Not applicable

Samples collected from locations EP001 through EP008 were used.

Qualifier definitions:

J = Value is estimated.

µg/Kg = micrograms per kilogram

COPC = chemical of potential concern

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**Table 2.4**  
**Occurrence, Distribution and Selection of Chemicals of Potential Concern**  
**Eastern Pond Surface Water**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

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

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Sample ID of Maximum Concentration	Detection Frequency	Range of Reporting Limits Min-Max	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (3)	Potential ARAR/TBC Value (4)	Potential ARAR/TBC Source	Retain as COPC?	Rationale for Contaminant Deletion or Selection (5)
	<b>Volatile Organics</b>															
156-59-2	cis-1,2-Dichloroethene	1.2		2.1		µg/L	MTR-EP002-SW(1.5)040809-FL	2 / 4	1.0 - 1.0	NA	NA	NA	NA	NA	Yes	S

- (1) Minimum or maximum concentration detected in exposure area.  
 (2) The concentration used for screening is the maximum detected concentration.  
 (3) Values were not screened. All detected concentrations were considered COPC.  
 (4) There are no applicable ARAR values for surface water.

NA = Not applicable  
 Samples collected from locations EP001 through EP004 were used.

µg/L = micrograms per liter  
 COPC = chemical of potential concern

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**Table 2.5**  
**Occurrence, Distribution and Selection of Chemicals of Potential Concern**  
**Industrial Air - Property 36 Soil Vapor**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future  
Medium: Soil Vapor  
Exposure Medium: Industrial Air

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Sample ID of Maximum Concentration	Detection Frequency	Range of Reporting Limits Min-Max	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Retain as COPC?	Rationale for Contaminant Deletion or Selection
	<b>Volatile Organics</b>															
78-93-3	2-Butanone	5.9		8.85		µg/m³	MTR-VMW3-V4.5-5.0 121908	2 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
95-63-6	1,2,4-Trimethylbenzene	9.83		9.83		µg/m³	MTR-VMW3-V4.5-5.0 122308	1 / 2	1	NA	NA	NA	NA	NA	Yes	NA
67-64-1	Acetone	64.14		78.39		µg/m³	MTR-VMW3-V4.5-5.0 121908	2 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
71-43-2	Benzene	9.58		12.78		µg/m³	MTR-VMW3-V4.5-5.0 121908	2 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
75-15-0	Carbon disulfide	3.11		3.11		µg/m³	MTR-VMW3-V4.5-5.0 122308	1 / 2	1	NA	NA	NA	NA	NA	Yes	NA
108-90-7	Chlorobenzene	9.21		13.81		µg/m³	MTR-VMW3-V4.5-5.0 121908	2 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
75-71-8	Dichlorodifluoromethane	14.84		19.78		µg/m³	MTR-VMW3-V4.5-5.0 122308	2 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
100-41-4	Ethylbenzene	17.37		17.37		µg/m³	MTR-VMW3-V4.5-5.0 121908 MTR-VMW3-V4.5-5.0 122308	2 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
110-54-3	Hexane	3.52		7.05		µg/m³	MTR-VMW3-V4.5-5.0 121908	2 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
75-09-2	Methylene chloride	3.47		10.42		µg/m³	MTR-VMW3-V4.5-5.0 121908	2 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
108-88-3	Toluene	90.43		116.81		µg/m³	MTR-VMW3-V4.5-5.0 121908	2 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
75-69-4	Trichlorofluoromethane	5.62		5.62		µg/m³	MTR-VMW3-V4.5-5.0 122308	1 / 2	1	NA	NA	NA	NA	NA	Yes	NA
106-42-3	m&p-Xylene	30.4		43.42		µg/m³	MTR-VMW3-V4.5-5.0 121908	2 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
95-47-6	o-Xylene	8.68		13.03		µg/m³	MTR-VMW3-V4.5-5.0 121908	2 / 2	NA	NA	NA	NA	NA	NA	Yes	NA

- (1) Minimum or maximum concentration detected in exposure area.  
(2) The concentration used for screening is the maximum detected concentration.  
(3) Values were not screened. All detected concentrations were considered COPC.

NA = Not applicable  
The maximum concentration of the samples collected from VMW3 (4.5-5) were used.

µg/m³ = micrograms per cubic meter  
COPC = chemical of potential concern

Since a vapor monitoring well was not installed at Property 36, as a conservative measure, VMW-3(4.5-5), which is located at the Site (Property 41) was used to identify COPCs and estimate indoor air quality at Property 36.

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**Table 2.6**  
**Occurrence, Distribution and Selection of Chemicals of Potential Concern**  
**Industrial Air - Property 36 Groundwater**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

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

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Sample ID of Maximum Concentration	Detection Frequency	Range of Reporting Limits Min-Max	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Retain as COPC?	Rationale for Contaminant Deletion or Selection
	<b>Volatile Organics</b>															
75-35-4	1,1-Dichloroethene	0.62	J	1.2		µG/L	MTR-MW30(41.1)-G090109	4 / 5	1	NA	NA	NA	NA	NA	Yes	NA
156-59-2	cis-1,2-Dichloroethene	73		150		µG/L	MTR-MW30(41.1)-G090109	5 / 5	NA	NA	NA	NA	NA	NA	Yes	NA
156-60-5	trans-1,2-Dichloroethene	1.3		3.2		µG/L	MTR-MW30(41.1)-G090109	5 / 5	NA	NA	NA	NA	NA	NA	Yes	NA
79-01-6	Trichloroethene	59		82		µG/L	MTR-MW30(41.1)-G090109	5 / 5	NA	NA	NA	NA	NA	NA	Yes	NA
75-01-4	Vinyl chloride	1.6		3.5		µG/L	MTR-MW30(41.1)-G090109	5 / 5	NA	NA	NA	NA	NA	NA	Yes	NA

- (1) Minimum or maximum concentration detected in exposure area.  
(2) The concentration used for screening is the maximum detected concentration.  
(3) Values were not screened. All detected concentrations were considered COPC.

NA = Not applicable  
The maximum concentration of the samples collected from MW30 (41.1) were used.  
Qualifier definitions:  
J = Value is estimated.

µg/L = micrograms per liter  
COPC = chemical of potential concern

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**Table 2.7**  
**Occurrence, Distribution and Selection of Chemicals of Potential Concern**  
**Residential Air - Property 8 Groundwater**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

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

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Sample ID of Maximum Concentration	Detection Frequency	Range of Reporting Limits Min-Max	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (3)	Potential ARAR/TBC Value (4)	Potential ARAR/TBC Source	Retain as COPC?	Rationale for Contaminant Deletion or Selection (5)
	<b>Volatile Organics</b>															
	Cis-1,2-Dichloroethene	2.8		4.5		µg/L	3597NOLDSR31-PRE-111908	11 / 25	NA	NA	NA	NA	NA	NA	Yes	NA

- (1) Minimum or maximum concentration detected in exposure area.  
 (2) The concentration used for screening is the maximum detected concentration.  
 (3) Values were not screened. All detected concentrations were considered COPC.

The maximum concentration of the samples collected from MW-37(23.3), MW-39(13), and Property 8 potable water well were used.

Prepared by / Date: EYM 8/16/11  
 Checked by / Date: MJM 8/16/11

**Table 2.8**  
**Occurrence, Distribution and Selection of Chemicals of Potential Concern**  
**Residential Air - Property 16A Soil Vapor**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future  
Medium: Soil Vapor  
Exposure Medium: Residential Air

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Sample ID of Maximum Concentration	Detection Frequency	Range of Reporting Limits Min-Max	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Retain as COPC?	Rationale for Contaminant Deletion or Selection
	<b>Volatile Organics</b>															
78-93-3	2-Butanone	8.85		8.85		µg/m³	MTR-VMW4-V7.0-7.5 122208	1 / 4	1	NA	NA	NA	NA	NA	Yes	NA
95-63-6	1,2,4-Trimethylbenzene	14.75		14.75		µg/m³	MTR-VMW4-V7.0-7.5 122208	1 / 4	1	NA	NA	NA	NA	NA	Yes	NA
108-67-8	1,3,5-Trimethylbenzene	4.92		4.92		µg/m³	MTR-VMW4-V7.0-7.5 122208	1 / 4	1	NA	NA	NA	NA	NA	Yes	NA
67-64-1	Acetone	5.28		57.01		µg/m³	MTR-VMW4-V7.0-7.5 122208	4 / 4	NA	NA	NA	NA	NA	NA	Yes	NA
71-43-2	Benzene	6.39		9.58		µg/m³	MTR-VMW4-V7.0-7.5 122208	2 / 4	NA	NA	NA	NA	NA	NA	Yes	NA
108-90-7	Chlorobenzene	4.6		9.21		µg/m³	MTR-VMW5-V7.0-7.5 122208	2 / 4	NA	NA	NA	NA	NA	NA	Yes	NA
100-41-4	Ethylbenzene	4.34		13.03		µg/m³	MTR-VMW4-V7.0-7.5 122208	2 / 4	NA	NA	NA	NA	NA	NA	Yes	NA
110-54-3	Hexane	7.05		7.05		µg/m³	MTR-VMW4-V7.0-7.5 122208	1 / 4	1	NA	NA	NA	NA	NA	Yes	NA
75-09-2	Methylene chloride	3.47		3.47		µg/m³	MTR-VMW4-V7.0-7.5 122208 MTR-VMW5-V7.0-7.5 122208	2 / 4	NA	NA	NA	NA	NA	NA	Yes	NA
127-18-4	Tetrachloroethene	31		31		µg/m³	MTR-VMW4-V7.0-7.5 123010	1 / 4	NA	NA	NA	NA	NA	NA	Yes	NA
108-88-3	Toluene	37.68		71.59		µg/m³	MTR-VMW4-V7.0-7.5 122208	2 / 4	NA	NA	NA	NA	NA	NA	Yes	NA
106-42-3	m&p-Xylene	13.03		52.11		µg/m³	MTR-VMW4-V7.0-7.5 122208	2 / 4	NA	NA	NA	NA	NA	NA	Yes	NA
95-47-6	o-Xylene	4.34		17.37		µg/m³	MTR-VMW4-V7.0-7.5 122208	2 / 4	NA	NA	NA	NA	NA	NA	Yes	NA

(1) Minimum or maximum concentration detected in exposure area.

(2) The concentration used for screening is the maximum detected concentration.

(3) Values were not screened. All detected concentrations were considered COPC.

NA = Not applicable

The maximum concentration of the samples collected from VMW-4 (7-7.5) and VMW-5 (7-7.5) were used.

Two samples for each site were taken at different times, on December 22, 2008 and on December 30, 2010 resulting in a total of four samples.

In 2008 there were 12 chemicals detected in the analysis for Property 16A (acetone, benzene, 2-butanone, chlorobenzene, ethylbenzene, hexane, methylene chloride, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, toluene, m,p-xylene and o-xylene). In 2010 there were only 2 chemicals detected in Property 16A (acetone and tetrachloroethene).

µg/m³ = micrograms per cubic meter

COPC = chemical of potential concern

Prepared by / Date: EYM 08/12/2011

Checked by / Date: KASK 08/15/2011

**Table 2.9**  
**Occurrence, Distribution and Selection of Chemicals of Potential Concern**  
**Residential Air - Property 17 Soil Vapor**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future  
 Medium: Soil Vapor  
 Exposure Medium: Residential Air

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Sample ID of Maximum Concentration	Detection Frequency	Range of Reporting Limits Min-Max	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Retain as COPC?	Rationale for Contaminant Deletion or Selection
	<b>Volatile Organics</b>															
95-63-6	1,2,4-Trimethylbenzene	9.83		9.83		µg/m³	MTR-VMW10-V4.5-5.0 122208	1 / 1	NA	NA	NA	NA	NA	NA	Yes	NA
71-43-2	Benzene	3.19		3.19		µg/m³	MTR-VMW10-V4.5-5.0 122208	1 / 1	NA	NA	NA	NA	NA	NA	Yes	NA
110-54-3	Hexane	3.52		3.52		µg/m³	MTR-VMW10-V4.5-5.0 122208	1 / 1	NA	NA	NA	NA	NA	NA	Yes	NA
75-09-2	Methylene chloride	10.42		10.42		µg/m³	MTR-VMW10-V4.5-5.0 122208	1 / 1	NA	NA	NA	NA	NA	NA	Yes	NA
108-88-3	Toluene	82.9		82.9		µg/m³	MTR-VMW10-V4.5-5.0 122208	1 / 1	NA	NA	NA	NA	NA	NA	Yes	NA
106-42-3	m&p-Xylene	13.03		13.03		µg/m³	MTR-VMW10-V4.5-5.0 122208	1 / 1	NA	NA	NA	NA	NA	NA	Yes	NA
95-47-6	o-Xylene	4.34		4.34		µg/m³	MTR-VMW10-V4.5-5.0 122208	1 / 1	NA	NA	NA	NA	NA	NA	Yes	NA

- (1) Minimum or maximum concentration detected in exposure area.  
 (2) The concentration used for screening is the maximum detected concentration.  
 (3) Values were not screened. All detected concentrations were considered COPC.

NA = Not applicable  
 The sample collected from VMW-10 (4.5-5) was used.

µg/m³ = micrograms per cubic meter  
 COPC = chemical of potential concern

Prepared by / Date: CMR 02/04/11  
 Checked by / Date: MJM 02/23/11

**Table 2.10**  
**Occurrence, Distribution and Selection of Chemicals of Potential Concern**  
**Residential Air - Property 18-19 Groundwater**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

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

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Sample ID of Maximum Concentration	Detection Frequency	Range of Reporting Limits Min-Max	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Retain as COPC?	Rationale for Contaminant Deletion or Selection
	<b>Volatile Organics</b>															
75-01-4	Vinyl chloride	0.87		18		µg/L	3791NHWW31-RAW-0310 3791NHWW31-RAW-0310R	28 / 56	NA	NA	NA	NA	NA	NA	Yes	NA

- (1) Minimum or maximum concentration detected in exposure area.  
 (2) The concentration used for screening is the maximum detected concentration.  
 (3) Values were not screened. All detected concentrations were considered COPC.

For property 18, VMW-11 could not be sampled due to ice blockage. There is no vapor monitoring well at Property 19. Therefore, vapor intrusion potential has been evaluated using groundwater data - in particular, data from potable water samples collected from Property 19 and from the adjacent Property 16A. The use of data from the potable well at Property 16A is a conservative approach to this evaluation.  
 NA = Not applicable

Prepared by / Date: EYM 08/15/2011  
 Checked by / Date: MJM 08/15/2011

µg/L = micrograms per liter  
 COPC = chemical of potential concern

**Table 2.11**  
**Occurrence, Distribution and Selection of Chemicals of Potential Concern**  
**Residential Air - Property 20 Soil Vapor**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future  
 Medium: Soil Vapor  
 Exposure Medium: Residential Air

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Sample ID of Maximum Concentration	Detection Frequency	Range of Reporting Limits Min-Max	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Retain as COPC?	Rationale for Contaminant Deletion or Selection
	<b>Volatile Organics</b>															
78-93-3	2-Butanone	2.95		2.95		µg/m³	MTR-VMW8-V4.5-5.0 122208	1 / 2	1	NA	NA	NA	NA	NA	Yes	NA
95-63-6	1,2,4-Trimethylbenzene	4.92		4.92		µg/m³	MTR-VMW8-V4.5-5.0 122208	1 / 2	1	NA	NA	NA	NA	NA	Yes	NA
71-43-2	Benzene	6.39		9.58		µg/m³	MTR-VMW8-V4.5-5.0 122208	2 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
75-15-0	Carbon disulfide	18.68		18.68		µg/m³	MTR-VMW8-V4.5-5.0 122208	1 / 2	1	NA	NA	NA	NA	NA	Yes	NA
76-13-1	Freon 113	15.33		15.33		µg/m³	MTR-VMW8-V4.5-5.0 122208	1 / 2	1	NA	NA	NA	NA	NA	Yes	NA
110-54-3	Hexane	17.62		17.62		µg/m³	MTR-VMW8-V4.5-5.0 122208	1 / 2	1	NA	NA	NA	NA	NA	Yes	NA
75-09-2	Methylene chloride	6.95		55.58		µg/m³	MTR-VMW8-V4.5-5.0 122208	2 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
108-88-3	Toluene	90.43		116.81		µg/m³	MTR-VMW9-V4.5-5.0 122208	2 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
106-42-3	m&p-Xylene	13.03		13.03		µg/m³	MTR-VMW8-V4.5-5.0 122208	1 / 2	1	NA	NA	NA	NA	NA	Yes	NA

(1) Minimum or maximum concentration detected in exposure area.

(2) The concentration used for screening is the maximum detected concentration.

(3) Values were not screened. All detected concentrations were considered COPC.

NA = Not applicable

The maximum concentration of the samples collected from VMW-8 (4.5-5) and VMW-9 (4.5-5) were used.

µg/m³ = micrograms per cubic meter

COPC = chemical of potential concern

Prepared by / Date: CMR 02/04/11

Checked by / Date: MJM 02/23/11



**Table 2.12**  
**Occurrence, Distribution and Selection of Chemicals of Potential Concern**  
**Residential Air - Property 21 Soil Vapor**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future  
 Medium: Soil Vapor  
 Exposure Medium: Residential Air

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Sample ID of Maximum Concentration	Detection Frequency	Range of Reporting Limits Min-Max	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Retain as COPC?	Rationale for Contaminant Deletion or Selection
	<b>Volatile Organics</b>															
95-63-6	1,2,4-Trimethylbenzene	14.75		14.75		µg/m³	MTR-VMW7-V4.5-5.0 122208	1 / 1	NA	NA	NA	NA	NA	NA	Yes	NA
108-67-8	1,3,5-Trimethylbenzene	4.92		4.92		µg/m³	MTR-VMW7-V4.5-5.0 122208	1 / 1	NA	NA	NA	NA	NA	NA	Yes	NA
71-43-2	Benzene	12.78		12.78		µg/m³	MTR-VMW7-V4.5-5.0 122208	1 / 1	NA	NA	NA	NA	NA	NA	Yes	NA
75-15-0	Carbon disulfide	9.34		9.34		µg/m³	MTR-VMW7-V4.5-5.0 122208	1 / 1	NA	NA	NA	NA	NA	NA	Yes	NA
100-41-4	Ethylbenzene	8.68		8.68		µg/m³	MTR-VMW7-V4.5-5.0 122208	1 / 1	NA	NA	NA	NA	NA	NA	Yes	NA
76-13-1	Freon 113	15.33		15.33		µg/m³	MTR-VMW7-V4.5-5.0 122208	1 / 1	NA	NA	NA	NA	NA	NA	Yes	NA
110-54-3	Hexane	35.24		35.24		µg/m³	MTR-VMW7-V4.5-5.0 122208	1 / 1	NA	NA	NA	NA	NA	NA	Yes	NA
75-09-2	Methylene chloride	48.64		48.64		µg/m³	MTR-VMW7-V4.5-5.0 122208	1 / 1	NA	NA	NA	NA	NA	NA	Yes	NA
108-88-3	Toluene	222.32		222.32		µg/m³	MTR-VMW7-V4.5-5.0 122208	1 / 1	NA	NA	NA	NA	NA	NA	Yes	NA
106-42-3	m&p-Xylene	34.74		34.74		µg/m³	MTR-VMW7-V4.5-5.0 122208	1 / 1	NA	NA	NA	NA	NA	NA	Yes	NA
95-47-6	o-Xylene	13.03		13.03		µg/m³	MTR-VMW7-V4.5-5.0 122208	1 / 1	NA	NA	NA	NA	NA	NA	Yes	NA

- (1) Minimum or maximum concentration detected in exposure area.  
 (2) The concentration used for screening is the maximum detected concentration.  
 (3) Values were not screened. All detected concentrations were considered COPC.

NA = Not applicable  
 The sample collected from VMW-7 (4.5-5) was used.

µg/m³ = micrograms per cubic meter  
 COPC = chemical of potential concern

Prepared by / Date: CMR 02/04/11  
 Checked by / Date: MJM 02/23/11

**Table 2.13**  
**Occurrence, Distribution and Selection of Chemicals of Potential Concern**  
**Residential Air - Property 23 Soil Vapor**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future  
Medium: Soil Vapor  
Exposure Medium: Residential Air

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Sample ID of Maximum Concentration	Detection Frequency	Range of Reporting Limits Min-Max	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Retain as COPC?	Rationale for Contaminant Deletion or Selection
	<b>Volatile Organics</b>															
95-63-6	1,2,4-Trimethylbenzene	14.75		14.75		µg/m³	MTR-VMW6-V9.0-9.5 122208	1 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
108-67-8	1,3,5-Trimethylbenzene	4.92		4.92		µg/m³	MTR-VMW6-V9.0-9.5 122208	1 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
106-46-7	1,4-Dichlorobenzene	1.5	J	1.5		µg/m³	MTR-VMW6-V9.0-9.5 042110	1 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
78-93-3	2-Butanone	2.6	J	2.6		µg/m³	MTR-VMW6-V9.0-9.5 042110	1 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
108-10-1	4-Methyl-2-pentanone	0.78	J	0.78		µg/m³	MTR-VMW6-V9.0-9.5 042110	1 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
67-64-1	Acetone	18		18		µg/m³	MTR-VMW6-V9.0-9.5 042110	1 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
71-43-2	Benzene	0.8	J	15.97		µg/m³	MTR-VMW6-V9.0-9.5 122208	2 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
75-15-0	Carbon disulfide	18.68		18.68		µg/m³	MTR-VMW6-V9.0-9.5 122208	1 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
108-90-7	Chlorobenzene	9.21		9.21		µg/m³	MTR-VMW6-V9.0-9.5 122208	2 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
75-71-8	Dichlorodifluoromethane	3.2	J	3.2		µg/m³	MTR-VMW6-V9.0-9.5 042110	1 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
100-41-4	Ethylbenzene	8.68		8.68		µg/m³	MTR-VMW6-V9.0-9.5 122208	1 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
76-13-1	Freon 113	15.33		15.33		µg/m³	MTR-VMW6-V9.0-9.5 122208	1 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
110-54-3	Hexane	49.34		49.34		µg/m³	MTR-VMW6-V9.0-9.5 122208	1 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
75-09-2	Methylene chloride	41.69		41.69		µg/m³	MTR-VMW6-V9.0-9.5 122208	1 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
108-88-3	Toluene	192.17		192.17		µg/m³	MTR-VMW6-V9.0-9.5 122208	1 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
106-42-3	m&p-Xylene	0.87		30.4		µg/m³	MTR-VMW6-V9.0-9.5 122208	2 / 2	NA	NA	NA	NA	NA	NA	Yes	NA
95-47-6	o-Xylene	1.9		8.68		µg/m³	MTR-VMW6-V9.0-9.5 122208	2 / 2	NA	NA	NA	NA	NA	NA	Yes	NA

(1) Minimum or maximum concentration detected in exposure area.

(2) The concentration used for screening is the maximum detected concentration.

(3) Values were not screened. All detected concentrations were considered COPC.

NA = Not applicable

The sample collected from VMW-6 (9-9.5) was used.

Two samples for the site were taken at different tiems, on December 22, 2008 and on April 21, 2010 resulting in a total of 2 samples.

In 2008 there were 12 chemicals detected (1,2,4-trimethylbenzene,

1,3,5-trimethylbenzene, benzene, carbon disulfide, chlorobenzene, ethylbenzene, Freon 113, hexane, methylchloride, toluene, m,p-xylene and o-xylene). In 2010 there were only 8 chemicals detected (1,4-dichlorobenzene, 2-butanone, 4-methyl-2-pentanone, acetone, benzene, chlorobenzene, dichlorodifluoromethane, m,p-xylene and o-xylene).

µg/m³ = micrograms per cubic meter

COPC = chemical of potential concern

Prepared by / Date: EYM 08/15/2011

Checked by / Date: KASK 08/15/2011

**Table 2.14**  
**Occurrence, Distribution and Selection of Chemicals of Potential Concern**  
**Residential Air - Property 37 Groundwater**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

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

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Sample ID of Maximum Concentration	Detection Frequency	Range of Reporting Limits Min-Max	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Retain as COPC?	Rationale for Contaminant Deletion or Selection
	<b>Volatile Organics</b>															
156-59-2	cis-1,2-Dichloroethene	1.5		3.5		µg/L	MTR-MW11-G121310	5 / 6	1	NA	NA	NA	NA	NA	Yes	NA
79-01-6	Trichloroethene	2		3.4		µg/L	MTR-MW11-G081210	5 / 6	NA	NA	NA	NA	NA	NA	Yes	NA
75-01-4	Vinyl chloride	3.2		7.8		µg/L	MTR-MW11-G121310	2 / 6	1	NA	NA	NA	NA	NA	Yes	NA

- (1) Minimum or maximum concentration detected in exposure area.  
 (2) The concentration used for screening is the maximum detected concentration.  
 (3) Values were not screened. All detected concentrations were considered COPC.

NA = Not applicable  
 The maximum concentration of the samples collected from MW-11 were used.  
 µg/L = micrograms per liter  
 COPC = chemical of potential concern

**Table 2.15**  
**Occurrence, Distribution and Selection of Chemicals of Potential Concern**  
**Residential Air - Property 38 Soil Vapor**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future  
 Medium: Soil Vapor  
 Exposure Medium: Residential Air

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Sample ID of Maximum Concentration	Detection Frequency	Range of Reporting Limits Min-Max	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Retain as COPC?	Rationale for Contaminant Deletion or Selection
	<b>Volatile Organics</b>															
78-93-3	2-Butanone	8.85		8.85		µg/m³	MTR-VMW2-V4.5-5.0 121808	1 / 1	1	NA	NA	NA	NA	NA	Yes	NA
67-64-1	Acetone	33.26		33.26		µg/m³	MTR-VMW2-V4.5-5.0 121808	1 / 1	1	NA	NA	NA	NA	NA	Yes	NA
71-43-2	Benzene	6.39		6.39		µg/m³	MTR-VMW2-V4.5-5.0 121808	1 / 1	1	NA	NA	NA	NA	NA	Yes	NA
108-90-7	Chlorobenzene	4.6		4.6		µg/m³	MTR-VMW2-V4.5-5.0 121808	1 / 1	1	NA	NA	NA	NA	NA	Yes	NA
108-88-3	Toluene	56.52		56.52		µg/m³	MTR-VMW2-V4.5-5.0 121808	1 / 1	1	NA	NA	NA	NA	NA	Yes	NA
106-42-3	m&p-Xylene	8.68		8.68		µg/m³	MTR-VMW2-V4.5-5.0 121808	1 / 1	1	NA	NA	NA	NA	NA	Yes	NA
95-47-6	o-Xylene	4.34		4.34		µg/m³	MTR-VMW2-V4.5-5.0 121808	1 / 1	1	NA	NA	NA	NA	NA	Yes	NA

- (1) Minimum or maximum concentration detected in exposure area.  
 (2) The concentration used for screening is the maximum detected concentration.  
 (3) Values were not screened. All detected concentrations were considered COPC.

NA = Not applicable  
 The sample collected from VMW-2 (4.5-5) was used because VMW-2(4.5-5) is the most shallow soil vapor probe on Property 38.

µg/m³ = micrograms per cubic meter  
 COPC = chemical of potential concern

Prepared by / Date: CMR 02/04/11  
 Checked by / Date: MJM 02/23/11

**Table 2.16**  
**Occurrence, Distribution and Selection of Chemicals of Potential Concern**  
**Residential Air - Property 39 Groundwater**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

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

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Sample ID of Maximum Concentration	Detection Frequency	Range of Reporting Limits Min-Max	Concentration Used for Screening (2)	Background Value	Screening Toxicity Value (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	Retain as COPC?	Rationale for Contaminant Deletion or Selection
	<b>Volatile Organics</b>															
79-01-6	Trichloroethene	0.38	J	0.38	J	µg/L	MTR-MW24(24.9)-G041410	1 / 5	NA	NA	NA	NA	NA	NA	Yes	NA

- (1) Minimum or maximum concentration detected in exposure area.  
 (2) The concentration used for screening is the maximum detected concentration.  
 (3) Values were not screened. All detected concentrations were considered COPC.

NA = Not applicable  
 The maximum concentration of the samples collected from MW-24 (24.9) were used.  
 Qualifier definitions:  
 J = Value is estimated.

µg/L = micrograms per liter  
 COPC = chemical of potential concern

Prepared by / Date: CMR 02/04/11  
 Checked by / Date: MJM 02/23/11

**Table 3.1**  
**Baseline Human Health Risk Assessment Approach**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Timeframe	Receptor	Exposure Point	Activity	Exposure Medium	Exposure Route	Previous Evaluation	RI/FS Approach
Current/Future	Resident	Property 38 Wetlands	Recreation	Wetland soil	Direct Contact (incidental ingestion and dermal contact)	None	Quantitative Risk Assessment
Current/Future	Resident	Eastern Pond	Recreation	Surface Water Sediment	Direct Contact (incidental ingestion and dermal contact)	None None	Quantitative Risk Assessment
Current/Future	Industrial Worker	Property 36	Work	Indoor Air	Inhalation	None	Quantitative Risk Assessment
Current/Future	Resident	Property 8	Residence	Indoor Air	Inhalation	None	Quantitative Risk Assessment
Current/Future	Resident	Property 16A	Residence	Indoor Air	Inhalation	None	Quantitative Risk Assessment
Current/Future	Resident	Property 17	Residence	Indoor Air	Inhalation	None	Quantitative Risk Assessment
Current/Future	Resident	Property 18-19	Residence	Indoor Air	Inhalation	None	Quantitative Risk Assessment
Current/Future	Resident	Property 20	Residence	Indoor Air	Inhalation	None	Quantitative Risk Assessment
Current/Future	Resident	Property 21	Residence	Indoor Air	Inhalation	None	Quantitative Risk Assessment
Current/Future	Resident	Property 23	Residence	Indoor Air	Inhalation	None	Quantitative Risk Assessment
Current/Future	Resident	Property 37	Residence	Indoor Air	Inhalation	None	Quantitative Risk Assessment
Current/Future	Resident	Property 38	Residence	Indoor Air	Inhalation	None	Quantitative Risk Assessment
Current/Future	Resident	Property 39	Residence	Indoor Air	Inhalation	None	Quantitative Risk Assessment
Current/Future	Industrial Worker	Property 41	Work	Indoor Air	Inhalation	None	Quantitative Risk Assessment
Current/Future	Resident	Property 15	Residence	Indoor Air	Inhalation	None	Quantitative Risk Assessment

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**Table 3.2**  
**Exposure Pathway Summary**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Exposure Point and Receptor Population	Receptor Age	Scenario Timeframe	Potential Exposure Medium and Relevant Pathways			
			Wetland Soil	Sediment	Surface Water	Indoor Air
<b>Property 38 Wetlands</b>						
Area Resident (walking, hunting)	Child, Adolescent, Adult	C/F	ING, DERM	--	--	--
<b>Eastern Pond</b>						
Area Resident (wading)	Child, Adolescent, Adult	C/F	--	ING, DERM	ING, DERM	--
<b>Property 36</b>						
Industrial Worker	Adult	C/F	--	--	--	INH
<b>Property 8</b>						
Area Resident	Child, Adolescent, Adult	C/F	--	--	--	INH
<b>Property 16A</b>						
Area Resident	Child, Adolescent, Adult	C/F	--	--	--	INH
<b>Property 17</b>						
Area Resident	Child, Adolescent, Adult	C/F	--	--	--	INH
<b>Property 18-19</b>						
Area Resident	Child, Adolescent, Adult	C/F	--	--	--	INH
<b>Property 20</b>						
Area Resident	Child, Adolescent, Adult	C/F	--	--	--	INH
<b>Property 21</b>						
Area Resident	Child, Adolescent, Adult	C/F	--	--	--	INH
<b>Property 23</b>						
Area Resident	Child, Adolescent, Adult	C/F	--	--	--	INH
<b>Property 37</b>						
Area Resident	Child, Adolescent, Adult	C/F	--	--	--	INH
<b>Property 38</b>						
Area Resident	Child, Adolescent, Adult	C/F	--	--	--	INH
<b>Property 39</b>						
Area Resident	Child, Adolescent, Adult	C/F	--	--	--	INH
<b>Property 41</b>						
Industrial Worker	Adult	C/F	--	--	--	INH
<b>Property 15</b>						
Area Resident	Child, Adolescent, Adult	C/F	--	--	--	INH

**Notes:**

*Timeframe:*

C - current land use

F - future land use

*Pathways:*

DERM = exposure via dermal contact

ING = exposure via incidental ingestion

INH = exposure via inhalation

"-" indicates that the pathway is incomplete.

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**Table 3.3**  
**Medium-Specific Exposure Point Concentration Summary**  
**Property 38 Wetland Soil**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future
Medium: Wetland Soil
Exposure Medium: Wetland Soil

Exposure Point	Chemical of Potential Concern (1)	Units	Arithmetic Mean	95% UCL (distribution)	Maximum Detected Concentration (qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Wetlands north of Eastern Pond	Volatile Organics								
	2-Butanone	µg/Kg	NC	NC	200	200	µg/Kg	Max	(2)
	Acetone	µg/Kg	NC	NC	1300	1300	µg/Kg	Max	(2)
	Carbon disulfide	µg/Kg	NC	NC	20	20	µg/Kg	Max	(2)
	Toluene	µg/Kg	NC	NC	0.92	0.92	µg/Kg	Max	(2)

(1) Chemicals of potential concern are identified in Table 2.1 through 2.16 for site exposure areas.

(2) Max: Maximum detected concentration utilized.

µg/Kg = micrograms per kilogram

EPC = Exposure Point Concentration

UCL = Upper Confidence Limit on the arithmetic mean

NC = Not calculated

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**Table 3.4**  
**Medium-Specific Exposure Point Concentration Summary**  
**Eastern Pond Sediment**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

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

Exposure Point	Chemical of Potential Concern (1)	Units	Arithmetic Mean	95% UCL (distribution)	Maximum Detected Concentration (qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Eastern Pond	Volatile Organics								
	2-Butanone	µg/Kg	NC	NC	29	29	µg/Kg	Max	(2)
	cis-1,2-Dichloroethene	µg/Kg	NC	NC	8.3	8.3	µg/Kg	Max	(2)
	Acetone	µg/Kg	NC	NC	330	330	µg/Kg	Max	(2)
	Toluene	µg/Kg	NC	NC	1.7 J	1.7	µg/Kg	Max	(2)

(1) Chemicals of potential concern are identified in Table 2.1 through 2.16 for site exposure areas.

(2) Max: Maximum detected concentration utilized.

µg/Kg = micrograms per kilogram

EPC = Exposure Point Concentration

UCL = Upper Confidence Limit on the arithmetic mean

NC = Not calculated

Qualifier definitions:

J = Value is estimated.

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**Table 3.5**  
**Medium-Specific Exposure Point Concentration Summary**  
**Eastern Pond Surface Water**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

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

Exposure Point	Chemical of Potential Concern (1)	Units	Arithmetic Mean	95% UCL (distribution)	Maximum Detected Concentration (qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Eastern Pond	Volatile Organics								
	cis-1,2-Dichloroethene	µg/L	NC	NC	2.1	2.1	µg/L	Max	(2)

(1) Chemicals of potential concern are identified in Table 2.1 through 2.16 for site exposure areas.

(2) Max: Maximum detected concentration utilized.

µg/L = micrograms per liter

EPC = Exposure Point Concentration

UCL = Upper Confidence Limit on the arithmetic mean

NC = Not calculated

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**Table 3.6**  
**Medium-Specific Exposure Point Concentration Summary**  
**Industrial Air - Soil Vapor Samples - Property 36**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future
Medium: Soil Vapor
Exposure Medium: Industrial Air

Exposure Point	Chemical of Potential Concern (1)	Units	Arithmetic Mean	95% UCL (distribution)	Maximum Detected Concentration (qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
<b>Property 36</b>	<b>Volatile Organics</b>								
VMW-3	2-Butanone	µg/m <sup>3</sup>	NC	NC	8.85	8.85	µg/m <sup>3</sup>	Max	(2)
	1,2,4-Trimethylbenzene	µg/m <sup>3</sup>	NC	NC	9.83	9.83	µg/m <sup>3</sup>	Max	(2)
	Acetone	µg/m <sup>3</sup>	NC	NC	78.39	78.39	µg/m <sup>3</sup>	Max	(2)
	Benzene	µg/m <sup>3</sup>	NC	NC	12.78	12.78	µg/m <sup>3</sup>	Max	(2)
	Carbon disulfide	µg/m <sup>3</sup>	NC	NC	3.11	3.11	µg/m <sup>3</sup>	Max	(2)
	Chlorobenzene	µg/m <sup>3</sup>	NC	NC	13.81	13.81	µg/m <sup>3</sup>	Max	(2)
	Dichlorodifluoromethane	µg/m <sup>3</sup>	NC	NC	19.78	19.78	µg/m <sup>3</sup>	Max	(2)
	Ethylbenzene	µg/m <sup>3</sup>	NC	NC	17.37	17.37	µg/m <sup>3</sup>	Max	(2)
	Hexane	µg/m <sup>3</sup>	NC	NC	7.05	7.05	µg/m <sup>3</sup>	Max	(2)
	Methylene chloride	µg/m <sup>3</sup>	NC	NC	10.42	10.42	µg/m <sup>3</sup>	Max	(2)
	Toluene	µg/m <sup>3</sup>	NC	NC	116.81	116.81	µg/m <sup>3</sup>	Max	(2)
	Trichlorofluoromethane	µg/m <sup>3</sup>	NC	NC	5.62	5.62	µg/m <sup>3</sup>	Max	(2)
	m&p-Xylene	µg/m <sup>3</sup>	NC	NC	43.42	43.42	µg/m <sup>3</sup>	Max	(2)
	o-Xylene	µg/m <sup>3</sup>	NC	NC	13.03	13.03	µg/m <sup>3</sup>	Max	(2)

(1) Chemicals of potential concern are identified in Table 2.1 through 2.16 for site exposure areas.

(2) Max: Maximum detected concentration in VMW-3(4.5-5) utilized. VMW-3(4.5-5) was utilized because a vapor monitoring well is not located on Property 36.

µg/m<sup>3</sup> = micrograms per cubic meter

EPC = Exposure Point Concentration

UCL = Upper Confidence Limit on the arithmetic mean

NC = Not calculated

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Checked by / Date: MJM 02/23/11

**Table 3.7**  
**Medium-Specific Exposure Point Concentration Summary**  
**Industrial Air - Groundwater Samples - Property 36**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

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

Exposure Point	Chemical of Potential Concern (1)	Units	Arithmetic Mean	95% UCL (distribution)	Maximum Detected Concentration (qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
<b>Property 36</b>	<b>Volatile Organics</b>								
MW-30	1,1-Dichloroethene	µg/L	NC	NC	1.2	1.2	µg/L	Max	(2)
	cis-1,2-Dichloroethene	µg/L	NC	NC	150	150	µg/L	Max	(2)
	trans-1,2-Dichloroethene	µg/L	NC	NC	3.2	3.2	µg/L	Max	(2)
	Trichloroethene	µg/L	NC	NC	82	82	µg/L	Max	(2)
	Vinyl chloride	µg/L	NC	NC	3.5	3.5	µg/L	Max	(2)

(1) Chemicals of potential concern are identified in Table 2.1 through 2.16 for site exposure areas.

(2) Max: Maximum detected concentration utilized.

µg/L = micrograms per liter

EPC = Exposure Point Concentration

UCL = Upper Confidence Limit on the arithmetic mean

NC = Not calculated

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Checked by / Date: MJM 02/23/11

**Table 3.8**  
**Medium-Specific Exposure Point Concentration Summary**  
**Residential Air - Soil Vapor Samples - Property 16A**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future
Medium: Soil Vapor
Exposure Medium: Residential Air

Exposure Point	Chemical of Potential Concern (1)	Units	Arithmetic Mean	95% UCL (distribution)	Maximum Detected Concentration (qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
<b>Property 16A</b>	<b>Volatile Organics</b>								
VMW-4	2-Butanone	µg/m <sup>3</sup>	NC	NC	8.85	8.85	µg/m <sup>3</sup>	Max	(2)
VMW-5	1,2,4-Trimethylbenzene	µg/m <sup>3</sup>	NC	NC	14.75	14.75	µg/m <sup>3</sup>	Max	(2)
	1,3,5-Trimethylbenzene	µg/m <sup>3</sup>	NC	NC	4.92	4.92	µg/m <sup>3</sup>	Max	(2)
	Acetone	µg/m <sup>3</sup>	NC	NC	57.01	57.01	µg/m <sup>3</sup>	Max	(2)
	Benzene	µg/m <sup>3</sup>	NC	NC	9.58	9.58	µg/m <sup>3</sup>	Max	(2)
	Chlorobenzene	µg/m <sup>3</sup>	NC	NC	9.21	9.21	µg/m <sup>3</sup>	Max	(2)
	Ethylbenzene	µg/m <sup>3</sup>	NC	NC	13.03	13.03	µg/m <sup>3</sup>	Max	(2)
	Hexane	µg/m <sup>3</sup>	NC	NC	7.05	7.05	µg/m <sup>3</sup>	Max	(2)
	Methylene chloride	µg/m <sup>3</sup>	NC	NC	3.47	3.47	µg/m <sup>3</sup>	Max	(2)
	Tetrachloroethene	µg/m <sup>3</sup>	NC	NC	31	31	µg/m <sup>3</sup>	Max	(2)
	Toluene	µg/m <sup>3</sup>	NC	NC	71.59	71.59	µg/m <sup>3</sup>	Max	(2)
	m&p-Xylene	µg/m <sup>3</sup>	NC	NC	52.11	52.11	µg/m <sup>3</sup>	Max	(2)
	o-Xylene	µg/m <sup>3</sup>	NC	NC	17.37	17.37	µg/m <sup>3</sup>	Max	(2)

(1) Chemicals of potential concern are identified in Table 2.1 through 2.16 for site exposure areas.

(2) Max: Maximum detected concentration utilized.

µg/m<sup>3</sup> = micrograms per cubic meter

EPC = Exposure Point Concentration

UCL = Upper Confidence Limit on the arithmetic mean

NC = Not calculated

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Checked by / Date: KASK 08/15/2011

**Table 3.9**  
**Medium-Specific Exposure Point Concentration Summary**  
**Residential Air - Soil Vapor Samples - Property 17**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future
Medium: Soil Vapor
Exposure Medium: Residential Air

Exposure Point	Chemical of Potential Concern (1)	Units	Arithmetic Mean	95% UCL (distribution)	Maximum Detected Concentration (qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
<b>Property 17</b>	<b>Volatile Organics</b>								
VMW-10	1,2,4-Trimethylbenzene	µg/m <sup>3</sup>	NC	NC	9.83	9.83	µg/m <sup>3</sup>	Max	(2)
	Benzene	µg/m <sup>3</sup>	NC	NC	3.19	3.19	µg/m <sup>3</sup>	Max	(2)
	Hexane	µg/m <sup>3</sup>	NC	NC	3.52	3.52	µg/m <sup>3</sup>	Max	(2)
	Methylene chloride	µg/m <sup>3</sup>	NC	NC	10.42	10.42	µg/m <sup>3</sup>	Max	(2)
	Toluene	µg/m <sup>3</sup>	NC	NC	82.9	82.9	µg/m <sup>3</sup>	Max	(2)
	m&p-Xylene	µg/m <sup>3</sup>	NC	NC	13.03	13.03	µg/m <sup>3</sup>	Max	(2)
	o-Xylene	µg/m <sup>3</sup>	NC	NC	4.34	4.34	µg/m <sup>3</sup>	Max	(2)

(1) Chemicals of potential concern are identified in Table 2.1 through 2.16 for site exposure areas.

(2) Max: Maximum detected concentration utilized.

µg/m<sup>3</sup> = micrograms per cubic meter

EPC = Exposure Point Concentration

UCL = Upper Confidence Limit on the arithmetic mean

NC = Not calculated

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Checked by / Date: MJM 02/23/11

**Table 3.10**  
**Medium-Specific Exposure Point Concentration Summary**  
**Residential Air - Groundwater Samples - Property 18-19**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

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

Exposure Point	Chemical of Potential Concern (1)	Units	Arithmetic Mean	95% UCL (distribution)	Maximum Detected Concentration (qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Properties 18 and 19	Volatile Organics								
Potable	Vinyl chloride	µg/L	NC	NC	18	18	µg/L	Max	(2)

- (1) Chemicals of potential concern are identified in Table 2.1 through 2.16 for site exposure areas.  
 (2) Max: Maximum detected concentration in the potable water samples collected from Property 16A utilized.

µg/L = micrograms per liter

EPC = Exposure Point Concentration

UCL = Upper Confidence Limit on the arithmetic mean

NC = Not calculated

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**Table 3.11**  
**Medium-Specific Exposure Point Concentration Summary**  
**Residential Air - Soil Vapor Samples - Property 20**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future
Medium: Soil Vapor
Exposure Medium: Residential Air

Exposure Point	Chemical of Potential Concern (1)	Units	Arithmetic Mean	95% UCL (distribution)	Maximum Detected Concentration (qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
<b>Property 20</b>	<b>Volatile Organics</b>								
VMW-8	2-Butanone	µg/m <sup>3</sup>	NC	NC	2.95	2.95	µg/m <sup>3</sup>	Max	(2)
VMW-9	1,2,4-Trimethylbenzene	µg/m <sup>3</sup>	NC	NC	4.92	4.92	µg/m <sup>3</sup>	Max	(2)
	Benzene	µg/m <sup>3</sup>	NC	NC	9.58	9.58	µg/m <sup>3</sup>	Max	(2)
	Carbon disulfide	µg/m <sup>3</sup>	NC	NC	18.68	18.68	µg/m <sup>3</sup>	Max	(2)
	Freon 113	µg/m <sup>3</sup>	NC	NC	15.33	15.33	µg/m <sup>3</sup>	Max	(2)
	Hexane	µg/m <sup>3</sup>	NC	NC	17.62	17.62	µg/m <sup>3</sup>	Max	(2)
	Methylene chloride	µg/m <sup>3</sup>	NC	NC	55.58	55.58	µg/m <sup>3</sup>	Max	(2)
	Toluene	µg/m <sup>3</sup>	NC	NC	116.81	116.81	µg/m <sup>3</sup>	Max	(2)
	m&p-Xylene	µg/m <sup>3</sup>	NC	NC	13.03	13.03	µg/m <sup>3</sup>	Max	(2)

(1) Chemicals of potential concern are identified in Table 2.1 through 2.16 for site exposure areas.

(2) Max: Maximum detected concentration utilized.

µg/m<sup>3</sup> = micrograms per cubic meter

EPC = Exposure Point Concentration

UCL = Upper Confidence Limit on the arithmetic mean

NC = Not calculated

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**Table 3.12**  
**Medium-Specific Exposure Point Concentration Summary**  
**Residential Air - Soil Vapor Samples - Property 21**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future
Medium: Soil Vapor
Exposure Medium: Residential Air

Exposure Point	Chemical of Potential Concern (1)	Units	Arithmetic Mean	95% UCL (distribution)	Maximum Detected Concentration (qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
<b>Property 21</b>	<b>Volatile Organics</b>								
VMW-7	1,2,4-Trimethylbenzene	µg/m <sup>3</sup>	NC	NC	14.75	14.75	µg/m <sup>3</sup>	Max	(2)
	1,3,5-Trimethylbenzene	µg/m <sup>3</sup>	NC	NC	4.92	4.92	µg/m <sup>3</sup>	Max	(2)
	Benzene	µg/m <sup>3</sup>	NC	NC	12.78	12.78	µg/m <sup>3</sup>	Max	(2)
	Carbon disulfide	µg/m <sup>3</sup>	NC	NC	9.34	9.34	µg/m <sup>3</sup>	Max	(2)
	Ethylbenzene	µg/m <sup>3</sup>	NC	NC	8.68	8.68	µg/m <sup>3</sup>	Max	(2)
	Freon 113	µg/m <sup>3</sup>	NC	NC	15.33	15.33	µg/m <sup>3</sup>	Max	(2)
	Hexane	µg/m <sup>3</sup>	NC	NC	35.24	35.24	µg/m <sup>3</sup>	Max	(2)
	Methylene chloride	µg/m <sup>3</sup>	NC	NC	48.64	48.64	µg/m <sup>3</sup>	Max	(2)
	Toluene	µg/m <sup>3</sup>	NC	NC	222.32	222.32	µg/m <sup>3</sup>	Max	(2)
	m&p-Xylene	µg/m <sup>3</sup>	NC	NC	34.74	34.74	µg/m <sup>3</sup>	Max	(2)
	o-Xylene	µg/m <sup>3</sup>	NC	NC	13.03	13.03	µg/m <sup>3</sup>	Max	(2)

(1) Chemicals of potential concern are identified in Table 2.1 through 2.16 for site exposure areas.

(2) Max: Maximum detected concentration utilized.

µg/m<sup>3</sup> = micrograms per cubic meter

EPC = Exposure Point Concentration

UCL = Upper Confidence Limit on the arithmetic mean

NC = Not calculated

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Checked by / Date: MJM 02/23/11

**Table 3.13**  
**Medium-Specific Exposure Point Concentration Summary**  
**Residential Air - Soil Vapor Samples - Property 23**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future
Medium: Soil Vapor
Exposure Medium: Residential Air

Exposure Point	Chemical of Potential Concern (1)	Units	Arithmetic Mean	95% UCL (distribution)	Maximum Detected Concentration (qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
<b>Property 23</b>	<b>Volatile Organics</b>								
VMW-6	1,2,4-Trimethylbenzene	µg/m <sup>3</sup>	NC	NC	14.75	14.75	µg/m <sup>3</sup>	Max	(2)
	1,3,5-Trimethylbenzene	µg/m <sup>3</sup>	NC	NC	4.92	4.92	µg/m <sup>3</sup>	Max	(2)
	1,4-Dichlorobenzene	µg/m <sup>3</sup>	NC	NC	1.5 J	1.5	µg/m <sup>3</sup>	Max	(2)
	2-Butanone	µg/m <sup>3</sup>	NC	NC	2.6 J	2.6	µg/m <sup>3</sup>	Max	(2)
	4-Methyl-2-pentanone	µg/m <sup>3</sup>	NC	NC	0.78 J	0.78	µg/m <sup>3</sup>	Max	(2)
	Acetone	µg/m <sup>3</sup>	NC	NC	18	18	µg/m <sup>3</sup>	Max	(2)
	Benzene	µg/m <sup>3</sup>	NC	NC	15.97	15.97	µg/m <sup>3</sup>	Max	(2)
	Carbon disulfide	µg/m <sup>3</sup>	NC	NC	18.68	18.68	µg/m <sup>3</sup>	Max	(2)
	Chlorobenzene	µg/m <sup>3</sup>	NC	NC	9.21	9.21	µg/m <sup>3</sup>	Max	(2)
	Dichlorodifluoromethane	µg/m <sup>3</sup>	NC	NC	3.2 J	3.2	µg/m <sup>3</sup>	Max	(2)
	Ethylbenzene	µg/m <sup>3</sup>	NC	NC	8.68	8.68	µg/m <sup>3</sup>	Max	(2)
	Freon 113	µg/m <sup>3</sup>	NC	NC	15.33	15.33	µg/m <sup>3</sup>	Max	(2)
	Hexane	µg/m <sup>3</sup>	NC	NC	49.34	49.34	µg/m <sup>3</sup>	Max	(2)
	Methylene chloride	µg/m <sup>3</sup>	NC	NC	41.69	41.69	µg/m <sup>3</sup>	Max	(2)
	Toluene	µg/m <sup>3</sup>	NC	NC	192.17	192.17	µg/m <sup>3</sup>	Max	(2)
	m&p-Xylene	µg/m <sup>3</sup>	NC	NC	30.4	30.4	µg/m <sup>3</sup>	Max	(2)
	o-Xylene	µg/m <sup>3</sup>	NC	NC	8.68	8.68	µg/m <sup>3</sup>	Max	(2)

(1) Chemicals of potential concern are identified in Table 2.1 through 2.16 for site exposure areas.

(2) Max: Maximum detected concentration utilized.

µg/m<sup>3</sup> = micrograms per cubic meter

EPC = Exposure Point Concentration

UCL = Upper Confidence Limit on the arithmetic mean

NC = Not calculated

Prepared by / Date: EYM 08/15/2011

Checked by / Date: KASK 08/15/2011

**Table 3.14**  
**Medium-Specific Exposure Point Concentration Summary**  
**Residential Air - Groundwater Samples - Property 37**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

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

Exposure Point	Chemical of Potential Concern (1)	Units	Arithmetic Mean	95% UCL (distribution)	Maximum Detected Concentration (qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
<b>Property 37</b>	<b>Volatile Organics</b>								
MW-11	cis-1,2-Dichloroethene	µg/L	NC	NC	3.5	3.5	µg/L	Max	(2)
	Trichloroethene	µg/L	NC	NC	3.4	3.4	µg/L	Max	(2)
	Vinyl chloride	µg/L	NC	NC	7.8	7.8	µg/L	Max	(2)

(1) Chemicals of potential concern are identified in Table 2.1 through 2.16 for site exposure areas.

(2) Max: Maximum detected concentration utilized.

µg/L = micrograms per liter

EPC = Exposure Point Concentration

UCL = Upper Confidence Limit on the arithmetic mean

NC = Not calculated

Prepared by / Date: EYM 08/15/2011

Checked by / Date: KASK 08/15/2011

**Table 3.15**  
**Medium-Specific Exposure Point Concentration Summary**  
**Residential Air - Soil Vapor Samples - Property 38**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future
Medium: Soil Vapor
Exposure Medium: Residential Air

Exposure Point	Chemical of Potential Concern (1)	Units	Arithmetic Mean	95% UCL (distribution)	Maximum Detected Concentration (qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
<b>Property 38</b>	<b>Volatile Organics</b>								
VMW-2	2-Butanone	µg/m <sup>3</sup>	NC	NC	8.85	8.85	µg/m <sup>3</sup>	Max	(2)
	Acetone	µg/m <sup>3</sup>	NC	NC	33.26	33.26	µg/m <sup>3</sup>	Max	(2)
	Benzene	µg/m <sup>3</sup>	NC	NC	6.39	6.39	µg/m <sup>3</sup>	Max	(2)
	Chlorobenzene	µg/m <sup>3</sup>	NC	NC	4.6	4.6	µg/m <sup>3</sup>	Max	(2)
	Toluene	µg/m <sup>3</sup>	NC	NC	56.52	56.52	µg/m <sup>3</sup>	Max	(2)
	m&p-Xylene	µg/m <sup>3</sup>	NC	NC	8.68	8.68	µg/m <sup>3</sup>	Max	(2)
	o-Xylene	µg/m <sup>3</sup>	NC	NC	4.34	4.34	µg/m <sup>3</sup>	Max	(2)

(1) Chemicals of potential concern are identified in Table 2.1 through 2.16 for site exposure areas.

(2) Max: Maximum detected concentration utilized.

µg/m<sup>3</sup> = micrograms per cubic meter

EPC = Exposure Point Concentration

UCL = Upper Confidence Limit on the arithmetic mean

NC = Not calculated

Prepared by / Date: CMR 02/04/11

Checked by / Date: MJM 02/23/11

**Table 3.16**  
**Medium-Specific Exposure Point Concentration Summary**  
**Residential Air - Groundwater Samples - Property 39**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

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

Exposure Point	Chemical of Potential Concern (1)	Units	Arithmetic Mean	95% UCL (distribution)	Maximum Detected Concentration (qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
<b>Property 39</b>	<b>Volatile Organics</b>								
MW-24	Trichloroethene	µg/L	NC	NC	0.38 J	0.38	µg/L	Max	(2)

(1) Chemicals of potential concern are identified in Table 2.1 through 2.16 for site exposure areas.

(2) Max: Maximum detected concentration utilized.

µg/L = micrograms per liter

EPC = Exposure Point Concentration

UCL = Upper Confidence Limit on the arithmetic mean

NC = Not calculated

Qualifier definitions:

J = Value is estimated.

Prepared by / Date: CMR 02/04/11

Checked by / Date: MJM 02/23/11

**Table 3.17**  
**Medium-Specific Exposure Point Concentration Summary**  
**Residential Air - Indoor Air Samples - Property 15**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future
Medium: Indoor Air
Exposure Medium: Residential Air

Exposure Point	Chemical of Potential Concern (1)	Units	Arithmetic Mean	95% UCL (distribution)	Maximum Detected Concentration (qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
<b>Property 15</b>	<b>Volatile Organics</b>								
	1,2,4-Trimethylbenzene	µg/m <sup>3</sup>	NC	NC	0.16	0.16	µg/m <sup>3</sup>	Max	(2)
	1,3,5-Trimethylbenzene	µg/m <sup>3</sup>	NC	NC	0.29	0.29	µg/m <sup>3</sup>	Max	(2)
	2-Butanone	µg/m <sup>3</sup>	NC	NC	2.2	2.2	µg/m <sup>3</sup>	Max	(2)
	2-Propanol	µg/m <sup>3</sup>	NC	NC	4	4	µg/m <sup>3</sup>	Max	(2)
	Acetone	µg/m <sup>3</sup>	NC	NC	14	14	µg/m <sup>3</sup>	Max	(2)
	Benzene	µg/m <sup>3</sup>	NC	NC	0.4	0.4	µg/m <sup>3</sup>	Max	(2)
	Chloromethane	µg/m <sup>3</sup>	NC	NC	0.75	0.75	µg/m <sup>3</sup>	Max	(2)
	Dichlorodifluoromethane	µg/m <sup>3</sup>	NC	NC	0.61	0.61	µg/m <sup>3</sup>	Max	(2)
	Ethyl acetate	µg/m <sup>3</sup>	NC	NC	3	3	µg/m <sup>3</sup>	Max	(2)
	Ethylbenzene	µg/m <sup>3</sup>	NC	NC	8.5	8.5	µg/m <sup>3</sup>	Max	(2)
	Hexane	µg/m <sup>3</sup>	NC	NC	0.18	0.18	µg/m <sup>3</sup>	Max	(2)
	Isopropylbenzene	µg/m <sup>3</sup>	NC	NC	11	11	µg/m <sup>3</sup>	Max	(2)
	Methylene chloride	µg/m <sup>3</sup>	NC	NC	0.35	0.35	µg/m <sup>3</sup>	Max	(2)
	Tetrachloroethene	µg/m <sup>3</sup>	NC	NC	0.59	0.59	µg/m <sup>3</sup>	Max	(2)
	Tetrahydrofuran	µg/m <sup>3</sup>	NC	NC	1.9	1.9	µg/m <sup>3</sup>	Max	(2)
	Toluene	µg/m <sup>3</sup>	NC	NC	19	19	µg/m <sup>3</sup>	Max	(2)
	Trichlorofluoromethane	µg/m <sup>3</sup>	NC	NC	0.39	0.39	µg/m <sup>3</sup>	Max	(2)
	Xylene, m/p	µg/m <sup>3</sup>	NC	NC	81	81	µg/m <sup>3</sup>	Max	(2)
	Xylene, o	µg/m <sup>3</sup>	NC	NC	11	11	µg/m <sup>3</sup>	Max	(2)

(1) Chemicals of potential concern are identified in Table 2.1 through 2.16 for site exposure areas.

(2) Max: Maximum detected concentration utilized.

µg/m<sup>3</sup> = micrograms per cubic meter

EPC = Exposure Point Concentration

UCL = Upper Confidence Limit on the arithmetic mean

NC = Not calculated

Prepared by / Date: CMR 02/04/11

Checked by / Date: MJM 02/23/11

**Table 3.18**  
**Medium-Specific Exposure Point Concentration Summary**  
**Industrial Air - Indoor Air Samples - Property 41 - May 2010**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future
Medium: Indoor Air
Exposure Medium: Industrial Air

Exposure Point	Chemical of Potential Concern (1)	Units	Arithmetic Mean	95% UCL (distribution)	Maximum Detected Concentration (qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
<b>Property 41</b>	<b>Volatile Organics</b>								
	1,2,4-Trimethylbenzene	µg/m <sup>3</sup>	NC	NC	3.6	3.6	µg/m <sup>3</sup>	Max	(2)
	1,3,5-Trimethylbenzene	µg/m <sup>3</sup>	NC	NC	0.74	0.74	µg/m <sup>3</sup>	Max	(2)
	1,4-Dichlorobenzene	µg/m <sup>3</sup>	NC	NC	0.96	0.96	µg/m <sup>3</sup>	Max	(2)
	1,4-Dioxane	µg/m <sup>3</sup>	NC	NC	0.63	0.63	µg/m <sup>3</sup>	Max	(2)
	2-Butanone	µg/m <sup>3</sup>	NC	NC	3.9	3.9	µg/m <sup>3</sup>	Max	(2)
	2-Hexanone	µg/m <sup>3</sup>	NC	NC	0.19	0.19	µg/m <sup>3</sup>	Max	(2)
	2-Propanol	µg/m <sup>3</sup>	NC	NC	660	660	µg/m <sup>3</sup>	Max	(2)
	4-Ethyltoluene	µg/m <sup>3</sup>	NC	NC	0.54	0.54	µg/m <sup>3</sup>	Max	(2)
	Acetone	µg/m <sup>3</sup>	NC	NC	40	40	µg/m <sup>3</sup>	Max	(2)
	Benzene	µg/m <sup>3</sup>	NC	NC	0.83	0.83	µg/m <sup>3</sup>	Max	(2)
	Carbon disulfide	µg/m <sup>3</sup>	NC	NC	0.96	0.96	µg/m <sup>3</sup>	Max	(2)
	Carbon tetrachloride	µg/m <sup>3</sup>	NC	NC	0.82	0.82	µg/m <sup>3</sup>	Max	(2)
	Chloromethane	µg/m <sup>3</sup>	NC	NC	1.3	1.3	µg/m <sup>3</sup>	Max	(2)
	cis-1,2-Dichloroethene	µg/m <sup>3</sup>	NC	NC	13	13	µg/m <sup>3</sup>	Max	(2)
	Dichlorodifluoromethane	µg/m <sup>3</sup>	NC	NC	2.6	2.6	µg/m <sup>3</sup>	Max	(2)
	Ethyl acetate	µg/m <sup>3</sup>	NC	NC	0.33	0.33	µg/m <sup>3</sup>	Max	(2)
	Ethylbenzene	µg/m <sup>3</sup>	NC	NC	0.52	0.52	µg/m <sup>3</sup>	Max	(2)
	Heptane	µg/m <sup>3</sup>	NC	NC	0.7	0.7	µg/m <sup>3</sup>	Max	(2)
	Hexane	µg/m <sup>3</sup>	NC	NC	0.85	0.85	µg/m <sup>3</sup>	Max	(2)
	Methylene chloride	µg/m <sup>3</sup>	NC	NC	1	1	µg/m <sup>3</sup>	Max	(2)
	Styrene	µg/m <sup>3</sup>	NC	NC	0.72	0.72	µg/m <sup>3</sup>	Max	(2)
	Tetrahydrofuran	µg/m <sup>3</sup>	NC	NC	0.44	0.44	µg/m <sup>3</sup>	Max	(2)
	Toluene	µg/m <sup>3</sup>	NC	NC	21	21	µg/m <sup>3</sup>	Max	(2)
	Trichloroethene	µg/m <sup>3</sup>	NC	NC	1.5	1.5	µg/m <sup>3</sup>	Max	(2)
	Trichlorofluoromethane	µg/m <sup>3</sup>	NC	NC	2	2	µg/m <sup>3</sup>	Max	(2)
	m,p-Xylene	µg/m <sup>3</sup>	NC	NC	1.6	1.6	µg/m <sup>3</sup>	Max	(2)
	o-Xylene	µg/m <sup>3</sup>	NC	NC	0.74	0.74	µg/m <sup>3</sup>	Max	(2)

(1) Chemicals of potential concern are identified in Table 2.1 through 2.16 for site exposure areas.

(2) Max: Maximum detected concentration utilized.

µg/m<sup>3</sup> = micrograms per cubic meter

EPC = Exposure Point Concentration

UCL = Upper Confidence Limit on the arithmetic mean

NC = Not calculated

Prepared by / Date: CMR 02/04/11

Checked by / Date: MJM 02/23/11



**Table 3.19**  
**Medium-Specific Exposure Point Concentration Summary**  
**Industrial Air - Indoor Air Samples - Property 41 - February 2011**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current/Future
Medium: Indoor Air
Exposure Medium: Industrial Air

Exposure Point	Chemical of Potential Concern (1)	Units	Arithmetic Mean	95% UCL (distribution)	Maximum Detected Concentration (qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
<b>Property 41</b>	<b>Volatile Organics</b>								
	1,4-Dichlorobenzene	µg/m <sup>3</sup>	NC	NC	21	21	µg/m <sup>3</sup>	Max	(2)
	2-Propanol	µg/m <sup>3</sup>	NC	NC	62	62	µg/m <sup>3</sup>	Max	(2)
	Acetone	µg/m <sup>3</sup>	NC	NC	36	36	µg/m <sup>3</sup>	Max	(2)
	cis-1,2-Dichloroethene	µg/m <sup>3</sup>	NC	NC	7.2	7.2	µg/m <sup>3</sup>	Max	(2)
	Ethyl acetate	µg/m <sup>3</sup>	NC	NC	39	39	µg/m <sup>3</sup>	Max	(2)
	Ethylbenzene	µg/m <sup>3</sup>	NC	NC	8.9	8.9	µg/m <sup>3</sup>	Max	(2)
	Toluene	µg/m <sup>3</sup>	NC	NC	6	6	µg/m <sup>3</sup>	Max	(2)
	m,p-Xylene	µg/m <sup>3</sup>	NC	NC	29	29	µg/m <sup>3</sup>	Max	(2)
	o-Xylene	µg/m <sup>3</sup>	NC	NC	6	6	µg/m <sup>3</sup>	Max	(2)

(1) Chemicals of potential concern are identified in Table 2.1 through 2.16 for site exposure areas.

(2) Max: Maximum detected concentration utilized.

µg/m<sup>3</sup> = micrograms per cubic meter

EPC = Exposure Point Concentration

UCL = Upper Confidence Limit on the arithmetic mean

NC = Not calculated

Prepared by / Date: CMR 02/04/11

Checked by / Date: MJM 02/23/11

**Table 3.20**  
**Medium-Specific Exposure Point Concentration Summary**  
**Residential Air - Groundwater Samples - Property 8**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Scenario Time frame: Current/Future
Medium: Groundwater
Exposure Medium: Residential Air

Exposure Point	Chemical of Potential Concern (1)	Units	Arithmetic Mean	95% UCL (distribution)	Maximum Detected Concentration (qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Property 8	<b>Volatile Organics</b>								
	Cis-1,2-Dichloroethene	µg/L	NC	NC	4.5	4.5	µg/L	Max	(2)

(1) Chemicals of potential concern are identified in Table 2.1 through 2.16 for site exposure areas.

(2) Max: Maximum detected concentration utilized.

Prepared by/Date: EYM 08/12/2011

Checked by/Date: MJM 8/12/2011

µg/L = micrograms per liter

EPC = Exposure Point Concentration

UCL = Upper Confidence Limit on the arithmetic mean

NC = Not calculated

U = Not detected, value is the detection limit

**Table 4.1**  
**Values Used For Daily Intake Calculations - Wetland Soil (Property 38)**  
**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

SCENARIO TIMEFRAME: CURRENT/FUTURE  
 MEDIUM: WETLAND SOIL  
 EXPOSURE MEDIUM: WETLAND SOIL

EXPOSURE ROUTE	RECEPTOR POPULATION	RECEPTOR AGE	EXPOSURE POINT	PARAMETER CODE	PARAMETER DEFINITION	VALUE	UNITS	RATIONALE/REFERENCE	INTAKE EQUATION/ MODEL NAME
INGESTION	RESIDENT	ADULT	WETLANDS NORTH OF EASTERN POND	CS	CHEMICAL CONCENTRATION IN WETLAND SOIL	chemical-specific	mg/kg		$\text{INTAKE-INGESTION (mg/kg/day)} = \text{CS} \times \text{IR-S} \times \text{FI} \times \text{EF} \times \text{ED} \times \text{ADAF} \times \text{CF} \times 1/\text{BW} \times 1/\text{AT}$
				IR-S	INGESTION RATE OF WETLAND SOIL	100	mg/day		
				FI	FRACTION INGESTED	1	unitless	USEPA, 1994 Assumption	
				EF	EXPOSURE FREQUENCY	72	day/yr	USEPA, 1994	
				ED	EXPOSURE DURATION	24	yr	USEPA, 1994	
				BW	BODY WEIGHT	70	kg	USEPA, 1994	
				AT-C	AVERAGING TIME (CANCER)	25550	day	USEPA, 1989	
				AT-N	AVERAGING TIME (NONCANCER)	8760	day	USEPA, 1989	
				ADAF	AGE DEPENDENT ADJUSTMENT FACTOR	1.8	unitless	USEPA, 2006	
				CF	CONVERSION FACTOR	0.000001	kg/mg		
		CHILD	WETLANDS NORTH OF EASTERN POND	CS	CHEMICAL CONCENTRATION IN WETLAND SOIL	chemical-specific	mg/kg		$\text{INTAKE-INGESTION (mg/kg/day)} = \text{CS} \times \text{IR-S} \times \text{FI} \times \text{EF} \times \text{ED} \times \text{ADAF} \times \text{CF} \times 1/\text{BW} \times 1/\text{AT}$
				IR-S	INGESTION RATE OF WETLAND SOIL	200	mg/day	USEPA, 1994	
				FI	FRACTION INGESTED	1	unitless	Assumption	
				EF	EXPOSURE FREQUENCY	72	day/yr	USEPA, 1994	
				ED	EXPOSURE DURATION	6	yr	USEPA, 1994	
				BW	BODY WEIGHT	15	kg	USEPA, 1994	
				AT-C	AVERAGING TIME (CANCER)	25550	day	USEPA, 1989	
				AT-N	AVERAGING TIME (NONCANCER)	2190	day	USEPA, 1989	
				ADAF	AGE DEPENDENT ADJUSTMENT FACTOR	5.3	unitless	USEPA, 2006	
				CF	CONVERSION FACTOR	0.000001	kg/mg		
DERMAL CONTACT	RESIDENT	ADULT	WETLANDS NORTH OF EASTERN POND	CS	CHEMICAL CONCENTRATION IN WETLAND SOIL	chemical-specific	mg/kg		$\text{INTAKE-DERMAL (mg/kg/day)} = \text{DAevent} \times \text{SA} \times \text{EV} \times \text{EF} \times \text{ED} \times \text{ADAF} \times 1/\text{BW} \times 1/\text{AT}$ <p>Where DAevent =  <math display="block">\text{CS} \times \text{AF} \times \text{AbF} \times \text{CF}</math> </p>
				AF	ADHERENCE FACTOR	0.08	mg/cm <sup>2</sup> -event	USEPA, 1998	
				AbF	ABSORPTION FACTOR	1	unitless	Assumption	
				SA	SKIN SURFACE AREA AVAILABLE FOR CONTACT	5000	cm <sup>2</sup> /day	IDEM, 2006	
				EV	EVENT DAY	1	event/day	Assumption	
				EF	EXPOSURE FREQUENCY	150	day/yr	USEPA, 1994	
				ED	EXPOSURE DURATION	24	yr	USEPA, 1994	
				BW	BODY WEIGHT	70	kg	USEPA, 1994	
				AT-C	AVERAGING TIME (CANCER)	25550	day	USEPA, 1989	
				AT-N	AVERAGING TIME (NONCANCER)	8760	day	USEPA, 1989	
				ADAF	AGE DEPENDENT ADJUSTMENT FACTOR	1.8	unitless	USEPA, 2006	
				CF	CONVERSION FACTOR	0.000001	kg/mg		
		CHILD	WETLANDS NORTH OF EASTERN POND	CS	CHEMICAL CONCENTRATION IN WETLAND SOIL	chemical-specific	mg/kg		$\text{INTAKE-DERMAL (mg/kg/day)} = \text{DAevent} \times \text{SA} \times \text{EV} \times \text{EF} \times \text{ED} \times \text{ADAF} \times 1/\text{BW} \times 1/\text{AT}$ <p>Where DAevent =  <math display="block">\text{CS} \times \text{AF} \times \text{AbF} \times \text{CF}</math> </p>
				AF	ADHERENCE FACTOR	1	mg/cm <sup>2</sup> -event	USEPA, 1998	
				AbF	ABSORPTION FACTOR	1	unitless	Assumption	
				SA	SKIN SURFACE AREA AVAILABLE FOR CONTACT	2000	cm <sup>2</sup> /day	IDEM, 2006	
				EV	EVENT DAY	1	event/day	Assumption	
				EF	EXPOSURE FREQUENCY	72	day/yr	USEPA, 1994	
				ED	EXPOSURE DURATION	6	yr	USEPA, 1994	
				BW	BODY WEIGHT	15	kg	USEPA, 1994	
				AT-C	AVERAGING TIME (CANCER)	25550	day	USEPA, 1989	
				AT-N	AVERAGING TIME (NONCANCER)	2190	day	USEPA, 1989	
				ADAF	AGE DEPENDENT ADJUSTMENT FACTOR	5.3	unitless	USEPA, 2006	
				CF	CONVERSION FACTOR	0.000001	kg/mg		

IDEM, 2006. "Risk Integrated System of Closure, Technical Resource Guidance Document"; Indiana Department of Environmental Management. Values from Appendix 1, Table D.  
 USEPA, 1989. "Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A)"; Office of Emergency and Remedial Response; EPA-540/1-89/002 (interim final); Washington, D.C., December.  
 USEPA, 1994. "Risk Updates No. 2"; USEPA Region I, Waste Management Division; August. Values from "Attachment 2" to Risk Updates No. 2.  
 USEPA, 1997. "Exposure Factors Handbook, Volume 1"; Office of Research and Development; EPA-600/P-95/002Fa; Washington, D.C.; August.  
 USEPA, 1999. "Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part E)"; Office of Solid Waste and Emergency Response; EPA-540/R-99/005 (interim final); Washington, D.C.

**Table 4.2**  
**Values Used For Daily Intake Calculations - Eastern Pond Sediment**  
**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

SCENARIO TIMEFRAME: CURRENT/FUTURE  
 MEDIUM: SEDIMENT  
 EXPOSURE MEDIUM: SEDIMENT

EXPOSURE ROUTE	RECEPTOR POPULATION	RECEPTOR AGE	EXPOSURE POINT	PARAMETER CODE	PARAMETER DEFINITION	VALUE	UNITS	RATIONALE/ REFERENCE	INTAKE EQUATION/ MODEL NAME
INGESTION	RESIDENT	ADULT	EASTERN POND	CS	CHEMICAL CONCENTRATION IN SEDIMENT	chemical-specific	mg/kg	USEPA, 1994 Assumption USEPA, 1994 USEPA, 1994 USEPA, 1994 USEPA, 1989 USEPA, 1989 USEPA, 2006	INTAKE-INGESTION (mg/kg/day) = CS x IR-S x FI x EF x ED x ADAF x CF x 1/BW x 1/AT
				IR-S	INGESTION RATE OF SEDIMENT	100	mg/day		
				FI	FRACTION INGESTED	1	unitless		
				EF	EXPOSURE FREQUENCY	72	day/yr		
				ED	EXPOSURE DURATION	24	yr		
				BW	BODY WEIGHT	70	kg		
				AT-C	AVERAGING TIME (CANCER)	25550	day		
				AT-N	AVERAGING TIME (NONCANCER)	8760	day		
				ADAF	AGE DEPENDENT ADJUSTMENT FACTOR	1.8	unitless		
				CF	CONVERSION FACTOR	0.000001	kg/mg		
		CHILD	EASTERN POND	CS	CHEMICAL CONCENTRATION IN SEDIMENT	chemical-specific	mg/kg	USEPA, 1994 Assumption USEPA, 1994 USEPA, 1994 USEPA, 1994 USEPA, 1989 USEPA, 1989 USEPA, 2006	INTAKE-INGESTION (mg/kg/day) = CS x IR-S x FI x EF x ED x ADAF x CF x 1/BW x 1/AT
				IR-S	INGESTION RATE OF SEDIMENT	200	mg/day		
				FI	FRACTION INGESTED	1	unitless		
				EF	EXPOSURE FREQUENCY	72	day/yr		
				ED	EXPOSURE DURATION	6	yr		
				BW	BODY WEIGHT	15	kg		
				AT-C	AVERAGING TIME (CANCER)	25550	day		
				AT-N	AVERAGING TIME (NONCANCER)	2190	day		
				ADAF	AGE DEPENDENT ADJUSTMENT FACTOR	5.3	unitless		
				CF	CONVERSION FACTOR	0.000001	kg/mg		
DERMAL CONTACT	RESIDENT	ADULT	EASTERN POND	CS	CHEMICAL CONCENTRATION IN SEDIMENT	chemical-specific	mg/kg	USEPA, 1998 Assumption IDEM, 2006 Assumption USEPA, 1994 USEPA, 1994 USEPA, 1994 USEPA, 1989 USEPA, 1989 USEPA, 2006	INTAKE-DERMAL (mg/kg/day) = DAevent x SA x EV x EF x ED x ADAF x 1/BW x 1/AT  Where DAevent = CS x AF x AbF x CF
				AF	ADHERENCE FACTOR	0.08	mg/cm <sup>2</sup> -event		
				AbF	ABSORPTION FACTOR	1	unitless		
				SA	SKIN SURFACE AREA AVAILABLE FOR CONTACT	5000	cm <sup>2</sup> /day		
				EV	EVENT DAY	1	event/day		
				EF	EXPOSURE FREQUENCY	150	day/yr		
				ED	EXPOSURE DURATION	24	yr		
				BW	BODY WEIGHT	70	kg		
				AT-C	AVERAGING TIME (CANCER)	25550	day		
				AT-N	AVERAGING TIME (NONCANCER)	8760	day		
				ADAF	AGE DEPENDENT ADJUSTMENT FACTOR	1.8	unitless		
				CF	CONVERSION FACTOR	0.000001	kg/mg		
		CHILD	EASTERN POND	CS	CHEMICAL CONCENTRATION IN SEDIMENT	chemical-specific	mg/kg	USEPA, 1998 Assumption IDEM, 2006 Assumption USEPA, 1994 USEPA, 1994 USEPA, 1994 USEPA, 1989 USEPA, 1989 USEPA, 2006	INTAKE-DERMAL (mg/kg/day) = DAevent x SA x EV x EF x ED x ADAF x 1/BW x 1/AT  Where DAevent = CS x AF x AbF x CF
				AF	ADHERENCE FACTOR	1	mg/cm <sup>2</sup> -event		
				AbF	ABSORPTION FACTOR	1	unitless		
				SA	SKIN SURFACE AREA AVAILABLE FOR CONTACT	2000	cm <sup>2</sup> /day		
				EV	EVENT DAY	1	event/day		
				EF	EXPOSURE FREQUENCY	72	day/yr		
				ED	EXPOSURE DURATION	6	yr		
				BW	BODY WEIGHT	15	kg		
				AT-C	AVERAGING TIME (CANCER)	25550	day		
				AT-N	AVERAGING TIME (NONCANCER)	2190	day		
				ADAF	AGE DEPENDENT ADJUSTMENT FACTOR	5.3	unitless		
				CF	CONVERSION FACTOR	0.000001	kg/mg		

IDEM, 2006. "Risk Integrated System of Closure, Technical Resource Guidance Document"; Indiana Department of Environmental Management. Values from Appendix 1, Table D.  
 USEPA, 1989. "Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A)"; Office of Emergency and Remedial Response; EPA-540/1-89/002 (interim final); Washington, D.C., December.  
 USEPA, 1994. "Risk Updates No. 2"; USEPA Region 1, Waste Management Division; August. Values from "Attachment 2" to Risk Updates No. 2.  
 USEPA, 1997. "Exposure Factors Handbook, Volume 1"; Office of Research and Development; EPA-600/P-95/002Fa; Washington, D.C.; August.  
 USEPA, 1999. "Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part E)"; Office of Solid Waste and Emergency Response; EPA-540/R-99/005 (interim final); Washington, D.C.

**Table 4.3**  
**Values Used For Daily Intake Calculations - Eastern Pond Surface Water**  
**Human Health Risk Assessment - Draft**  
**TORX Facility**  
**Rochester, Indiana**

SCENARIO TIMEFRAME: CURRENT/FUTURE  
 MEDIUM: SURFACE WATER  
 EXPOSURE MEDIUM: SURFACE WATER

EXPOSURE ROUTE	RECEPTOR POPULATION	RECEPTOR AGE	EXPOSURE POINT	PARAMETER CODE	PARAMETER DEFINITION	VALUE	UNITS	RATIONALE/ REFERENCE	INTAKE EQUATION/ MODEL NAME
INGESTION	RESIDENT	ADULT	EASTERN POND	CW	CHEMICAL CONCENTRATION IN WATER	chemical-specific	mg/l		$\text{INTAKE-INGESTION (mg/kg/day)} = \text{CW} \times \text{IR-W} \times \text{FI} \times \text{EF} \times \text{ED} \times \text{ADAF} \times 1/\text{BW} \times 1/\text{AT}$
				IR-W	INGESTION RATE OF WATER	0.05	l/hour	Assumption	
				FI	FRACTION INGESTED	1	unitless	Assumption	
				EF	EXPOSURE FREQUENCY	72	event/yr	Assumption	
				ED	EXPOSURE DURATION	24	yr	USEPA, 1994	
				ET	EXPOSURE TIME	1	hours/event	Assumption	
				BW	BODY WEIGHT	70	kg	USEPA, 1994	
				AT-C	AVERAGING TIME (CANCER)	25550	day	USEPA, 1989	
				AT-N	AVERAGING TIME (NONCANCER)	8760	day	USEPA, 1989	
				ADAF	AGE DEPENDENT ADJUSTMENT FACTOR	1.8	unitless	USEPA, 2006	
		CHILD	EASTERN POND	CW	CHEMICAL CONCENTRATION IN WATER	chemical-specific	mg/l		$\text{INTAKE-INGESTION (mg/kg/day)} = \text{CW} \times \text{IR-W} \times \text{FI} \times \text{EF} \times \text{ED} \times \text{ADAF} \times 1/\text{BW} \times 1/\text{AT}$
				IR-W	INGESTION RATE OF WATER	0.05	l/hour	Assumption	
				FI	FRACTION INGESTED	1	unitless	Assumption	
				EF	EXPOSURE FREQUENCY	72	event/yr	Assumption	
				ED	EXPOSURE DURATION	6	yr	USEPA, 1994	
				ET	EXPOSURE TIME	2	hours/event	Assumption	
				BW	BODY WEIGHT	15	kg	USEPA, 1994	
				AT-C	AVERAGING TIME (CANCER)	25550	day	USEPA, 1989	
				AT-N	AVERAGING TIME (NONCANCER)	2190	day	USEPA, 1989	
				ADAF	AGE DEPENDENT ADJUSTMENT FACTOR	5.3	unitless	USEPA, 2006	
DERMAL CONTACT	RESIDENT	ADULT	EASTERN POND	CW	CHEMICAL CONCENTRATION IN WATER	chemical-specific	mg/l		$\text{INTAKE-DERMAL (mg/kg/day)} = \text{CW} \times \text{SA} \times \text{PCevent} \times \text{EV} \times \text{EF} \times \text{ED} \times \text{ADAF} \times \text{CF} \times 1/\text{BW} \times 1/\text{A}$
				PCevent	PERMEABILITY CONSTANT PER EVENT	chemical-specific	cm/event	USEPA, 2001	
				SA	SKIN SURFACE AREA AVAILABLE FOR CONTACT	5000	cm <sup>2</sup>	IDEM, 2006	
				ET	EXPOSURE TIME	1	hr/day	Assumption	
				EV	EVENT DAY	1	event/day	Assumption	
				EF	EXPOSURE FREQUENCY	72	day/yr	Assumption	
				ED	EXPOSURE DURATION	24	yr	USEPA, 1994	
				BW	BODY WEIGHT	70	kg	USEPA, 1994	
				AT-C	AVERAGING TIME (CANCER)	25550	day	USEPA, 1989	
				AT-N	AVERAGING TIME (NONCANCER)	8760	day	USEPA, 1989	
				ADAF	AGE DEPENDENT ADJUSTMENT FACTOR	1.8	unitless	USEPA, 2006	
				CF	CONVERSION FACTOR	0.001	l/cm <sup>2</sup>		
		CHILD	EASTERN POND	CW	CHEMICAL CONCENTRATION IN WATER	chemical-specific	mg/l		$\text{INTAKE-DERMAL (mg/kg/day)} = \text{CW} \times \text{SA} \times \text{PCevent} \times \text{EV} \times \text{EF} \times \text{ED} \times \text{ADAF} \times \text{CF} \times 1/\text{BW} \times 1/\text{A}$
				PCevent	PERMEABILITY CONSTANT PER EVENT	chemical-specific	cm/event	USEPA, 2001	
				SA	SKIN SURFACE AREA AVAILABLE FOR CONTACT	2000	cm <sup>2</sup>	IDEM, 2006	
				ET	EXPOSURE TIME	2	hr/day	Assumption	
				EV	EVENT DAY	1	event/day	Assumption	
				EF	EXPOSURE FREQUENCY	72	day/yr	Assumption	
				ED	EXPOSURE DURATION	6	yr	USEPA, 1994	
				BW	BODY WEIGHT	15	kg	USEPA, 1994	
				AT-C	AVERAGING TIME (CANCER)	25550	day	USEPA, 1989	
				AT-N	AVERAGING TIME (NONCANCER)	2190	day	USEPA, 1989	
				ADAF	AGE DEPENDENT ADJUSTMENT FACTOR	5.3	unitless	USEPA, 2006	
				CF	CONVERSION FACTOR	0.001	l/cm <sup>2</sup>		

IDEM, 2006. "Risk Integrated System of Closure, Technical Resource Guidance Document"; Indiana Department of Environmental Management. Values from Appendix 1, Table D.  
 USEPA, 1989. "Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A)"; Office of Emergency and Remedial Response; EPA-540/1-89/002 (interim final); Washington, D.C., December.  
 USEPA, 1994. "Risk Updates No. 2"; USEPA Region 1, Waste Management Division; August. Values from "Attachment 2" to Risk Updates No. 2.  
 USEPA, 1997. "Exposure Factors Handbook, Volume 1"; Office of Research and Development; EPA-600/P-95/002Fa; Washington, D.C.; August.  
 USEPA, 1999. "Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part E)"; Office of Solid Waste and Emergency Response; EPA-540/R-99/005 (interim final); Washington, D.C.

Table 4.4  
Values Used For Average Air Concentration Calculations - Industrial Worker  
Human Health Risk Assessment  
TORX Facility  
Rochester, Indiana

SCENARIO TIMEFRAME: CURRENT/FUTURE  
MEDIUM: AIR  
EXPOSURE MEDIUM: INDUSTRIAL AIR

EXPOSURE ROUTE	RECEPTOR POPULATION	RECEPTOR AGE	EXPOSURE POINT	PARAMETER CODE	PARAMETER DEFINITION	VALUE	UNITS	RATIONALE/ REFERENCE	INTAKE EQUATION/ MODEL NAME
INHALATION	INDUSTRIAL WORKER	ADULT	PROPERTY 36, 41	CA	CHEMICAL CONCENTRATION IN AIR	chemical-specific	mg/m <sup>3</sup>	Assumption USEPA, 1994 Assumption USEPA, 1989 USEPA, 1989	AVERAGE CONCENTRATION (mg/m <sup>3</sup> ) = CA x EF x ED x ET x 1/AT
				EF	EXPOSURE FREQUENCY	250	days/yr		
				ED	EXPOSURE DURATION	24	yr		
				ET	EXPOSURE TIME	8	hr/day		
				AT-C	AVERAGING TIME (CANCER)	25550	day		
				AT-N	AVERAGING TIME (NONCANCER)	8760	day		

USEPA, 1989. "Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A)"; Office of Emergency and Remedial Response; EPA-540/1-89/002 (interim final); Washington, D.C., December.  
USEPA, 1994. "Risk Updates No. 2"; USEPA Region I, Waste Management Division; August. Values from "Attachment 2" to Risk Updates No. 2.

Table 4.5  
Values Used For Average Air Concentration Calculations - Resident  
Human Health Risk Assessment  
TORX Facility  
Rochester, Indiana

SCENARIO TIMEFRAME: CURRENT/FUTURE
MEDIUM: AIR
EXPOSURE MEDIUM: RESIDENTIAL AIR

EXPOSURE ROUTE	RECEPTOR POPULATION	RECEPTOR AGE	EXPOSURE POINT	PARAMETER CODE	PARAMETER DEFINITION	VALUE	UNITS	RATIONALE/ REFERENCE	INTAKE EQUATION/ MODEL NAME
INHALATION	RESIDENT	ADULT, CHILD	PROPERTY 8, 16A, 17-21 15, 23, AND 37-39	CG	CHEMICAL CONCENTRATION IN AIR	chemical-specific	mg/m <sup>3</sup>	Assumption USEPA, 1994 Assumption USEPA, 1989 USEPA, 1989	AVERAGE CONCENTRATION (mg/m <sup>3</sup> ) = CA x EF x ED x ET x 1/AT
				EF	EXPOSURE FREQUENCY	350	days/yr		
				ED	EXPOSURE DURATION	30	yr		
				ET	EXPOSURE TIME	24			
				AT-C	AVERAGING TIME (CANCER)	25550	day		
				AT-N	AVERAGING TIME (NONCANCER)	10950	day		

USEPA, 1989. "Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A)"; Office of Emergency and Remedial Response; EPA-540/1-89/002 (interim final); Washington, D.C., December.  
USEPA, 1994. "Risk Updates No. 2"; USEPA Region I, Waste Management Division; August. Values from "Attachment 2" to Risk Updates No. 2.

**Table 5.1**  
**Non-Cancer Toxicity Data - Oral/Dermal**

**Baseline Human Health Risk Assessment - Draft**  
**TORX Facility**  
**Rochester, Indiana**

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Adjusted Dermal RfD (2)		Primary Target Organ or System / Critical Effect	Combined Uncertainty/Modifying Factors	RfD: Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)
<b>VOLATILES</b>										
1,2-Dichloroethene (cis)	chronic	1.0E-02	mg/kg/day	100%	1.0E-02	mg/kg/day	Circulatory (Blood)		PPRTV	
2-Butanone (Methyl Ethyl Ketone)	chronic	6.0E-01	mg/kg/day	100%	6.0E-01	mg/kg/day	Developmental (Nonspecific)	300/1	IRIS	December 2010
Acetone	chronic	9.0E-01	mg/kg/day	100%	9.0E-01	mg/kg/day	Systemic (kidney, liver)	1,000/1	IRIS	December 2010
Carbon disulfide	chronic	1.0E-01	mg/kg/day	100%	1.0E-01	mg/kg/day	Developmental (Teratology, nonspecific)	100/1	IRIS	December 2010
Toluene	chronic	8.0E-02	mg/kg/day	100%	8.0E-02	mg/kg/day	Systemic (kidney, liver)	1,000/1	IRIS	December 2010

**Notes:**

IRIS = Integrated Risk Information System: December 2010

HEAST= Health Effects Assessment Summary Tables: FY 1997

NCEA = National Center for Environmental Assessment: April, 2003

NCEA provisional values are obtained from the USEPA Region I

ND = no data available

(1) Values obtained from RAGS Volume 1 (Part E, Supplemental Guidance for Dermal Risk Assessment) (EPA, 2004)

Per this guidance, a value of 100% is used for analytes without published values.

(2) Adjusted Dermal RfD = Oral RfD x Oral to Dermal Adjustment Factor. Per RAGS Part E (USEPA, 1999), adjustments are only performed for chemicals that have an oral absorption efficiency of less than 50%.

mg = milligram  
 kg = kilogram  
 BW = body weight

Prepared by / Date: CMR 02/04/11

Checked by / Date: MJM 02/23/11



**Table 5.2**  
**Non-Cancer Toxicity Data - Inhalation**

**Baseline Human Health Risk Assessment - Draft**  
**TORX Facility**  
**Rochester, Indiana**

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD		Primary Target Organ or System / Critical Effect	Combined Uncertainty/Modifying Factors	RfD: Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s)
<b>VOLATILES</b>									
Acetone	chronic	3.2E+00	mg/m <sup>3</sup>	9.0E-01	mg/kg/day	Neurological (Nonspecific)		IDEM	
Benzene	chronic	3.0E-02	mg/m <sup>3</sup>	8.6E-03	mg/kg/day	Decreased lymphosite count	300/1	IRIS	December 2010
2-Butanone	chronic	5.0E+00	mg/m <sup>3</sup>	1.4E+00	mg/kg/day	Developmental (Structural malformations)	300/1	IRIS	December 2010
Carbon disulfide	chronic	7.0E-01	mg/m <sup>3</sup>	2.0E-01	mg/kg/day	Neurological (Peripheral nervous system)	30/1	IRIS	December 2010
Chlorobenzene	chronic	6.0E-02	mg/m <sup>3</sup>	1.7E-02	mg/kg/day	Systemic (Liver)		IDEM	
Dichlorodifluoromethane	chronic	2.0E-01	mg/m <sup>3</sup>	5.7E-02	mg/kg/day			HEAST	FY 1997
1,1-Dichloroethene	chronic	2.0E-01	mg/m <sup>3</sup>	5.7E-02	mg/kg/day	Liver	30/1	IRIS	December 2010
cis-1,2-Dichloroethene	chronic	3.5E-02	mg/m <sup>3</sup>	1.0E-02	mg/kg/day	Circulatory (Blood)		PPRTV	
trans-1,2-Dichloroethene	chronic	7.0E-02	mg/m <sup>3</sup>	2.0E-02	mg/kg/day	Circulatory (Blood)		PPRTV	
Ethylbenzene	chronic	1.0E+00	mg/m <sup>3</sup>	2.9E-01	mg/kg/day	Developmental (Teratology)	300/1	IRIS	December 2010
Freon 113	chronic	3.0E+01	mg/m <sup>3</sup>	8.6E+00	mg/kg/day			HEAST	FY 1997
Hexane	chronic	2.0E-01	mg/m <sup>3</sup>	5.7E-02	mg/kg/day	Neurological (Nonspecific)	300	IRIS	December 2010
Methylene chloride	chronic	3.0E+00	mg/m <sup>3</sup>	8.6E-01	mg/kg/day			HEAST	FY 1997
Toluene	chronic	4.0E-01	mg/m <sup>3</sup>	1.4E+00	mg/kg/day	Neurological (Central nervous system)	10	IRIS	December 2010
Trichloroethene	chronic	3.5E-02	mg/m <sup>3</sup>	1.0E-02	mg/kg/day			IDEM	
Trichlorofluoromethane	chronic	7.0E-01	mg/m <sup>3</sup>	2.0E-01	mg/kg/day			HEAST	FY 1997
1,2,4-Trimethylbenzene	chronic	6.0E-03	mg/m <sup>3</sup>	1.7E-03	mg/kg/day	Neurological (Central nervous system)		IDEM	
1,3,5-Trimethylbenzene	chronic	6.0E-03	mg/m <sup>3</sup>	1.7E-03	mg/kg/day	Neurological (Central nervous system)		IDEM	
Vinyl chloride	chronic	1.0E-01	mg/m <sup>3</sup>	2.9E-02	mg/kg/day	Liver cell polymorphism	30/1	IRIS	December 2010
m,p-Xylenes	chronic	1.0E-01	mg/m <sup>3</sup>	2.9E-02	mg/kg/day	Neurological (Central nervous system)	300/1	IRIS	December 2010
o-Xylenes	chronic	1.0E-01	mg/m <sup>3</sup>	2.9E-02	mg/kg/day	Neurological (Central nervous system)	300/1	IRIS	December 2010

**Notes:**

IRIS = Integrated Risk Information System December 2010

HEAST= Health Effects Assessment Summary Tables FY 1997

NCEA = National Center for Environmental Assessment: April, 2003

NCEA provisional values are obtained from the USEPA Region I

ND = no data available

mg = milligram

kg = kilogram

m<sup>3</sup> = cubic meters

Prepared by / Date: CMR 02/04/11

Checked by / Date: MJM 02/23/11

**Table 6.1**  
**Cancer Toxicity Data - Oral/Dermal**

**Human Health Risk Assessment - Draft**  
**TORX Facility**  
**Rochester, Indiana**

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal (2)		Weight of Evidence/ Cancer Guideline Description	Oral Cancer Slope Factor	
	Value	Units		Value	Units		Source(s)	Date(s)
<b>VOLATILES</b>								
1,2-Dichloroethene (cis)	NA	NA	NA	NA	NA	ND		
2-Butanone (Methyl Ethyl Ketone)	NA	NA	NA	NA	NA	ND		
Acetone	NA	NA	NA	NA	NA	D		
Carbon disulfide	NA	NA	NA	NA	NA	ND		
Toluene	NA	NA	NA	NA	NA	D		

**Notes:**

IRIS = Integrated Risk Information System:

HEAST= Health Effects Assessment Summary Tables:

NCEA = National Center for Environmental Assessment:

NCEA provisional values are obtained from the USEPA Region IX PRG Table dated 11/02

CalEPA = California Environmental Protection Agency table dated 1/31/03

February, 2003

FY 1997

November, 2002

mg = milligram

kg = kilogram

BW = body weight

ND = no data available

Prepared by / Date: CMR 02/04/11

Checked by / Date: MJM 02/23/11

(1) Values obtained from RAGS Volume 1 (Part E, Supplemental Guidance for Dermal Risk Assessment) (EPA, 2004)

Per this guidance, a value of 100% is used for analytes without published values.

(2) Adjusted Dermal SF = Oral SF / Oral to Dermal Adjustment Factor. Per RAGS Part E (USEPA, 1999), adjustments are only performed for chemicals that have an oral absorption efficiency of less than 50%.

**Weight of Evidence:**

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and  
inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

**Table 6.2**  
**Cancer Toxicity Data - Inhalation**

**Human Health Risk Assessment - Draft**  
**TORX Facility**  
**Rochester, Indiana**

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description	Unit Risk: Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s)
<b>VOLATILES</b>							
Acetone	NA	NA	NA	NA	D		
Benzene	7.80E-06	(µg/m <sup>3</sup> ) <sup>-1</sup>	2.7E-02	(mg/kg/day) <sup>-1</sup>	A	IRIS	December 2010
2-Butanone	NA	NA	NA	NA	ND		
Carbon disulfide	NA	NA	NA	NA	ND		
Chlorobenzene	NA	NA	NA	NA	D		
Dichlorodifluoromethane	NA	NA	NA	NA	ND		
1,1-Dichloroethene	NA	NA	NA	NA	C		
cis-1,2-Dichloroethene	NA	NA	NA	NA	ND		
trans-1,2-Dichloroethene	NA	NA	NA	NA	ND		
Ethylbenzene	NA	NA	NA	NA	D		
Freon 113	NA	NA	NA	NA	ND		
Hexane	NA	NA	NA	NA	ND		
Methylene chloride	4.70E-07	(µg/m <sup>3</sup> ) <sup>-1</sup>	1.3E-04	(mg/kg/day) <sup>-1</sup>	B2	IRIS	December 2010
Toluene	NA	NA	NA	NA	D		
Trichloroethene	5.14E-06	(µg/m <sup>3</sup> ) <sup>-1</sup>	1.8E-02	(mg/kg/day) <sup>-1</sup>	ND	IDEM	May 2009
Trichlorofluoromethane	NA	NA	NA	NA	ND		
1,2,4-Trimethylbenzene	NA	NA	NA	NA	ND		
1,3,5-Trimethylbenzene	NA	NA	NA	NA	ND		
Vinyl chloride	4.40E-06	(µg/m <sup>3</sup> ) <sup>-1</sup>	3.1E-02	(mg/kg/day) <sup>-1</sup>	A	IRIS	December 2010
m,p-Xylenes	NA	NA	NA	NA	ND		
o-Xylenes	NA	NA	NA	NA	ND		

**Notes:**

IRIS = Integrated Risk Information System: December 2010 mg = milligram  
 HEAST= Health Effects Assessment Summary Tables: FY 1997 kg = kilogram  
 NCEA = National Center for Environmental Assessment: November, 2002 BW = body weight  
 NCEA provisional values are obtained from the USEPA Region IX PRG Table dated 11/02 ND = no data available  
 CalEPA = California Environmental Protection Agency table dated 1/31/03

Prepared by / Date: CMR 02/04/11

Checked by / Date: MJM 02/23/11

**Weight of Evidence:**

- A - Human carcinogen
- B1 - Probable human carcinogen - indicates that limited human data are available
- B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
- C - Possible human carcinogen
- D - Not classifiable as a human carcinogen
- E - Evidence of noncarcinogenicity

TABLE 7.1  
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CURRENT/FUTURE - ADOLESCENT/ADULT RESIDENT - PROPERTY 3I  
HUMAN HEALTH RISK ASSESSMENT  
TORX FACILITY  
ROCHESTER, INDIANA

SCENARIO TIMEFRAME: CURRENT/FUTURE RECEPTOR POPULATION: WETLAND VISITOR RECEPTOR AGE: ADULT																	
MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK CALCULATIONS						NON-CANCER HAZARD CALCULATIONS				
					VALUE	UNITS	INTAKE/EXPOSURE CONCENTRATION		CSF/UNIT RISK		CANCER RISK	INTAKE/EXPOSURE CONCENTRATION		RD/RfC (1)		HAZARD QUOTIENT	
							VALUE	UNITS	VALUE	UNITS		VALUE	UNITS	VALUE	UNITS		
SEDIMENT	SEDIMENT	WETLANDS	INGESTION	Carbon disulfide	0.02	mg/kg			NC				5.6E-09	mg/kg/day	1.0E-01	mg/kg/day	6.E-08
				2-Butanone (Methyl Ethyl Ketone)	0.2	mg/kg			NC				5.6E-08	mg/kg/day	6.0E-01	mg/kg/day	9.E-08
				Acetone	1.3	mg/kg			NC				3.7E-07	mg/kg/day	9.0E-01	mg/kg/day	4.E-07
				Toluene	0.00092	mg/kg			NC				2.6E-10	mg/kg/day	8.0E-02	mg/kg/day	3.E-09
				EXPOSURE ROUTE TOTAL				--						6.E-07			
			DERMAL	Carbon disulfide	0.02	mg/kg			NC				4.7E-10	mg/kg/day	1.0E-01	mg/kg/day	5.E-09
				2-Butanone (Methyl Ethyl Ketone)	0.2	mg/kg			NC				4.7E-09	mg/kg/day	6.0E-01	mg/kg/day	8.E-09
				Acetone	1.3	mg/kg			NC				3.1E-08	mg/kg/day	9.0E-01	mg/kg/day	3.E-08
				Toluene	0.00092	mg/kg			NC				2.2E-11	mg/kg/day	8.0E-02	mg/kg/day	3.E-10
				EXPOSURE ROUTE TOTAL				--						5E-08			
EXPOSURE POINT TOTAL											0E+00					6E-07	
EXPOSURE MEDIUM TOTAL											0E+00					6E-07	
SEDIMENT TOTAL											0E+00					6E-07	

NOTES:  
(1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.  
NC - Not carcinogenic by this exposure route.  
--- - Not calculated; dose-response data and/or dermal absorption values are not available.

TABLE 7.2  
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CURRENT/FUTURE - CHILD RESIDENT - PROPERTY 3  
HUMAN HEALTH RISK ASSESSMENT  
TORX FACILITY  
ROCHESTER, INDIANA

SCENARIO TIMEFRAME: CURRENT/FUTURE  
RECEPTOR POPULATION: WETLAND VISITOR  
RECEPTOR AGE: CHILD

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK CALCULATIONS						NON-CANCER HAZARD CALCULATIONS					
					VALUE	UNITS	INTAKE/EXPOSURE CONCENTRATION		CSF/UNIT RISK		CANCER RISK	INTAKE/EXPOSURE CONCENTRATION		RfD/RfC (1)		HAZARD QUOTIENT		
							VALUE	UNITS	VALUE	UNITS		VALUE	UNITS	VALUE	UNITS			
SEDIMENT	SEDIMENT	WETLANDS	INGESTION	Carbon disulfide	0.02	mg/kg			NC		NC			5.3E-08	mg/kg/day	1.0E-01	mg/kg/day	5.E-07
				2-Butanone (Methyl Ethyl Ketone)	0.2	mg/kg			NC		NC			5.3E-07	mg/kg/day	6.0E-01	mg/kg/day	9.E-07
				Acetone	1.3	mg/kg			NC		NC			3.4E-06	mg/kg/day	9.0E-01	mg/kg/day	4.E-06
				Toluene	0.00092	mg/kg			NC		NC			2.4E-09	mg/kg/day	8.0E-02	mg/kg/day	3.E-08
			EXPOSURE ROUTE TOTAL														5.E-06	
			DERMAL	Carbon disulfide	0.02	mg/kg			NC		NC			5.3E-09	mg/kg/day	1.0E-01	mg/kg/day	5.E-08
				2-Butanone (Methyl Ethyl Ketone)	0.2	mg/kg			NC		NC			5.3E-08	mg/kg/day	6.0E-01	mg/kg/day	9.E-08
				Acetone	1.3	mg/kg			NC		NC			3.4E-07	mg/kg/day	9.0E-01	mg/kg/day	4.E-07
				Toluene	0.00092	mg/kg			NC		NC			2.4E-10	mg/kg/day	8.0E-02	mg/kg/day	3.E-09
			EXPOSURE ROUTE TOTAL														5E-08	
EXPOSURE POINT TOTAL														6E-07				
EXPOSURE MEDIUM TOTAL														6E-07				
SEDIMENT TOTAL														6E-07				

NOTES:  
(1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.  
NC - Not carcinogenic by this exposure route.  
--- - Not calculated; dose-response data and/or dermal absorption values are not available.

**TABLE 7.3**  
**CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CURRENT/FUTURE - ADOLESCENT/ADULT RESIDENT - EASTERN POND**  
**HUMAN HEALTH RISK ASSESSMENT**  
**TORX FACILITY**  
**ROCHESTER, INDIANA**

SCENARIO TIMEFRAME: CURRENT/FUTURE  
 RECEPTOR POPULATION: RECREATIONAL VISITOR  
 RECEPTOR AGE: ADULT

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK CALCULATIONS						NON-CANCER HAZARD CALCULATIONS				
					VALUE	UNITS	INTAKE/EXPOSURE CONCENTRATION		CSF/UNIT RISK		CANCER RISK	INTAKE/EXPOSURE CONCENTRATION		RfD/RfC (1)		HAZARD QUOTIENT	
							VALUE	UNITS	VALUE	UNITS		VALUE	UNITS	VALUE	UNITS		
SEDIMENT	SEDIMENT	EASTERN POND	INGESTION	1,2-Dichloroethene (cis)	0.0083	mg/kg	NC		NC				2.3E-09	mg/kg/day	1.0E-02	mg/kg/day	2.E-07
				2-Butanone (Methyl Ethyl Ketone)	0.029	mg/kg	NC		NC			8.2E-09	mg/kg/day	6.0E-01	mg/kg/day	1.E-08	
				Acetone	0.33	mg/kg	NC		NC			9.3E-08	mg/kg/day	9.0E-01	mg/kg/day	1.E-07	
				Toluene	0.0017	mg/kg	NC		NC			4.8E-10	mg/kg/day	8.0E-02	mg/kg/day	6.E-09	
			EXPOSURE ROUTE TOTAL		--										4.E-07		
			DERMAL	1,2-Dichloroethene (cis)	0.0083	mg/kg	NC		NC			1.9E-10	mg/kg/day	1.0E-02	mg/kg/day	2.E-08	
				2-Butanone (Methyl Ethyl Ketone)	0.029	mg/kg	NC		NC			6.8E-10	mg/kg/day	6.0E-01	mg/kg/day	1.E-09	
				Acetone	0.33	mg/kg	NC		NC			7.7E-09	mg/kg/day	9.0E-01	mg/kg/day	9.E-09	
				Toluene	0.0017	mg/kg	NC		NC			4.0E-11	mg/kg/day	8.0E-02	mg/kg/day	5.E-10	
			EXPOSURE ROUTE TOTAL		--										3E-08		
EXPOSURE POINT TOTAL		0E+00										4E-07					
EXPOSURE MEDIUM TOTAL		0E+00										4E-07					
SEDIMENT TOTAL		0E+00										4E-07					
SURFACE WATER	SURFACE WATER	EASTERN POND	INGESTION	1,2-Dichloroethene (cis)	0.0021	mg/l	NC		NC			3.0E-07	mg/kg/day	1.0E-02	mg/kg/day	3.E-05	
				EXPOSURE ROUTE TOTAL		--										3.E-05	
			DERMAL	1,2-Dichloroethene (cis)	0.0021	mg/l	NC		NC			2.5E-06	mg/kg/day	1.0E-02	mg/kg/day	2.E-04	
				EXPOSURE ROUTE TOTAL		--										2E-04	
			EXPOSURE POINT TOTAL		0E+00										3E-04		
			EXPOSURE MEDIUM TOTAL		0E+00										3E-04		
			SURFACE WATER TOTAL		0E+00										3E-04		

NOTES:  
 (1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.  
 NC - Not carcinogenic by this exposure route.  
 -- - Not calculated; dose-response data and/or dermal absorption values are not available.

Prepared by / Date: CMR 02/04/11  
 Checked by / Date: MJM 02/23/11

**TABLE 7.4**  
**CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS - CURRENT/FUTURE - CHILD RESIDENT - EASTERN POND**  
**HUMAN HEALTH RISK ASSESSMENT**  
**TORX FACILITY**  
**ROCHESTER, INDIANA**

SCENARIO TIMEFRAME: CURRENT/FUTURE  
 RECEPTOR POPULATION: RECREATIONAL VISITOR  
 RECEPTOR AGE: CHILD

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK CALCULATIONS						NON-CANCER HAZARD CALCULATIONS				
					VALUE	UNITS	INTAKE/EXPOSURE CONCENTRATION		CSF/UNIT RISK		CANCER RISK	INTAKE/EXPOSURE CONCENTRATION		RfD/RfC (1)		HAZARD QUOTIENT	
							VALUE	UNITS	VALUE	UNITS		VALUE	UNITS	VALUE	UNITS		
SEDIMENT	SEDIMENT	EATERN POND	INGESTION	1,2-Dichloroethene (cis)	0.0083	mg/kg	NC		NC			2.2E-08	mg/kg/day	1.0E-02	mg/kg/day	2.E-06	
				2-Butanone (Methyl Ethyl Ketone)	0.029	mg/kg	NC		NC			7.6E-08	mg/kg/day	6.0E-01	mg/kg/day	1.E-07	
				Acetone	0.33	mg/kg	NC		NC			8.7E-07	mg/kg/day	9.0E-01	mg/kg/day	1.E-06	
				Toluene	0.0017	mg/kg	NC		NC			4.5E-09	mg/kg/day	8.0E-02	mg/kg/day	6.E-08	
			EXPOSURE ROUTE TOTAL		--										3.E-06		
			DERMAL	1,2-Dichloroethene (cis)	0.0083	mg/kg	NC		NC			2.2E-09	mg/kg/day	1.0E-02	mg/kg/day	2.E-07	
				2-Butanone (Methyl Ethyl Ketone)	0.029	mg/kg	NC		NC			7.6E-09	mg/kg/day	6.0E-01	mg/kg/day	1.E-08	
				Acetone	0.33	mg/kg	NC		NC			8.7E-08	mg/kg/day	9.0E-01	mg/kg/day	1.E-07	
				Toluene	0.0017	mg/kg	NC		NC			4.5E-10	mg/kg/day	8.0E-02	mg/kg/day	6.E-09	
			EXPOSURE ROUTE TOTAL		--										3E-07		
EXPOSURE POINT TOTAL		0E+00										4E-06					
EXPOSURE MEDIUM TOTAL		0E+00										4E-06					
SEDIMENT TOTAL											0E+00		4E-06				
SURFACE WATER	SURFACE WATER	EASTERN POND	INGESTION	1,2-Dichloroethene (cis)	0.0021	mg/l	NC		NC			2.8E-06	mg/kg/day	1.0E-02	mg/kg/day	3.E-04	
				EXPOSURE ROUTE TOTAL		--										3.E-04	
			DERMAL	1,2-Dichloroethene (cis)	0.0021	mg/l	NC		NC			6.5E-06	mg/kg/day	1.0E-02	mg/kg/day	6.E-04	
				EXPOSURE ROUTE TOTAL		--										6E-04	
			EXPOSURE POINT TOTAL		0E+00										9E-04		
			EXPOSURE MEDIUM TOTAL		0E+00										9E-04		
SURFACE WATER TOTAL											0E+00		9E-04				

NOTES:  
 (1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.  
 NC - Not carcinogenic by this exposure route.  
 -- - Not calculated; dose-response data and/or dermal absorption values are not available.

Prepared by / Date: CMR 02/04/11  
 Checked by / Date: MJM 02/23/11

**TABLE 7.5**  
**CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS -**  
**CURRENT/FUTURE - INDUSTRIAL WORKER - INDOOR AIR VIA SOIL VAPOR - PROPERTY 36**

**HUMAN HEALTH RISK ASSESSMENT**  
**TORX FACILITY**  
**ROCHESTER, INDIANA**

SCENARIO TIMEFRAME: CURRENT/FUTURE  
 RECEPTOR POPULATION: INDUSTRIAL WORKERS  
 RECEPTOR AGE: ADULT

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK	HAZARD QUOTIENT
					VALUE	UNITS		
SOIL VAPOR	INDOOR AIR	PROPERTY 36	INHALATION	2-Butanone	8.85	µg/m³	NC	8.4E-07
				1,2,4-Trimethylbenzene	9.83	µg/m³	NC	6.9E-04
				Acetone	78.39	µg/m³	NC	5.9E-06
				Benzene	12.78	µg/m³	2.6E-08	2.6E-04
				Carbon disulfide	3.11	µg/m³	NC	4.7E-06
				Chlorobenzene	13.81	µg/m³	NC	3.5E-05
				Dichlorodifluoromethane	19.78	µg/m³	NC	4.3E-05
				Ethylbenzene	17.37	µg/m³	NC	6.0E-06
				Hexane	7.05	µg/m³	NC	2.3E-05
				Methylene chloride	10.42	µg/m³	1.1E-09	1.8E-06
				Toluene	116.81	µg/m³	NC	1.1E-05
				Trichlorofluoromethane	5.62	µg/m³	NC	3.9E-06
				m,p-Xylenes	43.42	µg/m³	NC	2.0E-04
				o-Xylenes	13.03	µg/m³	NC	6.4E-05
INDOOR AIR TOTAL							3E-08	1E-03

NOTES:

(1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.

NC - Not carcinogenic by this exposure route.

-- - Not calculated; dose-response data and/or dermal absorption values are not available.

EPC - Exposure Point Concentration in soil vapor used to calculate indoor air concentrations and risks as shown in Appendix B.

Prepared by / Date: CMR 02/04/11

Checked by / Date: MJM 02/23/11



**TABLE 7.6**  
**CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS -**  
**CURRENT/FUTURE - INDUSTRIAL WORKER - INDOOR AIR VIA GROUNDWATER - PROPERTY 36**

**HUMAN HEALTH RISK ASSESSMENT**  
**TORX FACILITY**  
**ROCHESTER, INDIANA**

SCENARIO TIMEFRAME: CURRENT/FUTURE  
 RECEPTOR POPULATION: INDUSTRIAL WORKERS  
 RECEPTOR AGE: ADULT

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK	HAZARD QUOTIENT
					VALUE	UNITS		
GROUNDWATER	INDOOR AIR	PROPERTY 36	INHALATION	1,1-Dichloroethene	1.2	µg/L	NC	4.6E-04
				cis-1,2-Dichloroethene	150	µg/L	NC	1.5E-01
				trans-1,2-Dichloroethene	3.2	µg/L	NC	9.6E-04
				Trichloroethene	82	µg/L	4.1E-06	5.3E-02
				Vinyl chloride	3.5	µg/L	6.9E-07	3.6E-03
INDOOR AIR TOTAL							5E-06	2E-01

NOTES:

(1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.

NC - Not carcinogenic by this exposure route.

-- - Not calculated; dose-response data and/or dermal absorption values are not available.

EPC - Exposure Point Concentration in groundwater used to calculate indoor air concentrations and risks as shown in Appendix B.

Prepared by / Date: CMR 02/04/11

Checked by / Date: MJM 02/23/11

**TABLE 7.7**  
**CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS -**  
**CURRENT/FUTURE - RESIDENT - INDOOR AIR VIA SOIL VAPOR - PROPERTY 16A**

**HUMAN HEALTH RISK ASSESSMENT**  
**TORX FACILITY**  
**ROCHESTER, INDIANA**

SCENARIO TIMEFRAME: CURRENT/FUTURE  
 RECEPTOR POPULATION: RESIDENT  
 RECEPTOR AGE: CHILD/ADULT

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK	HAZARD QUOTIENT
					VALUE	UNITS		
SOIL VAPOR	INDOOR AIR	PROPERTY 16A	INHALATION	2-Butanone	8.85	µg/m³	NC	2.2E-06
				1,2,4-Trimethylbenzene	14.75	µg/m³	NC	2.6E-03
				1,3,5-Trimethylbenzene	4.92	µg/m³	NC	8.8E-04
				Acetone	57.01	µg/m³	NC	2.8E-05
				Benzene	9.58	µg/m³	4.2E-08	4.2E-04
				Chlorobenzene	9.21	µg/m³	NC	9.2E-05
				Ethylbenzene	13.03	µg/m³	NC	1.6E-05
				Hexane	7.05	µg/m³	NC	6.6E-05
				Methylene chloride	3.47	µg/m³	9.9E-10	1.6E-06
				Tetrachloroethene	31	µg/m³	9.E-08	6.1E-05
				Toluene	71.59	µg/m³	NC	1.9E-05
				m,p-Xylenes	52.11	µg/m³	NC	6.0E-04
				o-Xylenes	17.37	µg/m³	NC	2.3E-04
INDOOR AIR TOTAL							1E-07	5E-03

NOTES:

(1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.

NC - Not carcinogenic by this exposure route.

EPC - Exposure Point Concentration in soil vapor used to calculate indoor air concentrations and risks as shown in Appendix B.

Prepared by / Date: EYM 08/15/2011

Checked by / Date: KASK 08/15/2011

**TABLE 7.8**  
**CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS -**  
**CURRENT/FUTURE - RESIDENT - INDOOR AIR VIA SOIL VAPOR - PROPERTY 17**

**HUMAN HEALTH RISK ASSESSMENT**  
**TORX FACILITY**  
**ROCHESTER, INDIANA**

SCENARIO TIMEFRAME: CURRENT/FUTURE  
 RECEPTOR POPULATION: RESIDENT  
 RECEPTOR AGE: CHILD/ADULT

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK	HAZARD QUOTIENT
					VALUE	UNITS		
SOIL VAPOR	INDOOR AIR	PROPERTY 17	INHALATION	1,2,4-Trimethylbenzene	9.83	µg/m³	NC	2.3E-03
				Benzene	3.19	µg/m³	1.8E-08	1.8E-04
				Hexane	3.52	µg/m³	NC	3.7E-05
				Methylene chloride	10.42	µg/m³	3.6E-09	6.0E-06
				Toluene	82.9	µg/m³	NC	2.7E-05
				m,p-Xylenes	13.03	µg/m³	NC	1.9E-04
				o-Xylenes	4.34	µg/m³	NC	7.1E-05
INDOOR AIR TOTAL							2E-08	3E-03

NOTES:

(1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.

NC - Not carcinogenic by this exposure route.

-- - Not calculated; dose-response data and/or dermal absorption values are not available.

EPC - Exposure Point Concentration in soil vapor used to calculate indoor air concentrations and risks as shown in Appendix B.

Prepared by / Date: CMR 02/04/11

Checked by / Date: MJM 02/23/11

**TABLE 7.9**  
**CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS -**  
**CURRENT/FUTURE - RESIDENT - INDOOR AIR VIA GROUNDWATER - PROPERTY 18-19**

**HUMAN HEALTH RISK ASSESSMENT**  
**TORX FACILITY**  
**ROCHESTER, INDIANA**

SCENARIO TIMEFRAME: CURRENT/FUTURE  
 RECEPTOR POPULATION: RESIDENT  
 RECEPTOR AGE: CHILD/ADULT

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK	HAZARD QUOTIENT
					VALUE	UNITS		
GROUNDWATER	INDOOR AIR	PROPERTIES 18 and 19	INHALATION	Vinyl chloride	18	µg/L	5.8.E-06	1.5E-02
<b>INDOOR AIR TOTAL</b>							<b>6E-06</b>	<b>2E-02</b>

NOTES:

(1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.

NC - Not carcinogenic by this exposure route.

EPC - Exposure Point Concentration in groundwater used to calculate indoor air concentrations and risks as shown in Appendix B.

Prepared by / Date: EYM 08/15/2011

Checked by / Date: KASK 08/15/2011

**TABLE 7.10**  
**CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS -**  
**CURRENT/FUTURE - RESIDENT - INDOOR AIR VIA SOIL VAPOR - PROPERTY 20**

**HUMAN HEALTH RISK ASSESSMENT**  
**TORX FACILITY**  
**ROCHESTER, INDIANA**

SCENARIO TIMEFRAME: CURRENT/FUTURE  
 RECEPTOR POPULATION: RESIDENT  
 RECEPTOR AGE: CHILD/ADULT

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK	HAZARD QUOTIENT
					VALUE	UNITS		
SOIL VAPOR	INDOOR AIR	PROPERTY 20	INHALATION	2-Butanone	2.95	µg/m³	NC	3.5E-07
				1,2,4-Trimethylbenzene	4.92	µg/m³	NC	3.6E-04
				Benzene	9.58	µg/m³	1.6E-08	1.6E-04
				Carbon disulfide	18.68	µg/m³	NC	1.8E-05
				Freon 113	15.33	µg/m³	NC	2.7E-07
				Hexane	17.62	µg/m³	NC	9.2E-05
				Methylene chloride	55.58	µg/m³	7.3E-09	1.2E-05
				Toluene	116.81	µg/m³	NC	1.7E-04
				m,p-Xylenes	13.03	µg/m³	NC	6.4E-05
INDOOR AIR TOTAL							2E-08	9E-04

NOTES:

(1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.

NC - Not carcinogenic by this exposure route.

-- - Not calculated; dose-response data and/or dermal absorption values are not available.

EPC - Exposure Point Concentration in soil vapor used to calculate indoor air concentrations and risks as shown in Appendix B.

Prepared by / Date: CMR 02/04/11

Checked by / Date: MJM 02/23/11

**TABLE 7.11**  
**CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS -**  
**CURRENT/FUTURE - RESIDENT - INDOOR AIR VIA SOIL VAPOR - PROPERTY 21**

**HUMAN HEALTH RISK ASSESSMENT**  
**TORX FACILITY**  
**ROCHESTER, INDIANA**

SCENARIO TIMEFRAME: CURRENT/FUTURE  
 RECEPTOR POPULATION: RESIDENT  
 RECEPTOR AGE: CHILD/ADULT

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK	HAZARD QUOTIENT
					VALUE	UNITS		
SOIL VAPOR	INDOOR AIR	PROPERTY 21	INHALATION	1,2,4-Trimethylbenzene	14.75	µg/m³	NC	1.1E-03
				1,3,5-Trimethylbenzene	4.92	µg/m³	NC	3.6E-04
				Benzene	12.78	µg/m³	2.5E-08	2.5E-04
				Carbon disulfide	9.34	µg/m³	NC	8.9E-06
				Ethylbenzene	8.68	µg/m³	NC	4.5E-06
				Freon 113	15.33	µg/m³	NC	2.7E-07
				Hexane	35.24	µg/m³	NC	1.8E-04
				Methylene chloride	48.64	µg/m³	6.4E-09	1.1E-05
				Toluene	222.32	µg/m³	NC	2.6E-05
				m,p-Xylenes	34.74	µg/m³	NC	1.7E-04
				o-Xylenes	13.03	µg/m³	NC	7.6E-05
INDOOR AIR TOTAL							3E-08	2E-03

NOTES:

(1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.

NC - Not carcinogenic by this exposure route.

-- - Not calculated; dose-response data and/or dermal absorption values are not available.

EPC - Exposure Point Concentration in soil vapor used to calculate indoor air concentrations and risks as shown in Appendix B.

Prepared by / Date: CMR 02/04/11

Checked by / Date: MJM 02/23/11

**TABLE 7.12**  
**CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS -**  
**CURRENT/FUTURE - RESIDENT - INDOOR AIR VIA SOIL VAPOR - PROPERTY 23**

**HUMAN HEALTH RISK ASSESSMENT**  
**TORX FACILITY**  
**ROCHESTER, INDIANA**

SCENARIO TIMEFRAME: CURRENT/FUTURE  
 RECEPTOR POPULATION: RESIDENT  
 RECEPTOR AGE: CHILD/ADULT

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC			
					VALUE	UNITS	CANCER RISK	HAZARD QUOTIENT
SOIL VAPOR	INDOOR AIR	PROPERTY 23	INHALATION	1,2,4-Trimethylbenzene	14.75	µg/m³	NC	1.2E-03
				1,3,5-Trimethylbenzene	4.92	µg/m³	NC	4.0E-04
				1,4-Dichlorobenzene	1.5	µg/m³	NC	9.7E-07
				2-Butanone	2.6	µg/m³	NC	3.2E-07
				4-Methyl-2-pentanone	0.78	µg/m³	NC	1.5E-07
				Acetone	18	µg/m³	NC	4.3E-05
				Benzene	15.97	µg/m³	3.5E-08	3.5E-04
				Carbon disulfide	18.68	µg/m³	NA	2.0E-05
				Chlorobenzene	9.21	µg/m³	NA	4.4E-05
				Dichlorodifluoromethane	3.2	µg/m³	NA	8.0E-06
				Ethylbenzene	8.68	µg/m³	NA	5.0E-06
				Freon 113	15.33	µg/m³	NA	3.0E-07
				Hexane	49.34	µg/m³	NA	2.8E-04
				Methylene chloride	41.69	µg/m³	6.1E-09	1.0E-05
				Toluene	192.17	µg/m³	NC	2.5E-05
				m,p-Xylenes	30.4	µg/m³	NC	1.8E-04
				o-Xylenes	8.68	µg/m³	NC	5.7E-05
INDOOR AIR TOTAL							4E-08	3E-03

NOTES:

(1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.

NC - Not carcinogenic by this exposure route.

EPC - Exposure Point Concentration in soil vapor used to calculate indoor air concentrations and risks as shown in Appendix B.

Prepared by / Date: EYM 08/15/2011

Checked by / Date: KASK 08/15/2011

**TABLE 7.13**  
**CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS -**  
**CURRENT/FUTURE - RESIDENT - INDOOR AIR VIA GROUNDWATER - PROPERTY 37**

**HUMAN HEALTH RISK ASSESSMENT**  
**TORX FACILITY**  
**ROCHESTER, INDIANA**

SCENARIO TIMEFRAME: CURRENT/FUTURE RECEPTOR POPULATION: RESIDENT RECEPTOR AGE: CHILD/ADULT
--

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK	HAZARD QUOTIENT
					VALUE	UNITS		
GROUNDWATER	INDOOR AIR	PROPERTY 37	INHALATION	cis-1,2-Dichloroethene	3.5	µg/L	NC	3.3E-04
				Trichloroethene	3.4	µg/L	5.8E-08	7.5E-04
				Vinyl chloride	7.8	µg/L	8.6E-07	2.3E-03
INDOOR AIR TOTAL							9E-07	3E-03

NOTES:

(1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.

NC - Not carcinogenic by this exposure route.

EPC - Exposure Point Concentration in groundwater used to calculate indoor air concentrations and risks as shown in Appendix B.

Prepared by / Date: EYM 08/15/2011

Checked by / Date: KASK 08/15/2011



**TABLE 7.14**  
**CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS -**  
**CURRENT/FUTURE - RESIDENT - INDOOR AIR VIA SOIL VAPOR - PROPERTY 38**

**HUMAN HEALTH RISK ASSESSMENT**  
**TORX FACILITY**  
**ROCHESTER, INDIANA**

SCENARIO TIMEFRAME: CURRENT/FUTURE RECEPTOR POPULATION: RESIDENT RECEPTOR AGE: CHILD/ADULT
--

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC			
					VALUE	UNITS	CANCER RISK	HAZARD QUOTIENT
SOIL VAPOR	INDOOR AIR	PROPERTY 38	INHALATION	2-Butanone	8.85	µg/m³	NC	2.8E-06
				Acetone	33.26	µg/m³	NC	1.9E-05
				Benzene	6.39	µg/m³	3.5E-08	3.5E-04
				Chlorobenzene	4.6	µg/m³	NA	1.2E-04
				Toluene	56.52	µg/m³	NA	1.9E-05
				m,p-Xylenes	8.68	µg/m³	NA	1.3E-04
				o-Xylenes	4.34	µg/m³	NC	7.1E-05
INDOOR AIR TOTAL							4E-08	7E-04

NOTES:

(1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.

NC - Not carcinogenic by this exposure route.

-- - Not calculated; dose-response data and/or dermal absorption values are not available.

EPC - Exposure Point Concentration in soil vapor used to calculate indoor air concentrations and risks as shown in Appendix B.

Prepared by / Date: CMR 02/04/11

Checked by / Date: MJM 02/23/11

**TABLE 7.15**  
**CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS -**  
**CURRENT/FUTURE - RESIDENT - INDOOR AIR VIA GROUNDWATER - PROPERTY 39**

**HUMAN HEALTH RISK ASSESSMENT**  
**TORX FACILITY**  
**ROCHESTER, INDIANA**

SCENARIO TIMEFRAME: CURRENT/FUTURE RECEPTOR POPULATION: RESIDENT RECEPTOR AGE: CHILD/ADULT
--

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK	HAZARD QUOTIENT
					VALUE	UNITS		
GROUNDWATER	INDOOR AIR	PROPERTY 39	INHALATION	Trichloroethene	0.38	µg/L	9.E-10	1.2E-05
<b>INDOOR AIR TOTAL</b>							<b>9E-10</b>	<b>1E-05</b>

NOTES:

(1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.

NC - Not carcinogenic by this exposure route.

-- - Not calculated; dose-response data and/or dermal absorption values are not available.

EPC - Exposure Point Concentration in groundwater used to calculate indoor air concentrations and risks as shown in Appendix B.

Prepared by / Date: CMR 02/04/11

Checked by / Date: MJM 02/23/11

**TABLE 7.16**  
**CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS -- REASONABLE MAXIMUM EXPOSURE - CURRENT/FUTURE - RESIDENT - INDOOR AIR - PROPERTY 15 - FEBRUARY 2010**

**TORX FACILITY**  
**ROCHESTER, INDIANA**

SCENARIO TIMEFRAME: CURRENT/FUTURE  
 RECEPTOR POPULATION: RESIDENT  
 RECEPTOR AGE: INDOOR AIR - PROPERTY 15 - FEBRUARY 2010

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK CALCULATIONS					NON-CANCER HAZARD CALCULATIONS				
					VALUE	UNITS	INTAKE/EXPOSURE CONCENTRATION		CSF/UNIT RISK		CANCER RISK	INTAKE/EXPOSURE CONCENTRATION		RfD/RfC (1)		HAZARD QUOTIENT
							VALUE	UNITS	VALUE	UNITS		VALUE	UNITS	VALUE	UNITS	
AIR	AIR	PROPERTY 15 - FEBRUARY 2010	VAPOR INHALATION	1,2,4-Trimethylbenzene	0.16	ug/m3	NC		NC			1.5E-01	ug/m3	6.0E+00	ug/m3	3.E-02
				1,3,5-Trimethylbenzene	0.29	ug/m3	NC		NC			2.8E-01	ug/m3	6.0E+00	ug/m3	5.E-02
				2-Butanone	2.2	ug/m3	NC		NC			2.1E+00	ug/m3	5.0E+03	ug/m3	4.E-04
				2-Propanol	4	ug/m3	NC		NC			3.8E+00	ug/m3	7.0E+03	ug/m3	5.E-04
				Acetone	14	ug/m3	NC		NC			1.3E+01	ug/m3	3.1E+04	ug/m3	4.E-04
				Benzene	0.4	ug/m3	1.6E-01	ug/m3	7.8E-06	mg/m3	1.E-06	3.8E-01	ug/m3	3.0E+01	ug/m3	1.E-02
				Chloromethane	0.75	ug/m3	NC		NC			7.2E-01	ug/m3	9.0E+01	ug/m3	8.E-03
				Dichlorodifluoromethane	0.61	ug/m3	NC		NC			5.8E-01	ug/m3	2.0E+02	ug/m3	3.E-03
				Ethyl acetate	3	ug/m3	NC		NC			2.9E+00	ug/m3	0.0E+00	ug/m3	
				Ethylbenzene	8.5	ug/m3	NC		NC			8.2E+00	ug/m3	1.0E+03	ug/m3	8.E-03
				Hexane	0.18	ug/m3	NC		NC			1.7E-01	ug/m3	2.0E+02	ug/m3	9.E-04
				Isopropylbenzene	11	ug/m3	NC		NC			1.1E+01	ug/m3	4.0E+02	ug/m3	3.E-02
				Methylene chloride	0.35	ug/m3	1.4E-01	ug/m3	4.7E-07	mg/m3	7.E-08	3.4E-01	ug/m3	3.0E+03	ug/m3	1.E-04
				Tetrachloroethene	0.59	ug/m3	2.4E-01	ug/m3	5.9E-06	mg/m3	1.E-06	5.7E-01	ug/m3	2.7E+02	ug/m3	2.E-03
				Tetrahydrofuran	1.9	ug/m3	NC		NC			1.8E+00	ug/m3	0.0E+00	ug/m3	
				Toluene	19	ug/m3	NC		NC			1.8E+01	ug/m3	4.0E+02	ug/m3	5.E-02
				Trichlorofluoromethane	0.39	ug/m3	NC		NC			3.7E-01	ug/m3	7.0E+02	ug/m3	5.E-04
				Xylene, m/p	81	ug/m3	NC		NC			7.8E+01	ug/m3	1.0E+02	ug/m3	8.E-01
				Xylene, o	11	ug/m3	NC		NC			1.1E+01	ug/m3	1.0E+02	ug/m3	1.E-01
						EXPOSURE ROUTE TOTAL		3.E-06							1.E+00	
				EXPOSURE POINT TOTAL		3.E-06							1.E+00			
			EXPOSURE MEDIUM TOTAL		3.E-06							1.E+00				
AIR TOTAL										3.E-06	1.E+00					
TOTAL RECEPTOR RISK ACROSS ALL MEDIA										3.E-06	TOTAL RECEPTOR HAZARD ACROSS ALL MEDIA					1.E+00

NOTES:  
 (1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.  
 NC - Not carcinogenic by this exposure route.  
 NA - Not applicable; exposure route not applicable for this chemical/exposure medium.  
 NV - Not volatile; exposure route not complete for this chemical.  
 -- - Not calculated; dose-response data and/or dermal absorption values are not available.

Prepared by: KJC 2/24/11  
 Checked by: MJM 2/24/11

TABLE 7.17

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS -- REASONABLE MAXIMUM EXPOSURE - CURRENT/FUTURE - INDUSTRIAL WORKER - INDOOR AIR - PROPERTY 41 - MAY 2010

TORX FACILITY  
 ROCHESTER, INDIANA

SCENARIO TIMEFRAME: CURRENT/FUTURE  
 RECEPTOR POPULATION: INDUSTRIAL WORKER  
 RECEPTOR AGE: INDOOR AIR - PROPERTY 41 - MAY 2010

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK CALCULATIONS					NON-CANCER HAZARD CALCULATIONS					
					VALUE	UNITS	INTAKE/EXPOSURE CONCENTRATION		CSF/UNIT RISK		CANCER RISK	INTAKE/EXPOSURE CONCENTRATION		RfD/RfC (1)		HAZARD QUOTIENT	
							VALUE	UNITS	VALUE	UNITS		VALUE	UNITS	VALUE	UNITS		
AIR	AIR	PROPERTY 41 - MAY 2010	VAPOR INHALATION	1,2,4-Trimethylbenzene	3.6	ug/m3	NC		NC			8.2E-01	ug/m3	6.0E+00	ug/m3	1.E-01	
				1,3,5-Trimethylbenzene	0.74	ug/m3	NC		NC			1.7E-01	ug/m3	6.0E+00	ug/m3	3.E-02	
				1,4-Dichlorobenzene	0.96	ug/m3	7.5E-02	ug/m3	1.1E-05	mg/m3	8.E-07	2.2E-01	ug/m3	8.0E+02	ug/m3	3.E-04	
				1,4-Dioxane	0.63	ug/m3	4.9E-02	ug/m3	7.7E-06	mg/m3	4.E-07	1.4E-01	ug/m3	3.6E+03	ug/m3	4.E-05	
				2-Butanone	3.9	ug/m3	NC		NC			8.9E-01	ug/m3	5.0E+03	ug/m3	2.E-04	
				2-Hexanone	0.19	ug/m3	NC		NC			4.3E-02	ug/m3	3.0E+01	ug/m3	1.E-03	
				2-Propanol	660	ug/m3	NC		NC			1.5E+02	ug/m3	7.0E+03	ug/m3	2.E-02	
				4-Ethyltoluene	0.54	ug/m3	NC		NC			1.2E-01	ug/m3	0.0E+00	ug/m3		
				Acetone	40	ug/m3	NC		NC			9.1E+00	ug/m3	3.1E+04	ug/m3	3.E-04	
				Benzene	0.83	ug/m3	6.5E-02	ug/m3	7.8E-06	mg/m3	5.E-07	1.9E-01	ug/m3	3.0E+01	ug/m3	6.E-03	
				Carbon disulfide	0.96	ug/m3	NC		NC			2.2E-01	ug/m3	7.0E+02	ug/m3	3.E-04	
				Carbon tetrachloride	0.82	ug/m3	6.4E-02	ug/m3	6.0E-06	mg/m3	4.E-07	1.9E-01	ug/m3	1.0E+02	ug/m3	2.E-03	
				Chloromethane	1.3	ug/m3	NC		NC			3.0E-01	ug/m3	9.0E+01	ug/m3	3.E-03	
				cis-1,2-Dichloroethene	13	ug/m3	NC		NC			3.0E+00	ug/m3	3.5E+01	ug/m3	8.E-02	
				Dichlorodifluoromethane	2.6	ug/m3	NC		NC			5.9E-01	ug/m3	2.0E+02	ug/m3	3.E-03	
				Ethyl acetate	0.33	ug/m3	NC		NC			7.5E-02	ug/m3	0.0E+00	ug/m3		
				Ethylbenzene	0.52	ug/m3	NC		NC			1.2E-01	ug/m3	1.0E+03	ug/m3	1.E-04	
				Heptane	0.7	ug/m3	NC		NC			1.6E-01	ug/m3	0.0E+00	ug/m3		
				Hexane	0.85	ug/m3	NC		NC			1.9E-01	ug/m3	2.0E+02	ug/m3	1.E-03	
				Methylene chloride	1	ug/m3	7.8E-02	ug/m3	4.7E-07	mg/m3	4.E-08	2.3E-01	ug/m3	3.0E+03	ug/m3	8.E-05	
				Styrene	0.72	ug/m3	NC		NC			1.6E-01	ug/m3	1.0E+03	ug/m3	2.E-04	
				Tetrahydrofuran	0.44	ug/m3	NC		NC			1.0E-01	ug/m3	0.0E+00	ug/m3		
				Toluene	21	ug/m3	NC		NC			4.8E+00	ug/m3	4.0E+02	ug/m3	1.E-02	
				Trichloroethene	1.5	ug/m3	1.2E-01	ug/m3	5.1E-06	mg/m3	6.E-07	3.4E-01	ug/m3	3.5E+01	ug/m3	1.E-02	
				Trichlorofluoromethane	2	ug/m3	NC		NC			4.6E-01	ug/m3	7.0E+02	ug/m3	7.E-04	
				m,p-Xylene	1.6	ug/m3	NC		NC			3.7E-01	ug/m3	1.0E+02	ug/m3	4.E-03	
				o-Xylene	0.74	ug/m3	NC		NC			1.7E-01	ug/m3	1.0E+02	ug/m3	2.E-03	
							EXPOSURE ROUTE TOTAL							3.E-06			
				EXPOSURE POINT TOTAL								3.E-06					3.E-01
		EXPOSURE MEDIUM TOTAL									3.E-06					3.E-01	
AIR TOTAL											3.E-06	TOTAL RECEPTOR HAZARD ACROSS ALL MEDIA					3.E-01
											3.E-06	TOTAL RECEPTOR RISK ACROSS ALL MEDIA					3.E-01

NOTES:

(1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.

NC - Not carcinogenic by this exposure route.

NA - Not applicable; exposure route not applicable for this chemical/exposure medium.

NV - Not volatile; exposure route not complete for this chemical.

-- - Not calculated; dose-response data and/or dermal absorption values are not available.

Prepared by: CMR 2/10/11

Checked by: KJC 2/24/11

**TABLE 7.18**  
**CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS -- REASONABLE MAXIMUM EXPOSURE - CURRENT/FUTURE - INDUSTRIAL WORKER - INDOOR AIR - PROPERTY 41 - FEBRUARY 2011**

**TORX FACILITY**  
**ROCHESTER, INDIANA**

SCENARIO TIMEFRAME: CURRENT/FUTURE  
 RECEPTOR POPULATION: INDUSTRIAL WORKER  
 RECEPTOR AGE: INDOOR AIR - PROPERTY 41 - FEBRUARY 2011

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK CALCULATIONS						NON-CANCER HAZARD CALCULATIONS					
					VALUE	UNITS	INTAKE/EXPOSURE CONCENTRATION		CSF/UNIT RISK		CANCER RISK	INTAKE/EXPOSURE CONCENTRATION		RfD/RfC (1)		HAZARD QUOTIENT		
							VALUE	UNITS	VALUE	UNITS		VALUE	UNITS	VALUE	UNITS			
AIR	AIR	PROPERTY 41 - FEBRUARY 2011	VAPOR INHALATION	1,4-Dichlorobenzene	21	ug/m3	1.6E+00	ug/m3	1.1E-05	mg/m3	2.E-05	4.8E+00	ug/m3	8.0E+02	ug/m3	6.E-03		
				2-Propanol	62	ug/m3	NC		NC	1.4E+01		ug/m3	7.0E+03	ug/m3	2.E-03			
				Acetone	36	ug/m3	NC		NC	3.1E+04		ug/m3		3.E-04				
				cis-1,2-Dichloroethene	7.2	ug/m3	NC		NC	3.5E+01		ug/m3		5.E-02				
				Ethyl acetate	39	ug/m3	NC		NC	0.0E+00		ug/m3						
				Ethylbenzene	8.9	ug/m3	NC		NC	1.0E+03		ug/m3		2.E-03				
				Toluene	6	ug/m3	NC		NC	4.0E+02		ug/m3		3.E-03				
				m,p-Xylene	29	ug/m3	NC		NC	1.0E+02		ug/m3		7.E-02				
				o-Xylene	6	ug/m3	NC		NC	1.0E+02		ug/m3		1.E-02				
				EXPOSURE ROUTE TOTAL										2.E-05	1.E-01			
				EXPOSURE POINT TOTAL										2.E-05	1.E-01			
		EXPOSURE MEDIUM TOTAL										2.E-05	1.E-01					
AIR TOTAL											2.E-05	1.E-01						
TOTAL RECEPTOR RISK ACROSS ALL MEDIA										2.E-05	TOTAL RECEPTOR HAZARD ACROSS ALL MEDIA				1.E-01			

NOTES:  
 (1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.  
 NC - Not carcinogenic by this exposure route.  
 NA - Not applicable; exposure route not applicable for this chemical/exposure medium.  
 NV - Not volatile; exposure route not complete for this chemical.  
 -- - Not calculated; dose-response data and/or dermal absorption values are not available.

Prepared by: KJC 2/24/11  
 Checked by: MJM 2/24/11

**TABLE 7.19**  
**CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS**  
**CURRENT/FUTURE - RESIDENT - INDOOR AIR VIA GROUNDWATER - PROPERTY 8**

**HUMAN HEALTH RISK ASSESSMENT**  
**TORX FACILITY**  
**ROCHESTER, INDIANA**

SCENARIO TIMEFRAME: CURRENT/FUTURE RECEPTOR POPULATION: RESIDENT RECEPTOR AGE: CHILD/ADULT
--

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK	HAZARD QUOTIENT
					VALUE	UNITS		
GROUNDWATER	INDOOR AIR	PROPERTY 8	INHALATION	Cis-1,2-Dichloroethene	4.8	µg/L	NC	1.2E-03
<b>INDOOR AIR TOTAL</b>							<b>0E+00</b>	<b>1E-03</b>

NOTES:

(1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.

NC - Not carcinogenic by this exposure route.

EPC - Exposure Point Concentration in groundwater used to calculate indoor air concentrations and risks as shown in Appendix B.

Prepared by / Date: EYM 08/16/2011

Checked by / Date: MJM 08/16/2011

**Table 11**  
**Risk Summary Table**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Receptor	Activity	Exposure Point	Exposure Medium	Potential Exposure Route	Age Group	Cancer Risk	Hazard Index	
Resident	Recreation	Wetlands (Property 38)	Wetland soil	Direct Contact (incidental ingestion and dermal contact)	Adult/ Adolescent Child	NC NC	0.000001 0.000001	
		Eastern Pond (Property 38)	Surface Water		Adult/ Adolescent Child	NC NC	0.0003 0.0009	
			Sediment		Adult/ Adolescent Child	NC NC	0.0003 0.000004	
		Residence	Property 38		Indoor Air	Inhalation	All	4.00E-08
	Potable Water			Treatment System - Pathway Incomplete	Pathway Incomplete	Pathway Incomplete		
						Child Total:		0.0009
						Adult Total:		0.0006
					Receptor Total:	4.00E-08		

Receptor	Activity	Exposure Point	Exposure Medium	Potential Exposure Route	Age Group	Cancer Risk	Hazard Index
Resident	Recreation	Eastern Pond (Property 39)	Surface Water	Direct Contact (incidental ingestion and dermal contact)	Adult/ Adolescent Child	NC NC	0.0003 0.0009
			Sediment		Adult/ Adolescent Child	NC NC	0.0003 0.000004
			Residence		Property 39	Indoor Air	Inhalation
	Potable Water	Treatment System - Pathway Incomplete		Pathway Incomplete		Pathway Incomplete	
						Child Total:	
					Adult Total:		0.0006
					Receptor Total:	9.00E-10	

**Table 11**  
**Risk Summary Table**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Receptor	Activity	Exposure Point	Exposure Medium	Potential Exposure Route	Age Group	Cancer Risk	Hazard Index
Resident	Recreation	Eastern Pond (Property 40)	Surface Water	Direct Contact (incidental ingestion and dermal contact	Adult/ Adolescent	NC	0.0003
			Sediment		Child	NC	0.0009
					Adult/ Adolescent	NC	0.0003
	Residence	Property 40	Potable Water	Treatment System - Pathway Incomplete	Child	NC	0.000004
					All	Pathway Incomplete	Pathway Incomplete
					Child Total:		0.0009
					Adult Total:		0.0006
					Receptor Total:	NC	

Receptor	Activity	Exposure Point	Exposure Medium	Potential Exposure Route	Age Group	Cancer Risk	Hazard Index
Resident	Residence	Property 37	Indoor Air (Groundwater)	Inhalation	All	9.00E-07	0.003
			Potable Water	Water not impacted, multiple samples		Pathway Incomplete	Pathway Incomplete
Industrial Worker	Work	Property 36	Indoor Air (soil vapor)	Inhalation	Adult	3.00E-08	0.001
			Indoor Air (groundwater)			5.00E-06	0.2
			Potable Water	Water not impacted, multiple samples		Pathway Incomplete	Pathway Incomplete
Industrial Worker	Work	Property 41	Indoor Air	Inhalation (May 2010) Inhalation (February 2011)	Adult	3.00E-06	0.001
			Potable Water	Water not impacted, multiple samples		2.00E-05	0.2
Resident	Residence	Property 15	Indoor Air (Sub-Slab)	Inhalation	All	3.00E-06	1
			Potable Water	Water not impacted and Treatment System - Pathway Incomplete		Pathway Incomplete	Pathway Incomplete
Resident	Residence	Property 16A	Indoor Air (Soil Vapor)	Inhalation	All	1.00E-07	0.005
			Potable Water	Treatment System - Pathway Incomplete		Pathway Incomplete	Pathway Incomplete



**Table 11**  
**Risk Summary Table**


**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Resident	Residence	Property 17	Indoor Air (Soil Vapor)	Inhalation	All	2.00E-08	0.003
			Potable Water	Treatment System - Pathway Incomplete		Pathway Incomplete	Pathway Incomplete
Resident	Residence	Property 18-19	Indoor Air (Soil Vapor)	Inhalation	All	6.00E-06	0.02
			Potable Water	Treatment System - Pathway Incomplete		Pathway Incomplete	Pathway Incomplete
Resident	Residence	Property 20	Indoor Air (Soil Vapor)	Inhalation	All	2.00E-08	0.0009
			Potable Water	Treatment System - Pathway Incomplete		Pathway Incomplete	Pathway Incomplete
Resident	Residence	Property 21	Indoor Air (Soil Vapor)	Inhalation	All	3.00E-08	0.002
			Potable Water	Water not impacted and Treatment System - Pathway Incomplete		Pathway Incomplete	Pathway Incomplete
Resident	Residence	Property 23	Indoor Air (Soil Vapor)	Inhalation	All	4.00E-08	0.003
			Potable Water	Water not impacted and Treatment System - Pathway Incomplete		Pathway Incomplete	Pathway Incomplete
Resident	Residence	Property 8	Indoor Air (Groundwater)	Inhalation	All	NC	0.001
			Potable Water	Treatment System - Pathway Incomplete		Pathway Incomplete	Pathway Incomplete

Prepared by: EYM 8/16/11  
 Checked by: KASK 8/16/11

## **FIGURES**



DRAWN BY	P:\Textron\TFS\	FILE NO.
RLB	Drawings\TFS Topo.dwg	
APPROVED BY		DATE
	AMEC Electronic Signature	08/08/2011
SOURCE	USGS topographic quadrangles of Argos, IN, 1994 and Rochester, IN, 1992.	
PROJECT NO.	SCALE	
3359 09 2469	SEE ABOVE	

**TORX FACILITY  
4366 NORTH OLD US HIGHWAY 31  
ROCHESTER, INDIANA**



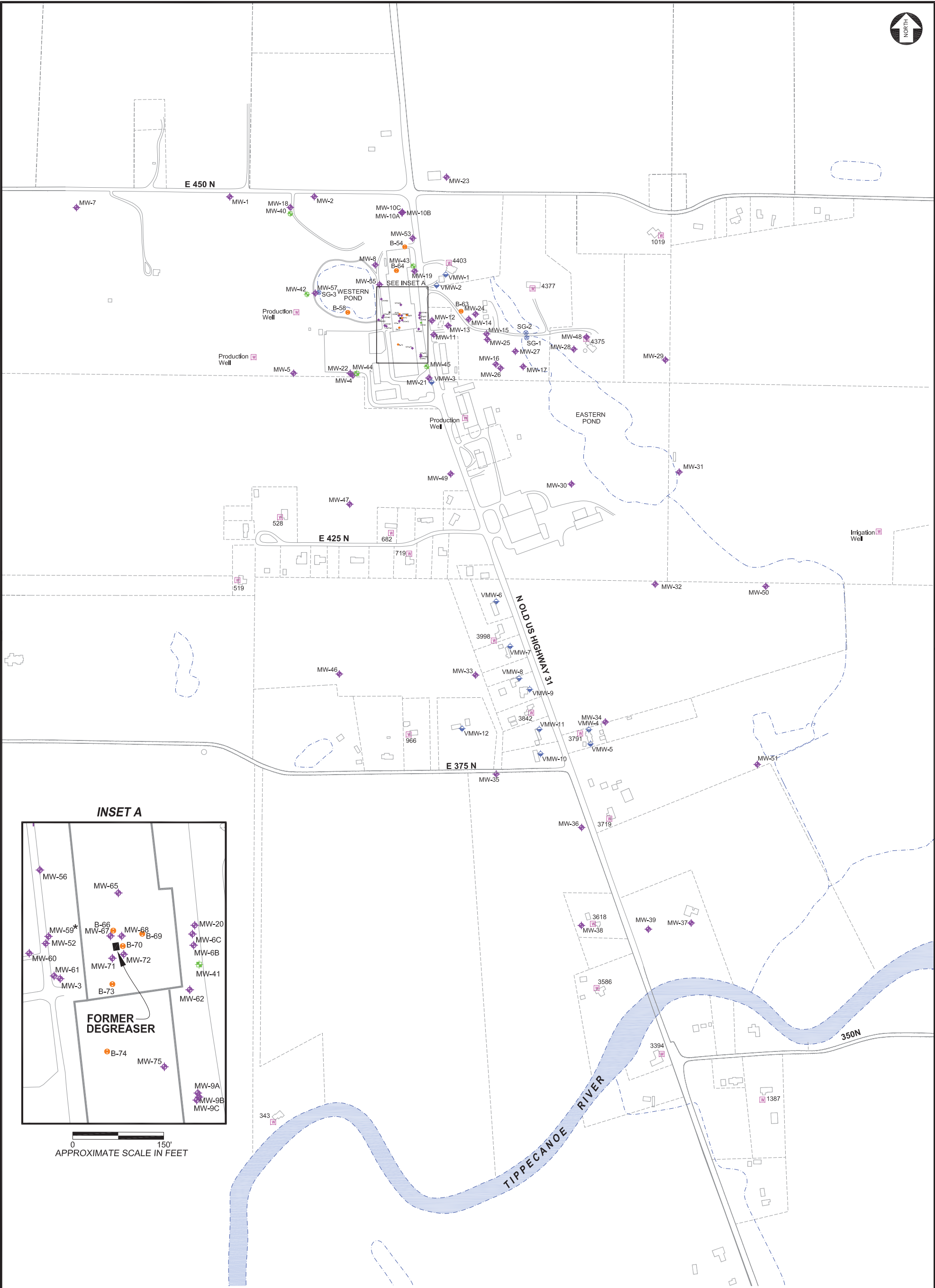
## SITE LOCATION MAP

DRAWING NO.

**1**

SHEET 1 of 1





**LEGEND**

- |       |                                     |       |  |
|-------|-------------------------------------|-------|--|
| B-70  | SOIL BORING LOCATION                | VMW-2 | VAPOR MONITORING WELL LOCATION                                     |
| MW-28 | OVERBURDEN MONITORING WELL LOCATION | SG-1  | STAFF GAGE LOCATION  |
| MW-40 | BEDROCK MONITORING WELL LOCATION    | ---   | APPROXIMATE PROPERTY BOUNDARY (from the Fulton County GIS website) |
| 3618  | POTABLE WATER WELL LOCATION         | *     | WELL CLUSTER WITH SHALLOW OFF-SET WELL                             |

0 600 1200  
APPROXIMATE SCALE IN FEET

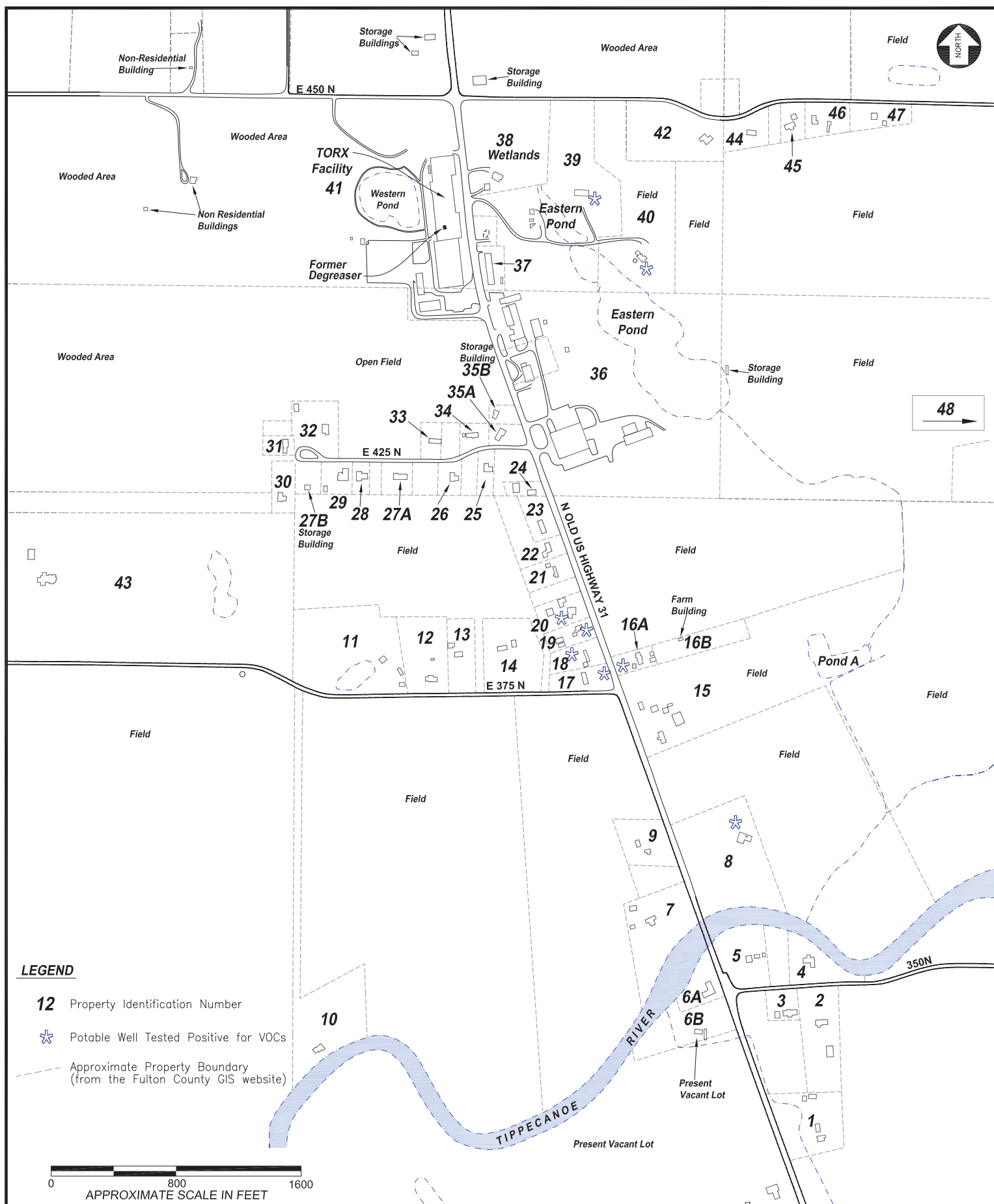
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RLB TFS Site Plan 2010 11x17.dwg  
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08/08/2011  
SOURCE Wells surveyed by Territorial Engineering,  
2009 & 2010; Fulton County, IN GIS, 2005.  
PROJECT NO. SCALE  
3359 09 2469 SEE ABOVE

**TORX FACILITY**  
**4366 NORTH OLD US HIGHWAY 31**  
**ROCHESTER, INDIANA**

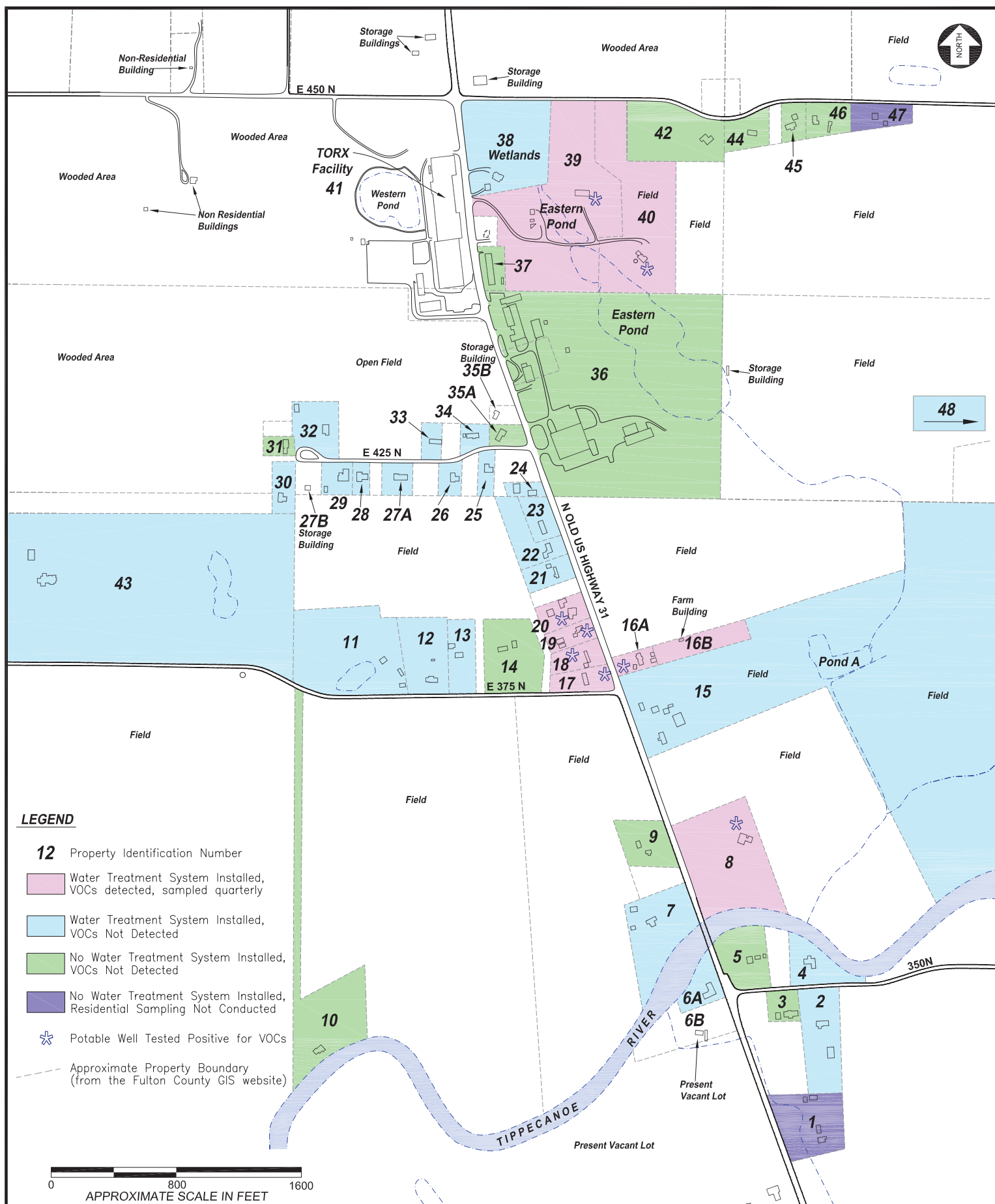


**SITE PLAN**

DRAWING NO.  
**2**  
SHEET 1 of 1







DRAWN BY RLB  
 APPROVED BY [Signature]  
 SOURCE Wells surveyed by Territorial Engineering, 2009; Fulton County, IN GIS, 2005.  
 PROJECT NO. 3359 09 2469  
 FILE NO. P:\Textron\TFS Drawings\WTS Systems.dwg  
 DATE 08/08/2011  
 SCALE SEE ABOVE

**TORX FACILITY**  
**4366 NORTH OLD US HIGHWAY 31**  
**ROCHESTER, INDIANA**



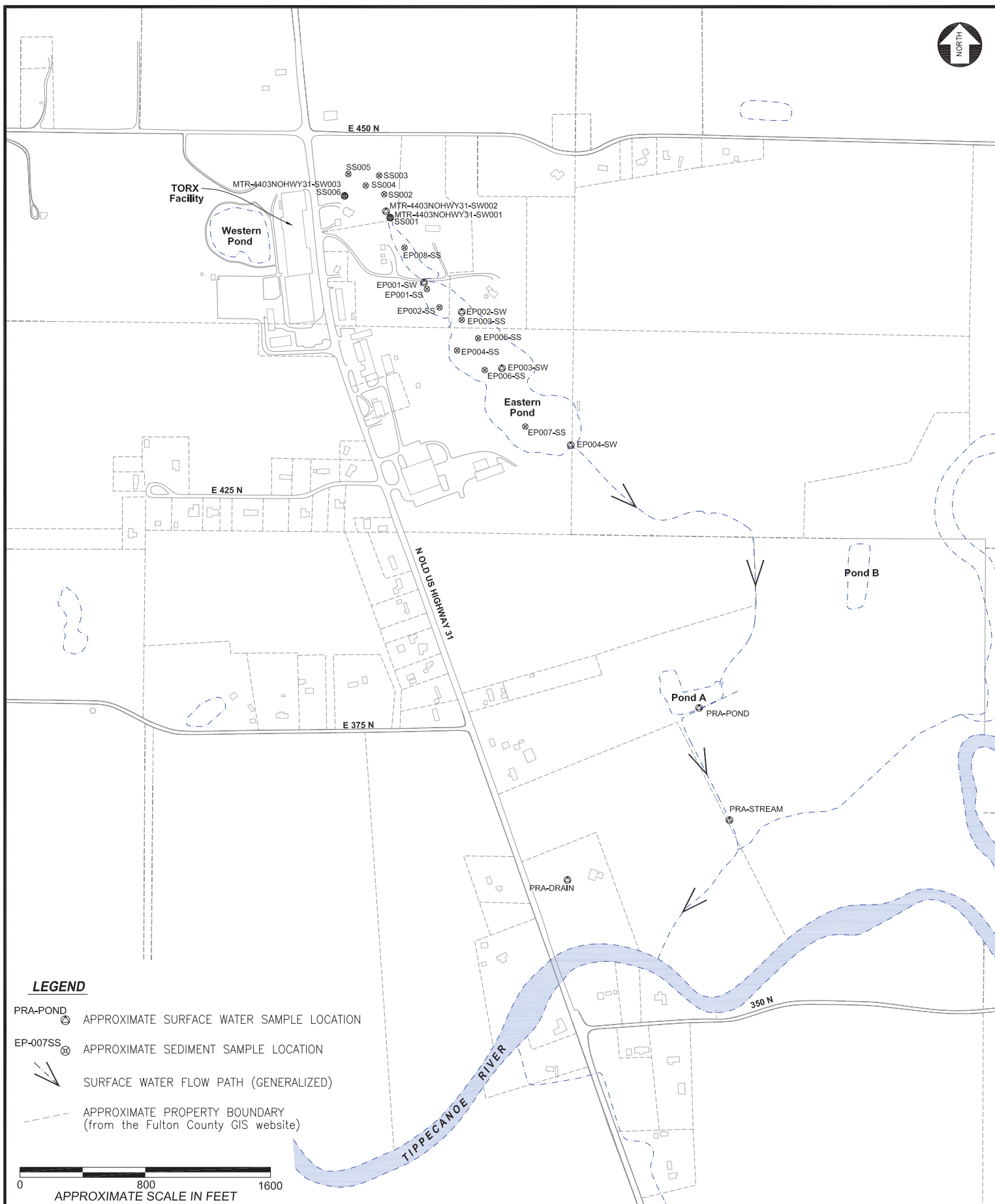
**LOCATIONS OF PROPERTIES**  
**THAT HAVE HAD POTABLE**  
**WATER TREATMENT**  
**SYSTEMS INSTALLED**

DRAWING NO. **5**  
 SHEET 1 of 1









#### LEGEND

- PRA-POND ○ APPROXIMATE SURFACE WATER SAMPLE LOCATION
- EP-007SS ○ APPROXIMATE SEDIMENT SAMPLE LOCATION
- > SURFACE WATER FLOW PATH (GENERALIZED)
- APPROXIMATE PROPERTY BOUNDARY (from the Fulton County GIS website)

0 800 1600  
APPROXIMATE SCALE IN FEET

DRAWN BY P:\Texttron\TFS\ FILE NO.  
RLB Drawings\TFS Risk Asmnt.dwg  
APPROVED BY DATE  
08/08/2011  
SOURCE Wells surveyed by Territorial Engineering,  
2009; Fulton County, IN GIS, 2005.  
PROJECT NO. SCALE  
3359 09 2469 SEE ABOVE

**TORX FACILITY**  
**4366 NORTH OLD US HIGHWAY 31**  
**ROCHESTER, INDIANA**

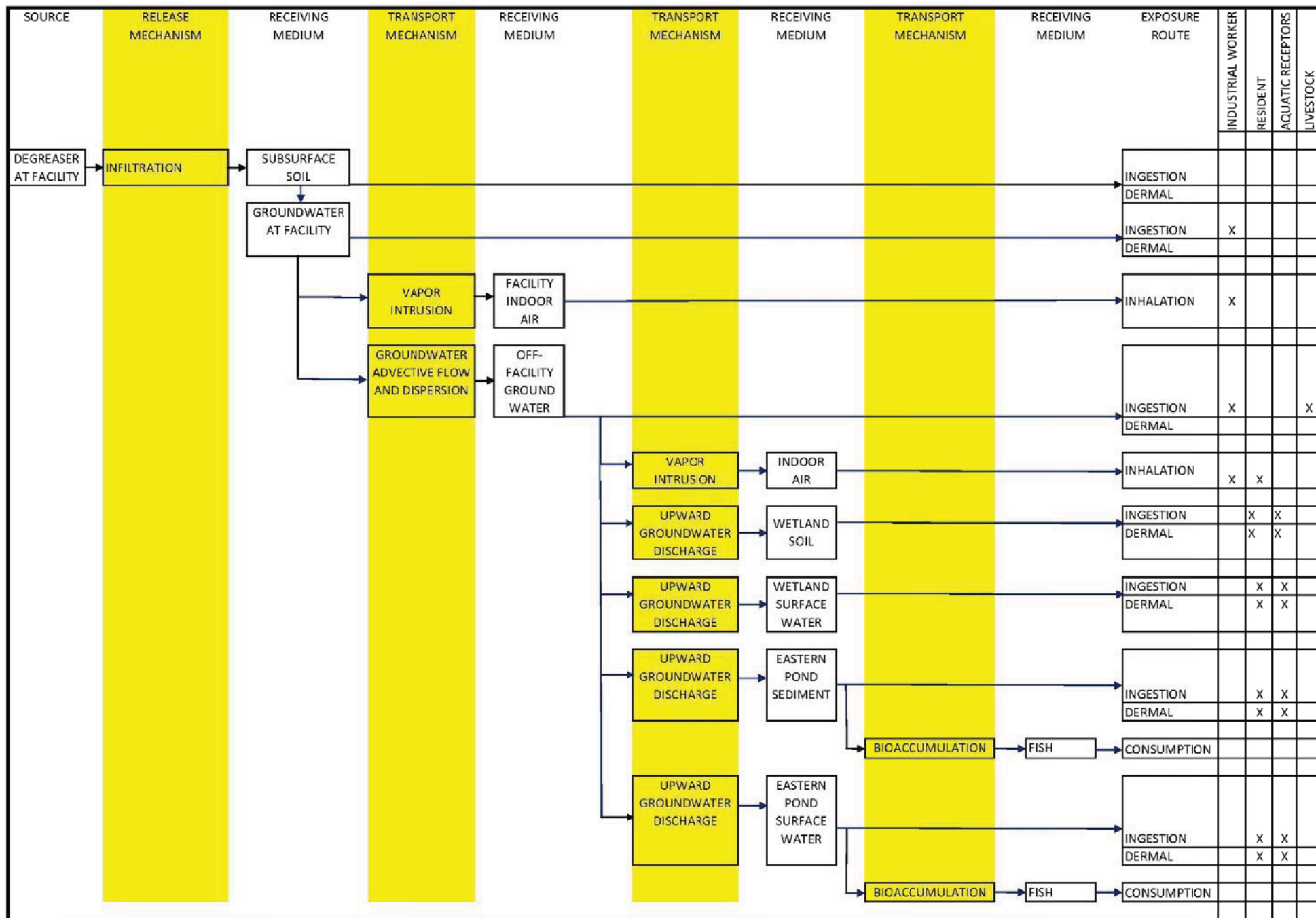


**SURFACE WATER AND**  
**SEDIMENT SAMPLE**  
**LOCATIONS**

DRAWING NO.

**7**

SHEET 1 of 1



DRAWN BY  
MJM 2/8/11  
CHECKED BY  
CMR 2/10/11  
SOURCE

P:\Textron\TFS\ FILE NO.  
Drawings\WTS Sampling.dwg  
DATE  
08/08/2011

PROJECT NO.  
3359 09 2469

SCALE  
SEE ABOVE

**TORX FACILITY**  
4366 NORTH OLD US HIGHWAY 31  
ROCHESTER, INDIANA



CONCEPTUAL SITE MODEL

DRAWING NO.  
**8**  
SHEET 1 of 1

**APPENDIX A**  
**RISK ASSESSMENT SUPPORTING DOCUMENTATION**

## LIST OF APPENDIX A TABLES

### Table No.

A-1	Property Designations
A-2	Samples Considered in the Risk Assessment
A-3	Groundwater Monitoring Well and Private Well Data Used as Input in Vapor Intrusion Modeling
A-4	Private Well Analytical Data
A-5	Analytical Data for Potable Water Samples – Property 36
A-6	Summary of Potable Water Analytical Data – Industrial facility at Property 41
A-7	Drinking Water Analytical Data – Residential Properties with Operating Water Treatment Systems
A-8A	Comprehensive Summary of Volatile Organic Compounds Detected in the Soil Gas Collected from the Vapor Monitoring Wells
A-8B	Comprehensive Summary of Volatile Organic Compounds Detected in the Soil Gas Collected from Property 16A in December 2010
A-9	February 2010 Indoor Air and Soil Gas Sampling Results – Property 15
A-10	May 2010 Indoor Air Sampling Results – Property 41 (TORX Facility)
A-11	February 2011 Indoor Air Sampling Results – Property 41 (TORX Facility)
A-12	April 2009 Surface Water Analytical Results – Eastern Pond
A-13	January 2009 Surface Water Analytical Results – Properties 15 and 8
A-14	April 2009 Sediment Analytical Results – Eastern Pond
A-15	May/June 2009 Surface Water Analytical Results – Property 38
A-16	June 2009 Sediment Analytical Results – Property 38

**Table A-1**  
**Property Designations**

**Human Health Risk Assessment**  
**TORX Facility**  
**Rochester, Indiana**

Map ID No.	Street No.	Street Name
1	3219	N Old US Hwy 31
2	1387	E 350 N
3	1311	E 350 N
4	1362	E 350 N
5	1302	E 350 N
6A	3394	N Old US Hwy 31
6B	Parcel was vacant	Parcel was vacant
7	3586	N Old US Hwy 31
8	3597	N Old US Hwy 31
9	3618	N Old US Hwy 31
10	343	E 375 N
11	908	E 375 N
12	948	E 375 N
13	966	E 375 N
14	972	E 375 N
15	3719	N Old US Hwy 31
16A	3791	N Old US Hwy 31
16B	Barn / Out-Building	Barn / Out-Building
17	1082	E 375 N
18	3796	N Old US Hwy 31
19	3842	N Old US Hwy 31
20	3868	N Old US Hwy 31
21	3980	N Old US Hwy 31
22	3998	N Old US Hwy 31
23	4008	N Old US Hwy 31
24	4016	N Old US Hwy 31
25	781	E 425 N
26	719	E 425 N
27A	581	E 425 N
27B	Barn / Out-Building	Barn / Out-Building
28	557	E 425 N
29	537	E 425 N
30	519	E 425 N
31	501	E 425 N
32	528	E 425 N
33	682	E 425 N
34	750	E 425 N
35A	782	E 425 N
35B	Garage / Out-Building	Garage / Out-Building
36	4079	N Old US Hwy 31
37	4163	N Old US Hwy 31
38	4403	N Old US Hwy 31
39	4377	N Old US Hwy 31
40	4375	N Old US Hwy 31
41	4327/4366	N Old US Hwy 31
42	1019	E 450 N
43	72	E 375 N
44	1049	E 450 N
45	1125	E 450 N
46	1195	E 450 N
47	1275	E 450 N
48	1995	E 450 N

Prepared by / Date: WDG 03/01/11  
Checked by / Date: MMM 03/01/11

Table A-2  
Samples Considered in the Risk Assessment  
TORX Facility  
Rochester, Indiana

Field sample ID	Sample Date	QC Code	Medium
MTR-3719NHWWY31-AA020910	09-Feb-10	FS	AIR
MTR-3719NHWWY31-IA020910-#1	09-Feb-10	FS	AIR
MTR-3719NHWWY31-IA020910-#1R	09-Feb-10	FD	AIR
MTR-3719NHWWY31-IA020910-#2	09-Feb-10	FS	AIR
MTR-3719NHWWY31-P1-V020910	09-Feb-10	FS	AIR
MTR-3719NHWWY31-P2-V020910	09-Feb-10	FS	AIR
MTR-4366NHWWY31-IA020911-1	09-Feb-11	FS	AIR
MTR-4366NHWWY31-IA020911-2	09-Feb-11	FS	AIR
MTR-4366NHWWY31-IA020911-3	09-Feb-11	FS	AIR
MTR-4366NHWWY31-IA020911-4	09-Feb-11	FS	AIR
MTR-4366NHWWY31-IA020911-5	09-Feb-11	FS	AIR
MTR-4366NHWWY31-IA020911-6	09-Feb-11	FS	AIR
MTR-4366NHWWY31-IA020911-7	09-Feb-11	FS	AIR
MTR-4366NHWWY31-AA020911	09-Feb-11	FS	AIR
MTR-4366NHWWY31-IA051210-1	12-May-10	FS	AIR
MTR-4366NHWWY31-IA051210-2	12-May-10	FS	AIR
MTR-4366NHWWY31-IA051210-3	12-May-10	FS	AIR
MTR-4366NHWWY31-IA051210-4	12-May-10	FS	AIR
MTR-4366NHWWY31-IA051210-5	12-May-10	FS	AIR
MTR-4366NHWWY31-IA051210-6	12-May-10	FS	AIR
MTR-4366NHWWY31-IA051210-7	12-May-10	FS	AIR
MTR-4366NHWWY31-IA051210-7R	12-May-10	FS	AIR
MTR-4366NHYY31-AA051210	12-May-10	FS	AIR
MTR-VMW1-V19.0-19.5	18-Dec-08	FS	AIR
MTR-VMW1-V24.5-25.0	18-Dec-08	FS	AIR
MTR-VMW2-V4.5-5.0	18-Dec-08	FS	AIR
MTR-VMW2-V14.5-15.0	18-Dec-08	FS	AIR
MTR-VMW2-V23.5-24.0	18-Dec-08	FS	AIR
MTR-VMW3-V4.5-5.0	19-Dec-08	FS	AIR
MTR-VMW3-V4.5-5.0	23-Dec-08	FS	AIR
MTR-VMW3-V14.5-15.0	19-Dec-08	FS	AIR
MTR-VMW3-V14.5-15.0	23-Dec-08	FS	AIR
MTR-VMW3-V23.5-24.0	19-Dec-08	FS	AIR
MTR-VMW3-V23.5-24.0	23-Dec-08	FS	AIR
MTR-VMW4-V7.0-7.5	22-Dec-08	FS	AIR
MTR-VMW4-V13.5-14.0	22-Dec-08	FS	AIR
MTR-VMW5-V7.0-7.5	22-Dec-08	FS	AIR
MTR-VMW5-V13.5-14.0	22-Dec-08	FS	AIR
MTR-VMW6-V9.0-9.5	22-Dec-08	FS	AIR
MTR-VMW7-V4.5-5.0	22-Dec-08	FS	AIR
MTR-VMW8-V4.5-5.0	22-Dec-08	FS	AIR
MTR-VMW9-V4.5-5.0	22-Dec-08	FS	AIR
MTR-VMW10-V4.5-5.0	22-Dec-08	FS	AIR
MTR-VMW10-V10.0-10.5	22-Dec-08	FS	AIR
MTR-VMW12-V10.0-10.5	22-Dec-08	FS	AIR
MTR-VMW12-V14.5-15.0	22-Dec-08	FS	AIR

Table A-2  
Samples Considered in the Risk Assessment  
TORX Facility  
Rochester, Indiana

Field sample ID	Sample Date	QC Code	Medium
MTR-VMW4-V7.0-7.5	16-Dec-10	FS	AIR
MTR-VMW4-V13.5-14.0	16-Dec-10	FS	AIR
MTR-VMW4-V13.5-14.0	16-Dec-10	FS	AIR
MTR-VMW5-V7.0-7.5	16-Dec-10	FS	AIR
MTR-VMW5-V13.5-14.0	16-Dec-10	FS	AIR
3868NHWWY31-RAW-1210	14-Dec-10	FS	GW
3791NHWWY31-RAW-1210	14-Dec-10	FS	GW
3791NHWWY31-RAW-1210R	14-Dec-10	FD	GW
3796NHWWY31-RAW-1210	14-Dec-10	FS	GW
3842NHWWY31-RAW-1210	14-Dec-10	FS	GW
3842NHWWY31-RAW-1210R	14-Dec-10	FD	GW
3791NHWWY31-RAW-0910R	16-Sep-10	FD	GW
3796NHWWY31-RAW-0910	16-Sep-10	FS	GW
3842NHWWY31-RAW-0910	16-Sep-10	FS	GW
3868NHWWY31-RAW-0910	16-Sep-10	FS	GW
1082E375N-RAW-0910	16-Sep-10	FS	GW
3597NHWWY31-RAW-1910	16-Sep-10	FS	GW
4163NHWWY31-SPIG-0610	03-Jun-10	FS	GW
3791NHWWY31-RAW-0910	16-Sep-10	FS	GW
MTR-MW24(55.4)-G121410	14-Dec-10	FS	GW
MTR-MW24(55.4)-G121410R	14-Dec-10	FD	GW
MTR-MW30(41.1)-G121410	14-Dec-10	FS	GW
1082E375N-RAW-1209	11-Dec-09	FS	GW
3597NHWWY31-RAW-1209	08-Dec-09	FS	GW
3842NHWWY31-RAW-1209	08-Dec-09	FS	GW
3791NHWWY31-RAW-1209	08-Dec-09	FS	GW
3791NHWWY31-RAW-1209 R	08-Dec-09	FD	GW
3796NHWWY31-RAW-1209	08-Dec-09	FS	GW
3791 N Hwy 31 - Raw - 1109	17-Nov-09	FS	GW
3791 N Hwy 31 - Raw - 1109R	17-Nov-09	FD	GW
3796NHWWY31-RAW-0909	10-Sep-09	FS	GW
3796NHWWY31-RAW-0909R	10-Sep-09	FD	GW
1082E375N-RAW-0909	10-Sep-09	FS	GW
3791NHWWY31-RAW-1009	06-Oct-09	FS	GW
MTR-MW26(17.5)-G090209	02-Sep-09	FS	GW
MTR-4375NOHWY31-G090309	03-Sep-09	FS	GW
MTR-4375NOHWY31-G090309R	03-Sep-09	FD	GW
3791 N Hwy31-RAW-0809	31-Aug-09	FS	GW
3842NHWWY31-RAW-0909	10-Sep-09	FS	GW
3791NHWWY31-RAW-0909	10-Sep-09	FS	GW
3791NHWWY31-RAW-0909R	10-Sep-09	FD	GW
3597NHWWY31-RAW-0909	10-Sep-09	FS	GW
3868NHWWY31-RAW-0909	10-Sep-09	FS	GW
MTR-5010N250E-DW100609	06-Oct-09	FS	GW
MTR-2241E450N-DW100609	06-Oct-09	FS	GW
MTR-2241E450N-DW100609R	06-Oct-09	FD	GW

Table A-2  
Samples Considered in the Risk Assessment  
TORX Facility  
Rochester, Indiana

Field sample ID	Sample Date	QC Code	Medium
MTR-1999E450N-DW100609A	06-Oct-09	FS	GW
MTR-1999E450N-DW100609B	06-Oct-09	FS	GW
MTR-1049E450N-DW100609	06-Oct-09	FS	GW
MTR-1125E450N-DW100609	06-Oct-09	FS	GW
MTR-1195E450N-DW100609	06-Oct-09	FS	GW
3791 N Hwy 31-RAW-0809R	31-Aug-09	FD	GW
MTR-MW24(122.6)-G090109	01-Sep-09	FS	GW
MTR-MW24(159.4)-G090209	02-Sep-09	FS	GW
MTR-MW24(24.9)-G090109	01-Sep-09	FS	GW
MTR-MW24(55.4)-G090209	02-Sep-09	FS	GW
MTR-MW24(55.4)-G090209R	02-Sep-09	FD	GW
MTR-MW30(120.2)-G090109	01-Sep-09	FS	GW
MTR-MW30(148)-G090109	01-Sep-09	FS	GW
MTR-MW30(41.1)-G090109	01-Sep-09	FS	GW
NEL-RAW-0209	03-Feb-09	FS	GW
NOR-RAW-0209	11-Feb-09	FS	GW
NEWLIN60E375N021109	11-Feb-09	FS	GW
Burkette4909NOldUS31020309	03-Feb-09	FS	GW
Burkette4909NOldUS31D	03-Feb-09	FD	GW
1 Anderson 120E450N020309	03-Feb-09	FS	GW
2 Anderson 120E450N020309	03-Feb-09	FS	GW
DRE1910NOld31020309	03-Feb-09	FS	GW
MILLER-RAW-0309	19-Mar-09	FS	GW
MIL-RAW-0309	19-Mar-09	FS	GW
CHR-RAW-0209	11-Feb-09	FS	GW
NORMAN-RAW-0309	19-Mar-09	FS	GW
NOR-RAW-0309	19-Mar-09	FS	GW
PRA-RAW-0309	19-Mar-09	FS	GW
PRATT-RAW-0309	19-Mar-09	FS	GW
TOWNE-RAW-0309	19-Mar-09	FS	GW
TOW-RAW-0309	19-Mar-09	FS	GW
TOW-RAW-0309-R	19-Mar-09	FD	GW
Talbot1995E450N021109	11-Feb-09	FS	GW
Raw-3791 N Old US 31	20-May-09	FS	GW
Raw-3791 N Old US 31 R	20-May-09	FD	GW
3842 N Hwy 31-RAW-0609	02-Jun-09	FS	GW
3868 N Hwy 31-RAW-0609	02-Jun-09	FS	GW
MTR-1019 E450N-DW060209	02-Jun-09	FS	GW
MTR-1302E350N-DW052609	26-May-09	FS	GW
MTR-1302E350N-DW052609R	26-May-09	FD	GW
MTR-343 E375N-DW052709	27-May-09	FS	GW
MTR-4016NOHWY31-DW062409	24-Jun-09	FS	GW
MTR-4016NOHWY31-DW062409R	24-Jun-09	FD	GW
1082 E375N-RAW-0609	02-Jun-09	FS	GW
3597 N Hwy 31-RAW-0609	02-Jun-09	FS	GW
3791 N Hwy 31-RAW-0609	02-Jun-09	FS	GW



Table A-2  
Samples Considered in the Risk Assessment  
TORX Facility  
Rochester, Indiana

Field sample ID	Sample Date	QC Code	Medium
3791 N Hwy 31-RAW-0609R	02-Jun-09	FD	GW
3796 N Hwy 31-RAW-0609	02-Jun-09	FS	GW
MTR-MW30(120.2)-G050709	07-May-09	FS	GW
MTR-MW30(148)-G050709	07-May-09	FS	GW
MTR-MW30(41.1)-G050709	07-May-09	FS	GW
MTR-MW24(122.6)-G051409	14-May-09	FS	GW
MTR-MW24(159.4)-G051409	14-May-09	FS	GW
MTR-MW24(24.9)-G051409	14-May-09	FS	GW
MTR-MW24(55.4)-G051409	14-May-09	FS	GW
MTR-MW24(55.4)-G051409R	14-May-09	FS	GW
Payne-Well - 0409	29-Apr-09	FS	GW
Payne-Well - 0409R	29-Apr-09	FD	GW
Correll-Well - 0409	29-Apr-09	FS	GW
MTR-4377NOHWY31-G121010	10-Dec-10	FS	GW
MTR-4377NOHWY31-G121510	15-Dec-10	FS	GW
3597NHWWY31-RAW-1210	14-Dec-10	FS	GW
3791NHWWY31-RAW-0709	23-Jul-09	FS	GW
3791NHWWY31-RAW-0709R	23-Jul-09	FD	GW
MTR-MW11-G121310	13-Dec-10	FS	GW
1082E375N-RAW-1210	14-Dec-10	FS	GW
MTR-MW11-G081210	12-Aug-10	FS	GW
MTR-MW24(55.4)-G080910	09-Aug-10	FS	GW
MTR-MW24(55.4)-G080910R	09-Aug-10	FD	GW
MTR-MW30(41.1)-G080910	09-Aug-10	FS	GW
3868NHWWY-RAW-0610	03-Jun-10	FS	GW
3597NHWWY31-RAW-0610	30-Jun-10	FS	GW
3597NHWWY31-RAW-0610R	30-Jun-10	FD	GW
3842NHWWY31-RAW-0610	30-Jun-10	FS	GW
3868NHWWY31-RAW-0310	13-Mar-10	FS	GW
3597NHWWY-RAW-0610	03-Jun-10	FS	GW
3791NHWWY-RAW-0610	03-Jun-10	FS	GW
3791NHWWY-RAW-0610R	03-Jun-10	FD	GW
3796NHWWY-RAW-0610	03-Jun-10	FS	GW
1082E375N-RAW-0610	03-Jun-10	FS	GW
MTR-3618NOHWY31-DW051110	11-May-10	FS	GW
MTR-4217NOHWY31-DW051110	11-May-10	FS	GW
MTR-501E425N-DW051110	11-May-10	FS	GW
MTR-782E425N-DW051110	11-May-10	FS	GW
MTR-782E425N-DW051110R	11-May-10	FD	GW
MTR-MW11-G041910	19-Apr-10	FS	GW
MTR-MW24(122.6)-G041410	14-Apr-10	FS	GW
MTR-MW24(159.4)-G041410	14-Apr-10	FS	GW
MTR-MW24(24.9)-G041410	14-Apr-10	FS	GW
MTR-MW24(55.4)-G041410	14-Apr-10	FS	GW
MTR-MW24(55.4)-G041410R	14-Apr-10	FD	GW
MTR-MW30(120.2)-G041410	14-Apr-10	FS	GW

Table A-2  
Samples Considered in the Risk Assessment  
TORX Facility  
Rochester, Indiana

Field sample ID	Sample Date	QC Code	Medium
MTR-MW30(148)-G041310	13-Apr-10	FS	GW
MTR-MW30(41.1)-G041410	14-Apr-10	FS	GW
1019 E 450 N	19-Nov-08	FS	GW
MTR-MW11-G120709	07-Dec-09	FS	GW
MTR-MW24(122.6)-G120809	08-Dec-09	FS	GW
MTR-MW24(159.4)-G120809	08-Dec-09	FS	GW
MTR-MW24(24.9)-G120809	08-Dec-09	FS	GW
MTR-MW24(55.4)-G120809	08-Dec-09	FS	GW
MTR-MW24(55.4)-G120809R	08-Dec-09	FD	GW
MTR-MW30(120.2)-G120809	08-Dec-09	FS	GW
MTR-MW30(148)-G120809	08-Dec-09	FS	GW
MTR-MW30(41.1)-G120809	08-Dec-09	FS	GW
PRA-Drain-0109	07-Jan-09	FS	SW
MTR-4163NOHWY31-DW112009	20-Nov-09	FS	GW
3868NHWY31-RAW-0110	13-Jan-10	FS	GW
3791NHWY31-RAW-0110	13-Jan-10	FS	GW
3791NHWY31-RAW-0110R	13-Jan-10	FD	GW
3597 N Old SR 31-pre	19-Nov-08	FS	GW
3719 N Old SR 31	19-Nov-08	FS	GW
3791 N Old SR 31-pre	19-Nov-08	FS	GW
3842 N Old SR 31-pre	19-Nov-08	FS	GW
3884 N Old SR 31	19-Nov-08	FS	GW
3998 N Old SR 31	19-Nov-08	FS	GW
4008 N Old SR 31	19-Nov-08	FS	GW
4008 N Old SR 31 DUP	19-Nov-08	FD	GW
4016 N Old SR 31	19-Nov-08	FS	GW
416 N Old SR 31	18-Nov-08	FS	GW
4217 N Old SR 31	19-Nov-08	FS	GW
4375 N Old SR 31-pre	18-Nov-08	FS	GW
4377 N Old SR 31-pre	18-Nov-08	FS	GW
4377 N Old SR 31-pre DUP	18-Nov-08	FD	GW
4403 N Old SR 31-pre	18-Nov-08	FS	GW
501 E 425 N	19-Nov-08	FS	GW
518 N Old SR 31	18-Nov-08	FS	GW
519 E 425 N	19-Nov-08	FS	GW
528 E 425 N	19-Nov-08	FS	GW
537 E 425 N	19-Nov-08	FS	GW
557 E 425 N	19-Nov-08	FS	GW
682 E 425 N	18-Nov-08	FS	GW
719 E 425 N	18-Nov-08	FS	GW
750 E 425 N	18-Nov-08	FS	GW
781 E 425 N	18-Nov-08	FS	GW
782 E 425 N	18-Nov-08	FS	GW
3796NHWY31-RAW-0310	10-Mar-10	FS	GW
3796NHWY31-RAW-0310R	10-Mar-10	FD	GW
3842NHWY31-RAW-0310	09-Mar-10	FS	GW

Table A-2  
Samples Considered in the Risk Assessment  
TORX Facility  
Rochester, Indiana

Field sample ID	Sample Date	QC Code	Medium
1082E375N-RAW-0310	09-Mar-10	FS	GW
3597NHWY31-RAW-0310	09-Mar-10	FS	GW
3791NHWY31-RAW-0310	10-Mar-10	FS	GW
3791NHWY31-RAW-0310R	10-Mar-10	FD	GW
4403NHWY31-RAW-0410	14-Apr-10	FS	GW
4403NHWY31-SPIG-0410	14-Apr-10	FS	GW-F
4403NHWY31-TRT-0410	14-Apr-10	FS	GW-F
519E425N-TRT-0310	29-Mar-10	FS	GW-F
528E425N-TRT-0310	29-Mar-10	FS	GW-F
537E425N-TRT-0310	29-Mar-10	FS	GW-F
557E425N-TRT-0310	30-Mar-10	FS	GW-F
581E425N-TRT-0310	30-Mar-10	FS	GW-F
581E425N-TRT-0310R	30-Mar-10	FD	GW-F
682E425N-TRT-0310	31-Mar-10	FS	GW-F
719E425N-TRT-0310	29-Mar-10	FS	GW-F
72E 375N-TRT-0310	31-Mar-10	FS	GW-F
72E 375N-TRT-0310R	31-Mar-10	FD	GW-F
750E425N-TRT-0310	29-Mar-10	FS	GW-F
781E425N-TRT-0310	30-Mar-10	FS	GW-F
948E375N-TRT-0310	30-Mar-10	FS	GW-F
966E375N-TRT-0310	29-Mar-10	FS	GW-F
3791NHWY31-TRT-0310	10-Mar-10	FS	GW-F
3597NHWY31-TRT-0310	09-Mar-10	FS	GW-F
1082E375N-TRT-0310	09-Mar-10	FS	GW-F
3842NHWY31-TRT-0310	09-Mar-10	FS	GW-F
3796NHWY31-TRT-0310	10-Mar-10	FS	GW-F
3791NHWY31-TRT-0110	13-Jan-10	FS	GW-F
3868NHWY31-TRT-0110	13-Jan-10	FS	GW-F
1362E350N-TRT-0410	05-Apr-10	FS	GW-F
1387E350N-TRT-0301	29-Mar-10	FS	GW-F
1995E450N-TRT-0310	30-Mar-10	FS	GW-F
3586NHWY31-TRT-0410	14-Apr-10	FS	GW-F
3719NHWY31-TRT-0410	08-Apr-10	FS	GW-F
3719NHWY31-TRT-0410R	08-Apr-10	FD	GW-F
3980NHwy31-TRT-0310	29-Mar-10	FS	GW-F
3998NHWY31-TRT-0310	30-Mar-10	FS	GW-F
4008NHWY31-TRT-0310	30-Mar-10	FS	GW-F
4016NHwy31-TRT-0310	29-Mar-10	FS	GW-F
1082E375N-TRT-0610	03-Jun-10	FS	GW-F
3796NHWY-TRT-0610	03-Jun-10	FS	GW-F
3791NHWY-TRT-0610	03-Jun-10	FS	GW-F
3868NHWY31-TRT-0310	13-Mar-10	FS	GW-F
3842NHWY31-TRT-0610	30-Jun-10	FS	GW-F
3597NHWY31-TRT-0610	30-Jun-10	FS	GW-F
3868NHWY-TRT-0610	03-Jun-10	FS	GW-F
3597NHWY-FNL-0610	03-Jun-10	FS	GW-F

Table A-2  
Samples Considered in the Risk Assessment  
TORX Facility  
Rochester, Indiana

Field sample ID	Sample Date	QC Code	Medium
3394NHWY31-TRT-0610	30-Jun-10	FS	GW-F
1082E375N-TRT-1210	14-Dec-10	FS	GW-F
3791NHWY31-TRT-0709	23-Jul-09	FS	GW-F
3796 N Hwy 31-TRT-0609	02-Jun-09	FS	GW-F
3791 N Hwy 31-TRT-0609	02-Jun-09	FS	GW-F
3597 N Hwy 31-TRT-0609	02-Jun-09	FS	GW-F
1082 E375N-TRT-0609	02-Jun-09	FS	GW-F
3868 N Hwy 31-TRT-0609	02-Jun-09	FS	GW-F
3842 N Hwy 31-TRT-0609	02-Jun-09	FS	GW-F
TRT-3791 N Old US 31	20-May-09	FS	GW-F
TOW-TRT-0309	19-Mar-09	FS	GW-F
TOWNE-FINAL-0309	19-Mar-09	FS	GW-F
PRA-TRT-0309	19-Mar-09	FS	GW-F
PRATT-FINAL-0309	19-Mar-09	FS	GW-F
NOR-TRT-0309	19-Mar-09	FS	GW-F
CHR-TRT-0209	11-Feb-09	FS	GW-F
MIL-TRT-0309	19-Mar-09	FS	GW-F
NORMAN-FINAL-0309	19-Mar-09	FS	GW-F
NOR-TRT-0209	11-Feb-09	FS	GW-F
NEL-FNL-0209	03-Feb-09	FS	GW-F
NOR-FNC-0209	11-Feb-09	FS	GW-F
NEL-TRT-0209	03-Feb-09	FS	GW-F
CHR-FNL-0209	11-Feb-09	FS	GW-F
CHR-FNL-0209R	11-Feb-09	FD	GW-F
MILLER-FINAL-0309	19-Mar-09	FS	GW-F
3791 N Hwy 31-TRT-0809	31-Aug-09	FS	GW-F
3597NHWY31-TRT-0909	10-Sep-09	FS	GW-F
3842NHWY31-TRT-0909	10-Sep-09	FS	GW-F
3791NHWY31-FNL-0909	10-Sep-09	FS	GW-F
3791NHWY31-FNL-1210	14-Dec-10	FS	GW-F
3791NHWY31-TRT-1009	06-Oct-09	FS	GW-F
1082E375N-TRT-0909	10-Sep-09	FS	GW-F
3796NHWY31-TRT-0909	10-Sep-09	FS	GW-F
3868NHWY31-FNL-0909	10-Sep-09	FS	GW-F
3791 N Hwy 31 - TRT - 1109	17-Nov-09	FS	GW-F
3796NHWY31-TRT-1209	08-Dec-09	FS	GW-F
3842NHWY31-TRT-1209	08-Dec-09	FS	GW-F
3791NHWY31-FNL-1209	08-Dec-09	FS	GW-F
3597NHWY31-TRT-1209	08-Dec-09	FS	GW-F
1082E375N-TRT-1209	11-Dec-09	FS	GW-F
3597NHWY31-TRT-0910	16-Sep-10	FS	GW-F
1082E375N-TRT-0910	16-Sep-10	FS	GW-F
3868NHWY31-TRT-0910	16-Sep-10	FS	GW-F
3842NHWY31-TRT-0910	16-Sep-10	FS	GW-F
3796NHWY31-TRT-0910	16-Sep-10	FS	GW-F
3791NHWY31-TRT-0910	16-Sep-10	FS	GW-F

Table A-2  
Samples Considered in the Risk Assessment  
TORX Facility  
Rochester, Indiana

Field sample ID	Sample Date	QC Code	Medium
3842NHWWY31-TRT-1210	14-Dec-10	FS	GW-F
3796NHWWY31-TRT-1210	14-Dec-10	FS	GW-F
3791NHWWY31-TRT-1210	14-Dec-10	FS	GW-F
3868NHWWY31-TRT-1210	14-Dec-10	FS	GW-F
3791NHWWY31-TRT-1209	08-Dec-09	FS	GW-S
3791NHWWY31-TRT-0909	10-Sep-09	FS	GW-S
3868NHWWY31-TRT-0909	10-Sep-09	FS	GW-S
3597NHWWY31-TRT-1210	14-Dec-10	FS	GW-S
3597NHWWY-TRT-0610	03-Jun-10	FS	GW-S
MTR-4403NOHWY31-SS001(0.5-1.0)-062409	24-Jun-09	FS	SED
MTR-4403NOHWY31-SS001(1.0-1.5)-062409	24-Jun-09	FS	SED
MTR-4403NOHWY31-SS002(0.5-1.0)-062409	24-Jun-09	FS	SED
MTR-4403NOHWY31-SS002(1.0-1.5)-062409	24-Jun-09	FS	SED
MTR-4403NOHWY31-SS003(0.5-1.0)-062409	24-Jun-09	FS	SED
MTR-4403NOHWY31-SS003(1.0-1.5)-062409	24-Jun-09	FS	SED
MTR-4403NOHWY31-SS004(0.5-1.0)-062409	24-Jun-09	FS	SED
MTR-4403NOHWY31-SS004(1.0-1.5)-062409	24-Jun-09	FS	SED
MTR-4403NOHWY31-SS005(0.5-1.0)-062409	24-Jun-09	FS	SED
MTR-4403NOHWY31-SS005(1.0-1.5)-062409	24-Jun-09	FS	SED
MTR-4403NOHWY31-SS006(0.5-1.0)-062409	24-Jun-09	FS	SED
MTR-4403NOHWY31-SS006(1.0-1.5)-062409	24-Jun-09	FS	SED
MTR-EP001-SS(2.0)040809	08-Apr-09	FS	SED
MTR-EP002-SS(2.8)040809	08-Apr-09	FS	SED
MTR-EP003-SS(2.8)040809	08-Apr-09	FS	SED
MTR-4403NOHWY31-SS001(0.5-1.0)-062409R	24-Jun-09	FD	SED
MTR-EP005-SS(4.1)040809	08-Apr-09	FS	SED
MTR-EP006-SS(4.1)040809	08-Apr-09	FS	SED
MTR-EP007-SS(6.5)040809	08-Apr-09	FS	SED
MTR-EP004-SS(3.6)040809	08-Apr-09	FS	SED
MTR-EP008-SS(7.6)040809	08-Apr-09	FS	SED
PRA-Pond-0109	07-Jan-09	FS	SW
PRA-Stream-0109	07-Jan-09	FS	SW
MTR-4403NOHWY31-SW003-062409	24-Jun-09	FS	SW
Payne-Pond - 0409	29-Apr-09	FS	SW
MTR-EP001-SW(1.5)040809-FL	08-Apr-09	FS	SW
MTR-EP002-SW(1.5)040809-FL	08-Apr-09	FS	SW
MTR-EP003-SW(3.6)040809-FL	08-Apr-09	FS	SW
MTR-EP004-SW(2.4)040809-FL	08-Apr-09	FS	SW
MTR-4403NOHWY31-SW001-051209	12-May-09	FS	SW
MTR-4403NOHWY31-SW002-051209	12-May-09	FS	SW
MTR-4403NOHWY31-SW003-051209	12-May-09	FS	SW
MTR-4403NOHWY31-SW003-051209R	12-May-09	FD	SW
MTR-4403NOHWY31-SW003-062409	24-Jun-09	FS	SW
FS - field sample	Prepared by:	MJM	2/24/2011
FD - field duplicate	Checked by:	BJR	2/25/2011

**Table A-3**  
**Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling**  
**TORX Facility**  
**Rochester, Indiana**

Location		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31	
Field Sample ID		3796 N Hwy 31-RAW-0609		3796 N Hwy 31-TRT-0609		3796NHwy-RAW-0610		3796NHwy-TRT-0610		3796NHwy31-RAW-0310		3796NHwy31-RAW-0310R		3796NHwy31-RAW-0909	
Sample Date		6/2/2009		6/2/2009		6/3/2010		6/3/2010		3/10/2010		3/10/2010		9/10/2009	
Sample Delivery Group		906119		906119		1006164		1006164		1003270		1003270		909291	
Sample Type		FS		FS		FS		FS		FS		FD		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organics</b>															
1,1,1,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1,1-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1,2,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1,2-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2,3-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2,3-Trichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2,4-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2,4-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dibromo-3-chloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dibromoethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dichloroethene (total)	ug/L														
1,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,3-Dichloropropene (total)	ug/L														
1,3,5-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,3-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,3-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,4-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
2,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
2-Butanone	ug/L														
2-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
2-Hexanone	ug/L														
4-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
4-iso-Propyltoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
4-Methyl-2-pentanone	ug/L														
Acetone	ug/L														
Benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromochloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromodichloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromoform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Carbon disulfide	ug/L														
Carbon tetrachloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chlorodibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chloroform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	

**Table A-3**  
**Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling**  
**TORX Facility**  
**Rochester, Indiana**

Location		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31	
Field Sample ID		3796 N Hwy 31-RAW-0609		3796 N Hwy 31-TRT-0609		3796NHwy-RAW-0610		3796NHwy-TRT-0610		3796NHwy31-RAW-0310		3796NHwy31-RAW-0310R		3796NHwy31-RAW-0909	
Sample Date		6/2/2009		6/2/2009		6/3/2010		6/3/2010		3/10/2010		3/10/2010		9/10/2009	
Sample Delivery Group		906119		906119		1006164		1006164		1003270		1003270		909291	
Sample Type		FS		FS		FS		FS		FS		FD		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 UJ		0.5 UJ		0.5 U		0.5 U		0.5 U	
Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Methylene chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
n-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Naphthalene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Propylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
sec-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Styrene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
tert-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Tetrachloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Toluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
trans-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
trans-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Trichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Trichlorofluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Vinyl chloride	ug/L	6.6		0.5 U		7.8 *		0.5 U		0.5 U		0.5 U		8.8	
Xylene, m/p	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Xylene, o	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Xylenes, Total	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
<b>Metals, Total</b>															
Lead	mg/L														

ug/L = microgram per liter

mg/L = milligram per liter

U = not detected, value is the detection limit

J = value is estimated

R = value is rejected

**Table A-3**  
**Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling**  
**TORX Facility**  
**Rochester, Indiana**

Location		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31	
Field Sample ID		3796NHWHY31-RAW-0909R		3796NHWHY31-RAW-0910		3796NHWHY31-RAW-1209		3796NHWHY31-RAW-1210		3796NHWHY31-TRT-0310		3796NHWHY31-TRT-0909		3796NHWHY31-TRT-0910	
Sample Date		9/10/2009		9/16/2010		12/8/2009		12/14/2010		3/10/2010		9/10/2009		9/16/2010	
Sample Delivery Group		909291		1009527		912326		1012496		1003270		909291		1009527	
Sample Type		FD		FS		FS		FS		FS		FS		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organics</b>															
1,1,1,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,1-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,3-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,3-Trichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2,4-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromo-3-chloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dibromoethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethene (total)	ug/L														
1,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,3-Dichloropropene (total)	ug/L														
1,3,5-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,3-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,3-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,4-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
2,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
2-Butanone	ug/L														
2-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
2-Hexanone	ug/L														
4-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
4-iso-Propyltoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
4-Methyl-2-pentanone	ug/L														
Acetone	ug/L														
Benzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromochloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon disulfide	ug/L														
Carbon tetrachloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chlorodibromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U



**Table A-3**  
**Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling**  
**TORX Facility**  
**Rochester, Indiana**

Location		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31	
Field Sample ID		3796NHXY31-RAW-0909R		3796NHXY31-RAW-0910		3796NHXY31-RAW-1209		3796NHXY31-RAW-1210		3796NHXY31-TRT-0310		3796NHXY31-TRT-0909		3796NHXY31-TRT-0910	
Sample Date		9/10/2009		9/16/2010		12/8/2009		12/14/2010		3/10/2010		9/10/2009		9/16/2010	
Sample Delivery Group		909291		1009527		912326		1012496		1003270		909291		1009527	
Sample Type		FD		FS		FS		FS		FS		FS		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Methylene chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
n-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Naphthalene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Propylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
sec-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Styrene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
tert-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Tetrachloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Toluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
trans-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
trans-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Trichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Trichlorofluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Vinyl chloride	ug/L	9.7		8.7		9.1		8.5		0.5 U		0.5 U		0.5 U	
Xylene, m/p	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Xylene, o	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Xylenes, Total	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
<b>Metals, Total</b>															
Lead	mg/L														

ug/L = microgram per liter

mg/L = milligram per liter

U = not detected, value is the detection limit

J = value is estimated

R = value is rejected

**Table A-3**  
**Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling**  
**TORX Facility**  
**Rochester, Indiana**

Location		3796 N 31		3796 N 31		3842 N 31		3842 N 31		3842 N 31		3842 N 31		3842 N 31	
Field Sample ID		3796NHWHY31-TRT-1209		3796NHWHY31-TRT-1210		3842 N Hwy 31-RAW-0609		3842 N Hwy 31-TRT-0609		3842 N Old SR 31-pre		3842NHWHY31-RAW-0310		3842NHWHY31-RAW-0610	
Sample Date		12/8/2009		12/14/2010		6/2/2009		6/2/2009		11/19/2008		3/9/2010		6/30/2010	
Sample Delivery Group		912326		1012496		906118		906118		LQ5576		1003275		1007049	
Sample Type		FS		FS		FS		FS		FS		FS		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organics</b>															
1,1,1,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1,1-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1,2,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1,2-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2,3-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2,3-Trichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2,4-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2,4-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dibromo-3-chloropropane	ug/L	R		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dibromoethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dichloroethene (total)	ug/L														
1,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,3-Dichloropropene (total)	ug/L														
1,3,5-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,3-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,3-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,4-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
2,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
2-Butanone	ug/L														
2-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
2-Hexanone	ug/L														
4-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
4-iso-Propyltoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
4-Methyl-2-pentanone	ug/L														
Acetone	ug/L														
Benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromochloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromodichloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromoform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Carbon disulfide	ug/L														
Carbon tetrachloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chlorodibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chloroform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	

**Table A-3**  
**Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling**  
**TORX Facility**  
**Rochester, Indiana**

Location		3796 N 31		3796 N 31		3842 N 31		3842 N 31		3842 N 31		3842 N 31		3842 N 31	
Field Sample ID		3796NHwy31-TRT-1209		3796NHwy31-TRT-1210		3842 N Hwy 31-RAW-0609		3842 N Hwy 31-TRT-0609		3842 N Old SR 31-pre		3842NHwy31-RAW-0310		3842NHwy31-RAW-0610	
Sample Date		12/8/2009		12/14/2010		6/2/2009		6/2/2009		11/19/2008		3/9/2010		6/30/2010	
Sample Delivery Group		912326		1012496		906118		906118		LQ5576		1003275		1007049	
Sample Type		FS		FS		FS		FS		FS		FS		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 UJ		0.5 UJ	
Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		0.5 U		1 U		1 U	
Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Methylene chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
n-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Naphthalene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Propylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
sec-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Styrene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
tert-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Tetrachloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Toluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
trans-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
trans-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Trichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Trichlorofluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Vinyl chloride	ug/L	0.5 U		0.5 U		0.96		0.5 U		1.2		1.8		1.3	
Xylene, m/p	ug/L	1 U		1 U		1 U		1 U		0.5 U		1 U		1 U	
Xylene, o	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Xylenes, Total	ug/L	0.5 U		0.5 U		0.5 U		0.5 U				0.5 U		0.5 U	
<b>Metals, Total</b>															
Lead	mg/L														

ug/L = microgram per liter

mg/L = milligram per liter

U = not detected, value is the detection limit

J = value is estimated

R = value is rejected

**Table A-3**  
**Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling**  
**TORX Facility**  
**Rochester, Indiana**

Location		3842 N 31		3842 N 31		3842 N 31		3842 N 31		3842 N 31		3842 N 31		3842 N 31	
Field Sample ID		3842NHWWY31-RAW-0909		3842NHWWY31-RAW-0910		3842NHWWY31-RAW-1209		3842NHWWY31-RAW-1210		3842NHWWY31-RAW-1210R		3842NHWWY31-TRT-0310		3842NHWWY31-TRT-0610	
Sample Date		9/10/2009		9/16/2010		12/8/2009		12/14/2010		12/14/2010		3/9/2010		6/30/2010	
Sample Delivery Group		909287		1009528		912329		1012501		1012501		1003275		1007049	
Sample Type		FS		FS		FS		FS		FD		FS		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organics</b>															
1,1,1,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1,1-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1,2,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1,2-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2,3-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2,3-Trichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2,4-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2,4-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dibromo-3-chloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dibromoethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dichloroethene (total)	ug/L														
1,2-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,3-Dichloropropene (total)	ug/L														
1,3,5-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,3-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,3-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,4-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
2,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
2-Butanone	ug/L														
2-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
2-Hexanone	ug/L														
4-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
4-iso-Propyltoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
4-Methyl-2-pentanone	ug/L														
Acetone	ug/L														
Benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromochloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromodichloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromoform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Carbon disulfide	ug/L														
Carbon tetrachloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chlorodibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chloroform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	

**Table A-3**  
**Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling**  
**TORX Facility**  
**Rochester, Indiana**

Location		3842 N 31		3842 N 31		3842 N 31		3842 N 31		3842 N 31		3842 N 31	
Field Sample ID		3842NHWWY31-RAW-0909		3842NHWWY31-RAW-0910		3842NHWWY31-RAW-1209		3842NHWWY31-RAW-1210		3842NHWWY31-RAW-1210R		3842NHWWY31-TRT-0310	
Sample Date		9/10/2009		9/16/2010		12/8/2009		12/14/2010		12/14/2010		3/9/2010	
Sample Delivery Group		909287		1009528		912329		1012501		1012501		1003275	
Sample Type		FS		FS		FS		FS		FD		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 UJ	
Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Methylene chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
n-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Naphthalene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Propylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
sec-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Styrene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
tert-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Tetrachloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Toluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
trans-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
trans-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Trichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Trichlorofluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Vinyl chloride	ug/L	1.3		1.6		0.5 U		1.6		1.6		0.5 U	
Xylene, m/p	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Xylene, o	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Xylenes, Total	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
<b>Metals, Total</b>													
Lead	mg/L												

ug/L = microgram per liter

mg/L = milligram per liter

U = not detected, value is the detection limit

J = value is estimated

R = value is rejected

**Table A-3**  
**Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling**  
**TORX Facility**  
**Rochester, Indiana**

Location		3842 N 31		3842 N 31		3842 N 31		3842 N 31		3842 N 31		3842 N 31		3842 N 31	
Field Sample ID		3842NHWHY31-TRT-0909		3842NHWHY31-TRT-0910		3842NHWHY31-TRT-1209		3842NHWHY31-TRT-1210		TOW-RAW-0309		TOW-RAW-0309-R		TOW-TRT-0309	
Sample Date		9/10/2009		9/16/2010		12/8/2009		12/14/2010		3/19/2009		3/19/2009		3/19/2009	
Sample Delivery Group		909287		1009528		912329		1012501		903431		903431		903431	
Sample Type		FS		FS		FS		FS		FS		FD		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organics</b>															
1,1,1,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1,1-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1,2,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1,2-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,1-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2,3-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2,3-Trichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2,4-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2,4-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dibromo-3-chloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 UJ		0.5 UJ		0.5 U	
1,2-Dibromoethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,2-Dichloroethene (total)	ug/L														
1,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,3-Dichloropropene (total)	ug/L														
1,3,5-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,3-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,3-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
1,4-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
2,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 UJ		0.5 UJ		0.5 U	
2-Butanone	ug/L														
2-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
2-Hexanone	ug/L														
4-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
4-iso-Propyltoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
4-Methyl-2-pentanone	ug/L														
Acetone	ug/L														
Benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromochloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromodichloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Bromoform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 UJ		0.5 UJ		0.5 U	
Bromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Carbon disulfide	ug/L														
Carbon tetrachloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chlorodibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chloroform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Chloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	

Table A-3  
Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling  
TORX Facility  
Rochester, Indiana

Location		3842 N 31		3842 N 31		3842 N 31		3842 N 31		3842 N 31		3842 N 31	
Field Sample ID		3842NHWHY31-TRT-0909		3842NHWHY31-TRT-0910		3842NHWHY31-TRT-1209		3842NHWHY31-TRT-1210		TOW-RAW-0309		TOW-RAW-0309-R	
Sample Date		9/10/2009		9/16/2010		12/8/2009		12/14/2010		3/19/2009		3/19/2009	
Sample Delivery Group		909287		1009528		912329		1012501		903431		903431	
Sample Type		FS		FS		FS		FS		FS		FD	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Methylene chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
n-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Naphthalene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Propylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
sec-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Styrene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
tert-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Tetrachloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Toluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
trans-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
trans-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Trichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Trichlorofluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Vinyl chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.89		0.87	
Xylene, m/p	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Xylene, o	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
Xylenes, Total	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
<b>Metals, Total</b>													
Lead	mg/L												

ug/L = microgram per liter

mg/L = milligram per liter

U = not detected, value is the detection limit

J = value is estimated

R = value is rejected

Table A-3  
Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling  
TORX Facility  
Rochester, Indiana

Location		3842 N 31		3842 N 31		MW-11		MW-11		MW-11		MW-11		MW-11	
Field Sample ID		TOWNE-FINAL-0309		TOWNE-RAW-0309		MTR-MW11 - G083109		MTR-MW11-G041910		MTR-MW11-G051309		MTR-MW11-G081210		MTR-MW11-G120709	
Sample Date		3/19/2009		3/19/2009		8/31/2009		4/19/2010		5/13/2009		8/12/2010		12/7/2009	
Sample Delivery Group		903431		903431		909031		1004473		905289		1008344		912323	
Sample Type		FS		FS		FS		FS		FS		FS		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organics</b>															
1,1,1,2-Tetrachloroethane	ug/L														
1,1,1-Trichloroethane	ug/L					1 U		1 U		1 U		1 U		1 U	
1,1,2,2-Tetrachloroethane	ug/L					1 U		1 U		1 U		1 U		1 U	
1,1,2-Trichloroethane	ug/L					1 U		1 U		1 U		1 U		1 U	
1,1-Dichloroethane	ug/L					1 U		1 U		1 U		1 U		1 U	
1,1-Dichloroethene	ug/L					1 U		1 U		1 U		1 U		1 U	
1,1-Dichloropropene	ug/L														
1,2,3-Trichlorobenzene	ug/L														
1,2,3-Trichloropropane	ug/L														
1,2,4-Trichlorobenzene	ug/L														
1,2,4-Trimethylbenzene	ug/L														
1,2-Dibromo-3-chloropropane	ug/L														
1,2-Dibromoethane	ug/L														
1,2-Dichlorobenzene	ug/L														
1,2-Dichloroethane	ug/L					1 U		1 U		1 U		1 U		1 U	
1,2-Dichloroethene (total)	ug/L					1.5 J		2.9		1.6 J				1.7 J	
1,2-Dichloropropane	ug/L					2 U		2 U		2 U		2 U		2 U	
1,3-Dichloropropene (total)	ug/L					2 U		2 U		2 U				2 U	
1,3,5-Trimethylbenzene	ug/L														
1,3-Dichlorobenzene	ug/L														
1,3-Dichloropropane	ug/L														
1,4-Dichlorobenzene	ug/L														
2,2-Dichloropropane	ug/L														
2-Butanone	ug/L					5 U		5 U		5 U		5 UJ		5 UJ	
2-Chlorotoluene	ug/L														
2-Hexanone	ug/L					5 U		5 U		5 U		5 U		5 U	
4-Chlorotoluene	ug/L														
4-iso-Propyltoluene	ug/L														
4-Methyl-2-pentanone	ug/L					5 U		5 U		5 U		5 U		5 U	
Acetone	ug/L					20 U		20 U		20 U		20 U		20 U	
Benzene	ug/L					1 U		1 U		0.23 J		1 U		1 U	
Bromobenzene	ug/L														
Bromochloromethane	ug/L														
Bromodichloromethane	ug/L					1 U		1 U		1 U		1 U		1 U	
Bromoform	ug/L					1 U		1 U		1 U		1 U		1 U	
Bromomethane	ug/L					1 U		1 U		1 U		1 U		1 U	
Carbon disulfide	ug/L					2.5 U		2.5 U		2.5 U		2.5 U		2.5 U	
Carbon tetrachloride	ug/L					1 U		1 U		1 U		1 U		1 U	
Chlorobenzene	ug/L					1 U		1 U		1 U		1 U		1 U	
Chlorodibromomethane	ug/L					1 U		1 U		1 U		1 U		1 U	
Chloroethane	ug/L					1 U		1 U		1 U		1 U		1 U	
Chloroform	ug/L					1 U		1 U		1 U		1 U		1 U	
Chloromethane	ug/L					1 U		1 U		1 U		1 U		1 U	



Table A-3  
Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling  
TORX Facility  
Rochester, Indiana

Location		3842 N 31		3842 N 31		MW-11		MW-11		MW-11		MW-11		MW-11	
Field Sample ID		TOWNE-FINAL-0309		TOWNE-RAW-0309		MTR-MW11 - G083109		MTR-MW11-G041910		MTR-MW11-G051309		MTR-MW11-G081210		MTR-MW11-G120709	
Sample Date		3/19/2009		3/19/2009		8/31/2009		4/19/2010		5/13/2009		8/12/2010		12/7/2009	
Sample Delivery Group		903431		903431		909031		1004473		905289		1008344		912323	
Sample Type		FS		FS		FS		FS		FS		FS		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Cis-1,2-Dichloroethene	ug/L					1.5		2.9		1.6		1 U		1.7	
cis-1,3-Dichloropropene	ug/L					1 U		1 U		1 U		1 U		1 U	
Dibromomethane	ug/L														
Dichlorodifluoromethane	ug/L														
Ethyl benzene	ug/L					1 U		1 U		0.2 J		1 UJ		0.18 J	
Hexachlorobutadiene	ug/L														
Isopropylbenzene	ug/L														
Methyl Tertbutyl Ether	ug/L														
Methylene chloride	ug/L					5 U		5 U		5 U		5 U		5 U	
n-Butylbenzene	ug/L														
Naphthalene	ug/L														
Propylbenzene	ug/L														
sec-Butylbenzene	ug/L														
Styrene	ug/L					1 U		1 U		1 U		1 U		1 U	
tert-Butylbenzene	ug/L														
Tetrachloroethene	ug/L					2 U		2 UJ		2 U		2 U		2 U	
Toluene	ug/L					1 U		1 U		0.68 J		1 U		1 U	
trans-1,2-Dichloroethene	ug/L					1 U		1 U		1 U		1 U		1 U	
trans-1,3-Dichloropropene	ug/L					1 U		1 U		1 U		1 U		1 U	
Trichloroethene	ug/L					2.9		2.4		2		3.4		2.6	
Trichlorofluoromethane	ug/L														
Vinyl chloride	ug/L					1 U		3.2		1 U		1 U		1 U	
Xylene, m/p	ug/L					2 U		2 U		0.33 J		2 U		0.55 J	
Xylene, o	ug/L					1 U		1 U		1 U		1 U		0.2 J	
Xylenes, Total	ug/L					2 U		2 U		2 U		2 U		0.75 J	
<b>Metals, Total</b>															
Lead	mg/L	0.005 U		0.005 U											

ug/L = microgram per liter

mg/L = milligram per liter

U = not detected, value is the detection limit

J = value is estimated

R = value is rejected

Table A-3  
Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling  
TORX Facility  
Rochester, Indiana

Location		MW-11		MW-24		MW-24		MW-24		MW-24		MW-24		MW-24	
Field Sample ID		MTR-MW11-G121310		MTR-MW24(122.6)-G041410		MTR-MW24(122.6)-G051409		MTR-MW24(122.6)-G090109		MTR-MW24(122.6)-G120809		MTR-MW24(159.4)-G041410		MTR-MW24(159.4)-G051409	
Sample Date		12/13/2010		4/14/2010		5/14/2009		9/1/2009		12/8/2009		4/14/2010		5/14/2009	
Sample Delivery Group		1012390		1004330		905289		909126		912323		1004330		905289	
Sample Type		FS		FS		FS		FS		FS		FS		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organics</b>															
1,1,1,2-Tetrachloroethane	ug/L														
1,1,1-Trichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,1,2,2-Tetrachloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,1,2-Trichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,1-Dichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,1-Dichloroethene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,1-Dichloropropene	ug/L														
1,2,3-Trichlorobenzene	ug/L														
1,2,3-Trichloropropane	ug/L														
1,2,4-Trichlorobenzene	ug/L														
1,2,4-Trimethylbenzene	ug/L														
1,2-Dibromo-3-chloropropane	ug/L														
1,2-Dibromoethane	ug/L														
1,2-Dichlorobenzene	ug/L														
1,2-Dichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,2-Dichloroethene (total)	ug/L			2 U		2 U		2 U		2 U		2 U		2 U	
1,2-Dichloropropane	ug/L	2 U		2 U		2 U		2 U		2 U		2 U		2 U	
1,3-Dichloropropene (total)	ug/L			2 U		2 U		2 U		2 U		2 U		2 U	
1,3,5-Trimethylbenzene	ug/L														
1,3-Dichlorobenzene	ug/L														
1,3-Dichloropropane	ug/L														
1,4-Dichlorobenzene	ug/L														
2,2-Dichloropropane	ug/L														
2-Butanone	ug/L	5 U		5 U		5 U		5 U		5 U		5 U		5 U	
2-Chlorotoluene	ug/L														
2-Hexanone	ug/L	5 U		5 U		5 U		5 U		5 U		5 U		5 U	
4-Chlorotoluene	ug/L														
4-iso-Propyltoluene	ug/L														
4-Methyl-2-pentanone	ug/L	5 U		5 U		5 U		5 U		5 U		5 U		5 U	
Acetone	ug/L	20 U		20 U		20 U		20 U		20 U		20 U		20 U	
Benzene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Bromobenzene	ug/L														
Bromochloromethane	ug/L														
Bromodichloromethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Bromoform	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Bromomethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Carbon disulfide	ug/L	2.5 U		2.5 U		2.5 U		2.5 U		2.5 U		2.5 U		2.5 U	
Carbon tetrachloride	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Chlorobenzene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Chlorodibromomethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Chloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Chloroform	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Chloromethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	

Table A-3  
Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling  
TORX Facility  
Rochester, Indiana

Location		MW-11		MW-24		MW-24		MW-24		MW-24		MW-24	
Field Sample ID		MTR-MW11-G121310		MTR-MW24(122.6)-G041410		MTR-MW24(122.6)-G051409		MTR-MW24(122.6)-G090109		MTR-MW24(122.6)-G120809		MTR-MW24(159.4)-G041410	
Sample Date		12/13/2010		4/14/2010		5/14/2009		9/1/2009		12/8/2009		4/14/2010	
Sample Delivery Group		1012390		1004330		905289		909126		912323		1004330	
Sample Type		FS		FS		FS		FS		FS		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Cis-1,2-Dichloroethene	ug/L	3.5		1 U		1 U		1 U		1 U		1 U	
cis-1,3-Dichloropropene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Dibromomethane	ug/L												
Dichlorodifluoromethane	ug/L												
Ethyl benzene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Hexachlorobutadiene	ug/L												
Isopropylbenzene	ug/L												
Methyl Tertbutyl Ether	ug/L												
Methylene chloride	ug/L	5 U		5 U		5 U		5 U		5 U		5 U	
n-Butylbenzene	ug/L												
Naphthalene	ug/L												
Propylbenzene	ug/L												
sec-Butylbenzene	ug/L												
Styrene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
tert-Butylbenzene	ug/L												
Tetrachloroethene	ug/L	2 U		2 U		2 U		2 U		2 U		R	
Toluene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
trans-1,2-Dichloroethene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
trans-1,3-Dichloropropene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Trichloroethene	ug/L	2.8		1 U		1 U		1 U		1 U		1 U	
Trichlorofluoromethane	ug/L												
Vinyl chloride	ug/L	7.8		1 U		1 U		1 U		1 U		1 U	
Xylene, m/p	ug/L	2 U		2 U		2 U		2 U		2 U		2 U	
Xylene, o	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Xylenes, Total	ug/L	2 U		2 U		2 U		2 U		2 U		2 U	
<b>Metals, Total</b>													
Lead	mg/L												

ug/L = microgram per liter

mg/L = milligram per liter

U = not detected, value is the detection limit

J = value is estimated

R = value is rejected

Table A-3  
Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling  
TORX Facility  
Rochester, Indiana

Location		MW-24		MW-24		MW-24		MW-24		MW-24		MW-24	
Field Sample ID		MTR-MW24(159.4)-G090209		MTR-MW24(159.4)-G120809		MTR-MW24(24.9)-G041410		MTR-MW24(24.9)-G051409		MTR-MW24(24.9)-G090109		MTR-MW24(24.9)-G120809	
Sample Date		9/2/2009		12/8/2009		4/14/2010		5/14/2009		9/1/2009		12/8/2009	
Sample Delivery Group		909126		912323		1004330		905289		909126		912323	
Sample Type		FS		FS		FS		FS		FS		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organics</b>													
1,1,1,2-Tetrachloroethane	ug/L												
1,1,1-Trichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
1,1,2,2-Tetrachloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
1,1,2-Trichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
1,1-Dichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
1,1-Dichloroethene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
1,1-Dichloropropene	ug/L												
1,2,3-Trichlorobenzene	ug/L												
1,2,3-Trichloropropane	ug/L												
1,2,4-Trichlorobenzene	ug/L												
1,2,4-Trimethylbenzene	ug/L												
1,2-Dibromo-3-chloropropane	ug/L												
1,2-Dibromoethane	ug/L												
1,2-Dichlorobenzene	ug/L												
1,2-Dichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
1,2-Dichloroethene (total)	ug/L	2 U		2 U		2 U		2 U		2 U		2 U	
1,2-Dichloropropane	ug/L	2 U		2 U		2 U		2 U		2 U		2 U	
1,3-Dichloropropene (total)	ug/L	2 U		2 U		2 U		2 U		2 U		2 U	
1,3,5-Trimethylbenzene	ug/L												
1,3-Dichlorobenzene	ug/L												
1,3-Dichloropropane	ug/L												
1,4-Dichlorobenzene	ug/L												
2,2-Dichloropropane	ug/L												
2-Butanone	ug/L	5 U		5 UJ		5 U		5 U		5 U		5 UJ	
2-Chlorotoluene	ug/L												
2-Hexanone	ug/L	5 U		5 U		5 U		5 U		5 U		5 U	
4-Chlorotoluene	ug/L												
4-iso-Propyltoluene	ug/L												
4-Methyl-2-pentanone	ug/L	5 U		5 U		5 U		5 U		5 U		5 U	
Acetone	ug/L	20 U		20 U		20 U		20 U		20 UJ		20 U	
Benzene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Bromobenzene	ug/L												
Bromochloromethane	ug/L												
Bromodichloromethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Bromoform	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Bromomethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Carbon disulfide	ug/L	2.5 U		2.5 U		2.5 U		2.5 U		2.5 U		2.5 U	
Carbon tetrachloride	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Chlorobenzene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Chlorodibromomethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Chloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Chloroform	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Chloromethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 UJ	

Table A-3  
Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling  
TORX Facility  
Rochester, Indiana

Location		MW-24		MW-24		MW-24		MW-24		MW-24		MW-24	
Field Sample ID		MTR-MW24(159.4)-G090209		MTR-MW24(159.4)-G120809		MTR-MW24(24.9)-G041410		MTR-MW24(24.9)-G051409		MTR-MW24(24.9)-G090109		MTR-MW24(24.9)-G120809	
Sample Date		9/2/2009		12/8/2009		4/14/2010		5/14/2009		9/1/2009		12/8/2009	
Sample Delivery Group		909126		912323		1004330		905289		909126		912323	
Sample Type		FS		FS		FS		FS		FS		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Cis-1,2-Dichloroethene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	98
cis-1,3-Dichloropropene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	1 U
Dibromomethane	ug/L												
Dichlorodifluoromethane	ug/L												
Ethyl benzene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	1 U
Hexachlorobutadiene	ug/L												
Isopropylbenzene	ug/L												
Methyl Tertbutyl Ether	ug/L												
Methylene chloride	ug/L	5 U		5 U		5 U		5 U		5 U		5 U	5 U
n-Butylbenzene	ug/L												
Naphthalene	ug/L												
Propylbenzene	ug/L												
sec-Butylbenzene	ug/L												
Styrene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	1 U
tert-Butylbenzene	ug/L												
Tetrachloroethene	ug/L	2 U		2 U		2 U		2 U		2 U		2 U	R
Toluene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	1 U
trans-1,2-Dichloroethene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	7.9
trans-1,3-Dichloropropene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	1 U
Trichloroethene	ug/L	1 U		1 U		0.38 J		1 U		1 U		1 U	170
Trichlorofluoromethane	ug/L												
Vinyl chloride	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	0.75 J
Xylene, m/p	ug/L	2 U		2 U		2 U		2 U		2 U		2 U	2 U
Xylene, o	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	1 U
Xylenes, Total	ug/L	2 U		2 U		2 U		2 U		2 U		2 U	2 U
<b>Metals, Total</b>													
Lead	mg/L												

ug/L = microgram per liter

mg/L = milligram per liter

U = not detected, value is the detection limit

J = value is estimated

R = value is rejected

Table A-3  
Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling  
TORX Facility  
Rochester, Indiana

Location		MW-24		MW-24		MW-24		MW-24		MW-24		MW-24		MW-24	
Field Sample ID		MTR-MW24(55.4)-G041410R		MTR-MW24(55.4)-G051409		MTR-MW24(55.4)-G051409R		MTR-MW24(55.4)-G080910		MTR-MW24(55.4)-G080910R		MTR-MW24(55.4)-G090209		MTR-MW24(55.4)-G090209R	
Sample Date		4/14/2010		5/14/2009		5/14/2009		8/9/2010		8/9/2010		9/2/2009		9/2/2009	
Sample Delivery Group		1004330		905289		905289		1008284		1008284		909126		909126	
Sample Type		FD		FS		FS		FS		FD		FS		FD	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organics</b>															
1,1,1,2-Tetrachloroethane	ug/L														
1,1,1-Trichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,1,2,2-Tetrachloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,1,2-Trichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,1-Dichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,1-Dichloroethene	ug/L	0.85 J		0.78 J		0.75 J		1 U		1 U		0.71 J		0.75 J	
1,1-Dichloropropene	ug/L														
1,2,3-Trichlorobenzene	ug/L														
1,2,3-Trichloropropane	ug/L														
1,2,4-Trichlorobenzene	ug/L														
1,2,4-Trimethylbenzene	ug/L														
1,2-Dibromo-3-chloropropane	ug/L														
1,2-Dibromoethane	ug/L														
1,2-Dichlorobenzene	ug/L														
1,2-Dichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,2-Dichloroethene (total)	ug/L	119		63		62						74		76	
1,2-Dichloropropane	ug/L	2 U		2 U		2 U		2 U		2 U		2 U		2 U	
1,3-Dichloropropene (total)	ug/L	2 U		2 U		2 U						2 U		2 U	
1,3,5-Trimethylbenzene	ug/L														
1,3-Dichlorobenzene	ug/L														
1,3-Dichloropropane	ug/L														
1,4-Dichlorobenzene	ug/L														
2,2-Dichloropropane	ug/L														
2-Butanone	ug/L	5 U		5 U		5 U		5 UJ		5 UJ		5 U		5 U	
2-Chlorotoluene	ug/L														
2-Hexanone	ug/L	5 U		5 U		5 U		5 U		5 U		5 U		5 U	
4-Chlorotoluene	ug/L														
4-iso-Propyltoluene	ug/L														
4-Methyl-2-pentanone	ug/L	5 U		5 U		5 U		5 U		5 U		5 U		5 U	
Acetone	ug/L	20 U		20 U		20 U		20 U		20 U		20 U		20 U	
Benzene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Bromobenzene	ug/L														
Bromochloromethane	ug/L														
Bromodichloromethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Bromoform	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Bromomethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Carbon disulfide	ug/L	2.5 U		2.5 U		2.5 U		2.5 U		2.5 U		2.5 U		2.5 U	
Carbon tetrachloride	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Chlorobenzene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Chlorodibromomethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Chloroethane	ug/L	1 U		1 U		1 U		1 UJ		1 UJ		1 U		1 U	
Chloroform	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Chloromethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	

Table A-3  
Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling  
TORX Facility  
Rochester, Indiana

Location		MW-24		MW-24		MW-24		MW-24		MW-24		MW-24	
Field Sample ID		MTR-MW24(55.4)-G041410R		MTR-MW24(55.4)-G051409		MTR-MW24(55.4)-G051409R		MTR-MW24(55.4)-G080910		MTR-MW24(55.4)-G080910R		MTR-MW24(55.4)-G090209	
Sample Date		4/14/2010		5/14/2009		5/14/2009		8/9/2010		8/9/2010		9/2/2009	
Sample Delivery Group		1004330		905289		905289		1008284		1008284		909126	
Sample Type		FD		FS		FS		FS		FD		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Cis-1,2-Dichloroethene	ug/L	100		56		55		92		83		68	
cis-1,3-Dichloropropene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Dibromomethane	ug/L												
Dichlorodifluoromethane	ug/L												
Ethyl benzene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Hexachlorobutadiene	ug/L												
Isopropylbenzene	ug/L												
Methyl Tertbutyl Ether	ug/L												
Methylene chloride	ug/L	5 U		5 U		5 U		5 U		5 U		5 U	
n-Butylbenzene	ug/L												
Naphthalene	ug/L												
Propylbenzene	ug/L												
sec-Butylbenzene	ug/L												
Styrene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
tert-Butylbenzene	ug/L												
Tetrachloroethene	ug/L	R		2 U		2 U		2 U		2 U		2 U	
Toluene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
trans-1,2-Dichloroethene	ug/L	9.1		7.1		7		5.3		5.2		6.2	
trans-1,3-Dichloropropene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Trichloroethene	ug/L	180		150		150		110		110		150	
Trichlorofluoromethane	ug/L												
Vinyl chloride	ug/L	0.85 J		1.5		1.5		1 U		1 U		1 U	
Xylene, m/p	ug/L	2 U		2 U		2 U		2 U		2 U		2 U	
Xylene, o	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
Xylenes, Total	ug/L	2 U		2 U		2 U		2 U		2 U		2 U	
<b>Metals, Total</b>													
Lead	mg/L												

ug/L = microgram per liter

mg/L = milligram per liter

U = not detected, value is the detection limit

J = value is estimated

R = value is rejected

**Table A-3**  
**Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling**  
**TORX Facility**  
**Rochester, Indiana**

Location		MW-24		MW-24		MW-24		MW-24		MW-30		MW-30		MW-30	
Field Sample ID		MTR-MW24(55.4)-G120809		MTR-MW24(55.4)-G120809R		MTR-MW24(55.4)-G121410		MTR-MW24(55.4)-G121410R		MTR-MW30(120.2)-G041410		MTR-MW30(120.2)-G050709		MTR-MW30(120.2)-G090109	
Sample Date		12/8/2009		12/8/2009		12/14/2010		12/14/2010		4/14/2010		5/7/2009		9/1/2009	
Sample Delivery Group		912323		912323		1012492		1012492		1004330		905163		909126	
Sample Type		FS		FD		FS		FD		FS		FS		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organics</b>															
1,1,1,2-Tetrachloroethane	ug/L														
1,1,1-Trichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,1,2,2-Tetrachloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,1,2-Trichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,1-Dichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,1-Dichloroethene	ug/L	0.52 J		0.5 J		1 U		0.75 J		1 U		1 U		1 U	
1,1-Dichloropropene	ug/L														
1,2,3-Trichlorobenzene	ug/L														
1,2,3-Trichloropropane	ug/L														
1,2,4-Trichlorobenzene	ug/L														
1,2,4-Trimethylbenzene	ug/L														
1,2-Dibromo-3-chloropropane	ug/L														
1,2-Dibromoethane	ug/L														
1,2-Dichlorobenzene	ug/L														
1,2-Dichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,2-Dichloroethene (total)	ug/L	64		57						2 U		2 U		2 U	
1,2-Dichloropropane	ug/L	2 U		2 U		2 U		2 U		2 U		2 U		2 U	
1,3-Dichloropropene (total)	ug/L	2 U		2 U						2 U		2 U		2 U	
1,3,5-Trimethylbenzene	ug/L														
1,3-Dichlorobenzene	ug/L														
1,3-Dichloropropane	ug/L														
1,4-Dichlorobenzene	ug/L														
2,2-Dichloropropane	ug/L														
2-Butanone	ug/L	5 UJ		5 UJ		5 U		5 U		5 U		5 UJ		5 U	
2-Chlorotoluene	ug/L														
2-Hexanone	ug/L	5 U		5 U		5 U		5 U		5 U		5 U		5 U	
4-Chlorotoluene	ug/L														
4-iso-Propyltoluene	ug/L														
4-Methyl-2-pentanone	ug/L	5 U		5 U		5 U		5 U		5 U		5 U		5 U	
Acetone	ug/L	20 U		20 U		20 U		20 U		20 U		20 UJ		20 U	
Benzene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Bromobenzene	ug/L														
Bromochloromethane	ug/L														
Bromodichloromethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Bromoform	ug/L	1 U		1 U		1 U		1 U		1 U		1 UJ		1 U	
Bromomethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 UJ		1 U	
Carbon disulfide	ug/L	2.5 U		2.5 U		2.5 U		2.5 U		2.5 U		2.5 UJ		2.5 U	
Carbon tetrachloride	ug/L	1 U		1 U		1 U		1 U		1 U		1 UJ		1 U	
Chlorobenzene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Chlorodibromomethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 UJ		1 U	
Chloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Chloroform	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Chloromethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	



Table A-3  
Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling  
TORX Facility  
Rochester, Indiana

Location		MW-24		MW-24		MW-24		MW-24		MW-30		MW-30		MW-30	
Field Sample ID		MTR-MW24(55.4)-G120809		MTR-MW24(55.4)-G120809R		MTR-MW24(55.4)-G121410		MTR-MW24(55.4)-G121410R		MTR-MW30(120.2)-G041410		MTR-MW30(120.2)-G050709		MTR-MW30(120.2)-G090109	
Sample Date		12/8/2009		12/8/2009		12/14/2010		12/14/2010		4/14/2010		5/7/2009		9/1/2009	
Sample Delivery Group		912323		912323		1012492		1012492		1004330		905163		909126	
Sample Type		FS		FD		FS		FD		FS		FS		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Cis-1,2-Dichloroethene	ug/L	59		53		130		110		1 U		1 U		1 U	
cis-1,3-Dichloropropene	ug/L	1 U		1 U		1 U		1 U		1 U		1 UJ		1 U	
Dibromomethane	ug/L														
Dichlorodifluoromethane	ug/L														
Ethyl benzene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Hexachlorobutadiene	ug/L														
Isopropylbenzene	ug/L														
Methyl Tertbutyl Ether	ug/L														
Methylene chloride	ug/L	5 U		5 U		5 U		5 U		5 U		5 U		5 U	
n-Butylbenzene	ug/L														
Naphthalene	ug/L														
Propylbenzene	ug/L														
sec-Butylbenzene	ug/L														
Styrene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
tert-Butylbenzene	ug/L														
Tetrachloroethene	ug/L	2 U		2 U		2 U		2 U		2 U		2 U		2 U	
Toluene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
trans-1,2-Dichloroethene	ug/L	5		4.4		9.3		8.3		1 U		1 U		1 U	
trans-1,3-Dichloropropene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Trichloroethene	ug/L	130		130		140		130		1 U		1 U		1 U	
Trichlorofluoromethane	ug/L														
Vinyl chloride	ug/L	0.77 J		1 U		1 UJ		1.2 J		1 U		1 U		1 U	
Xylene, m/p	ug/L	2 U		2 U		2 U		2 U		2 U		2 U		2 U	
Xylene, o	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Xylenes, Total	ug/L	2 U		2 U		2 U		2 U		2 U		2 U		2 U	
<b>Metals, Total</b>															
Lead	mg/L														

ug/L = microgram per liter

mg/L = milligram per liter

U = not detected, value is the detection limit

J = value is estimated

R = value is rejected

Table A-3  
Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling  
TORX Facility  
Rochester, Indiana

Location		MW-30		MW-30		MW-30		MW-30		MW-30		MW-30		MW-30	
Field Sample ID		MTR-MW30(120.2)-G120809		MTR-MW30(148)-G041310		MTR-MW30(148)-G050709		MTR-MW30(148)-G090109		MTR-MW30(148)-G120809		MTR-MW30(41.1)-G041410		MTR-MW30(41.1)-G050709	
Sample Date		12/8/2009		4/13/2010		5/7/2009		9/1/2009		12/8/2009		4/14/2010		5/7/2009	
Sample Delivery Group		912323		1004330		905163		909126		912323		1004330		905163	
Sample Type		FS		FS		FS		FS		FS		FS		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organics</b>															
1,1,1,2-Tetrachloroethane	ug/L														
1,1,1-Trichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,1,2,2-Tetrachloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,1,2-Trichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,1-Dichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,1-Dichloroethene	ug/L	1 U		1 U		1 U		1 U		1 U		0.7 J		1	
1,1-Dichloropropene	ug/L														
1,2,3-Trichlorobenzene	ug/L														
1,2,3-Trichloropropane	ug/L														
1,2,4-Trichlorobenzene	ug/L														
1,2,4-Trimethylbenzene	ug/L														
1,2-Dibromo-3-chloropropane	ug/L														
1,2-Dibromoethane	ug/L														
1,2-Dichlorobenzene	ug/L														
1,2-Dichloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
1,2-Dichloroethene (total)	ug/L	2 U		2 U		2 U		2 U		2 U		84		130	
1,2-Dichloropropane	ug/L	2 U		2 U		2 U		2 U		2 U		2 U		2 U	
1,3-Dichloropropene (total)	ug/L	2 U		2 U		2 U		2 U		2 U		2 U		2 U	
1,3,5-Trimethylbenzene	ug/L														
1,3-Dichlorobenzene	ug/L														
1,3-Dichloropropane	ug/L														
1,4-Dichlorobenzene	ug/L														
2,2-Dichloropropane	ug/L														
2-Butanone	ug/L	5 UJ		5 U		5 UJ		5 U		5 UJ		5 UJ		5 UJ	
2-Chlorotoluene	ug/L														
2-Hexanone	ug/L	5 U		5 U		5 U		5 U		5 U		5 U		5 U	
4-Chlorotoluene	ug/L														
4-iso-Propyltoluene	ug/L														
4-Methyl-2-pentanone	ug/L	5 U		5 U		5 U		5 U		5 U		5 U		5 U	
Acetone	ug/L	20 U		20 U		20 UJ		20 U		20 U		20 U		20 UJ	
Benzene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Bromobenzene	ug/L														
Bromochloromethane	ug/L														
Bromodichloromethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Bromoform	ug/L	1 U		1 U		1 UJ		1 U		1 U		1 U		1 UJ	
Bromomethane	ug/L	1 U		1 U		1 UJ		1 U		1 U		1 U		1 UJ	
Carbon disulfide	ug/L	2.5 U		2.5 U		2.5 UJ		2.5 U		2.5 U		2.5 U		2.5 UJ	
Carbon tetrachloride	ug/L	1 U		1 U		1 UJ		1 U		1 U		1 U		1 UJ	
Chlorobenzene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Chlorodibromomethane	ug/L	1 U		1 U		1 UJ		1 U		1 U		1 U		1 UJ	
Chloroethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Chloroform	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
Chloromethane	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	

Table A-3  
Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling  
TORX Facility  
Rochester, Indiana

Location		MW-30		MW-30		MW-30		MW-30		MW-30		MW-30	
Field Sample ID		MTR-MW30(120.2)-G120809		MTR-MW30(148)-G041310		MTR-MW30(148)-G050709		MTR-MW30(148)-G090109		MTR-MW30(148)-G120809		MTR-MW30(41.1)-G041410	
Sample Date		12/8/2009		4/13/2010		5/7/2009		9/1/2009		12/8/2009		4/14/2010	
Sample Delivery Group		912323		1004330		905163		909126		912323		1004330	
Sample Type		FS		FS		FS		FS		FS		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Cis-1,2-Dichloroethene	ug/L	1 U		1 U		1 U		1 U		1 U		82	130
cis-1,3-Dichloropropene	ug/L	1 U		1 U		1 UJ		1 U		1 U		1 U	1 UJ
Dibromomethane	ug/L												
Dichlorodifluoromethane	ug/L												
Ethyl benzene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	1 U
Hexachlorobutadiene	ug/L												
Isopropylbenzene	ug/L												
Methyl Tertbutyl Ether	ug/L												
Methylene chloride	ug/L	5 U		5 U		5 U		5 U		5 U		5 U	5 U
n-Butylbenzene	ug/L												
Naphthalene	ug/L												
Propylbenzene	ug/L												
sec-Butylbenzene	ug/L												
Styrene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	1 U
tert-Butylbenzene	ug/L												
Tetrachloroethene	ug/L	2 U		2 U		2 U		2 U		2 U		2 U	2 U
Toluene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	1 U
trans-1,2-Dichloroethene	ug/L	1 U		1 U		1 U		1 U		1 U		1.8	2.7
trans-1,3-Dichloropropene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	1 U
Trichloroethene	ug/L	1 U		1 U		1 U		1 U		1 U		72	77
Trichlorofluoromethane	ug/L												
Vinyl chloride	ug/L	1 U		1 U		1 U		1 U		1 U		1.8	2.2
Xylene, m/p	ug/L	2 U		2 U		2 U		2 U		2 U		2 U	2 U
Xylene, o	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	1 U
Xylenes, Total	ug/L	2 U		2 U		2 U		2 U		2 U		2 U	2 U
<b>Metals, Total</b>													
Lead	mg/L												

ug/L = microgram per liter

mg/L = milligram per liter

U = not detected, value is the detection limit

J = value is estimated

R = value is rejected

**Table A-3**  
**Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling**  
**TORX Facility**  
**Rochester, Indiana**

Location		MW-30		MW-30		MW-30		MW-30	
Field Sample ID		MTR-MW30(41.1)-G080910		MTR-MW30(41.1)-G090109		MTR-MW30(41.1)-G120809		MTR-MW30(41.1)-G121410	
Sample Date		8/9/2010		9/1/2009		12/8/2009		12/14/2010	
Sample Delivery Group		1008284		909126		912323		1012492	
Sample Type		FS		FS		FS		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organics</b>									
1,1,1,2-Tetrachloroethane	ug/L								
1,1,1-Trichloroethane	ug/L	1 U		1 U		1 U		1 U	
1,1,2,2-Tetrachloroethane	ug/L	1 U		1 U		1 U		1 U	
1,1,2-Trichloroethane	ug/L	1 U		1 U		1 U		1 U	
1,1-Dichloroethane	ug/L	1 U		1 U		1 U		1 U	
1,1-Dichloroethene	ug/L	1 U		1.2		0.62 J		1 U	
1,1-Dichloropropene	ug/L								
1,2,3-Trichlorobenzene	ug/L								
1,2,3-Trichloropropane	ug/L								
1,2,4-Trichlorobenzene	ug/L								
1,2,4-Trimethylbenzene	ug/L								
1,2-Dibromo-3-chloropropane	ug/L								
1,2-Dibromoethane	ug/L								
1,2-Dichlorobenzene	ug/L								
1,2-Dichloroethane	ug/L	1 U		1 U		1 U		1 U	
1,2-Dichloroethene (total)	ug/L			150		97			
1,2-Dichloropropane	ug/L	2 U		2 U		2 U		2 U	
1,3-Dichloropropene (total)	ug/L			2 U		2 U			
1,3,5-Trimethylbenzene	ug/L								
1,3-Dichlorobenzene	ug/L								
1,3-Dichloropropane	ug/L								
1,4-Dichlorobenzene	ug/L								
2,2-Dichloropropane	ug/L								
2-Butanone	ug/L	5 UJ		5 U		5 UJ		5 U	
2-Chlorotoluene	ug/L								
2-Hexanone	ug/L	5 U		5 U		5 U		5 U	
4-Chlorotoluene	ug/L								
4-iso-Propyltoluene	ug/L								
4-Methyl-2-pentanone	ug/L	5 U		5 U		5 U		5 U	
Acetone	ug/L	20 U		20 U		20 U		20 U	
Benzene	ug/L	1 U		1 U		1 U		1 U	
Bromobenzene	ug/L								
Bromochloromethane	ug/L								
Bromodichloromethane	ug/L	1 U		1 U		1 U		1 U	
Bromoform	ug/L	1 U		1 U		1 U		1 U	
Bromomethane	ug/L	1 U		1 U		1 U		1 U	
Carbon disulfide	ug/L	2.5 U		2.5 U		2.5 U		2.5 U	
Carbon tetrachloride	ug/L	1 U		1 U		1 U		1 U	
Chlorobenzene	ug/L	1 U		1 U		1 U		1 U	
Chlorodibromomethane	ug/L	1 U		1 U		1 U		1 U	
Chloroethane	ug/L	1 UJ		1 U		1 U		1 U	
Chloroform	ug/L	1 U		1 U		1 U		1 U	
Chloromethane	ug/L	1 U		1 U		1 U		1 U	

**Table A-3**  
**Groundwater Monitoring Well and Private Well Data Used as Input to Vapor Intrusion Modeling**  
**TORX Facility**  
**Rochester, Indiana**

Location		MW-30		MW-30		MW-30		MW-30	
Field Sample ID		MTR-MW30(41.1)-G080910		MTR-MW30(41.1)-G090109		MTR-MW30(41.1)-G120809		MTR-MW30(41.1)-G121410	
Sample Date		8/9/2010		9/1/2009		12/8/2009		12/14/2010	
Sample Delivery Group		1008284		909126		912323		1012492	
Sample Type		FS		FS		FS		FS	
Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Cis-1,2-Dichloroethene	ug/L	73		150		95		59	
cis-1,3-Dichloropropene	ug/L	1 U		1 U		1 U		1 U	
Dibromomethane	ug/L								
Dichlorodifluoromethane	ug/L								
Ethyl benzene	ug/L	1 U		1 U		1 U		1 U	
Hexachlorobutadiene	ug/L								
Isopropylbenzene	ug/L								
Methyl Tertbutyl Ether	ug/L								
Methylene chloride	ug/L	5 U		5 U		5 U		5 U	
n-Butylbenzene	ug/L								
Naphthalene	ug/L								
Propylbenzene	ug/L								
sec-Butylbenzene	ug/L								
Styrene	ug/L	1 U		1 U		1 U		1 U	
tert-Butylbenzene	ug/L								
Tetrachloroethene	ug/L	2 U		2 U		2 U		2 U	
Toluene	ug/L	1 U		1 U		1 U		1 U	
trans-1,2-Dichloroethene	ug/L	1.3		3.2		2.1		1 U	
trans-1,3-Dichloropropene	ug/L	1 U		1 U		1 U		1 U	
Trichloroethene	ug/L	59		82		65		58	
Trichlorofluoromethane	ug/L								
Vinyl chloride	ug/L	1.6		3.5		2.8		1 U	
Xylene, m/p	ug/L	2 U		2 U		2 U		2 U	
Xylene, o	ug/L	1 U		1 U		1 U		1 U	
Xylenes, Total	ug/L	2 U		2 U		2 U		2 U	
<b>Metals, Total</b>									
Lead	mg/L								

ug/L = microgram per liter

mg/L = milligram per liter

U = not detected, value is the detection limit

J = value is estimated

R = value is rejected

Prepared by / Date: KJC 02/24/11

Checked by / Date: MJM 02/24/11

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			1019 E 450 N		1019 E 450 N		1049 E 450 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N	
Field Sample ID			1019 E 450 N		MTR-1019 E450N-DW060209		MTR-1049E450N-DW100609		1082 E375N-RAW-0609		1082 E375N-TRT-0609		1082E375N-RAW-0310		1082E375N-RAW-0610	
Sample Date			11/19/2008		6/2/2009		10/6/2009		6/2/2009		6/2/2009		3/9/2010		6/3/2010	
Sample Delivery Group			LQ5586		906121		910202		906122		906122		1003269		1006162	
Sample Type			FS		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,1-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromoethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethene (total)	ug/L														
E524.2	1,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropene (total)	ug/L														
E524.2	1,4-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Butanone	ug/L														
E524.2	2-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Hexanone	ug/L														
E524.2	4-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-iso-Propyltoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-Methyl-2-pentanone	ug/L														
E524.2	Acetone	ug/L														
E524.2	Benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromochloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromodichloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromoform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Carbon disulfide	ug/L														
E524.2	Carbon tetrachloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorodibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			1019 E 450 N		1019 E 450 N		1049 E 450 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N	
Field Sample ID			1019 E 450 N		MTR-1019 E450N-DW060209		MTR-1049E450N-DW100609		1082 E375N-RAW-0609		1082 E375N-TRT-0609		1082E375N-RAW-0310		1082E375N-RAW-0610	
Sample Date			11/19/2008		6/2/2009		10/6/2009		6/2/2009		6/2/2009		3/9/2010		6/3/2010	
Sample Delivery Group			LQ5586		906121		910202		906122		906122		1003269		1006162	
Sample Type			FS		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	0.5 U		1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methylene chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	n-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Naphthalene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Propylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	sec-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Styrene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	tert-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Tetrachloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Toluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichlorofluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Vinyl chloride	ug/L	0.2 U		0.5 U		0.5 U		0.97		0.5 U		1.6		1.3	
E524.2	Xylene, m/p	ug/L	0.5 U		1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Xylene, o	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylenes, Total	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N	
Field Sample ID			1082E375N-RAW-0909		1082E375N-RAW-0910		1082E375N-RAW-1209		1082E375N-RAW-1210		1082E375N-TRT-0310		1082E375N-TRT-0610		1082E375N-TRT-0909	
Sample Date			9/10/2009		9/16/2010		12/11/2009		12/14/2010		3/9/2010		6/3/2010		9/10/2009	
Sample Delivery Group			909292		1009526		912325		1012497		1003269		1006162		909292	
Sample Type			FS		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,1-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromoethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethene (total)	ug/L														
E524.2	1,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropene (total)	ug/L														
E524.2	1,4-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Butanone	ug/L														
E524.2	2-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Hexanone	ug/L														
E524.2	4-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-iso-Propyltoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-Methyl-2-pentanone	ug/L														
E524.2	Acetone	ug/L														
E524.2	Benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromochloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromodichloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromoform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Carbon disulfide	ug/L														
E524.2	Carbon tetrachloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorodibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	



**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N	
Field Sample ID			1082E375N-RAW-0909		1082E375N-RAW-0910		1082E375N-RAW-1209		1082E375N-RAW-1210		1082E375N-TRT-0310		1082E375N-TRT-0610		1082E375N-TRT-0909	
Sample Date			9/10/2009		9/16/2010		12/11/2009		12/14/2010		3/9/2010		6/3/2010		9/10/2009	
Sample Delivery Group			909292		1009526		912325		1012497		1003269		1006162		909292	
Sample Type			FS		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 UJ		0.5 UJ		0.5 U	
E524.2	Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methylene chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	n-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Naphthalene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Propylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	sec-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Styrene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	tert-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Tetrachloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Toluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichlorofluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Vinyl chloride	ug/L	1.2		1.5		0.5 U		1.4		0.5 U		0.5 U		0.5 U	
E524.2	Xylene, m/p	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Xylene, o	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylenes, Total	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			1082 E 375 N		1082 E 375 N		1082 E 375 N		1125 E 450 N		1195 E 450 N		120 E 450 N 1		120 E 450 N 2	
Field Sample ID			1082E375N-TRT-0910		1082E375N-TRT-1209		1082E375N-TRT-1210		MTR-1125E450N-DW100609		MTR-1195E450N-DW100609		1 Anderson 120E450N020309		2 Anderson 120E450N020309	
Sample Date			9/16/2010		12/11/2009		12/14/2010		10/6/2009		10/6/2009		2/3/2009		2/3/2009	
Sample Delivery Group			1009526		912325		1012497		910202		910202		902083		902083	
Sample Type			FS		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,1-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromoethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethene (total)	ug/L														
E524.2	1,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropene (total)	ug/L														
E524.2	1,4-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Butanone	ug/L														
E524.2	2-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Hexanone	ug/L														
E524.2	4-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-iso-Propyltoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-Methyl-2-pentanone	ug/L														
E524.2	Acetone	ug/L														
E524.2	Benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromochloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromodichloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromoform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Carbon disulfide	ug/L														
E524.2	Carbon tetrachloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorodibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			1082 E 375 N		1082 E 375 N		1082 E 375 N		1125 E 450 N		1195 E 450 N		120 E 450 N 1		120 E 450 N 2	
Field Sample ID			1082E375N-TRT-0910		1082E375N-TRT-1209		1082E375N-TRT-1210		MTR-1125E450N-DW100609		MTR-1195E450N-DW100609		1 Anderson 120E450N020309		2 Anderson 120E450N020309	
Sample Date			9/16/2010		12/11/2009		12/14/2010		10/6/2009		10/6/2009		2/3/2009		2/3/2009	
Sample Delivery Group			1009526		912325		1012497		910202		910202		902083		902083	
Sample Type			FS		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methylene chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	n-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Naphthalene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Propylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	sec-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Styrene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	tert-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Tetrachloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Toluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichlorofluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Vinyl chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylene, m/p	ug/L	1 U		1 U		1 U		1 U		1 U		0.5 U		0.5 U	
E524.2	Xylene, o	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylenes, Total	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			1302 E 350 N		1302 E 350 N		1362 E 350 N		1387 E 350 N		1910 N 31		1995 E 450 N		1995 E 450 N	
Field Sample ID			MTR-1302E350N-DW052609		MTR-1302E350N-DW052609R		1362E350N-TRT-0410		1387E350N-TRT-0301		DRE1910N01d31020309		1995E450N-TRT-0310		Talbot1995E450N021109	
Sample Date			5/26/2009		5/26/2009		4/5/2010		3/29/2010		2/3/2009		3/30/2010		2/11/2009	
Sample Delivery Group			905537		905537		1004161		1004017		902082		1004019		902265	
Sample Type			FS		FD		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,1-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromoethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethene (total)	ug/L														
E524.2	1,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropene (total)	ug/L														
E524.2	1,4-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Butanone	ug/L														
E524.2	2-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Hexanone	ug/L														
E524.2	4-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-iso-Propyltoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-Methyl-2-pentanone	ug/L														
E524.2	Acetone	ug/L														
E524.2	Benzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromochloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromodichloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromoform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Carbon disulfide	ug/L														
E524.2	Carbon tetrachloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorodibromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			1302 E 350 N		1302 E 350 N		1362 E 350 N		1387 E 350 N		1910 N 31		1995 E 450 N		1995 E 450 N	
Field Sample ID			MTR-1302E350N-DW052609		MTR-1302E350N-DW052609R		1362E350N-TRT-0410		1387E350N-TRT-0301		DRE1910N01d31020309		1995E450N-TRT-0310		Talbot1995E450N021109	
Sample Date			5/26/2009		5/26/2009		4/5/2010		3/29/2010		2/3/2009		3/30/2010		2/11/2009	
Sample Delivery Group			905537		905537		1004161		1004017		902082		1004019		902265	
Sample Type			FS		FD		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methylene chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	n-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Naphthalene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Propylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	sec-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Styrene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	tert-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Tetrachloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Toluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichlorofluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Vinyl chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylene, m/p	ug/L	1 U		1 U		1 U		1 U		0.5 U		1 U		1 U	
E524.2	Xylene, o	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylenes, Total	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			1999 E 450 N		1999 E 450 N		2241 E 450 N		2241 E 450 N		3394 N 31		343 E 375 N		3586 N 31	
Field Sample ID			MTR-1999E450N-DW100609A		MTR-1999E450N-DW100609B		MTR-2241E450N-DW100609		MTR-2241E450N-DW100609R		3394NHWHY31-TRT-0610		MTR-343 E375N-DW052709		3586NHWHY31-TRT-0410	
Sample Date			10/6/2009		10/6/2009		10/6/2009		10/6/2009		6/30/2010		5/27/2009		4/14/2010	
Sample Delivery Group			910203		910203		910204		910204		1007050		905514		1004328	
Sample Type			FS		FS		FS		FD		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,1-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromoethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethene (total)	ug/L														
E524.2	1,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropene (total)	ug/L														
E524.2	1,4-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Butanone	ug/L														
E524.2	2-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Hexanone	ug/L														
E524.2	4-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-iso-Propyltoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-Methyl-2-pentanone	ug/L														
E524.2	Acetone	ug/L														
E524.2	Benzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromochloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromodichloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromoform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Carbon disulfide	ug/L														
E524.2	Carbon tetrachloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorodibromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			1999 E 450 N		1999 E 450 N		2241 E 450 N		2241 E 450 N		3394 N 31		343 E 375 N		3586 N 31	
Field Sample ID			MTR-1999E450N-DW100609A		MTR-1999E450N-DW100609B		MTR-2241E450N-DW100609		MTR-2241E450N-DW100609R		3394NHVY31-TRT-0610		MTR-343 E375N-DW052709		3586NHVY31-TRT-0410	
Sample Date			10/6/2009		10/6/2009		10/6/2009		10/6/2009		6/30/2010		5/27/2009		4/14/2010	
Sample Delivery Group			910203		910203		910204		910204		1007050		905514		1004328	
Sample Type			FS		FS		FS		FD		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	cis-1,3-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Dibromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Dichlorodifluoromethane	ug/L	0.5	UJ	0.5	UJ	0.5	UJ	0.5	UJ	0.5	UJ	0.5	U	0.5	UJ
E524.2	Ethyl benzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Hexachlorobutadiene	ug/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U
E524.2	Isopropylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Methyl Tertbutyl Ether	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Methylene chloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	n-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ
E524.2	Naphthalene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ
E524.2	Propylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	sec-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Styrene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	tert-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Tetrachloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ
E524.2	Toluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,2-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,3-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichlorofluoromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Vinyl chloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Xylene, m/p	ug/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U
E524.2	Xylene, o	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Xylenes, Total	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31	
Field Sample ID			3597 N Hwy 31-RAW-0609		3597 N Hwy 31-TRT-0609		3597 N Old SR 31-pre		3597NHwy-FNL-0610		3597NHwy-RAW-0610		3597NHwy-TRT-0610		3597NHwy31-RAW-0310			
Sample Date			6/2/2009		6/2/2009		11/19/2008		6/3/2010		6/3/2010		6/3/2010		3/9/2010			
Sample Delivery Group			906123		906123		LQ5575		1006163		1006163		1006163		1003273			
Sample Type			FS		FS		FS		FS		FS		FS		FS			
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,1-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromoethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethene (total)	ug/L																
E524.2	1,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropene (total)	ug/L																
E524.2	1,4-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Butanone	ug/L																
E524.2	2-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Hexanone	ug/L																
E524.2	4-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-iso-Propyltoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-Methyl-2-pentanone	ug/L																
E524.2	Acetone	ug/L																
E524.2	Benzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromochloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromodichloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromoform	ug/L	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Carbon disulfide	ug/L																
E524.2	Carbon tetrachloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorodibromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroform	ug/L	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U



**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31	
Field Sample ID			3597 N Hwy 31-RAW-0609		3597 N Hwy 31-TRT-0609		3597 N Old SR 31-pre		3597NHwy-FNL-0610		3597NHwy-RAW-0610		3597NHwy-TRT-0610		3597NHwy31-RAW-0310	
Sample Date			6/2/2009		6/2/2009		11/19/2008		6/3/2010		6/3/2010		6/3/2010		3/9/2010	
Sample Delivery Group			906123		906123		LQ5575		1006163		1006163		1006163		1003273	
Sample Type			FS		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Cis-1,2-Dichloroethene	ug/L	3.5		0.5 U		4.5		0.5 U		0.5 U		3.7		2.9	
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 UJ		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 UJ		0.5 UJ		0.5 UJ	
E524.2	Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 UJ		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	1 U		1 U		0.5 U		1 U		1 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 UJ		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 UJ		0.5 U		0.5 U		0.5 U	
E524.2	Methylene chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	n-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Naphthalene	ug/L	0.5 U		0.5 U		0.5 U		0.5 UJ		0.5 U		0.5 U		0.5 U	
E524.2	Propylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 UJ		0.5 U		0.5 U		0.5 U	
E524.2	sec-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Styrene	ug/L	0.5 U		0.5 U		0.5 U		0.5 UJ		0.5 U		0.5 U		0.5 U	
E524.2	tert-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Tetrachloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Toluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 UJ		0.5 U		0.5 U		0.5 U	
E524.2	Trichlorofluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Vinyl chloride	ug/L	0.5 U		0.5 U		0.2 U		0.5 UJ		0.5 U		0.5 U		0.5 U	
E524.2	Xylene, m/p	ug/L	1 U		1 U		0.5 U		1 UJ		1 U		1 U		1 U	
E524.2	Xylene, o	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylenes, Total	ug/L	0.5 U		0.5 U				0.5 UJ		0.5 U		0.5 U		0.5 U	
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31	
Field Sample ID			3597NHWY31-RAW-0610		3597NHWY31-RAW-0610R		3597NHWY31-RAW-0909		3597NHWY31-RAW-1209		3597NHWY31-RAW-1210		3597NHWY31-RAW-1210		3597NHWY31-RAW-1910		3597NHWY31-TRT-0310	
Sample Date			6/30/2010		6/30/2010		9/10/2009		12/8/2009		12/14/2010		9/16/2010		3/9/2010		3/9/2010	
Sample Delivery Group			1007048		1007048		909289		912328		1012498		1009525		1003273		1003273	
Sample Type			FS		FD		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,1-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromoethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethene (total)	ug/L																
E524.2	1,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropene (total)	ug/L																
E524.2	1,4-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Butanone	ug/L																
E524.2	2-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Hexanone	ug/L																
E524.2	4-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-iso-Propyltoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-Methyl-2-pentanone	ug/L																
E524.2	Acetone	ug/L																
E524.2	Benzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromochloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromodichloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromoform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Carbon disulfide	ug/L																
E524.2	Carbon tetrachloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorodibromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31	
Field Sample ID			3597NHWY31-RAW-0610		3597NHWY31-RAW-0610R		3597NHWY31-RAW-0909		3597NHWY31-RAW-1209		3597NHWY31-RAW-1210		3597NHWY31-RAW-1910		3597NHWY31-TRT-0310	
Sample Date			6/30/2010		6/30/2010		9/10/2009		12/8/2009		12/14/2010		9/16/2010		3/9/2010	
Sample Delivery Group			1007048		1007048		909289		912328		1012498		1009525		1003273	
Sample Type			FS		FD		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Cis-1,2-Dichloroethene	ug/L	3.7	U	3.7	U	2.9		2.8		3.2		3.3		0.5	U
E524.2	cis-1,3-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Dibromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Dichlorodifluoromethane	ug/L	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ
E524.2	Ethyl benzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Hexachlorobutadiene	ug/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U
E524.2	Isopropylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Methyl Tertbutyl Ether	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Methylene chloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	n-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Naphthalene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Propylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	sec-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Styrene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	tert-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Tetrachloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Toluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,2-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,3-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichlorofluoromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Vinyl chloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Xylene, m/p	ug/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U
E524.2	Xylene, o	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Xylenes, Total	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31	
Field Sample ID			3597NHWHY31-TRT-0610		3597NHWHY31-TRT-0909		3597NHWHY31-TRT-0910		3597NHWHY31-TRT-1209		3597NHWHY31-TRT-1210		3597NHWHY31-TRT-1210		PRA-Drain-0109	
Sample Date			6/30/2010		9/10/2009		9/16/2010		12/8/2009		12/14/2010		12/14/2010		1/7/2009	
Sample Delivery Group			1007048		909289		1009525		912328		1012498		1012498		DSA0269	
Sample Type			FS		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,1-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloropropene	ug/L	0.5 UJ		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 UJ	
E524.2	1,2-Dibromoethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethene (total)	ug/L														
E524.2	1,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropene (total)	ug/L														
E524.2	1,4-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 UJ	
E524.2	2-Butanone	ug/L														
E524.2	2-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Hexanone	ug/L														
E524.2	4-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-iso-Propyltoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-Methyl-2-pentanone	ug/L														
E524.2	Acetone	ug/L														
E524.2	Benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromochloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromodichloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromoform	ug/L	0.5 UJ		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 UJ	
E524.2	Bromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Carbon disulfide	ug/L														
E524.2	Carbon tetrachloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorodibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31	
Field Sample ID			3597NHWHY31-TRT-0610		3597NHWHY31-TRT-0909		3597NHWHY31-TRT-0910		3597NHWHY31-TRT-1209		3597NHWHY31-TRT-1210		3597NHWHY31-TRT-1210		PRA-Drain-0109	
Sample Date			6/30/2010		9/10/2009		9/16/2010		12/8/2009		12/14/2010		12/14/2010		1/7/2009	
Sample Delivery Group			1007048		909289		1009525		912328		1012498		1012498		DSA0269	
Sample Type			FS		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	3.7
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	Dichlorodifluoromethane	ug/L	0.5 UJ		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		0.5 U	1 U
E524.2	Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		5 U	0.5 U
E524.2	Methylene chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	n-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	Naphthalene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	Propylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	sec-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	Styrene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	tert-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	Tetrachloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	Toluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	trans-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	trans-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	Trichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	Trichlorofluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	Vinyl chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	Xylene, m/p	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	1 U
E524.2	Xylene, o	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	0.5 U
E524.2	Xylenes, Total	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		1.5 U	0.5 U
E524.2	Total Halogenated Hydrocarbons	ug/L													0.5 U	
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3597 N 31		3597 N 31		3597 N 31		3618 N 31		3719 N 31		3719 N 31		3719 N 31	
Field Sample ID			PRA-TRT-0309		PRATT-FINAL-0309		PRATT-RAW-0309		TRT-3618NOHWY31-DW05111		3719 N Old SR 31		3719NHWWY31-TRT-0410		3719NHWWY31-TRT-0410R	
Sample Date			3/19/2009		3/19/2009		3/19/2009		5/11/2010		11/19/2008		4/8/2010		4/8/2010	
Sample Delivery Group			903431		903431		903431		1005292		LQ5579		1004220		1004220	
Sample Type			FS		FS		FS		FS		FS		FS		FD	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,1-Trichloroethane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2-Trichloroethane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloropropene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichloropropane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromoethane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichlorobenzene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethene (total)	ug/L														
E524.2	1,2-Dichloropropane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichlorobenzene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropene (total)	ug/L														
E524.2	1,4-Dichlorobenzene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2,2-Dichloropropane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Butanone	ug/L														
E524.2	2-Chlorotoluene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Hexanone	ug/L														
E524.2	4-Chlorotoluene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-iso-Propyltoluene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-Methyl-2-pentanone	ug/L														
E524.2	Acetone	ug/L														
E524.2	Benzene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromobenzene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromochloromethane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromodichloromethane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromoform	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromomethane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Carbon disulfide	ug/L														
E524.2	Carbon tetrachloride	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorobenzene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorodibromomethane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroethane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroform	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloromethane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	U

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location Field Sample ID Sample Date Sample Delivery Group Sample Type			3597 N 31 PRA-TRT-0309 3/19/2009 903431 FS		3597 N 31 PRATT-FINAL-0309 3/19/2009 903431 FS		3597 N 31 PRATT-RAW-0309 3/19/2009 903431 FS		3618 N 31 ITR-3618NOHWY31-DW05111 5/11/2010 1005292 FS		3719 N 31 3719 N Old SR 31 11/19/2008 LQ5579 FS		3719 N 31 3719NHWWY31-TRT-0410 4/8/2010 1004220 FS		3719 N 31 3719NHWWY31-TRT-0410R 4/8/2010 1004220 FD	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Ethyl benzene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	1 U						1 U		0.5 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methylene chloride	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	n-Butylbenzene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Naphthalene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Propylbenzene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	sec-Butylbenzene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Styrene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	tert-Butylbenzene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Tetrachloroethene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Toluene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,2-Dichloroethene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,3-Dichloropropene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichloroethene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichlorofluoromethane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Vinyl chloride	ug/L	0.5 U						0.5 U		0.2 U		0.5 U		0.5 U	
E524.2	Xylene, m/p	ug/L	1 U						1 U		0.5 U		1 U		1 U	
E524.2	Xylene, o	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylenes, Total	ug/L	0.5 U						0.5 U				0.5 U		0.5 U	
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L			0.005 U			0.005 U								

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			3791 N Hwy 31 - Raw - 1109		3791 N Hwy 31 - Raw - 1109R		3791 N Hwy 31 - TRT - 1109		3791 N Hwy 31-RAW-0609		3791 N Hwy 31-RAW-0609R		3791 N Hwy 31-RAW-0809R		3791 N Hwy 31-TRT-0609	
Sample Date			11/17/2009		11/17/2009		11/17/2009		6/2/2009		6/2/2009		8/31/2009		6/2/2009	
Sample Delivery Group			911462		911462		911462		906120		906120		909036		906120	
Sample Type			FS		FD		FS		FS		FD		FD		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,1-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U
E524.2	1,2-Dibromoethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethene (total)	ug/L														
E524.2	1,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropene (total)	ug/L														
E524.2	1,4-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Butanone	ug/L														
E524.2	2-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Hexanone	ug/L														
E524.2	4-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-iso-Propyltoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-Methyl-2-pentanone	ug/L														
E524.2	Acetone	ug/L														
E524.2	Benzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromochloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromodichloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U
E524.2	Bromoform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U
E524.2	Bromomethane	ug/L	0.5	UJ	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	UJ	0.5	U
E524.2	Carbon disulfide	ug/L														
E524.2	Carbon tetrachloride	ug/L	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorodibromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U
E524.2	Chloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U
E524.2	Chloroform	ug/L	0.5	UJ	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloromethane	ug/L	0.5	UJ	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U



**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			3791 N Hwy 31 - Raw - 1109		3791 N Hwy 31 - Raw - 1109R		3791 N Hwy 31 - TRT - 1109		3791 N Hwy 31-RAW-0609		3791 N Hwy 31-RAW-0609R		3791 N Hwy 31-RAW-0809R		3791 N Hwy 31-TRT-0609	
Sample Date			11/17/2009		11/17/2009		11/17/2009		6/2/2009		6/2/2009		8/31/2009		6/2/2009	
Sample Delivery Group			911462		911462		911462		906120		906120		909036		906120	
Sample Type			FS		FD		FS		FS		FD		FD		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	cis-1,3-Dichloropropene	ug/L	0.5	UJ	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	UJ	0.5	U
E524.2	Dibromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Dichlorodifluoromethane	ug/L	0.5	UJ	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Ethyl benzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Hexachlorobutadiene	ug/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U
E524.2	Isopropylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Methyl Tertbutyl Ether	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Methylene chloride	ug/L	0.5	UJ	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	UJ	0.5	U
E524.2	n-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Naphthalene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Propylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	sec-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Styrene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	tert-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Tetrachloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Toluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,2-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,3-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U
E524.2	Trichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichlorofluoromethane	ug/L	0.5	UJ	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Vinyl chloride	ug/L	12	J	12	J	0.5	UJ	8.1		8.3		12		0.5	U
E524.2	Xylene, m/p	ug/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U
E524.2	Xylene, o	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Xylenes, Total	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			3791 N Hwy 31-TRT-0809		3791 N Hwy31-RAW-0809		3791 N Old SR 31-pre		3791NHwy-RAW-0610		3791NHwy-RAW-0610R		3791NHwy-TRT-0610		3791NHwy31-FNL-0909	
Sample Date			8/31/2009		8/31/2009		11/19/2008		6/3/2010		6/3/2010		6/3/2010		9/10/2009	
Sample Delivery Group			909036		909036		LQ5580		1006161		1006161		1006161		909288	
Sample Type			FS		FS		FS		FS		FD		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,1-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloropropene	ug/L	0.5 UJ		0.5 UJ		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5 UJ		0.5 UJ		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromoethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethene (total)	ug/L														
E524.2	1,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropene (total)	ug/L														
E524.2	1,4-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Butanone	ug/L														
E524.2	2-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Hexanone	ug/L														
E524.2	4-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-iso-Propyltoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-Methyl-2-pentanone	ug/L														
E524.2	Acetone	ug/L														
E524.2	Benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromochloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromodichloromethane	ug/L	0.5 UJ		0.5 UJ		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromoform	ug/L	0.5 UJ		0.5 UJ		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromomethane	ug/L	0.5 UJ		0.5 UJ		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Carbon disulfide	ug/L														
E524.2	Carbon tetrachloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorodibromomethane	ug/L	0.5 UJ		0.5 UJ		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroethane	ug/L	0.5 UJ		0.5 UJ		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			3791 N Hwy 31-TRT-0809		3791 N Hwy31-RAW-0809		3791 N Old SR 31-pre		3791NHwy-RAW-0610		3791NHwy-RAW-0610R		3791NHwy-TRT-0610		3791NHwy31-FNL-0909	
Sample Date			8/31/2009		8/31/2009		11/19/2008		6/3/2010		6/3/2010		6/3/2010		9/10/2009	
Sample Delivery Group			909036		909036		LQ5580		1006161		1006161		1006161		909288	
Sample Type			FS		FS		FS		FS		FD		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 UJ		0.5 UJ		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 UJ		0.5 UJ		0.5 UJ		0.5 U	
E524.2	Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	1 U		1 U		0.5 U		1 U		1 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methylene chloride	ug/L	0.5 UJ		0.5 UJ		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	n-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Naphthalene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Propylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	sec-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Styrene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	tert-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Tetrachloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Toluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,3-Dichloropropene	ug/L	0.5 UJ		0.5 UJ		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichlorofluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Vinyl chloride	ug/L	0.5 U		12		10		10 *		11 *		0.5 U		0.5 U	
E524.2	Xylene, m/p	ug/L	1 U		1 U		0.5 U		1 U		1 U		1 U		1 U	
E524.2	Xylene, o	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylenes, Total	ug/L	0.5 U		0.5 U				0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			3791NHWHY31-FNL-1209		3791NHWHY31-FNL-1210		3791NHWHY31-RAW-0110		3791NHWHY31-RAW-0110R		3791NHWHY31-RAW-0310		3791NHWHY31-RAW-0310R		3791NHWHY31-RAW-0709	
Sample Date			12/8/2009		12/14/2010		1/13/2010		1/13/2010		3/10/2010		3/10/2010		7/23/2009	
Sample Delivery Group			912327		1012499		1001242		1001242		1003274		1003274		907512	
Sample Type			FS		FS		FS		FD		FS		FD		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,1-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromoethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethene (total)	ug/L														
E524.2	1,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropene (total)	ug/L														
E524.2	1,4-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Butanone	ug/L														
E524.2	2-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Hexanone	ug/L														
E524.2	4-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-iso-Propyltoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-Methyl-2-pentanone	ug/L														
E524.2	Acetone	ug/L														
E524.2	Benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromochloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromodichloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromoform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Carbon disulfide	ug/L														
E524.2	Carbon tetrachloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorodibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			3791NHWWY31-FNL-1209		3791NHWWY31-FNL-1210		3791NHWWY31-RAW-0110		3791NHWWY31-RAW-0110R		3791NHWWY31-RAW-0310		3791NHWWY31-RAW-0310R		3791NHWWY31-RAW-0709	
Sample Date			12/8/2009		12/14/2010		1/13/2010		1/13/2010		3/10/2010		3/10/2010		7/23/2009	
Sample Delivery Group			912327		1012499		1001242		1001242		1003274		1003274		907512	
Sample Type			FS		FS		FS		FD		FS		FD		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methylene chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	n-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Naphthalene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Propylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	sec-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Styrene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	tert-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Tetrachloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Toluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichlorofluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Vinyl chloride	ug/L	0.5 U		0.5 U		11		11		18		18		9.8	
E524.2	Xylene, m/p	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Xylene, o	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylenes, Total	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			3791NHWHY31-RAW-0709R		3791NHWHY31-RAW-0909		3791NHWHY31-RAW-0909R		3791NHWHY31-RAW-0910		3791NHWHY31-RAW-0910R		3791NHWHY31-RAW-1009		3791NHWHY31-RAW-1209	
Sample Date			7/23/2009		9/10/2009		9/10/2009		9/16/2010		9/16/2010		9/16/2010		10/6/2009	
Sample Delivery Group			907512		909288		909288		1009524		1009524		1009524		910201	
Sample Type			FD		FS		FD		FS		FD		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,1-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromoethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethene (total)	ug/L														
E524.2	1,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropene (total)	ug/L														
E524.2	1,4-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Butanone	ug/L														
E524.2	2-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Hexanone	ug/L														
E524.2	4-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-iso-Propyltoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-Methyl-2-pentanone	ug/L														
E524.2	Acetone	ug/L														
E524.2	Benzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromochloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromodichloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromoform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Carbon disulfide	ug/L														
E524.2	Carbon tetrachloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorodibromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			3791NHWHY31-RAW-0709R		3791NHWHY31-RAW-0909		3791NHWHY31-RAW-0909R		3791NHWHY31-RAW-0910		3791NHWHY31-RAW-0910R		3791NHWHY31-RAW-1009		3791NHWHY31-RAW-1209	
Sample Date			7/23/2009		9/10/2009		9/10/2009		9/16/2010		9/16/2010		10/6/2009		12/8/2009	
Sample Delivery Group			907512		909288		909288		1009524		1009524		910201		912327	
Sample Type			FD		FS		FD		FS		FD		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methylene chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	n-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Naphthalene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Propylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	sec-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Styrene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	tert-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Tetrachloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Toluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichlorofluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Vinyl chloride	ug/L	9.8		11		11		11		11		12		0.5 U	
E524.2	Xylene, m/p	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Xylene, o	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylenes, Total	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			3791NHWHY31-RAW-1209 R		3791NHWHY31-RAW-1210		3791NHWHY31-RAW-1210R		3791NHWHY31-TRT-0110		3791NHWHY31-TRT-0310		3791NHWHY31-TRT-0709		3791NHWHY31-TRT-0909	
Sample Date			12/8/2009		12/14/2010		12/14/2010		1/13/2010		3/10/2010		7/23/2009		9/10/2009	
Sample Delivery Group			912327		1012499		1012499		1001242		1003274		907512		909288	
Sample Type			FD		FS		FD		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,1-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromoethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethene (total)	ug/L														
E524.2	1,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropene (total)	ug/L														
E524.2	1,4-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Butanone	ug/L														
E524.2	2-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Hexanone	ug/L														
E524.2	4-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-iso-Propyltoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-Methyl-2-pentanone	ug/L														
E524.2	Acetone	ug/L														
E524.2	Benzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromochloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromodichloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromoform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Carbon disulfide	ug/L														
E524.2	Carbon tetrachloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorodibromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U



**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			3791NHWY31-RAW-1209 R		3791NHWY31-RAW-1210		3791NHWY31-RAW-1210R		3791NHWY31-TRT-0110		3791NHWY31-TRT-0310		3791NHWY31-TRT-0709		3791NHWY31-TRT-0909	
Sample Date			12/8/2009		12/14/2010		12/14/2010		1/13/2010		3/10/2010		7/23/2009		9/10/2009	
Sample Delivery Group			912327		1012499		1012499		1001242		1003274		907512		909288	
Sample Type			FD		FS		FD		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	cis-1,3-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Dibromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Dichlorodifluoromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	UJ	0.5	U	0.5	U
E524.2	Ethyl benzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Hexachlorobutadiene	ug/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U
E524.2	Isopropylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Methyl Tertbutyl Ether	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Methylene chloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	2.6		2.8	J
E524.2	n-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Naphthalene	ug/L	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	UJ
E524.2	Propylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	sec-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Styrene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	tert-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Tetrachloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Toluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,2-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,3-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichlorofluoromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Vinyl chloride	ug/L	0.5	U	11		11		0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Xylene, m/p	ug/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U
E524.2	Xylene, o	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Xylenes, Total	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			3791NHWY31-TRT-0910		3791NHWY31-TRT-1009		3791NHWY31-TRT-1209		3791NHWY31-TRT-1210		MIL-RAW-0309		MIL-TRT-0309		MILLER-FINAL-0309	
Sample Date			9/16/2010		10/6/2009		12/8/2009		12/14/2010		3/19/2009		3/19/2009		3/19/2009	
Sample Delivery Group			1009524		910201		912327		1012499		903431		903431		903431	
Sample Type			FS		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,1,1-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,1,2-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,1-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,1-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,1-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,2,3-Trichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,2-Dibromoethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,2-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,2-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,2-Dichloroethene (total)	ug/L														
E524.2	1,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,3-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,3-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	1,3-Dichloropropene (total)	ug/L														
E524.2	1,4-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	2,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	2-Butanone	ug/L														
E524.2	2-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	2-Hexanone	ug/L														
E524.2	4-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	4-iso-Propyltoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	4-Methyl-2-pentanone	ug/L														
E524.2	Acetone	ug/L														
E524.2	Benzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	Bromobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	Bromochloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	Bromodichloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	Bromoform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	Bromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	Carbon disulfide	ug/L														
E524.2	Carbon tetrachloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	Chlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	Chlorodibromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	Chloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	Chloroform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
E524.2	Chloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			3791NHWHY31-TRT-0910		3791NHWHY31-TRT-1009		3791NHWHY31-TRT-1209		3791NHWHY31-TRT-1210		3791 N 31		3791 N 31		3791 N 31	
Sample Date			9/16/2010		10/6/2009		12/8/2009		12/14/2010		3/19/2009		3/19/2009		3/19/2009	
Sample Delivery Group			1009524		910201		912327		1012499		903431		903431		903431	
Sample Type			FS		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U			
E524.2	Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	Methylene chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	n-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	Naphthalene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	Propylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	sec-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	Styrene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	tert-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	Tetrachloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	Toluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	trans-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	trans-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	Trichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	Trichlorofluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	Vinyl chloride	ug/L	0.5 U		0.5 U		11		0.92		8.5		0.5 U			
E524.2	Xylene, m/p	ug/L	1 U		1 U		1 U		1 U		1 U		1 U			
E524.2	Xylene, o	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	Xylenes, Total	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U			
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L													0.005 U	

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location Field Sample ID Sample Date Sample Delivery Group Sample Type			3791 N 31 MILLER-RAW-0309 3/19/2009 903431 FS		3791 N 31 Raw-3791 N Old US 31 5/20/2009 905395 FS		3791 N 31 Raw-3791 N Old US 31 R 5/20/2009 905395 FD		3791 N 31 TRT-3791 N Old US 31 5/20/2009 905395 FS		3796 N 31 3796 N Hwy 31-RAW-0609 6/2/2009 906119 FS		3796 N 31 3796 N Hwy 31-TRT-0609 6/2/2009 906119 FS		3796 N 31 3796NHwy-RAW-0610 6/3/2010 1006164 FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,1-Trichloroethane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2,2-Tetrachloroethane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2-Trichloroethane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloropropene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichlorobenzene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichloropropane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trichlorobenzene	ug/L			0.5 UJ		0.5 UJ		0.5 UJ		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trimethylbenzene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromo-3-chloropropane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromoethane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichlorobenzene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethene (total)	ug/L														
E524.2	1,2-Dichloropropane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3,5-Trimethylbenzene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichlorobenzene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropene (total)	ug/L														
E524.2	1,4-Dichlorobenzene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2,2-Dichloropropane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Butanone	ug/L														
E524.2	2-Chlorotoluene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Hexanone	ug/L														
E524.2	4-Chlorotoluene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-iso-Propyltoluene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-Methyl-2-pentanone	ug/L														
E524.2	Acetone	ug/L														
E524.2	Benzene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromobenzene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromochloromethane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromodichloromethane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromoform	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromomethane	ug/L			0.5 UJ		0.5 UJ		0.5 UJ		0.5 U		0.5 U		0.5 U	
E524.2	Carbon disulfide	ug/L														
E524.2	Carbon tetrachloride	ug/L			0.5 UJ		0.5 UJ		0.5 UJ		0.5 U		0.5 U		0.5 U	
E524.2	Chlorobenzene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorodibromomethane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroethane	ug/L			0.5 UJ		0.5 UJ		0.5 UJ		0.5 U		0.5 U		0.5 U	
E524.2	Chloroform	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloromethane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location Field Sample ID Sample Date Sample Delivery Group Sample Type			3791 N 31 MILLER-RAW-0309 3/19/2009 903431 FS		3791 N 31 Raw-3791 N Old US 31 5/20/2009 905395 FS		3791 N 31 Raw-3791 N Old US 31 R 5/20/2009 905395 FD		3791 N 31 TRT-3791 N Old US 31 5/20/2009 905395 FS		3796 N 31 3796 N Hwy 31-RAW-0609 6/2/2009 906119 FS		3796 N 31 3796 N Hwy 31-TRT-0609 6/2/2009 906119 FS		3796 N 31 3796NHwy-RAW-0610 6/3/2010 1006164 FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Cis-1,2-Dichloroethene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	cis-1,3-Dichloropropene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Ethyl benzene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L			1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methylene chloride	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	n-Butylbenzene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Naphthalene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Propylbenzene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	sec-Butylbenzene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Styrene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	tert-Butylbenzene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Tetrachloroethene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Toluene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,2-Dichloroethene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,3-Dichloropropene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichloroethene	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichlorofluoromethane	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Vinyl chloride	ug/L			9.8 *		10 *		0.5 U		6.6		0.5 U		7.8 *	
E524.2	Xylene, m/p	ug/L			1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Xylene, o	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylenes, Total	ug/L			0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L	0.005	U												

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31	
Field Sample ID			3796NHwy-TRT-0610		3796NHwy31-RAW-0310		3796NHwy31-RAW-0310R		3796NHwy31-RAW-0909		3796NHwy31-RAW-0909R		3796NHwy31-RAW-0910		3796NHwy31-RAW-1209	
Sample Date			6/3/2010		3/10/2010		3/10/2010		9/10/2009		9/10/2009		9/16/2010		12/8/2009	
Sample Delivery Group			1006164		1003270		1003270		909291		909291		1009527		912326	
Sample Type			FS		FS		FD		FS		FD		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,1-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromoethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethene (total)	ug/L														
E524.2	1,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropene (total)	ug/L														
E524.2	1,4-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Butanone	ug/L														
E524.2	2-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Hexanone	ug/L														
E524.2	4-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-iso-Propyltoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-Methyl-2-pentanone	ug/L														
E524.2	Acetone	ug/L														
E524.2	Benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromochloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromodichloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromoform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Carbon disulfide	ug/L														
E524.2	Carbon tetrachloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorodibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31	
Field Sample ID			3796NHWY-TRT-0610		3796NHWY31-RAW-0310		3796NHWY31-RAW-0310R		3796NHWY31-RAW-0909		3796NHWY31-RAW-0909R		3796NHWY31-RAW-0910		3796NHWY31-RAW-1209	
Sample Date			6/3/2010		3/10/2010		3/10/2010		9/10/2009		9/10/2009		9/10/2009		12/8/2009	
Sample Delivery Group			1006164		1003270		1003270		909291		909291		1009527		912326	
Sample Type			FS		FS		FD		FS		FD		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	0.5 UJ		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methylene chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	n-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Naphthalene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Propylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	sec-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Styrene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	tert-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Tetrachloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Toluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichlorofluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Vinyl chloride	ug/L	0.5 U		0.5 U		0.5 U		8.8		9.7		8.7		9.1	
E524.2	Xylene, m/p	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Xylene, o	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylenes, Total	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31	
Field Sample ID			3796NHUY31-RAW-1210		3796NHUY31-TRT-0310		3796NHUY31-TRT-0909		3796NHUY31-TRT-0910		3796NHUY31-TRT-1209		3796NHUY31-TRT-1210	
Sample Date			12/14/2010		3/10/2010		9/10/2009		9/16/2010		12/8/2009		12/14/2010	
Sample Delivery Group			1012496		1003270		909291		1009527		912326		1012496	
Sample Type			FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,1-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		R		0.5 U	
E524.2	1,2-Dibromoethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethene (total)	ug/L												
E524.2	1,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropene (total)	ug/L												
E524.2	1,4-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Butanone	ug/L												
E524.2	2-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Hexanone	ug/L												
E524.2	4-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-iso-Propyltoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-Methyl-2-pentanone	ug/L												
E524.2	Acetone	ug/L												
E524.2	Benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromochloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromodichloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromoform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Carbon disulfide	ug/L												
E524.2	Carbon tetrachloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorodibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	



**Table A-4**  
**Private Well Analytical Data**  
**TORX Facility**  
**Rochester, Indiana**

Location			3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31	
Field Sample ID			3796NHWY31-RAW-1210		3796NHWY31-TRT-0310		3796NHWY31-TRT-0909		3796NHWY31-TRT-0910		3796NHWY31-TRT-1209		3796NHWY31-TRT-1210	
Sample Date			12/14/2010		3/10/2010		9/10/2009		9/16/2010		12/8/2009		12/14/2010	
Sample Delivery Group			1012496		1003270		909291		1009527		912326		1012496	
Sample Type			FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methylene chloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	n-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Naphthalene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Propylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	sec-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Styrene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	tert-Butylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Tetrachloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Toluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichlorofluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Vinyl chloride	ug/L	8.5		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylene, m/p	ug/L	1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Xylene, o	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylenes, Total	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Total Halogenated Hydrocarbons	ug/L												
E200.8	Cadmium	mg/L												
E200.8	Chromium	mg/L												
E200.8	Copper	mg/L												
E200.8	Lead	mg/L												

FS - field sample  
FD - field duplicate  
U - not detected, value is the reporting limit  
J - value is estimated  
R - rejected  
ug/L - micrograms per liter  
mg/L - milligram per liter

Prepared by / Date: KJC 02/23/11  
Checked by / Date: CSR

**Table A-5**  
**Analytical Data for Potable Water Samples - Property 36**  
**TORX Facility**  
**Rochester, Indiana**

Parameter Name	Location Field Sample ID Sample Date Sample Delivery Group Sample Type		4217 N 31 4217 N Old SR 31 11/19/2008 LQ5600 FS		4217 N 31 MTR-4217NOHWY31-DW051110 5/11/2010 1005295 FS	
	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organics (ug/L)</b>						
1,1,1,2-Tetrachloroethane	0.5	U			0.5	U
1,1,1-Trichloroethane	0.5	U			0.5	U
1,1,2,2-Tetrachloroethane	0.5	U			0.5	U
1,1,2-Trichloroethane	0.5	U			0.5	U
1,1-Dichloroethane	0.5	U			0.5	U
1,1-Dichloroethene	0.5	U			0.5	U
1,1-Dichloropropene	0.5	U			0.5	U
1,2,3-Trichlorobenzene	0.5	U			0.5	U
1,2,3-Trichloropropane	0.5	U			0.5	U
1,2,4-Trichlorobenzene	0.5	U			0.5	U
1,2,4-Trimethylbenzene	0.5	U			0.5	U
1,2-Dibromo-3-chloropropane	0.5	U			0.5	U
1,2-Dibromoethane	0.5	U			0.5	U
1,2-Dichlorobenzene	0.5	U			0.5	U
1,2-Dichloroethane	0.5	U			0.5	U
1,2-Dichloropropane	0.5	U			0.5	U
1,3,5-Trimethylbenzene	0.5	U			0.5	U
1,3-Dichlorobenzene	0.5	U			0.5	U
1,3-Dichloropropane	0.5	U			0.5	U
1,4-Dichlorobenzene	0.5	U			0.5	U
2,2-Dichloropropane	0.5	U			0.5	U
2-Chlorotoluene	0.5	U			0.5	U
4-Chlorotoluene	0.5	U			0.5	U
4-iso-Propyltoluene	0.5	U			0.5	U
Benzene	0.5	U			0.5	U
Bromobenzene	0.5	U			0.5	U
Bromochloromethane	0.5	U			0.5	U
Bromodichloromethane	0.5	U			0.5	U
Bromoform	0.5	U			0.5	U
Bromomethane	0.5	U			0.5	U
Carbon tetrachloride	0.5	U			0.5	U
Chlorobenzene	0.5	U			0.5	U
Chlorodibromomethane	0.5	U			0.5	U
Chloroethane	0.5	U			0.5	U
Chloroform	0.5	U			0.5	U
Chloromethane	0.5	U			0.5	U
Cis-1,2-Dichloroethene	0.5	U			0.5	U
cis-1,3-Dichloropropene	0.5	U			0.5	U
Dibromomethane	0.5	U			0.5	U
Dichlorodifluoromethane	0.5	U			0.5	U
Ethyl benzene	0.5	U			0.5	U
Hexachlorobutadiene	0.5	U			1	U
Isopropylbenzene	0.5	U			0.5	U
Methyl Tertbutyl Ether	0.5	U			0.5	U
Methylene chloride	0.5	U			0.5	U
n-Butylbenzene	0.5	U			0.5	U
Naphthalene	0.5	U			0.5	U
Propylbenzene	0.5	U			0.5	U
sec-Butylbenzene	0.5	U			0.5	U
Styrene	0.5	U			0.5	U
tert-Butylbenzene	0.5	U			0.5	U

**Table A-5**  
**Analytical Data for Potable Water Samples - Property 36**  
**TORX Facility**  
**Rochester, Indiana**

<b>Location</b>	<b>4217 N 31</b>		<b>4217 N 31</b>	
<b>Field Sample ID</b>	<b>4217 N Old SR 31</b>		<b>MTR-4217NOHWY31-DW051110</b>	
<b>Sample Date</b>	<b>11/19/2008</b>		<b>5/11/2010</b>	
<b>Sample Delivery Group</b>	<b>LQ5600</b>		<b>1005295</b>	
<b>Sample Type</b>	<b>FS</b>		<b>FS</b>	
<b>Parameter Name</b>	<b>Result</b>	<b>Qual</b>	<b>Result</b>	<b>Qual</b>
Tetrachloroethene	0.5 U		0.5 U	
Toluene	0.5 U		0.5 U	
trans-1,2-Dichloroethene	0.5 U		0.5 U	
trans-1,3-Dichloropropene	0.5 U		0.5 U	
Trichloroethene	0.5 U		0.5 U	
Trichlorofluoromethane	0.5 U		0.5 U	
Vinyl chloride	0.2 U		0.5 U	
Xylene, m/p	0.5 U		1 U	
Xylene, o	0.5 U		0.5 U	
Xylenes, Total			0.5 U	

ug/L = microgram per liter

U = not detected, value is the reporting limit

Prepared by / Date: KJC 02/15/11

Checked by / Date: MJM 02/15/11

Table A-6

**Summary of Potable Water Analytical Data – Industrial Facility at Property 41  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

(Results reported in micrograms per liter, ug/l)

Sample Date	Benzene	Chlorobenzene	Chloroform	1,1-Dichloroethane	1,1-Dichloroethene	Cis-1,2-Dichloroethene	Ethyl benzene	Tetrachloroethene	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride	Xylenes, Total
04/10/02	< 0.5	< 0.5	NA	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
04/11/05	< 0.5	< 0.5	NA	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
03/18/08	< 0.5	< 0.5	NA	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
05/27/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

PB: WDG  
CB: MMM

Notes:

NA - Not analyzed

"<" - not detected, value is the detection limit

Table prepared using sample results obtained from the Indiana Drinking Water Branch (<https://myweb.in.gov/IDEM/DWW/index.jsp>)

For a complete list of analyzed compounds and results please refer to <https://myweb.in.gov/IDEM/DWW/index.jsp>.

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N	
Field Sample ID			1082 E375N-RAW-0609		1082 E375N-TRT-0609		1082E375N-RAW-0310		1082E375N-RAW-0610		1082E375N-RAW-0909		1082E375N-RAW-0910		1082E375N	
Sample Date			6/2/2009		6/2/2009		3/9/2010		6/3/2010		9/10/2009		9/16/2010		12/11	
Sample Delivery Group			906122		906122		1003269		1006162		909292		1009526		912	
Sample Type			FS		FS		FS		FS		FS		FS		F	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1,1-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1,2-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5 U		0.5 UJ		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,3-Trichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5 U		0.5 UJ		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5 U		0.5 UJ		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dibromoethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,3-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,3-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,4-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	2,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	2-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	4-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	4-iso-Propyltoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromochloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromodichloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromoform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Carbon tetrachloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chlorodibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chloroform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Dichlorodifluoromethane	ug/L	0.5 U		0.5 UJ		0.5 UJ		0.5 UJ		0.5 U		0.5 U		0.5	
E524.2	Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1	
E524.2	Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N	
Field Sample ID			1082 E375N-RAW-0609		1082 E375N-TRT-0609		1082E375N-RAW-0310		1082E375N-RAW-0610		1082E375N-RAW-0909		1082E375N-RAW-0910		1082E375N		1082E375N	
Sample Date			6/2/2009		6/2/2009		3/9/2010		6/3/2010		9/10/2009		9/16/2010		12/11		12/11	
Sample Delivery Group			906122		906122		1003269		1006162		909292		1009526		912		912	
Sample Type			FS		FS		FS		FS		FS		FS		F		F	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Methylene chloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	n-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Naphthalene	ug/L	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Propylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	sec-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Styrene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	tert-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Tetrachloroethene	ug/L	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Toluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,2-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,3-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichlorofluoromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Vinyl chloride	ug/L	0.97		0.5	UJ	1.6		1.3		1.2		1.5		0.5		0.5	
E524.2	Xylene, m/p	ug/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
E524.2	Xylene, o	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Xylenes, Total	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Total Halogenated Hydrocarbons	ug/L																
E200.8	Cadmium	mg/L																
E200.8	Chromium	mg/L																
E200.8	Copper	mg/L																
E200.8	Lead	mg/L																

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

R - rejected

ug/L - micrograms per liter

mg/L - milligram per liter

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			375 N	1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N	
Field Sample ID			RAW-1209	1082E375N-RAW-1210		1082E375N-TRT-0310		1082E375N-TRT-0610		1082E375N-TRT-0909		1082E375N-TRT-0910		1082E375N-TRT-1209	
Sample Date			2/2009	12/14/2010		3/9/2010		6/3/2010		9/10/2009		9/16/2010		12/11/2009	
Sample Delivery Group			325	1012497		1003269		1006162		909292		1009526		912325	
Sample Type			S	FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,1-Trichloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2-Trichloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloropropene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trimethylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromoethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3,5-Trimethylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,4-Dichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2,2-Dichloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Chlorotoluene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-Chlorotoluene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-iso-Propyltoluene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Benzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromochloromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromodichloromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromoform	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromomethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Carbon tetrachloride	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorodibromomethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroform	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Cis-1,2-Dichloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	cis-1,3-Dichloropropene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Ethyl benzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	U	1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location: 375 N				1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N		1082 E 375 N	
Field Sample ID -RAW-1209				1082E375N-RAW-1210		1082E375N-TRT-0310		1082E375N-TRT-0610		1082E375N-TRT-0909		1082E375N-TRT-0910		1082E375N-TRT-1209	
Sample Date 2009				12/14/2010		3/9/2010		6/3/2010		9/10/2009		9/16/2010		12/11/2009	
Sample Delivery Group 325				1012497		1003269		1006162		909292		1009526		912325	
Sample Type S				FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Methylene chloride	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	n-Butylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Naphthalene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Propylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	sec-Butylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Styrene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	tert-Butylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Tetrachloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Toluene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,2-Dichloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,3-Dichloropropene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichlorofluoromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Vinyl chloride	ug/L	U	1.4		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylene, m/p	ug/L	U	1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Xylene, o	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylenes, Total	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Total Halogenated Hydrocarbons	ug/L													
E200.8	Cadmium	mg/L													
E200.8	Chromium	mg/L													
E200.8	Copper	mg/L													
E200.8	Lead	mg/L													

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

R - rejected

ug/L - micrograms per liter

mg/L - milligram per liter



**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			1082 E 375 N		1362 E 350 N		1387 E 350 N		1995 E 450 N		1995 E 450 N		1999 E 450 N		1999 E	
Field Sample ID			1082E375N-TRT-1210		1362E350N-TRT-0410		1387E350N-TRT-0301		1995E450N-TRT-0310		Talbot1995E450N021109		MTR-1999E450N-DW100609A		MTR-1999E450N-DW100609A	
Sample Date			12/14/2010		4/5/2010		3/29/2010		3/30/2010		2/11/2009		10/6/2009		10/6/2009	
Sample Delivery Group			1012497		1004161		1004017		1004019		902265		910203		910203	
Sample Type			FS		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,1-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromoethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,4-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-iso-Propyltoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Benzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromochloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromodichloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromoform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Carbon tetrachloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorodibromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	cis-1,3-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Dibromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Dichlorodifluoromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Ethyl benzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Hexachlorobutadiene	ug/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U
E524.2	Isopropylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Methyl Tertbutyl Ether	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			1082 E 375 N		1362 E 350 N		1387 E 350 N		1995 E 450 N		1995 E 450 N		1999 E 450 N		1999 E 450 N	
Field Sample ID			1082E375N-TRT-1210		1362E350N-TRT-0410		1387E350N-TRT-0301		1995E450N-TRT-0310		Talbot1995E450N021109		MTR-1999E450N-DW100609A		MTR-1999E450N-DW100609A	
Sample Date			12/14/2010		4/5/2010		3/29/2010		3/30/2010		2/11/2009		10/6/2009		10/6/2009	
Sample Delivery Group			1012497		1004161		1004017		1004019		902265		910203		910203	
Sample Type			FS		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Methylene chloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	n-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Naphthalene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Propylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	sec-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Styrene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	tert-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Tetrachloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Toluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,2-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,3-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichlorofluoromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Vinyl chloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Xylene, m/p	ug/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U
E524.2	Xylene, o	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Xylenes, Total	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

R - rejected

ug/L - micrograms per liter

mg/L - milligram per liter

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			450 N	2241 E 450 N		2241 E 450 N		3394 N 31		3586 N 31		3597 N 31		3597 N 31	
Field Sample ID			N-DW100609B	MTR-2241E450N-DW100609		MTR-2241E450N-DW100609R		3394NHWHY31-TRT-0610		3586NHWHY31-TRT-0410		3597 N Hwy 31-RAW-0609		3597 N Hwy 31-TRT-0609	
Sample Date			2009	10/6/2009		10/6/2009		6/30/2010		4/14/2010		6/2/2009		6/2/2009	
Sample Delivery Group			203	910204		910204		1007050		1004328		906123		906123	
Sample Type			S	FS		FD		FS		FS		FS		FS	
Method	Parameter Name	Units	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,1-Trichloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2,2-Tetrachloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2-Trichloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloropropene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichlorobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichloropropane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trichlorobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trimethylbenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromo-3-chloropropane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromoethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichlorobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloropropane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3,5-Trimethylbenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichlorobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,4-Dichlorobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2,2-Dichloropropane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Chlorotoluene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-Chlorotoluene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-iso-Propyltoluene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Benzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromochloromethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromodichloromethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromoform	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromomethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Carbon tetrachloride	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorodibromomethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroform	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloromethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Cis-1,2-Dichloroethene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	3.5		0.5	U
E524.2	cis-1,3-Dichloropropene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Dibromomethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Dichlorodifluoromethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Ethyl benzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Hexachlorobutadiene	ug/L	U	1	U	1	U	1	U	1	U	1	U	1	U
E524.2	Isopropylbenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Methyl Tertbutyl Ether	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			450 N	2241 E 450 N		2241 E 450 N		3394 N 31		3586 N 31		3597 N 31		3597 N 31	
Field Sample ID			N-DW100609B	MTR-2241E450N-DW100609		MTR-2241E450N-DW100609R		3394NHWHY31-TRT-0610		3586NHWHY31-TRT-0410		3597 N Hwy 31-RAW-0609		3597 N Hwy 31-TRT-0609	
Sample Date			2009	10/6/2009		10/6/2009		6/30/2010		4/14/2010		6/2/2009		6/2/2009	
Sample Delivery Group			203	910204		910204		1007050		1004328		906123		906123	
Sample Type			S	FS		FD		FS		FS		FS		FS	
Method	Parameter Name	Units	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Methylene chloride	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	n-Butylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 UJ		0.5 U		0.5 U	
E524.2	Naphthalene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 UJ		0.5 U		0.5 U	
E524.2	Propylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	sec-Butylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Styrene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	tert-Butylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Tetrachloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 UJ		0.5 U		0.5 U	
E524.2	Toluene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,2-Dichloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,3-Dichloropropene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichlorofluoromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Vinyl chloride	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylene, m/p	ug/L	U	1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Xylene, o	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylenes, Total	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Total Halogenated Hydrocarbons	ug/L													
E200.8	Cadmium	mg/L													
E200.8	Chromium	mg/L													
E200.8	Copper	mg/L													
E200.8	Lead	mg/L													

FS - field sample  
FD - field duplicate  
U - not detected, value is the reporting limit  
J - value is estimated  
R - rejected  
ug/L - micrograms per liter  
mg/L - milligram per liter

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31	
Field Sample ID			3597 N Old SR 31-pre		3597NHWHY-FNL-0610		3597NHWHY-RAW-0610		3597NHWHY-TRT-0610		3597NHWHY31-RAW-0310		3597NHWHY31-RAW-0610		3597NHWHY31-RAW-0610		3597NHWHY31-RAW-0610	
Sample Date			11/19/2008		6/3/2010		6/3/2010		6/3/2010		6/3/2010		3/9/2010		6/30/2010		6/30/2010	
Sample Delivery Group			LQ5575		1006163		1006163		1006163		1006163		1003273		1007048		1007048	
Sample Type			FS		FS		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,1-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromoethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,4-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-iso-Propyltoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromochloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromodichloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromoform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Carbon tetrachloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorodibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Cis-1,2-Dichloroethene	ug/L	4.5		0.5 U		0.5 U		0.5 U		3.7		2.9		3.7 U		3.7	
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	0.5 U		1 U		1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31	
Field Sample ID			3597 N Old SR 31-pre		3597NHWHY-FNL-0610		3597NHWHY-RAW-0610		3597NHWHY-TRT-0610		3597NHWHY31-RAW-0310		3597NHWHY31-RAW-0610		3597NHWHY31-RAW-0610	
Sample Date			11/19/2008		6/3/2010		6/3/2010		6/3/2010		3/9/2010		6/30/2010		6/30/2010	
Sample Delivery Group			LQ5575		1006163		1006163		1006163		1003273		1007048		1007048	
Sample Type			FS		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Methylene chloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	n-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Naphthalene	ug/L	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Propylbenzene	ug/L	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	sec-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Styrene	ug/L	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	tert-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Tetrachloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Toluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,2-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,3-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichloroethene	ug/L	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichlorofluoromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Vinyl chloride	ug/L	0.2	U	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Xylene, m/p	ug/L	0.5	U	1	UJ	1	U	1	U	1	U	1	U	1	U
E524.2	Xylene, o	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Xylenes, Total	ug/L			0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

R - rejected

ug/L - micrograms per liter

mg/L - milligram per liter

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			N 31	3597 N 31	3597 N 31	3597 N 31	3597 N 31	3597 N 31	3597 N 31	3597 N 31	
Field Sample ID			-RAW-0610R	3597NHWHY31-RAW-0909	3597NHWHY31-RAW-1209	3597NHWHY31-RAW-1210	3597NHWHY31-RAW-1910	3597NHWHY31-RAW-1910	3597NHWHY31-TRT-0310	3597NHWHY31-TRT-0610	
Sample Date			2010	9/10/2009	12/8/2009	12/14/2010	12/14/2010	9/16/2010	3/9/2010	6/30/2010	
Sample Delivery Group			048	909289	912328	1012498	1009525	1009525	1003273	1007048	
Sample Type			D	FS	FS	FS	FS	FS	FS	FS	
Method	Parameter Name	Units	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,1-Trichloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2-Trichloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloropropene	ug/L	UJ	0.5 U		0.5 U		0.5 U		0.5 UJ	
E524.2	1,2,3-Trichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trimethylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromoethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3,5-Trimethylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,4-Dichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2,2-Dichloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Chlorotoluene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-Chlorotoluene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-iso-Propyltoluene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Benzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromochloromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromodichloromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromoform	ug/L	UJ	0.5 U		0.5 U		0.5 U		0.5 UJ	
E524.2	Bromomethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Carbon tetrachloride	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorodibromomethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroform	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Cis-1,2-Dichloroethene	ug/L	U	2.9		2.8		3.2		0.5 U	
E524.2	cis-1,3-Dichloropropene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	UJ	0.5 U		0.5 U		0.5 U		0.5 UJ	
E524.2	Ethyl benzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	U	1 U		1 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U	

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

		Location		N 31	3597 N 31		3597 N 31	3597 N 31		3597 N 31	3597 N 31		3597 N 31	3597 N 31	
		Field Sample ID		-RAW-0610R	3597NHWHY31-RAW-0909		3597NHWHY31-RAW-1209	3597NHWHY31-RAW-1210		3597NHWHY31-RAW-1910	3597NHWHY31-TRT-0310		3597NHWHY31-TRT-0610		
		Sample Date		2010	9/10/2009		12/8/2009	12/14/2010		9/16/2010	3/9/2010		6/30/2010		
		Sample Delivery Group		048	909289		912328	1012498		1009525	1003273		1007048		
		Sample Type		D	FS		FS	FS		FS	FS		FS		
Method	Parameter Name	Units	Qual		Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	
E524.2	Methylene chloride	ug/L	U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		
E524.2	n-Butylbenzene	ug/L	U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		
E524.2	Naphthalene	ug/L	U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		
E524.2	Propylbenzene	ug/L	U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		
E524.2	sec-Butylbenzene	ug/L	U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		
E524.2	Styrene	ug/L	U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		
E524.2	tert-Butylbenzene	ug/L	U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		
E524.2	Tetrachloroethene	ug/L	U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		
E524.2	Toluene	ug/L	U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		
E524.2	trans-1,2-Dichloroethene	ug/L	U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		
E524.2	trans-1,3-Dichloropropene	ug/L	U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		
E524.2	Trichloroethene	ug/L	U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		
E524.2	Trichlorofluoromethane	ug/L	U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		
E524.2	Vinyl chloride	ug/L	U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		
E524.2	Xylene, m/p	ug/L	U		1 U		1 U		1 U		1 U		1 U		
E524.2	Xylene, o	ug/L	U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		
E524.2	Xylenes, Total	ug/L	U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		
E524.2	Total Halogenated Hydrocarbons	ug/L													
E200.8	Cadmium	mg/L													
E200.8	Chromium	mg/L													
E200.8	Copper	mg/L													
E200.8	Lead	mg/L													

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

R - rejected

ug/L - micrograms per liter

mg/L - milligram per liter



**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31	
Field Sample ID			3597NHWHY31-TRT-0909		3597NHWHY31-TRT-0910		3597NHWHY31-TRT-1209		3597NHWHY31-TRT-1210		PRA-Drain-0109		PRA-RAW-0309		PRA-TF					
Sample Date			9/10/2009		9/16/2010		12/8/2009		12/14/2010		1/7/2009		3/19/2009		3/19/					
Sample Delivery Group			909289		1009525		912328		1012498		DSA0269		903431		903					
Sample Type			FS		FS		FS		FS		FS		FS		FS					
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,1-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2-Trichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromoethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,4-Dichlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2,2-Dichloropropane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-Chlorotoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-iso-Propyltoluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Benzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromochloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromodichloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromoform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Carbon tetrachloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorobenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorodibromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroform	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	3.7		0.5	U	0.5	U
E524.2	cis-1,3-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Dibromomethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Dichlorodifluoromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Ethyl benzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Hexachlorobutadiene	ug/L	1	U	1	U	1	U	1	U	0.5	U	1	U	1	U	0.5	U	1	U
E524.2	Isopropylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Methyl Tertbutyl Ether	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	5	U	0.5	U	0.5	U	0.5	U	0.5	U

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31		3597 N 31	
Field Sample ID			3597NHWY31-TRT-0909		3597NHWY31-TRT-0910		3597NHWY31-TRT-1209		3597NHWY31-TRT-1210		PRA-Drain-0109		PRA-RAW-0309		PRA-TRT-0309	
Sample Date			9/10/2009		9/16/2010		12/8/2009		12/14/2010		1/7/2009		3/19/2009		3/19/2009	
Sample Delivery Group			909289		1009525		912328		1012498		DSA0269		903431		903431	
Sample Type			FS		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Methylene chloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	n-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Naphthalene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Propylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	sec-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Styrene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	tert-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Tetrachloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Toluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U			0.5	U	0.5	U
E524.2	trans-1,2-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,3-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichlorofluoromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Vinyl chloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Xylene, m/p	ug/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U
E524.2	Xylene, o	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Xylenes, Total	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	1.5	U	0.5	U	0.5	U
E524.2	Total Halogenated Hydrocarbons	ug/L									0.5	U				
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

R - rejected

ug/L - micrograms per liter

mg/L - milligram per liter

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			N 31	3597 N 31		3597 N 31		3719 N 31		3719 N 31		3719 N 31		3791 N 31	
Field Sample ID			T-0309	PRATT-FINAL-0309		PRATT-RAW-0309		3719 N Old SR 31		3719NHWHY31-TRT-0410		3719NHWHY31-TRT-0410R		3791 N Hwy 31 - Raw - 1109	
Sample Date			2009	3/19/2009		3/19/2009		11/19/2008		4/8/2010		4/8/2010		11/17/2009	
Sample Delivery Group			431	903431		903431		LQ5579		1004220		1004220		911462	
Sample Type			S	FS		FS		FS		FS		FD		FS	
Method	Parameter Name	Units	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,1-Trichloroethane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2-Trichloroethane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloropropene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichlorobenzene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichloropropane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trichlorobenzene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trimethylbenzene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromoethane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichlorobenzene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloropropane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3,5-Trimethylbenzene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichlorobenzene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,4-Dichlorobenzene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2,2-Dichloropropane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Chlorotoluene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-Chlorotoluene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-iso-Propyltoluene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Benzene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromobenzene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromochloromethane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromodichloromethane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromoform	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromomethane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 UJ	
E524.2	Carbon tetrachloride	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorobenzene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorodibromomethane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroethane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroform	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 UJ	
E524.2	Chloromethane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 UJ	
E524.2	Cis-1,2-Dichloroethene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	cis-1,3-Dichloropropene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 UJ	
E524.2	Dibromomethane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 UJ	
E524.2	Ethyl benzene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	U					0.5 U		1 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			N 31	3597 N 31		3597 N 31		3719 N 31		3719 N 31		3719 N 31		3791 N 31	
Field Sample ID			T-0309	PRATT-FINAL-0309		PRATT-RAW-0309		3719 N Old SR 31		3719NHWHY31-TRT-0410		3719NHWHY31-TRT-0410R		3791 N Hwy 31 - Raw - 1109	
Sample Date			2009	3/19/2009		3/19/2009		11/19/2008		4/8/2010		4/8/2010		11/17/2009	
Sample Delivery Group			431	903431		903431		LQ5579		1004220		1004220		911462	
Sample Type			S	FS		FS		FS		FS		FD		FS	
Method	Parameter Name	Units	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Methylene chloride	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 UJ	
E524.2	n-Butylbenzene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Naphthalene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Propylbenzene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	sec-Butylbenzene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Styrene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	tert-Butylbenzene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Tetrachloroethene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Toluene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,2-Dichloroethene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,3-Dichloropropene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichloroethene	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichlorofluoromethane	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 UJ	
E524.2	Vinyl chloride	ug/L	U					0.2 U		0.5 U		0.5 U		12 J	
E524.2	Xylene, m/p	ug/L	U					0.5 U		1 U		1 U		1 U	
E524.2	Xylene, o	ug/L	U					0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylenes, Total	ug/L	U							0.5 U		0.5 U		0.5 U	
E524.2	Total Halogenated Hydrocarbons	ug/L													
E200.8	Cadmium	mg/L													
E200.8	Chromium	mg/L													
E200.8	Copper	mg/L													
E200.8	Lead	mg/L		0.005 U		0.005 U									

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

R - rejected

ug/L - micrograms per liter

mg/L - milligram per liter

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			3791 N Hwy 31 - Raw - 1109R		3791 N Hwy 31 - TRT - 1109		3791 N Hwy 31-RAW-0609		3791 N Hwy 31-RAW-0609R		3791 N Hwy 31-RAW-0809R		3791 N Hwy 31-RAW-0809R		3791 N Hwy 31-TRT-0609		3791 N Hwy 31-TRT-0609		3791 N Hwy 31-TRT-0609	
Sample Date			11/17/2009		11/17/2009		6/2/2009		6/2/2009		6/2/2009		8/31/2009		6/2/2009		6/2/2009		8/31/	
Sample Delivery Group			911462		911462		906120		906120		906120		909036		906120		906120		909	
Sample Type			FD		FS		FS		FD		FD		FD		FS		FS		F	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1,1-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1,2-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,3-Trichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dibromoethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,3-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,3-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,4-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	2,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	2-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	4-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	4-iso-Propyltoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromochloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromodichloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromoform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Carbon tetrachloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chlorodibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chloroform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U		1 U		1	
E524.2	Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791
Field Sample ID			3791 N Hwy 31 - Raw - 1109R		3791 N Hwy 31 - TRT - 1109		3791 N Hwy 31-RAW-0609		3791 N Hwy 31-RAW-0609R		3791 N Hwy 31-RAW-0809R		3791 N Hwy 31-TRT-0609		3791 N Hwy 31-TRT-0609		3791 N Hwy
Sample Date			11/17/2009		11/17/2009		6/2/2009		6/2/2009		6/2/2009		8/31/2009		6/2/2009		8/31/
Sample Delivery Group			911462		911462		906120		906120		906120		909036		906120		909
Sample Type			FD		FS		FS		FD		FD		FD		FS		F
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result
E524.2	Methylene chloride	ug/L	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5
E524.2	n-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5
E524.2	Naphthalene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5
E524.2	Propylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5
E524.2	sec-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5
E524.2	Styrene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5
E524.2	tert-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5
E524.2	Tetrachloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5
E524.2	Toluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5
E524.2	trans-1,2-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5
E524.2	trans-1,3-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	U	0.5	U	0.5
E524.2	Trichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5
E524.2	Trichlorofluoromethane	ug/L	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5
E524.2	Vinyl chloride	ug/L	12	J	0.5	UJ	8.1		8.3		12		0.5	U	0.5	U	0.5
E524.2	Xylene, m/p	ug/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1
E524.2	Xylene, o	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5
E524.2	Xylenes, Total	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5
E524.2	Total Halogenated Hydrocarbons	ug/L															
E200.8	Cadmium	mg/L															
E200.8	Chromium	mg/L															
E200.8	Copper	mg/L															
E200.8	Lead	mg/L															

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

R - rejected

ug/L - micrograms per liter

mg/L - milligram per liter

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

		Location		N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
		Field Sample ID		31-TRT-0809		3791 N Hwy31-RAW-0809		3791 N Old SR 31-pre		3791NHwy-RAW-0610		3791NHwy-RAW-0610R		3791NHwy-TRT-0610		3791NHwy31-FNL-0909			
		Sample Date		2009		8/31/2009		11/19/2008		6/3/2010		6/3/2010		6/3/2010		9/10/2009			
		Sample Delivery Group		036		909036		LQ5580		1006161		1006161		1006161		909288			
		Sample Type		S		FS		FS		FS		FD		FS		FS			
Method	Parameter Name	Units	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,1-Trichloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2,2-Tetrachloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2-Trichloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloropropene	ug/L	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichlorobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichloropropane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trichlorobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trimethylbenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromo-3-chloropropane	ug/L	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromoethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichlorobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloropropane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3,5-Trimethylbenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichlorobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,4-Dichlorobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2,2-Dichloropropane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Chlorotoluene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-Chlorotoluene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-iso-Propyltoluene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Benzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromochloromethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromodichloromethane	ug/L	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromoform	ug/L	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromomethane	ug/L	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Carbon tetrachloride	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorodibromomethane	ug/L	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroethane	ug/L	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroform	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloromethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Cis-1,2-Dichloroethene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	cis-1,3-Dichloropropene	ug/L	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Dibromomethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Dichlorodifluoromethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	UJ	0.5	UJ	0.5	UJ	0.5	UJ	0.5	U
E524.2	Ethyl benzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Hexachlorobutadiene	ug/L	U	1	U	0.5	U	0.5	U	1	U	0.5	U	1	U	0.5	U	1	U
E524.2	Isopropylbenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Methyl Tertbutyl Ether	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

		Location		N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
		Field Sample ID		31-TRT-0809		3791 N Hwy31-RAW-0809		3791 N Old SR 31-pre		3791NHwy-RAW-0610		3791NHwy-RAW-0610R		3791NHwy-TRT-0610		3791NHwy31-FNL-0909	
		Sample Date		2009		8/31/2009		11/19/2008		6/3/2010		6/3/2010		6/3/2010		9/10/2009	
		Sample Delivery Group		036		909036		LQ5580		1006161		1006161		1006161		909288	
		Sample Type		S		FS		FS		FS		FD		FS		FS	
Method	Parameter Name	Units	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Methylene chloride	ug/L	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	n-Butylbenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Naphthalene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Propylbenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	sec-Butylbenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Styrene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	tert-Butylbenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Tetrachloroethene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Toluene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,2-Dichloroethene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,3-Dichloropropene	ug/L	UJ	0.5	UJ	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichloroethene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichlorofluoromethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Vinyl chloride	ug/L	U	12		10		10 *		11 *		0.5	U	0.5	U	0.5	U
E524.2	Xylene, m/p	ug/L	U	1	U	0.5	U	0.5	U	1	U	1	U	1	U	1	U
E524.2	Xylene, o	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Xylenes, Total	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Total Halogenated Hydrocarbons	ug/L															
E200.8	Cadmium	mg/L															
E200.8	Chromium	mg/L															
E200.8	Copper	mg/L															
E200.8	Lead	mg/L															

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

R - rejected

ug/L - micrograms per liter

mg/L - milligram per liter



**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			3791NHWHY31-FNL-1209		3791NHWHY31-FNL-1210		3791NHWHY31-RAW-0110		3791NHWHY31-RAW-0110R		3791NHWHY31-RAW-0310		3791NHWHY31-RAW-0310R		3791NHWHY31-RAW-0310R		3791NHWHY31-RAW-0310R	
Sample Date			12/8/2009		12/14/2010		1/13/2010		1/13/2010		3/10/2010		3/10/2010		3/10/2010		7/23/2010	
Sample Delivery Group			912327		1012499		1001242		1001242		1003274		1003274		1003274		907	
Sample Type			FS		FS		FS		FD		FS		FD		FD		F	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1,1-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1,2-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,3-Trichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dibromoethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,3-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,3-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,4-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	2,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	2-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	4-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	4-iso-Propyltoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromochloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromodichloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromoform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Carbon tetrachloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chlorodibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chloroform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U		1	
E524.2	Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791	
Field Sample ID			3791NHWY31-FNL-1209		3791NHWY31-FNL-1210		3791NHWY31-RAW-0110		3791NHWY31-RAW-0110R		3791NHWY31-RAW-0310		3791NHWY31-RAW-0310R		3791NHWY31-RAW-0723	
Sample Date			12/8/2009		12/14/2010		1/13/2010		1/13/2010		3/10/2010		3/10/2010		7/23/2010	
Sample Delivery Group			912327		1012499		1001242		1001242		1003274		1003274		907	
Sample Type			FS		FS		FS		FD		FS		FD		F	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Methylene chloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	n-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Naphthalene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Propylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	sec-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Styrene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	tert-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Tetrachloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Toluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,2-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,3-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichlorofluoromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Vinyl chloride	ug/L	0.5	U	0.5	U	11		11		18		18		9.8	
E524.2	Xylene, m/p	ug/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U
E524.2	Xylene, o	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Xylenes, Total	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

R - rejected

ug/L - micrograms per liter

mg/L - milligram per liter

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			N 31	3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			1-RAW-0709	3791NHWHY31-RAW-0709R		3791NHWHY31-RAW-0909		3791NHWHY31-RAW-0909R		3791NHWHY31-RAW-0910		3791NHWHY31-RAW-0910R		3791NHWHY31-RAW-1009	
Sample Date			2009	7/23/2009		9/10/2009		9/10/2009		9/16/2010		9/16/2010		10/6/2009	
Sample Delivery Group			512	907512		909288		909288		1009524		1009524		910201	
Sample Type			S	FD		FS		FD		FS		FD		FS	
Method	Parameter Name	Units	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,1-Trichloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2-Trichloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloropropene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trimethylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromoethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3,5-Trimethylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,4-Dichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2,2-Dichloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Chlorotoluene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-Chlorotoluene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-iso-Propyltoluene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Benzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromochloromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromodichloromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromoform	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromomethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Carbon tetrachloride	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorodibromomethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroform	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Cis-1,2-Dichloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	cis-1,3-Dichloropropene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Ethyl benzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	U	1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

			Location	N 31	3791 N 31		3791 N 31	3791 N 31		3791 N 31	3791 N 31		3791 N 31	3791 N 31	
			Field Sample ID	1-RAW-0709	3791NHWHY31-RAW-0709R		3791NHWHY31-RAW-0909	3791NHWHY31-RAW-0909R		3791NHWHY31-RAW-0910	3791NHWHY31-RAW-0910R		3791NHWHY31-RAW-1009	3791NHWHY31-RAW-1009	
			Sample Date	2009	7/23/2009		9/10/2009	9/10/2009		9/16/2010	9/16/2010		10/6/2009	10/6/2009	
			Sample Delivery Group	512	907512		909288	909288		1009524	1009524		910201	910201	
			Sample Type	S	FD		FS	FD		FS	FD		FS	FS	
Method	Parameter Name	Units	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Methylene chloride	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	n-Butylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Naphthalene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Propylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	sec-Butylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Styrene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	tert-Butylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Tetrachloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Toluene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,2-Dichloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,3-Dichloropropene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichlorofluoromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Vinyl chloride	ug/L		9.8		11		11		11		11		12	
E524.2	Xylene, m/p	ug/L	U	1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Xylene, o	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylenes, Total	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Total Halogenated Hydrocarbons	ug/L													
E200.8	Cadmium	mg/L													
E200.8	Chromium	mg/L													
E200.8	Copper	mg/L													
E200.8	Lead	mg/L													

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

R - rejected

ug/L - micrograms per liter

mg/L - milligram per liter

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			3791NHWWY31-RAW-1209		3791NHWWY31-RAW-1209 R		3791NHWWY31-RAW-1210		3791NHWWY31-RAW-1210R		3791NHWWY31-TRT-0110		3791NHWWY31-TRT-0310		3791NHWWY31-TRT-0310		3791NHWWY31-TRT-0310	
Sample Date			12/8/2009		12/8/2009		12/14/2010		12/14/2010		1/13/2010		3/10/2010		7/23/2010		7/23/2010	
Sample Delivery Group			912327		912327		1012499		1012499		1001242		1003274		907		907	
Sample Type			FS		FD		FS		FD		FS		FS		F		F	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1,1-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1,2-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,3-Trichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dibromoethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,3-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,3-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,4-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	2,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	2-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	4-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	4-iso-Propyltoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromochloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromodichloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromoform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Carbon tetrachloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chlorodibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chloroform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U		1	
E524.2	Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5	

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			3791NHWHY31-RAW-1209		3791NHWHY31-RAW-1209 R		3791NHWHY31-RAW-1210		3791NHWHY31-RAW-1210R		3791NHWHY31-TRT-0110		3791NHWHY31-TRT-0310		3791NHWHY31-TRT-0310	
Sample Date			12/8/2009		12/8/2009		12/14/2010		12/14/2010		1/13/2010		3/10/2010		7/23/2010	
Sample Delivery Group			912327		912327		1012499		1012499		1001242		1003274		907	
Sample Type			FS		FD		FS		FD		FS		FS		F	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Methylene chloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	2.6	
E524.2	n-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	
E524.2	Naphthalene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	
E524.2	Propylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	
E524.2	sec-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	
E524.2	Styrene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	
E524.2	tert-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	
E524.2	Tetrachloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	
E524.2	Toluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	
E524.2	trans-1,2-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	
E524.2	trans-1,3-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	
E524.2	Trichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	
E524.2	Trichlorofluoromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	
E524.2	Vinyl chloride	ug/L	0.5	U	0.5	U	11		11		0.5	U	0.5	U	0.5	
E524.2	Xylene, m/p	ug/L	1	U	1	U	1	U	1	U	1	U	1	U	1	
E524.2	Xylene, o	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	
E524.2	Xylenes, Total	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

R - rejected

ug/L - micrograms per liter

mg/L - milligram per liter

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			N 31	3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			11-TRT-0709	3791NHWY31-TRT-0909		3791NHWY31-TRT-0910		3791NHWY31-TRT-1009		3791NHWY31-TRT-1209		3791NHWY31-TRT-1210		3791 N 31	
Sample Date			2009	9/10/2009		9/16/2010		10/6/2009		12/8/2009		12/14/2010		3/19/2009	
Sample Delivery Group			512	909288		1009524		910201		912327		1012499		903431	
Sample Type			S	FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,1-Trichloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2,2-Tetrachloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1,2-Trichloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloroethene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,1-Dichloropropene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichlorobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,3-Trichloropropane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trichlorobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2,4-Trimethylbenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromo-3-chloropropane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dibromoethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichlorobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,2-Dichloropropane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3,5-Trimethylbenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichlorobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,3-Dichloropropane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	1,4-Dichlorobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2,2-Dichloropropane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	2-Chlorotoluene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-Chlorotoluene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	4-iso-Propyltoluene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Benzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromochloromethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromodichloromethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromoform	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Bromomethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Carbon tetrachloride	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorobenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chlorodibromomethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloroform	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Chloromethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Cis-1,2-Dichloroethene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	cis-1,3-Dichloropropene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Dibromomethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Dichlorodifluoromethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Ethyl benzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Hexachlorobutadiene	ug/L	U	1	U	1	U	1	U	1	U	1	U	1	U
E524.2	Isopropylbenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Methyl Tertbutyl Ether	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			N 31	3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31	
Field Sample ID			11-TRT-0709	3791NHWHY31-TRT-0909		3791NHWHY31-TRT-0910		3791NHWHY31-TRT-1009		3791NHWHY31-TRT-1209		3791NHWHY31-TRT-1210		MIL-RAW-0309	
Sample Date			2009	9/10/2009		9/16/2010		10/6/2009		12/8/2009		12/14/2010		3/19/2009	
Sample Delivery Group			512	909288		1009524		910201		912327		1012499		903431	
Sample Type			S	FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Methylene chloride	ug/L		2.8 J		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	n-Butylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Naphthalene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Propylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	sec-Butylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Styrene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	tert-Butylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Tetrachloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Toluene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,2-Dichloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	trans-1,3-Dichloropropene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Trichlorofluoromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Vinyl chloride	ug/L	U	0.5 U		0.5 U		0.5 U		11		0.92		8.5	
E524.2	Xylene, m/p	ug/L	U	1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Xylene, o	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Xylenes, Total	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Total Halogenated Hydrocarbons	ug/L													
E200.8	Cadmium	mg/L													
E200.8	Chromium	mg/L													
E200.8	Copper	mg/L													
E200.8	Lead	mg/L													

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

R - rejected

ug/L - micrograms per liter

mg/L - milligram per liter



**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3796	
Field Sample ID			MIL-TRT-0309		MILLER-FINAL-0309		MILLER-RAW-0309		Raw-3791 N Old US 31		Raw-3791 N Old US 31 R		TRT-3791 N Old US 31		3796 N Hwy :	
Sample Date			3/19/2009		3/19/2009		3/19/2009		5/20/2009		5/20/2009		5/20/2009		6/2/	
Sample Delivery Group			903431		903431		903431		905395		905395		905395		906	
Sample Type			FS		FS		FS		FS		FD		FS		F	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1,1-Trichloroethane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1,2-Trichloroethane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1-Dichloroethane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1-Dichloroethene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,1-Dichloropropene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,3-Trichloropropane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5 U						0.5 UJ		0.5 UJ		0.5 UJ		0.5	
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dibromoethane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dichlorobenzene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dichloroethane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,2-Dichloropropane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,3-Dichlorobenzene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,3-Dichloropropane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	1,4-Dichlorobenzene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	2,2-Dichloropropane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	2-Chlorotoluene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	4-Chlorotoluene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	4-iso-Propyltoluene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	Benzene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromobenzene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromochloromethane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromodichloromethane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromoform	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	Bromomethane	ug/L	0.5 U						0.5 UJ		0.5 UJ		0.5 UJ		0.5	
E524.2	Carbon tetrachloride	ug/L	0.5 U						0.5 UJ		0.5 UJ		0.5 UJ		0.5	
E524.2	Chlorobenzene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chlorodibromomethane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chloroethane	ug/L	0.5 U						0.5 UJ		0.5 UJ		0.5 UJ		0.5	
E524.2	Chloroform	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	Chloromethane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	Dibromomethane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	Dichlorodifluoromethane	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	Ethyl benzene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	Hexachlorobutadiene	ug/L	1 U						1 U		1 U		1 U		1	
E524.2	Isopropylbenzene	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U						0.5 U		0.5 U		0.5 U		0.5	

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3791 N 31		3796	
Field Sample ID			MIL-TRT-0309		MILLER-FINAL-0309		MILLER-RAW-0309		Raw-3791 N Old US 31		Raw-3791 N Old US 31 R		TRT-3791 N Old US 31		3796 N Hwy :	
Sample Date			3/19/2009		3/19/2009		3/19/2009		5/20/2009		5/20/2009		5/20/2009		6/2/2009	
Sample Delivery Group			903431		903431		903431		905395		905395		905395		906	
Sample Type			FS		FS		FS		FS		FD		FS		F	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Methylene chloride	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	
E524.2	n-Butylbenzene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	
E524.2	Naphthalene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	
E524.2	Propylbenzene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	
E524.2	sec-Butylbenzene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	
E524.2	Styrene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	
E524.2	tert-Butylbenzene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	
E524.2	Tetrachloroethene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	
E524.2	Toluene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	
E524.2	trans-1,2-Dichloroethene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	
E524.2	trans-1,3-Dichloropropene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	
E524.2	Trichloroethene	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	
E524.2	Trichlorofluoromethane	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	
E524.2	Vinyl chloride	ug/L	0.5	U					9.8 *		10 *		0.5	U	6.6	
E524.2	Xylene, m/p	ug/L	1	U					1	U	1	U	1	U	1	
E524.2	Xylene, o	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	
E524.2	Xylenes, Total	ug/L	0.5	U					0.5	U	0.5	U	0.5	U	0.5	
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L			0.005	U		0.005	U							

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

R - rejected

ug/L - micrograms per liter

mg/L - milligram per liter

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			N 31	3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31	
Field Sample ID			31-RAW-0609	3796 N Hwy 31-TRT-0609		3796NHwy-RAW-0610		3796NHwy-TRT-0610		3796NHwy31-RAW-0310		3796NHwy31-RAW-0310R		3796NHwy31-RAW-0909	
Sample Date			2009	6/2/2009		6/3/2010		6/3/2010		3/10/2010		3/10/2010		9/10/2009	
Sample Delivery Group			119	906119		1006164		1006164		1003270		1003270		909291	
Sample Type			S	FS		FS		FS		FS		FD		FS	
Method	Parameter Name	Units	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,1-Trichloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2-Trichloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloropropene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trimethylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromoethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3,5-Trimethylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,4-Dichlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2,2-Dichloropropane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Chlorotoluene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-Chlorotoluene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-iso-Propyltoluene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Benzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromochloromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromodichloromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromoform	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromomethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Carbon tetrachloride	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorobenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorodibromomethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroform	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Cis-1,2-Dichloroethene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	cis-1,3-Dichloropropene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Ethyl benzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	U	1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	U	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location				N 31	3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31	
Field Sample ID				31-RAW-0609	3796 N Hwy 31-TRT-0609		3796NHwy-RAW-0610		3796NHwy-TRT-0610		3796NHwy31-RAW-0310		3796NHwy31-RAW-0310R		3796NHwy31-RAW-0909	
Sample Date				2009	6/2/2009		6/3/2010		6/3/2010		3/10/2010		3/10/2010		9/10/2009	
Sample Delivery Group				119	906119		1006164		1006164		1003270		1003270		909291	
Sample Type				S	FS		FS		FS		FS		FD		FS	
Method	Parameter Name	Units	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	
E524.2	Methylene chloride	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	
E524.2	n-Butylbenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	
E524.2	Naphthalene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	
E524.2	Propylbenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	
E524.2	sec-Butylbenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	
E524.2	Styrene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	
E524.2	tert-Butylbenzene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	
E524.2	Tetrachloroethene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	
E524.2	Toluene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	
E524.2	trans-1,2-Dichloroethene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	
E524.2	trans-1,3-Dichloropropene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	
E524.2	Trichloroethene	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	
E524.2	Trichlorofluoromethane	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	
E524.2	Vinyl chloride	ug/L	U	0.5	U	7.8	*	0.5	U	0.5	U	0.5	U	8.8	U	
E524.2	Xylene, m/p	ug/L	U	1	U	1	U	1	U	1	U	1	U	1	U	
E524.2	Xylene, o	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	
E524.2	Xylenes, Total	ug/L	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	
E524.2	Total Halogenated Hydrocarbons	ug/L														
E200.8	Cadmium	mg/L														
E200.8	Chromium	mg/L														
E200.8	Copper	mg/L														
E200.8	Lead	mg/L														

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

R - rejected

ug/L - micrograms per liter

mg/L - milligram per liter

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31	
Field Sample ID			3796NHWHY31-RAW-0909R		3796NHWHY31-RAW-0910		3796NHWHY31-RAW-1209		3796NHWHY31-RAW-1210		3796NHWHY31-TRT-0310		3796NHWHY31-TRT-0910		3796NHWHY31-TRT-0909		3796NHWHY31-TRT-0910	
Sample Date			9/10/2009		9/16/2010		12/8/2009		12/14/2010		3/10/2010		9/10/2009		9/10/2009		9/16/2010	
Sample Delivery Group			909291		1009527		912326		1012496		1003270		909291		909291		1009527	
Sample Type			FD		FS		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,1-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1,2-Trichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,1-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,3-Trichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2,4-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dibromoethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3,5-Trimethylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,3-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	1,4-Dichlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2,2-Dichloropropane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	2-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-Chlorotoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	4-iso-Propyltoluene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromochloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromodichloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromoform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Bromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Carbon tetrachloride	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorobenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chlorodibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloroform	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Chloromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Cis-1,2-Dichloroethene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	cis-1,3-Dichloropropene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Ethyl benzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	1 U		1 U		1 U		1 U		1 U		1 U		1 U		1 U	
E524.2	Isopropylbenzene	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U		0.5 U	

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31		3796 N 31	
Field Sample ID			3796NHWY31-RAW-0909R		3796NHWY31-RAW-0910		3796NHWY31-RAW-1209		3796NHWY31-RAW-1210		3796NHWY31-TRT-0310		3796NHWY31-TRT-0909		3796NHWY31-TRT-0909		3796NHWY31-TRT-0909	
Sample Date			9/10/2009		9/16/2010		12/8/2009		12/14/2010		3/10/2010		9/10/2009		9/10/2009		9/16/2010	
Sample Delivery Group			909291		1009527		912326		1012496		1003270		909291		909291		1009527	
Sample Type			FD		FS		FS		FS		FS		FS		FS		FS	
Method	Parameter Name	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
E524.2	Methylene chloride	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	n-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Naphthalene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Propylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	sec-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Styrene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	tert-Butylbenzene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Tetrachloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Toluene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,2-Dichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	trans-1,3-Dichloropropene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichloroethene	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Trichlorofluoromethane	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Vinyl chloride	ug/L	9.7		8.7		9.1		8.5		0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Xylene, m/p	ug/L	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
E524.2	Xylene, o	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Xylenes, Total	ug/L	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
E524.2	Total Halogenated Hydrocarbons	ug/L																
E200.8	Cadmium	mg/L																
E200.8	Chromium	mg/L																
E200.8	Copper	mg/L																
E200.8	Lead	mg/L																

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

R - rejected

ug/L - micrograms per liter

mg/L - milligram per liter

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

		Location N 31		3796 N 31		3796 N 31	
		Field Sample ID 31-TRT-0910		3796NHWHY31-TRT-1209		3796NHWHY31-TRT-1210	
		Sample Date 2010		12/8/2009		12/14/2010	
		Sample Delivery Group 527		912326		1012496	
		Sample Type S		FS		FS	
Method	Parameter Name	Units	Qual	Result	Qual	Result	Qual
E524.2	1,1,1,2-Tetrachloroethane	ug/L	U	0.5 U		0.5 U	
E524.2	1,1,1-Trichloroethane	ug/L	U	0.5 U		0.5 U	
E524.2	1,1,2,2-Tetrachloroethane	ug/L	U	0.5 U		0.5 U	
E524.2	1,1,2-Trichloroethane	ug/L	U	0.5 U		0.5 U	
E524.2	1,1-Dichloroethane	ug/L	U	0.5 U		0.5 U	
E524.2	1,1-Dichloroethene	ug/L	U	0.5 U		0.5 U	
E524.2	1,1-Dichloropropene	ug/L	U	0.5 U		0.5 U	
E524.2	1,2,3-Trichlorobenzene	ug/L	U	0.5 U		0.5 U	
E524.2	1,2,3-Trichloropropane	ug/L	U	0.5 U		0.5 U	
E524.2	1,2,4-Trichlorobenzene	ug/L	U	0.5 U		0.5 U	
E524.2	1,2,4-Trimethylbenzene	ug/L	U	0.5 U		0.5 U	
E524.2	1,2-Dibromo-3-chloropropane	ug/L	U	R		0.5 U	
E524.2	1,2-Dibromoethane	ug/L	U	0.5 U		0.5 U	
E524.2	1,2-Dichlorobenzene	ug/L	U	0.5 U		0.5 U	
E524.2	1,2-Dichloroethane	ug/L	U	0.5 U		0.5 U	
E524.2	1,2-Dichloropropane	ug/L	U	0.5 U		0.5 U	
E524.2	1,3,5-Trimethylbenzene	ug/L	U	0.5 U		0.5 U	
E524.2	1,3-Dichlorobenzene	ug/L	U	0.5 U		0.5 U	
E524.2	1,3-Dichloropropane	ug/L	U	0.5 U		0.5 U	
E524.2	1,4-Dichlorobenzene	ug/L	U	0.5 U		0.5 U	
E524.2	2,2-Dichloropropane	ug/L	U	0.5 U		0.5 U	
E524.2	2-Chlorotoluene	ug/L	U	0.5 U		0.5 U	
E524.2	4-Chlorotoluene	ug/L	U	0.5 U		0.5 U	
E524.2	4-iso-Propyltoluene	ug/L	U	0.5 U		0.5 U	
E524.2	Benzene	ug/L	U	0.5 U		0.5 U	
E524.2	Bromobenzene	ug/L	U	0.5 U		0.5 U	
E524.2	Bromochloromethane	ug/L	U	0.5 U		0.5 U	
E524.2	Bromodichloromethane	ug/L	U	0.5 U		0.5 U	
E524.2	Bromoform	ug/L	U	0.5 U		0.5 U	
E524.2	Bromomethane	ug/L	U	0.5 U		0.5 U	
E524.2	Carbon tetrachloride	ug/L	U	0.5 U		0.5 U	
E524.2	Chlorobenzene	ug/L	U	0.5 U		0.5 U	
E524.2	Chlorodibromomethane	ug/L	U	0.5 U		0.5 U	
E524.2	Chloroethane	ug/L	U	0.5 U		0.5 U	
E524.2	Chloroform	ug/L	U	0.5 U		0.5 U	
E524.2	Chloromethane	ug/L	U	0.5 U		0.5 U	
E524.2	Cis-1,2-Dichloroethene	ug/L	U	0.5 U		0.5 U	
E524.2	cis-1,3-Dichloropropene	ug/L	U	0.5 U		0.5 U	
E524.2	Dibromomethane	ug/L	U	0.5 U		0.5 U	
E524.2	Dichlorodifluoromethane	ug/L	U	0.5 U		0.5 U	
E524.2	Ethyl benzene	ug/L	U	0.5 U		0.5 U	
E524.2	Hexachlorobutadiene	ug/L	U	1 U		1 U	
E524.2	Isopropylbenzene	ug/L	U	0.5 U		0.5 U	
E524.2	Methyl Tertbutyl Ether	ug/L	U	0.5 U		0.5 U	

**Table A-7**  
**Drinking Water Analytical Data - Residential Properties with Operating Water Treatment Systems**  
**TORX Facility**  
**Rochester, Indiana**

Location			N 31	3796 N 31		3796 N 31	
Field Sample ID			31-TRT-0910	3796NHWY31-TRT-1209		3796NHWY31-TRT-1210	
Sample Date			2010	12/8/2009		12/14/2010	
Sample Delivery Group			527	912326		1012496	
Sample Type			S	FS		FS	
Method	Parameter Name	Units	Qual	Result	Qual	Result	Qual
E524.2	Methylene chloride	ug/L	U	0.5 U		0.5 U	
E524.2	n-Butylbenzene	ug/L	U	0.5 U		0.5 U	
E524.2	Naphthalene	ug/L	U	0.5 U		0.5 U	
E524.2	Propylbenzene	ug/L	U	0.5 U		0.5 U	
E524.2	sec-Butylbenzene	ug/L	U	0.5 U		0.5 U	
E524.2	Styrene	ug/L	U	0.5 U		0.5 U	
E524.2	tert-Butylbenzene	ug/L	U	0.5 U		0.5 U	
E524.2	Tetrachloroethene	ug/L	U	0.5 U		0.5 U	
E524.2	Toluene	ug/L	U	0.5 U		0.5 U	
E524.2	trans-1,2-Dichloroethene	ug/L	U	0.5 U		0.5 U	
E524.2	trans-1,3-Dichloropropene	ug/L	U	0.5 U		0.5 U	
E524.2	Trichloroethene	ug/L	U	0.5 U		0.5 U	
E524.2	Trichlorofluoromethane	ug/L	U	0.5 U		0.5 U	
E524.2	Vinyl chloride	ug/L	U	0.5 U		0.5 U	
E524.2	Xylene, m/p	ug/L	U	1 U		1 U	
E524.2	Xylene, o	ug/L	U	0.5 U		0.5 U	
E524.2	Xylenes, Total	ug/L	U	0.5 U		0.5 U	
E524.2	Total Halogenated Hydrocarbons	ug/L					
E200.8	Cadmium	mg/L					
E200.8	Chromium	mg/L					
E200.8	Copper	mg/L					
E200.8	Lead	mg/L					

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

R - rejected

ug/L - micrograms per liter

mg/L - milligram per liter



**Table A-8A**  
**Comprehensive Summary of Volatile Organics Compounds Detected in the Soil Gas Collected from the Vapor Monitoring Wells**  
**TORX Facility**  
**Rochester, Indiana**

<b>Vapor Monitoring Well and Screen Interval (ft bgs)</b>	<b>VMW-1 (19-19.5)</b>	<b>VMW-1 (24.5-25)</b>	<b>VMW-2 (4.5-5)</b>	<b>VMW-2 (14.5-15)</b>	<b>VMW-2 (23.5-24)</b>	<b>VMW-3 (4.5-5)</b>	<b>VMW-3 (4.5-5)</b>	<b>VMW-3 (14.5-15)</b>	<b>VMW-3 (14.5-15)</b>
<b>Sample ID</b>	MTR-VMW1- V19.0-19.5 121808	MTR-VMW1- V24.5-25.0 121808	MTR-VMW2-V4.5- 5.0 121808	MTR-VMW2- V14.5-15.0 121808	MTR-VMW2- V23.5-24.0 121808	MTR-VMW3-V4.5- 5.0 121908	MTR-VMW3-V4.5- 5.0 122308	MTR-VMW3- V14.5-15.0 121908	MTR-VMW3- V14.5-15.0 122308
<b>Sample Date</b>	12/18/2008	12/18/2008	12/18/2008	12/18/2008	12/18/2008	12/19/2008	12/23/2008	12/19/2008	12/23/2008
<b>Parameter</b>									
<b>Volatile Organics (ppbV)</b>									
Acetone	14	10	14	19	12	13	14	33	27
Benzene	<1	<1	2	2	1	5	3	4	3
2-Butanone	<1	1	3	4	4	3	2	5	3
Carbon Disulfide	<1	<1	<1	<1	<1	1	2	<1	1
Chlorobenzene	<1	5	1	2	5	1	1	2	3
Cyclohexane	<1	<1	<1	<1	<1	1	<1	<1	<1
Dichlorodifluoromethane	50	23	<1	<1	<1	3	4	3	4
Ethyl Acetate	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	<1	<1	<1	2	<1	3	2	4	4
4-Ethyl Toluene	<1	<1	<1	<1	<1	<1	<1	<1	<1
Freon 113	<1	<1	<1	<1	<1	<1	<1	<1	<1
Heptane	<1	<1	<1	1	1	3	1	2	<1
Hexane	<1	<1	<1	1	2	2	1	1	<1
Methylene Chloride	<1	<1	<1	<1	<1	3	1	1	<1
2-Propanol (Isopropyl Alcohol)	<1	<1	<1	<1	<1	<1	<1	1	<1
Propene (Propylene)	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tetrahydrofuran	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	<1	<1	<1	<1	<1	<1	<1	<1	1
Trichlorofluoromethane	<1	<1	<1	<1	<1	<1	1	1	1
1,2,4-Trimethylbenzene	<1	<1	<1	1	<1	<1	1	<1	2
1,3,5-Trimethylbenzene	<1	<1	<1	<1	<1	<1	<1	1	<1
Toluene	9	4	15	14	9	31	24	37	32
Total Xylenes	3	1	2	5	2	13	9	19	20

**Table A-8A**  
**Comprehensive Summary of Volatile Organics Compounds Detected in the Soil Gas Collected from the Vapor Monitoring Wells**  
**TORX Facility**  
**Rochester, Indiana**

<b>Vapor Monitoring Well and Screen Interval (ft bgs)</b>	<b>VMW-3 (23.5-24)</b>	<b>VMW-3 (23.5-24)</b>	<b>VMW-4 (7-7.5)</b>	<b>VMW-4 (13.5-14)</b>	<b>VMW-5 (7-7.5)</b>	<b>VMW-5 (13.5-14)</b>	<b>VMW-6 (9-9.5)</b>	<b>VMW-7 (4.5-5)</b>	<b>VMW-8 (4.5-5)</b>
<b>Sample ID</b>	MTR-VMW3- V23.5-24.0 121908	MTR-VMW3- V23.5-24.0 122308	MTR-VMW4-V7.0- 7.5 122208	MTR-VMW4- V13.5-14.0 122208	MTR-VMW5-V7.0- 7.5 122208	MTR-VMW5- V13.5-14.0 122208	MTR-VMW6-V9.0- 9.5 122208	MTR-VMW7-V4.5- 5.0 122208	MTR-VMW8-V4.5- 5.0 122208
<b>Sample Date</b>	12/19/2008	12/23/2008	12/22/2008	12/22/2008	12/22/2008	12/22/2008	12/22/2008	12/22/2008	12/22/2008
<b>Parameter</b>									
<b>Volatile Organics (ppbV)</b>									
Acetone	<1	6	24	4	4	3	<1	<1	<1
Benzene	<1	2	3	1	2	1	5	4	3
2-Butanone	<1	<1	3	<1	<1	<1	<1	<1	1
Carbon Disulfide	<1	<1	<1	<1	<1	<1	6	3	6
Chlorobenzene	1	5	1	3	2	3	2	<1	<1
Cyclohexane	<1	<1	2	<1	<1	<1	7	6	4
Dichlorodifluoromethane	3	4	<1	<1	<1	<1	<1	<1	<1
Ethyl Acetate	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	<1	<1	3	<1	1	<1	2	2	<1
4-Ethyl Toluene	<1	<1	<1	<1	<1	<1	<1	<1	<1
Freon 113	<1	<1	<1	<1	<1	<1	2	2	2
Heptane	<1	<1	3	<1	1	<1	7	4	2
Hexane	<1	<1	2	<1	<1	<1	14	10	5
Methylene Chloride	<1	<1	1	2	1	<1	12	14	16
2-Propanol (Isopropyl Alcohol)	<1	1	<1	<1	<1	<1	<1	<1	<1
Propene (Propylene)	<1	<1	<1	<1	<1	<1	24	67	33
Tetrahydrofuran	<1	<1	1	<1	<1	<1	<1	<1	2
Trichloroethene	3	4	<1	<1	<1	<1	<1	<1	<1
Trichlorofluoromethane	1	2	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	<1	<1	3	<1	1	<1	3	3	1
1,3,5-Trimethylbenzene	<1	<1	1	<1	<1	<1	1	1	<1
Toluene	8	6	19	5	10	11	51	59	24
Total Xylenes	<1	1	16	<1	4	1	9	11	3

**Table A-8A**  
**Comprehensive Summary of Volatile Organics Compounds Detected in the Soil Gas Collected from the Vapor Monitoring Wells**  
**TORX Facility**  
**Rochester, Indiana**

Vapor Monitoring Well and Screen Interval (ft bgs)	VMW-9 (4.5-5)	VMW-9 (13.5-14)	VMW-10 (4.5-5)	VMW-10 (10-10.5)	VMW-11 (4.5-5)	VMW-11 (13.5-14)	VMW-12 (10-10.5)	VMW-12 (14.5-15)	VMW-12 (21.5-22)
Sample ID	MTR-VMW9-V4.5-5.0 122208	MTR-VMW9-V13.5-14.0 122208	MTR-VMW10-V4.5-5.0 122208	MTR-VMW10-V10.0-10.5 122208	Not Sampled [1]	Not Sampled [1]	MTR-VMW12-V10.0-10.5 122208	MTR-VMW12-V14.5-15.0 122208	Not Sampled [2]
Sample Date	12/22/2008	12/22/2008	12/22/2008	12/22/2008	12/22/2008	12/22/2008	12/22/2008	12/22/2008	12/22/2008
Parameter									
Volatile Organics (ppbV)									
Acetone	<1	18	<1	<1	NS	NS	<1	7	NS
Benzene	2	2	1	<1	NS	NS	3	4	NS
2-Butanone	<1	<1	<1	<1	NS	NS	<1	<1	NS
Carbon Disulfide	<1	2	<1	<1	NS	NS	<1	<1	NS
Chlorobenzene	<1	3	1	2	NS	NS	<1	<1	NS
Cyclohexane	<1	<1	<1	<1	NS	NS	<1	<1	NS
Dichlorodifluoromethane	<1	<1	<1	<1	NS	NS	<1	<1	NS
Ethyl Acetate	<1	<1	<1	<1	NS	NS	<1	3	NS
Ethylbenzene	<1	1	<1	<1	NS	NS	<1	<1	NS
4-Ethyl Toluene	<1	1	<1	<1	NS	NS	<1	<1	NS
Freon 113	<1	<1	<1	<1	NS	NS	<1	<1	NS
Heptane	<1	<1	<1	<1	NS	NS	<1	<1	NS
Hexane	<1	<1	1	<1	NS	NS	1	2	NS
Methylene Chloride	2	2	3	<1	NS	NS	<1	4	NS
2-Propanol (Isopropyl Alcohol)	<1	<1	<1	<1	NS	NS	<1	4	NS
Propene (Propylene)	<1	<1	<1	<1	NS	NS	<1	<1	NS
Tetrahydrofuran	<1	<1	1	<1	NS	NS	<1	<1	NS
Trichloroethene	<1	<1	<1	<1	NS	NS	<1	<1	NS
Trichlorofluoromethane	<1	<1	<1	<1	NS	NS	<1	<1	NS
1,2,4-Trimethylbenzene	<1	2	2	<1	NS	NS	<1	<1	NS
1,3,5-Trimethylbenzene	<1	<1	<1	<1	NS	NS	<1	<1	NS
Toluene	31	42	22	8	NS	NS	21	9	NS
Total Xylenes	<1	6	4	<1	NS	NS	1	1	NS

**Notes:**

Only compounds detected at concentrations greater than the laboratory detection limit (1.0 ppbV) are listed in this table.

**Bolded Concentration** exceeds laboratory detection limit

[1] VMW-11 wells could not be sampled due to ice build-up in protective cover; Analytical results are recorded as "NS"

[2] VMW-12 (21.5-22) could not be sampled due to blockage in vapor well tubing; Analytical results are recorded as "NS"

ft bgs = feet below ground surface

NAL indicates there is no IDEM Soil Gas Screening Level for the compound

ppbV = parts per billion by volume

PB: KJC 02/15/11  
CB: MJM 02/15/11

Table A-8B

Comprehensive Summary of Volatile Organic Compounds Detected in the Soil Gas Collected from Property 16A in December 2010  
 Performed on the Soil Gas Samples by Method TO-15  
 (Results reported in parts per billion by volume, ppbv)

	IDEM Residential Screening Level (ppbv)	VMW-4	VMW-4	VMW-4R	VMW-5	VMW-5
		7 – 7.5 feet	13.5 – 14 feet	13.5 – 14 feet	7 – 7.5 feet	13.5 – 14 feet
Tetrachloroethe (PCE)	47	Not detected	Not detected	Not detected	4.6	Not detected
Trichloroethene (TCE)	23	Not detected	Not detected	Not detected	Not detected	Not detected
cis-1,2-Dichloroethene (cis-1,2-DCE)	920	Not detected	Not detected	Not detected	Not detected	Not detected
trans-1,2-Dichloroethene (trans-1,2-DCE)	1,800	Not detected	Not detected	Not detected	Not detected	Not detected
Vinyl Chloride	85	Not detected	Not detected	Not detected	Not detected	Not detected
Acetone	140,000	15	3.2	Not detected	2.2	5.5
Methylene Chloride	1,200	Not detected	Not detected	Not detected	Not detected	Not detected
Hexane	5,900	Not detected	Not detected	Not detected	Not detected	Not detected
2-Butanone	170,000	Not detected	Not detected	Not detected	Not detected	Not detected
Tetrahydrofuran	NAL	Not detected	Not detected	Not detected	Not detected	Not detected
Cyclohexane	180,000	Not detected	Not detected	Not detected	Not detected	Not detected
Heptane	NAL	Not detected	Not detected	Not detected	Not detected	Not detected
Benzene	78	Not detected	Not detected	Not detected	Not detected	Not detected
Toluene	140,000	Not detected	Not detected	Not detected	Not detected	1.3
Chlorobenzene	1,300	Not detected	Not detected	Not detected	Not detected	1.0
Ethylbenzene	24,000	Not detected	Not detected	Not detected	Not detected	Not detected
M & P Xylene	2,400	Not detected	Not detected	Not detected	Not detected	Not detected
O-Xylene	2,400	Not detected	Not detected	Not detected	Not detected	Not detected
1,3,5-trimethylbenzene	130	Not detected	Not detected	Not detected	Not detected	Not detected
1,2,4-Trimethylbenzene	130	Not detected	Not detected	Not detected	Not detected	Not detected

"NAL" indicates there is no IDEM Soil Gas Screening Level for the compound

IDEM Residential Screening Levels taken from IDEM Draft Vapor Intrusion Pilot Program Study; Chlorinated Compounds from "Table 7 Residential Screening Levels for Chlorinated Compounds", Non-Chlorinated compound screening levels from "Table 1 Screening Levels for Benzene" or derived from multiplying 100 times the compound's respective residential, 30 year, indoor air action level in Table 2 (see Section 5.0, Page 8-9 of IDEM text).

R - Replicate Sample

PB:WDG  
 CB:PJS

**Table A-9**  
**February 2010 Indoor Air and Soil Gas Sampling Results - Property 15**  
**TORX Facility**  
**Rochester, Indiana**

Location	3719 N 31 #1		3719 N 31 #1		3719 N 31 #2		3719 N 31 AA		3719 N 31 P1		3719 N 31 P2	
Field Sample ID	MTR-3719NHWHY31- IA020910-#1		MTR-3719NHWHY31- IA020910-#1R		MTR-3719NHWHY31- IA020910-#2		MTR-3719NHWHY31- AA020910		MTR-3719NHWHY31- P1-V020910		MTR-3719NHWHY31- P2-V020910	
Sample Date	2/9/2010		2/9/2010		2/9/2010		2/9/2010		2/9/2010		2/9/2010	
Sample Delivery Group	1002228		1002228		1002228		1002228		1002228		1002228	
Sample Type	FS		FD		FS		FS		FS		FS	
Parameter Name	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organics (ppbV)</b>												
1,1,1-Trichloroethane	1 U		1 U		1 U		1 U		1 U		1 U	
1,1,2,2-Tetrachloroethane	1 U		1 U		1 U		1 U		1 U		1 U	
1,1,2-Trichloro-1,2,2-Trifluoroethane	1 U		1 U		1 U		1 U		1 U		1 U	
1,1,2-Trichloroethane	1 U		1 U		1 U		1 U		1 U		1 U	
1,1-Dichloroethane	1 U		1 U		1 U		1 U		1 U		1 U	
1,1-Dichloroethene	1 U		1 U		1 U		1 U		1 U		1 U	
1,2,4-Trichlorobenzene	1 U		1 U		1 U		1 U		1 U		1 U	
1,2,4-Trimethylbenzene	1 UJ		1 UJ		0.16 J		1 UJ		1 UJ		1 UJ	
1,2-Dibromoethane	1 U		1 U		1 U		1 U		1 U		1 U	
1,2-Dichloro-1,1,2,2-tetrafluoroethane	1 U		1 U		1 U		1 U		1 U		1 U	
1,2-Dichlorobenzene	1 U		1 U		1 U		1 U		1 U		1 U	
1,2-Dichloroethane	1 U		1 U		1 U		1 U		1 U		1 U	
1,2-Dichloropropane	1 U		1 U		1 U		1 U		1 U		1 U	
1,3,5-Trimethylbenzene	1 UJ		1 UJ		0.29 J		1 UJ		1 UJ		0.11 J	
1,3-Butadiene	1 U		1 U		1 U		1 U		1 U		1 U	
1,3-Dichlorobenzene	1 U		1 U		1 U		1 U		1 U		1 U	
1,4-Dichlorobenzene	1 U		1 U		1 U		1 U		0.12 J		1 U	
1,4-Dioxane	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
2-Butanone	2.2 J		0.86 J		0.89 J		2 UJ		2.2 J		2.3 J	
2-Hexanone	1 U		1 U		1 U		1 U		1 U		0.49 J	
2-Propanol	0.66 J		0.66 J		4		1 U		0.61 J		0.67 J	
4-Ethyltoluene	1 UJ		1 UJ		0.1 J		1 UJ		1 UJ		1 UJ	
4-Methyl-2-pentanone	1 U		0.18 J		1 U		1 U		0.49 J		0.31 J	
Acetone	4.6		5.2		14		1.4 U		11		11	
Benzene	0.25 J		0.27 J		0.4 J		0.29 J		1 U		1 U	
Benzyl chloride	1 UJ		1 UJ		1 UJ		1 UJ		1 UJ		1 UJ	
Bromodichloromethane	1 U		1 U		1 U		1 U		1 U		1 U	
Bromoform	1 U		1 U		1 U		1 U		1 U		1 U	
Bromomethane	1 U		1 U		1 U		1 U		1 U		1 U	
Carbon disulfide	1 U		1 U		1 U		1 U		0.21 J		0.12 J	
Carbon tetrachloride	1 U		1 U		1 U		1 U		1 U		1 U	
Chlorobenzene	1 U		1 U		1 U		1 U		1 U		1 U	
Chlorodibromomethane	1 U		1 U		1 U		1 U		1 U		1 U	

**Table A-9**  
**February 2010 Indoor Air and Soil Gas Sampling Results - Property 15**  
**TORX Facility**  
**Rochester, Indiana**

Location	3719 N 31 #1		3719 N 31 #1		3719 N 31 #2		3719 N 31 AA		3719 N 31 P1		3719 N 31 P2	
Field Sample ID	MTR-3719NHWHY31- IA020910-#1		MTR-3719NHWHY31- IA020910-#1R		MTR-3719NHWHY31- IA020910-#2		MTR-3719NHWHY31- AA020910		MTR-3719NHWHY31- P1-V020910		MTR-3719NHWHY31- P2-V020910	
Sample Date	2/9/2010		2/9/2010		2/9/2010		2/9/2010		2/9/2010		2/9/2010	
Sample Delivery Group	1002228		1002228		1002228		1002228		1002228		1002228	
Sample Type	FS		FD		FS		FS		FS		FS	
Parameter Name	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Chloroethane	1 U		1 U		1 U		1 U		1 U		1 U	
Chloroform	1 U		1 U		1 U		1 U		1 U		1 U	
Chloromethane	0.55 J		0.64 J		0.75 J		0.57 J		1 U		1 U	
Cis-1,2-Dichloroethene	1 U		1 U		1 U		1 U		1 U		1 U	
cis-1,3-Dichloropropene	1 U		1 U		1 U		1 U		1 U		1 U	
Cyclohexane	1 U		1 U		1 U		1 U		1 U		1 U	
Dichlorodifluoromethane	0.58 J		0.58 J		0.61 J		0.59 J		0.5 J		0.51 J	
Ethyl acetate	2 U		2 U		3		2 U		2 U		2 U	
Ethyl benzene	0.12 J		0.63 J		8.5		0.37 J		0.11 J		0.12 J	
Heptane	1 U		1 U		1 U		1 U		1 U		1 U	
Hexachlorobutadiene	1 U		1 U		1 U		1 U		1 U		1 U	
Hexane	0.18 J		1 U		1 U		1 U		1 U		1 U	
Isopropylbenzene	1 U		0.71 J		11		0.32 J		1 U		1 U	
Methyl Tertbutyl Ether	1 U		1 U		1 U		1 U		1 U		1 U	
Methylene chloride	1 U		0.15 J		0.35 J		0.12 J		1 U		1 U	
Propylene	1 U		1 U		1 U		1 U		1 U		1 U	
Styrene	1 U		1 U		1 U		1 U		1 U		1 U	
Tetrachloroethene	0.59 J		1 U		1 U		1 U		1 U		1 U	
Tetrahydrofuran	1.9 J		1 UJ		1 U		1 U		1 U		1 U	
Toluene	0.93 J		3.3 J		19		2.1		0.44 J		0.38 J	
trans-1,2-Dichloroethene	1 U		1 U		1 U		1 U		1 U		1 U	
trans-1,3-Dichloropropene	1 U		1 U		1 U		1 U		1 U		1 U	
Trichloroethene	0.4 U		0.4 U		0.4 U		0.4 U		0.4 U		0.4 U	
Trichlorofluoromethane	0.77 J		0.78 J		0.39 J		0.26 J		0.2 J		0.23 J	
Vinyl acetate	1 UJ		1 UJ		1 UJ		1 UJ		1 UJ		1 UJ	
Vinyl chloride	1 U		1 U		1 U		1 U		1 U		1 U	
Xylene, m/p	0.45 J		5.8 J		81 J		3.5		0.49 J		0.54 J	
Xylene, o	0.11 J		0.47 J		11		0.25 J		0.18 J		0.21 J	

ppbV = parts per billion by volume

U = not detected, value is the reporting limit

J = value is estimated

Prepared by / Date: KJC 02/15/11

Checked by / Date: MJM 02/15/11

**Table A-10**  
**May 2010 Indoor Air Sampling Results - Property 41 (TORX Facility)**  
**TORX Facility**  
**Rochester, Indiana**

Location	IA-1		IA-2		IA-3		IA-4		IA-5		IA-6	
Field Sample ID	MTR-4366NHwy31- IA051210-1		MTR-4366NHwy31- IA051210-2		MTR-4366NHwy31- IA051210-3		MTR-4366NHwy31- IA051210-4		MTR-4366NHwy31- IA051210-5		MTR-4366NHwy31- IA051210-6	
Sample date	5/12/2010		5/12/2010		5/12/2010		5/12/2010		5/12/2010		5/12/2010	
Sample Type	FS		FS		FS		FS		FS		FS	
Parameter	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organic Compounds (ug/m³)</b>												
1,1,1-Trichloroethane	5.5	U	5.5	U	5.5	U	5.5	U	1	U	1	U
1,1,2,2-Tetrachloroethane	6.9	U	6.9	U	1	U	6.9	U	1	U	1	U
1,1,2-Trichloroethane	5.5	U	5.5	U	5.5	U	1	U	1	U	1	U
1,1-Dichloroethane	4	U	4	U	1	U	4	U	1	U	1	U
1,1-Dichloroethene	4	U	4	U	1	U	4	U	1	U	1	U
1,2,4-Trichlorobenzene	7.4	U	7.4	U	1	U	7.4	U	1	U	1	U
1,2,4-Trimethylbenzene	4.9	U	4.9	U	0.11	J	3.6	J	0.2	J	1	U
1,2-Dibromoethane	7.7	U	7.7	U	1	U	1	U	1	U	1	U
1,2-Dichlorobenzene	6	U	6	U	1	U	1	U	1	U	1	U
1,2-Dichloroethane	4	U	4	U	1	U	1	U	1	U	1	U
1,2-Dichloropropane	4.6	U	4.6	U	1	U	1	U	1	U	1	U
1,3,5-Trimethylbenzene	0.64	J	4.9	U	1	U	1	U	1	U	0.74	J
1,3-Butadiene	2.2	U	2.2	U	1	U	1	U	1	U	1	U
1,3-Dichlorobenzene	6	U	6	U	1	U	1	U	1	U	6	U
1,4-Dichlorobenzene	0.96	J	0.72	J	1	U	1	U	1	U	6	U
1,4-Dioxane	7.2	U	7.2	U	2	U	2	U	0.63	J	7.2	U
2-Butanone	2	J	2.4	J	0.42	J	2.2	J	1	J	3.9	J
2-Hexanone	4.1	U	4.1	U	1	U	0.19	J	1	U	4.1	U
2-Propanol	17		7.8		0.6	J	4.8		270		23	
4-Ethyltoluene	0.54	J	4.9	U	1	U	1	U	1	U	0.13	J
4-Methyl-2-pentanone	4.1	U	4.1	U	4.1	U	1	U	1	U	4.1	U
Acetone	34		15		16		12		18		29	
Benzene	0.83	J	0.45	J	0.32	J	0.22	J	0.14	J	0.7	J
Benzyl chloride	5.2	U	5.2	U	5.2	U	1	U	1	U	5.2	U
Bromodichloromethane	1	U	6.7	U	6.7	U	1	U	1	U	6.7	U
Bromoform	10	U	10	U	10	U	1	U	1	U	10	U
Bromomethane	1	U	3.9	U	3.9	U	1	U	1	U	3.9	U
Carbon disulfide	3.1	U	3.1	U	3.1	U	0.96	J	1	U	3.1	U
Carbon tetrachloride	6.3	U	6.3	U	6.3	U	1	U	1	U	6.3	U
Chlorobenzene	4.6	U	4.6	U	4.6	U	1	U	1	U	4.6	U
Chloroethane	2.6	U	2.6	U	2.6	U	1	U	1	U	2.6	U
Chloroform	4.9	U	4.9	U	4.9	U	1	U	1	U	4.9	U
Chloromethane	1.2	J	1.3	J	1.2	J	0.65	J	0.61	J	1.3	J
cis-1,2-Dichloroethene	8.8		0.67	J	1.5	J	0.39	J	0.55	J	13	
cis-1,3-Dichloropropene	4.5	U	4.5	U	4.5	U	1	U	1	U	1	U
Cumene	4.9	U	4.9	U	4.9	U	4.9	U	1	U	4.9	U
Cyclohexane	3.4	U	3.4	U	3.4	U	1	U	1	U	3.4	U
Dibromochloromethane	8.5	U	8.5	U	8.5	U	1	U	1	U	8.5	U
Dichlorodifluoromethane	2.5	J	2.6	J	2.5	J	0.54	J	0.52	J	2.5	J
Ethyl acetate	7.2	U	7.2	U	7.2	U	0.33	J	2	U	7.2	U

**Table A-10**  
**May 2010 Indoor Air Sampling Results - Property 41 (TORX Facility)**  
**TORX Facility**  
**Rochester, Indiana**

Parameter	Location	IA-1		IA-2		IA-3		IA-4		IA-5		IA-6	
	Field Sample ID	MTR-4366NHWHY31- IA051210-1		MTR-4366NHWHY31- IA051210-2		MTR-4366NHWHY31- IA051210-3		MTR-4366NHWHY31- IA051210-4		MTR-4366NHWHY31- IA051210-5		MTR-4366NHWHY31- IA051210-6	
	Sample date	5/12/2010		5/12/2010		5/12/2010		5/12/2010		5/12/2010		5/12/2010	
	Sample Type	FS		FS		FS		FS		FS		FS	
		Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Ethylbenzene		4.3	U	4.3	U	4.3	U	0.15	J	1	U	0.52	J
Freon 113		7.7	U	7.7	U	7.7	U	1	U	1	U	7.7	U
Freon 114		7	U	7	U	7	U	1	U	1	U	7	U
Heptane		4.1	U	4.1	U	4.1	U	0.28	J	1	U	0.7	J
Hexachlorobutadiene		11	U	11	U	11	U	1	U	1	U	11	U
Hexane		0.78	J	3.5	U	3.5	U	1	U	3.5	U	0.85	J
m,p-Xylene		1.6	J	0.96	J	4.3	U	0.67	J	0.2	J	0.46	J
Methylene chloride		0.45	J	3.5	U	0.42	J	0.14	J	0.32	J	0.13	J
MTBE		3.6	U	3.6	U	3.6	U	1	U	1	U	1	U
o-Xylene		0.74	J	4.3	U	4.3	U	0.28	J	1	U	0.18	J
Propene		1.7	U	1.7	U	1.7	U	1	U	1	U	1	U
Styrene		0.72	J	4.3	U	4.3	U	4.3	U	1	U	0.15	J
Tetrachloroethene		6.8	U	6.8	U	6.8	U	6.8	U	1	U	1	U
Tetrahydrofuran		2.9	U	2.9	U	2.9	U	2.9	U	1	U	0.44	J
Toluene		6.5		1.7	J	1.1	J	21		0.65	J	5.3	
trans-1,2-Dichloroethene		4	U	4	U	4	U	4	U	1	U	1	U
trans-1,3-Dichloropropene		4.5	U	4.5	U	4.5	U	1	U	1	U	1	U
Trichloroethene		1.5	J	0.4	U	2.1	U	0.4	U	0.2	J	0.44	
Trichlorofluoromethane		2	J	0.25	J	1.3	J	0.27	J	1.3	J	0.32	J
Vinyl acetate		3.5	U	1	U	3.5	U	1	U	3.5	U	1	U
Vinyl chloride		2.6	U	1	U	1	U	1	U	2.6	U	1	U



**Table A-10**  
**May 2010 Indoor Air Sampling Results - Property 41 (TORX Facility)**  
**TORX Facility**  
**Rochester, Indiana**

Location	IA-7		IA-7		AA	
Field Sample ID	MTR-4366NHWHY31- IA051210-7		MTR-4366NHWHY31- IA051210-7R		MTR-4366NHWHY31- AA051210	
Sample date	5/12/2010		5/12/2010		5/12/2010	
Sample Type	FS		FS		FS	
Parameter	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organic Compounds (ug/m³)</b>						
1,1,1-Trichloroethane	5.5 U		5.5 U		1 U	
1,1,2,2-Tetrachloroethane	6.9 U		6.9 U		1 U	
1,1,2-Trichloroethane	5.5 U		5.5 U		1 U	
1,1-Dichloroethane	4 U		4 U		4 U	
1,1-Dichloroethene	4 U		4 U		4 U	
1,2,4-Trichlorobenzene	7.4 U		1 U		7.4 U	
1,2,4-Trimethylbenzene	4.9 U		1.1 J		4.9 U	
1,2-Dibromoethane	7.7 U		7.7 U		1 U	
1,2-Dichlorobenzene	6 U		6 U		1 U	
1,2-Dichloroethane	4 U		4 U		1 U	
1,2-Dichloropropane	4.6 U		4.6 U		1 U	
1,3,5-Trimethylbenzene	4.9 U		1 U		1 U	
1,3-Butadiene	2.2 U		2.2 U		1 U	
1,3-Dichlorobenzene	6 U		6 U		1 U	
1,4-Dichlorobenzene	6 U		6 U		1 U	
1,4-Dioxane	7.2 U		7.2 U		2 U	
2-Butanone	1.8 J		3 J		0.54 J	
2-Hexanone	4.1 U		4.1 U		4.1 U	
2-Propanol	660		480		2.5 U	
4-Ethyltoluene	4.9 U		4.9 U		4.9 U	
4-Methyl-2-pentanone	4.1 U		4.1 U		1 U	
Acetone	32		40		11	
Benzene	0.42 J		0.51 J		0.35 J	
Benzyl chloride	5.2 U		5.2 U		5.2 U	
Bromodichloromethane	6.7 U		6.7 U		6.7 U	
Bromoform	1 U		10 U		10 U	
Bromomethane	3.9 U		3.9 U		3.9 U	
Carbon disulfide	1 U		3.1 U		3.1 U	
Carbon tetrachloride	6.3 U		0.82 J		6.3 U	
Chlorobenzene	4.6 U		4.6 U		4.6 U	
Chloroethane	2.6 U		2.6 U		2.6 U	
Chloroform	4.9 U		4.9 U		4.9 U	
Chloromethane	1.1 J		1.3 J		1.2 J	
cis-1,2-Dichloroethene	2.4 J		2.7 J		1 J	
cis-1,3-Dichloropropene	4.5 U		4.5 U		4.5 U	
Cumene	4.9 U		4.9 U		4.9 U	
Cyclohexane	3.4 U		3.4 U		3.4 U	
Dibromochloromethane	8.5 U		8.5 U		1 U	
Dichlorodifluoromethane	2.3 J		2.5 J		0.51 J	
Ethyl acetate	7.2 U		7.2 U		2 U	

**Table A-10**  
**May 2010 Indoor Air Sampling Results - Property 41 (TORX Facility)**  
**TORX Facility**  
**Rochester, Indiana**

Parameter	Location	IA-7		IA-7		AA	
	Field Sample ID	MTR-4366NHXY31- IA051210-7		MTR-4366NHXY31- IA051210-7R		MTR-4366NHXY31- AA051210	
	Sample date Sample Type	5/12/2010 FS		5/12/2010 FS		5/12/2010 FS	
		Result	Qual	Result	Qual	Result	Qual
Ethylbenzene		4.3 U		4.3 U		1 U	
Freon 113		7.7 U		7.7 U		1 U	
Freon 114		7 U		7 U		1 U	
Heptane		4.1 U		4.1 U		1 U	
Hexachlorobutadiene		11 U		11 U		1 U	
Hexane		3.5 U		1 U		1 U	
m,p-Xylene		0.91 J		0.96 J		1 U	
Methylene chloride		1 J		0.3 J		1 U	
MTBE		3.6 U		1 U		1 U	
o-Xylene		4.3 U		1 U		1 U	
Propene		1.7 U		1 U		1 U	
Styrene		4.3 U		1 U		1 U	
Tetrachloroethene		6.8 U		1 U		1 U	
Tetrahydrofuran		2.9 U		0.14 J		1 U	
Toluene		1.9 J		0.54 J		0.15 J	
trans-1,2-Dichloroethene		1 U		4 U		1 U	
trans-1,3-Dichloropropene		4.5 U		4.5 U		1 U	
Trichloroethene		1.1 J		1.2 J		0.4 U	
Trichlorofluoromethane		1.3 J		1.5 J		0.21 J	
Vinyl acetate		3.5 U		3.5 U		1 U	
Vinyl chloride		2.6 U		2.6 U		1 U	

ug/m<sup>3</sup> = microgram per cubic meter  
u = not detected, value is the reporting limit  
J = value is estimated

Prepared by / Date: KJC 02/15/11  
Checked by / Date: MJM 02/15/11

Table A-11  
February 2011 Indoor Air Sampling Results - Property 41 (TORX Facility)  
TORX Facility  
Rochester, Indiana

Location	4366NHWY31 #1		4366NHWY31 #2		4366NHWY31 #3		4366NHWY31 #4		4366NHWY31 #5		4366NHWY31 #6		4366NHWY31 #7		AA	
Field Sample ID	MTR-4366NHWY31-IA020911-1		MTR-4366NHWY31-IA020911-2		MTR-4366NHWY31-IA020911-3		MTR-4366NHWY31-IA020911-4		MTR-4366NHWY31-IA020911-5		MTR-4366NHWY31-IA020911-6		MTR-4366NHWY31-IA020911-7		MTR-4366NHWY31-AA020911	
Sample Date	02/09/2011		02/09/2011		02/09/2011		02/09/2011		02/09/2011		02/09/2011		02/09/2011		02/09/2011	
Sample Type	FS		FS		FS		FS		FS		FS		FS		FS	
Parameter Name	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
1,4-Dichlorobenzene	6.0	U	21		6.0	U	6.0	U	6.0	U	6.0	U	6.0	U	6.0	U
2-Propanol	24		23		20		32		62	E	57		36		2.5	U
Acetone	24		19		13		20		22		36		17		3.8	
cis-1,2-Dichloroethene	5.8		7.2		4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Ethyl acetate	7.2	U	39		7.2	U	7.2	U	7.2	U	7.2	U	7.2	U	7.2	U
Ethylbenzene	4.3	U	4.3	U	4.3	U	4.3	U	8.9		4.3	U	4.3	U	4.3	U
Tetrachloroethene	6.8	U	6.8	U	6.8	U	6.8	U	6.8	U	6.8	U	6.8	U	6.8	U
Toluene	3.8	U	3.8	U	3.8	U	6.0		3.8	U	3.8	U	3.8	U	3.8	U
trans-1,2-Dichloroethene	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Trichloroethene	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U	2.1	U
Vinyl chloride	2.6	U	2.6	U	2.6	U	2.6	U	2.6	U	2.6	U	2.6	U	2.6	U
m,p-Xylene	4.3	U	4.3	U	4.3	U	4.3	U	29		4.3	U	4.3	U	4.3	U
o-Xylene	4.3	U	4.3	U	4.3	U	4.3	U	6.0		4.3	U	4.3	U	4.3	U

µg/m³ = microgram per cubic meter

U = not detected, value is the reporting limit

E = exceeds calibration range

Prepared by / Date: KJC 02/24/11

Checked by / Date: MJM 02/24/11

**Table A-12**  
**April 2009 Surface Water Analytical Results - Eastern Pond**  
**TORX Facility**  
**Rochester, Indiana**

Sample Delivery Group Location Field Sample ID Sample Date Sample Type	0904153 EP-001 MTR-EP001- SW(1.5)040809-FL 4/8/2009 FS	0904153 EP-002 MTR-EP002- SW(1.5)040809-FL 4/8/2009 FS	0904153 EP-003 MTR-EP003- SW(3.6)040809-FL 4/8/2009 FS	0904153 EP-004 MTR-EP004- SW(2.4)040809-FL 4/8/2009 FS
Parameter Name	Result Qual	Result Qualifier	Result Qualifier	Result Qualifier
<b>Volatile Organics (ug/L)</b>				
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U
1,2-Dichloroethene (total)	2 U	2.1	1.2 J	2 U
1,2-Dichloropropane	2 U	2 U	2 U	2 U
1,3-Dichloropropene (total)	2 U	2 U	2 U	2 U
2-Butanone	5 UJ	5 UJ	5 UJ	5 UJ
2-Hexanone	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U
Acetone	20 UJ	20 UJ	20 UJ	20 UJ
Benzene	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U
Carbon disulfide	2.5 U	2.5 U	2.5 U	2.5 U
Carbon tetrachloride	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U
Chlorodibromomethane	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U
Chloroform	1 U	1 U	1 U	1 U
Chloromethane	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethene	1 U	2.1	1.2	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U
Ethyl benzene	1 U	1 U	1 U	1 U
Methylene chloride	5 U	5 U	5 U	5 U
Styrene	1 U	1 U	1 U	1 U
Tetrachloroethene	2 U	2 U	2 U	2 U
Toluene	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U
Vinyl chloride	1 U	1 U	1 U	1 U
Xylene, m/p	2 U	2 U	2 U	2 U
Xylene, o	1 U	1 U	1 U	1 U
Xylenes, Total	2 U	2 U	2 U	2 U
1,4-Dioxane	1 U	1 U	1 U	1 U

FS - field sample

U - not detected, value is the reporting limit

J - value is estimated

ug/L - micrograms per liter

Prepared by / Date: KJC 02/15/11

Checked by / Date: MJM 02/15/11

**Table A-13**  
**January 2009 Surface Water Analytical Results - Properties 15 and 8**  
**TORX Facility**  
**Rochester, Indiana**

Sample ID Date	PRA-Drain-0109 1/7/2009	PRA-Pond-0109 1/7/2009	PRA-Stream-0109 1/7/2009
<b>Parameter</b>			
<b>Volatile Organics (ug/L) by EPA 524.2</b>			
Acetone	ND	ND	ND
Benzene	0.5 U	0.5 U	0.5 U
Bromobenzene	0.5 U	0.5 U	0.5 U
Bromochloromethane	0.5 U	0.5 U	0.5 U
Bromodichloromethane	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U
Bromomethane	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.5 U	0.5 U	0.5 U
Chlorobenzene	0.5 U	0.5 U	0.5 U
Chloroethane	0.5 U	0.5 U	0.5 U
Chloroform	0.5 U	0.5 U	0.5 U
Chloromethane	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	0.5 U	0.5 U	0.5 U
Dibromomethane	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene (total)	0.5 U	0.5 U	0.5 U
Ethylbenzene	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	0.5 U	0.5 U	0.5 U
Isopropylbenzene (Cumene)	0.5 U	0.5 U	0.5 U
Methyl tert-butyl ether	5 U	5 U	5 U
Methylene chloride	0.5 U	0.5 U	0.5 U
Naphthalene	0.5 U	0.5 U	0.5 U
n-Butylbenzene	0.5 U	0.5 U	0.5 U
n-Propylbenzene	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	0.5 U	0.5 U	0.5 U
Styrene	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5 U	0.5 U	0.5 U
Toluene	0.5 U	0.5 U	0.5 U
Total THMs	0.5 U	0.5 U	0.5 U
Trichloroethene	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	0.5 U	0.5 U	0.5 U
Vinyl chloride	0.5 U	0.5 U	0.5 U
Xylene, m,p-	1 U	1 U	1 U
Xylene, o-	0.5 U	0.5 U	0.5 U
Xylenes (total)	1.5 U	1.5 U	1.5 U

ND - Not detected

U - not detected, value is the reporting limit

Prepared by / Date:

KJC 11/24/09

**Table A-13**  
**January 2009 Surface Water Analytical Results - Properties 15 and 8**  
**TORX Facility**  
**Rochester, Indiana**

Parameter			
ug/L - microgram per liter		Checked by / Date:	kask 11/24/09

**Table A-14**  
**April 2009 Sediment Analytical Results - Eastern Pond**  
**TORX Facility**  
**Rochester, Indiana**

Sample Delivery Group Location	0904154 EP-001	0904154 EP-002	0904154 EP-003	0904154 EP-004	0904154 EP-005	0904154 EP-006	0904154 EP-007	0904154 EP-008
Field Sample ID	MTR-EP001- SS(2.0)040809	MTR-EP002- SS(2.8)040809	MTR-EP003- SS(2.8)040809	MTR-EP004- SS(3.6)040809	MTR-EP005- SS(4.1)040809	MTR-EP006- SS(4.1)040809	MTR-EP007- SS(6.5)040809	MTR-EP008- SS(7.6)040809
Sample Date	4/8/2009	4/8/2009	4/8/2009	4/8/2009	4/8/2009	4/8/2009	4/8/2009	4/8/2009
Sample Type	FS	FS	FS	FS	FS	FS	FS	FS
Parameter Name	Result	Qual	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organics (ug/Kg)</b>								
1,1,1-Trichloroethane	6.7 U		4.9 U		3.7 U		4.1 U	
1,1,2,2-Tetrachloroethane	6.7 U		4.9 U		3.7 U		4.1 U	
1,1,2-Trichloroethane	6.7 U		4.9 U		3.7 U		4.1 U	
1,1-Dichloroethane	6.7 U		4.9 U		3.7 U		4.1 U	
1,1-Dichloroethene	6.7 U		4.9 U		3.7 U		4.1 U	
1,2-Dichloroethane	6.7 U		4.9 U		3.7 U		4.1 U	
1,2-Dichloroethene (total)	2.8 U		2.1 U		1.6 U		1.7 U	
1,2-Dichloropropane	6.7 U		4.9 U		3.7 U		4.1 U	
1,3-Dichloropropene (total)	4.8 U		3.6 U		2.7 U		3 U	
1,4-Dioxane	340 U		250 U		190 U		210 U	
2-Butanone	6.7 U		4.9 U		3.7 U		4.1 U	
2-Hexanone	6.7 U		4.9 U		3.7 U		4.1 U	
4-Methyl-2-pentanone	6.7 U		4.9 U		3.7 U		4.1 U	
Acetone	200		15 U		36		12 U	
Benzene	6.7 U		4.9 U		3.7 U		4.1 U	
Bromodichloromethane	6.7 U		4.9 U		3.7 U		4.1 U	
Bromoform	6.7 U		4.9 U		3.7 U		4.1 U	
Bromomethane	20 U		15 U		11 U		12 U	
Carbon disulfide	6.7 U		4.9 U		3.7 U		4.1 U	
Carbon tetrachloride	6.7 U		4.9 U		3.7 U		4.1 U	
Chlorobenzene	6.7 U		4.9 U		3.7 U		4.1 U	
Chlorodibromomethane	6.7 U		4.9 U		3.7 U		4.1 U	
Chloroethane	20 U		15 U		11 U		12 U	
Chloroform	6.7 U		4.9 U		3.7 U		4.1 U	
Chloromethane	6.7 U		4.9 U		3.7 U		4.1 U	
Cis-1,2-Dichloroethene	6.7 U		4.9 U		3.7 U		4.1 U	
cis-1,3-Dichloropropene	6.7 U		4.9 U		3.7 U		4.1 U	
Ethyl benzene	6.7 U		4.9 U		3.7 U		4.1 U	
Methylene chloride	6.7 U		4.9 U		3.7 U		4.1 U	
Styrene	6.7 U		4.9 U		3.7 U		4.1 U	
Tetrachloroethene	6.7 U		4.9 U		3.7 U		4.1 U	
Toluene	6.7 U		4.9 U		3.7 U		4.1 U	
Total Trihalomethane	0 U		0 U		0 U		0 U	
trans-1,2-Dichloroethene	6.7 U		4.9 U		3.7 U		4.1 U	
trans-1,3-Dichloropropene	6.7 U		4.9 U		3.7 U		4.1 U	

Table A-14  
April 2009 Sediment Analytical Results - Eastern Pond  
TORX Facility  
Rochester, Indiana

Sample Delivery Group Location	0904154 EP-001	0904154 EP-002	0904154 EP-003	0904154 EP-004	0904154 EP-005	0904154 EP-006	0904154 EP-007	0904154 EP-008
Field Sample ID	MTR-EP001- SS(2.0)040809	MTR-EP002- SS(2.8)040809	MTR-EP003- SS(2.8)040809	MTR-EP004- SS(3.6)040809	MTR-EP005- SS(4.1)040809	MTR-EP006- SS(4.1)040809	MTR-EP007- SS(6.5)040809	MTR-EP008- SS(7.6)040809
Sample Date	4/8/2009	4/8/2009	4/8/2009	4/8/2009	4/8/2009	4/8/2009	4/8/2009	4/8/2009
Sample Type	FS	FS	FS	FS	FS	FS	FS	FS
Parameter Name	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Trichloroethene	6.7	U	4.9	U	3.7	U	4.1	U
Vinyl chloride	6.7	U	4.9	U	3.7	U	4.1	U
Xylene, m/p	6.7	U	4.9	U	3.7	U	4.1	U
Xylene, o	6.7	U	4.9	U	3.7	U	4.1	U
Xylenes, Total	7.7	U	5.6	U	4.3	U	4.7	U
<b>Inorganics (%)</b>								
Percent Moisture	85		80		73		76	
Total Organic Carbon	12	J	7		4.7		6.3	

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

ug/Kg - micrograms per kilogram

Prepared by / Date: KJC 02/15/11

Checked by / Date: MJM 02/15/11



**Table A-15**  
**May/June 2009 Surface Water Analytical Results - Property 38**  
**TORX Facility**  
**Rochester, Indiana**

Sample Delivery Group	906552		905224		905224		905224		905224	
Location	4403 N 31 SW003		SW-001		SW-002		SW-003		SW-003	
Field Sample ID	MTR-4403NOHWY31-SW003-062409		MTR-4403NOHWY31-SW001-051209		MTR-4403NOHWY31-SW002-051209		MTR-4403NOHWY31-SW003-051209		MTR-4403NOHWY31-SW003-051209R	
Sample Date	6/24/2009		5/12/2009		5/12/2009		5/12/2009		5/12/2009	
Sample Type	FS		FS		FS		FS		FD	
Parameter Name	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organics (ug/L)										
1,1,1-Trichloroethane	1 U		1 U		1 U		1 U		1 U	
1,1,2,2-Tetrachloroethane	1 U		1 U		1 U		1 U		1 U	
1,1,2-Trichloroethane	1 U		1 U		1 U		1 U		1 U	
1,1-Dichloroethane	1 U		1 U		1 U		1 U		1 U	
1,1-Dichloroethene	1 U		1 U		1 U		1 U		1 U	
1,2-Dichloroethane	1 U		1 U		1 U		1 U		1 U	
1,2-Dichloroethene (total)	2 U		2 U		2 U		2 U		2 U	
1,2-Dichloropropane	2 U		2 U		2 U		2 U		2 U	
1,3-Dichloropropene (total)	2 U		2 U		2 U		2 U		2 U	
2-Butanone	5 U		5 U		5 U		5 U		5 U	
2-Hexanone	5 U		5 U		5 U		5 U		5 U	
4-Methyl-2-pentanone	5 U		5 U		5 U		5 U		5 U	
Acetone	20 UJ		20 U		20 U		20 U		20 U	
Benzene	1 U		1 U		1 U		1 U		1 U	
Bromodichloromethane	1 U		1 U		1 U		1 U		1 U	
Bromoform	1 U		1 U		1 U		1 U		1 U	
Bromomethane	1 UJ		1 U		1 U		1 U		1 U	
Carbon disulfide	2.5 U		2.5 U		2.5 U		2.5 U		2.5 U	
Carbon tetrachloride	1 U		1 U		1 U		1 U		1 U	
Chlorobenzene	1 U		1 U		1 U		1 U		1 U	
Chlorodibromomethane	1 U		1 U		1 U		1 U		1 U	
Chloroethane	1 UJ		1 U		1 U		1 U		1 U	
Chloroform	1 U		1 U		1 U		1 U		1 U	
Chloromethane	1 U		1 U		1 U		1 U		1 U	
Cis-1,2-Dichloroethene	1 U		1 U		1 U		1 U		1 U	
cis-1,3-Dichloropropene	1 U		1 U		1 U		1 U		1 U	
Ethyl benzene	1 U		1 U		1 U		1 U		1 U	
Methylene chloride	5 U		5 U		5 U		5 U		5 U	
Styrene	1 U		1 U		1 U		1 U		1 U	
Tetrachloroethene	2 U		2 U		2 U		2 U		2 U	
Toluene	3.5		1 U		1 U		1 U		1 U	
trans-1,2-Dichloroethene	1 U		1 U		1 U		1 U		1 U	
trans-1,3-Dichloropropene	1 U		1 U		1 U		1 U		1 U	
Trichloroethene	1 U		1 U		1 U		1 U		1 U	
Vinyl chloride	1 U		1 U		1 U		1 U		1 U	
Xylene, m/p	2 U		2 U		2 U		2 U		2 U	
Xylene, o	1 U		1 U		1 U		1 U		1 U	
Xylenes, Total	2 U		2 U		2 U		2 U		2 U	

FS - field sample

FD - field duplicate

U - not detected, value is the reporting limit

J - value is estimated

ug/L - micrograms per liter

Prepared by / Date: KJC 02/15/11

Checked by / Date: MJM 02/15/11

Table A-16  
June 2009 Sediment Analytical Results - Property 38  
TORX Facility  
Rochester, Indiana

Sample Delivery Group	906552		906552		906552		906552		906552		906552		906552	
Location	4403 N 31 SS001		4403 N 31 SS001		4403 N 31 SS001		4403 N 31 SS002		4403 N 31 SS002		4403 N 31 SS003		4403 N 31 SS003	
Field Sample ID	MTR- 4403NOHWY31-		MTR- 4403NOHWY31-		MTR- 4403NOHWY31-		MTR- 4403NOHWY31-		MTR- 4403NOHWY31-		MTR- 4403NOHWY31-		MTR- 4403NOHWY31-	
Sample Date	6/24/2009		6/24/2009		6/24/2009		6/24/2009		6/24/2009		6/24/2009		6/24/2009	
Sample Type	FS		FD		FS		FS		FS		FS		FS	
Parameter Name	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organics (ug/Kg)</b>														
1,1,1-Trichloroethane	0.21 U		0.22 U		0.21 U		0.5 U		0.51 U		0.56 UJ		1.1 UJ	
1,1,2,2-Tetrachloroethane	0.31 U		0.32 U		0.31 U		0.74 U		0.75 U		0.82 UJ		1.7 UJ	
1,1,2-Trichloroethane	0.33 U		0.34 U		0.33 U		0.78 U		0.79 U		0.86 UJ		1.8 UJ	
1,1-Dichloroethane	0.29 U		0.3 U		0.29 U		0.69 U		0.69 U		0.76 UJ		1.6 UJ	
1,1-Dichloroethene	0.28 U		0.29 U		0.29 U		0.67 U		0.68 U		0.75 UJ		1.5 UJ	
1,2-Dichloroethane	0.34 U		0.35 U		0.35 U		0.82 U		0.82 U		0.9 UJ		1.9 UJ	
1,2-Dichloroethene (total)	0.54 U		0.56 U		0.55 U		1.3 U		1.3 U		1.4 UJ		2.9 UJ	
1,2-Dichloropropane	0.26 U		0.26 U		0.26 U		0.61 U		0.62 U		0.68 UJ		1.4 UJ	
1,3-Dichloropropene (total)	0.93 U		0.96 U		0.95 U		2.2 U		2.2 U		2.5 UJ		5.1 UJ	
2-Butanone	0.53 UJ		0.55 UJ		0.54 UJ		48 NJ		26 NJ		36 NJ		55 NJ	
2-Hexanone	0.57 U		0.59 U		0.58 U		1.4 U		1.4 U		1.5 UJ		3.1 UJ	
4-Methyl-2-pentanone	0.94 U		0.97 U		0.96 U		2.3 U		2.3 U		2.5 UJ		5.2 UJ	
Acetone	15 UJ		37 NJ		12 UJ		350 NJ		640 NJ		780 NJ		810 NJ	
Benzene	0.31 U		0.32 U		0.32 U		0.75 U		0.76 U		0.83 UJ		1.7 UJ	
Bromodichloromethane	0.25 U		0.26 U		0.25 U		0.6 U		0.6 U		0.66 UJ		1.4 UJ	
Bromoform	0.27 U		0.28 U		0.27 U		0.64 U		0.64 U		0.7 UJ		1.5 UJ	
Bromomethane	1.9 UJ		2 UJ		2 UJ		4.6 UJ		4.7 UJ		5.1 UJ		11 UJ	
Carbon disulfide	3.9		5.7		4.8		1.4 U		1.4 U		1.5 UJ		20 J	
Carbon tetrachloride	0.58 U		0.6 U		0.59 U		1.4 U		1.4 U		1.5 UJ		3.2 UJ	
Chlorobenzene	0.51 U		0.53 U		0.52 U		1.2 U		1.2 U		1.3 UJ		2.8 UJ	
Chlorodibromomethane	0.26 U		0.27 U		0.27 U		0.62 U		0.63 U		0.69 UJ		1.4 UJ	
Chloroethane	1.7 UJ		1.7 UJ		1.7 UJ		4 UJ		4.1 UJ		4.5 UJ		9.2 UJ	
Chloroform	0.27 U		0.28 U		0.27 U		0.64 U		0.65 U		0.71 UJ		1.5 UJ	
Chloromethane	1.1 U		1.2 U		1.2 U		2.8 U		2.8 U		3 UJ		6.3 UJ	
Cis-1,2-Dichloroethene	0.21 U		0.22 U		0.21 U		0.5 U		0.51 U		0.56 UJ		1.1 UJ	
cis-1,3-Dichloropropene	0.28 U		0.29 U		0.28 U		0.66 U		0.67 U		0.73 UJ		1.5 UJ	
Ethyl benzene	0.51 U		0.53 U		0.52 U		1.2 U		1.2 U		1.4 UJ		2.8 UJ	
Methylene chloride	0.71 U		0.73 U		0.72 U		1.7 U		1.7 U		1.9 UJ		3.9 UJ	
Styrene	0.46 U		0.48 U		0.47 U		1.1 U		1.1 U		1.2 UJ		2.5 UJ	
Tetrachloroethene	0.46 U		0.48 U		0.47 U		1.1 U		1.1 U		1.2 UJ		2.5 UJ	
Toluene	0.38 U		0.59		0.92		0.91 U		0.92 U		1 UJ		2.1 UJ	
Total Trihalomethane	0 U		0 U		0 U									
trans-1,2-Dichloroethene	0.33 U		0.34 U		0.33 U		0.79 U		0.79 U		0.87 UJ		1.8 UJ	
trans-1,3-Dichloropropene	0.65 U		0.68 U		0.67 U		1.6 U		1.6 U		1.7 UJ		3.6 UJ	
Trichloroethene	0.65 UJ		0.67 UJ		0.66 UJ		1.6 U		1.6 UJ		1.7 UJ		3.6 UJ	
Vinyl chloride	0.33 UJ		0.34 UJ		0.33 UJ		0.78 UJ		0.79 UJ		0.87 UJ		1.8 UJ	
Xylene, m/p	0.97 U		1 U		0.99 U		2.3 U		2.3 U		2.6 UJ		5.3 UJ	

Table A-16  
June 2009 Sediment Analytical Results - Property 38  
TORX Facility  
Rochester, Indiana

Sample Delivery Group	906552		906552		906552		906552		906552		906552		906552	
Location	4403 N 31 SS001		4403 N 31 SS001		4403 N 31 SS001		4403 N 31 SS002		4403 N 31 SS002		4403 N 31 SS003		4403 N 31 SS003	
Field Sample ID	MTR- 4403NOHWY31-		MTR- 4403NOHWY31-		MTR- 4403NOHWY31-		MTR- 4403NOHWY31-		MTR- 4403NOHWY31-		MTR- 4403NOHWY31-		MTR- 4403NOHWY31-	
Sample Date	6/24/2009		6/24/2009		6/24/2009		6/24/2009		6/24/2009		6/24/2009		6/24/2009	
Sample Type	FS		FD		FS		FS		FS		FS		FS	
Parameter Name	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Xylene, o	0.5 U		0.52 U		0.51 U		1.2 U		1.2 U		1.3 UJ		2.7 UJ	
Xylenes, Total	1.5 U		1.5 U		1.5 U		3.5 U		3.6 U		3.9 UJ		8.1 UJ	
Percent Moisture (%)														
Percent Moisture	22		25		24		68		68		71		86	

**Table A-16**  
**June 2009 Sediment Analytical Results - Property 38**  
**TORX Facility**  
**Rochester, Indiana**

Sample Delivery Group	906552		906552		906552		906552		906552		906552	
Location	4403 N 31 SS004		4403 N 31 SS004		4403 N 31 SS005		4403 N 31 SS005		4403 N 31 SS006		4403 N 31 SS006	
Field Sample ID	MTR- 4403NOHWY31-		MTR- 4403NOHWY31-		MTR- 4403NOHWY31-		MTR- 4403NOHWY31-		MTR- 4403NOHWY31-		MTR- 4403NOHWY31-	
Sample Date	6/24/2009		6/24/2009		6/24/2009		6/24/2009		6/24/2009		6/24/2009	
Sample Type	FS		FS		FS		FS		FS		FS	
Parameter Name	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
<b>Volatile Organics (ug/Kg)</b>												
1,1,1-Trichloroethane	0.76	UJ	0.91	UJ	0.91	UJ	0.92	UJ	0.7	UJ	0.89	UJ
1,1,2,2-Tetrachloroethane	1.1	UJ	1.3	UJ	1.3	UJ	1.4	UJ	1	UJ	1.3	UJ
1,1,2-Trichloroethane	1.2	UJ	1.4	UJ	1.4	UJ	1.4	UJ	1.1	UJ	1.4	UJ
1,1-Dichloroethane	1	UJ	1.2	UJ	1.2	UJ	1.3	UJ	0.96	UJ	1.2	UJ
1,1-Dichloroethene	1	UJ	1.2	UJ	1.2	UJ	1.2	UJ	0.95	UJ	1.2	UJ
1,2-Dichloroethane	1.2	UJ	1.5	UJ	1.5	UJ	1.5	UJ	1.1	UJ	1.4	UJ
1,2-Dichloroethene (total)	2	UJ	2.3	UJ	2.3	UJ	2.4	UJ	1.8	UJ	2.3	UJ
1,2-Dichloropropane	0.93	UJ	1.1	UJ	1.1	UJ	1.1	UJ	0.86	UJ	1.1	UJ
1,3-Dichloropropene (total)	3.4	UJ	4	UJ	4	UJ	4.1	UJ	3.1	UJ	3.9	UJ
2-Butanone	77	NJ	200	NJ	85	NJ	110	NJ	160	NJ	120	NJ
2-Hexanone	2.1	UJ	2.4	UJ	2.5	UJ	2.5	UJ	1.9	UJ	2.4	UJ
4-Methyl-2-pentanone	3.4	UJ	4.1	UJ	4.1	UJ	4.1	UJ	3.2	UJ	4	UJ
Acetone	1000	NJ	980	NJ	1200	NJ	1300	NJ	1300	NJ	1300	NJ
Benzene	1.1	UJ	1.3	UJ	1.4	UJ	1.4	UJ	1	UJ	1.3	UJ
Bromodichloromethane	0.91	UJ	1.1	UJ	1.1	UJ	1.1	UJ	0.84	UJ	1.1	UJ
Bromoform	0.97	UJ	1.1	UJ	1.2	UJ	1.2	UJ	0.89	UJ	1.1	UJ
Bromomethane	7.1	UJ	8.3	UJ	8.4	UJ	8.5	UJ	6.5	UJ	8.2	UJ
Carbon disulfide	9.2	J	19	J	7.8	J	2.6	UJ	6.5	J	9.2	J
Carbon tetrachloride	2.1	UJ	2.5	UJ	2.5	UJ	2.6	UJ	2	UJ	2.5	UJ
Chlorobenzene	1.9	UJ	2.2	UJ	2.2	UJ	2.2	UJ	1.7	UJ	2.2	UJ
Chlorodibromomethane	0.95	UJ	1.1	UJ	1.1	UJ	1.1	UJ	0.87	UJ	1.1	UJ
Chloroethane	6.1	UJ	7.3	UJ	7.3	UJ	7.4	UJ	5.7	UJ	7.1	UJ
Chloroform	0.98	UJ	1.2	UJ	1.2	UJ	1.2	UJ	0.9	UJ	1.1	UJ
Chloromethane	4.2	UJ	5	UJ	5	UJ	5	UJ	3.9	UJ	4.9	UJ
Cis-1,2-Dichloroethene	0.76	UJ	0.91	UJ	0.91	UJ	0.92	UJ	0.7	UJ	0.89	UJ
cis-1,3-Dichloropropene	1	UJ	1.2	UJ	1.2	UJ	1.2	UJ	0.93	UJ	1.2	UJ
Ethyl benzene	1.9	UJ	2.2	UJ	2.2	UJ	2.2	UJ	1.7	UJ	2.2	UJ
Methylene chloride	2.6	UJ	3.1	UJ	3.1	UJ	3.1	UJ	2.4	UJ	3	UJ
Styrene	1.7	UJ	2	UJ	2	UJ	2	UJ	1.5	UJ	R	
Tetrachloroethene	1.7	UJ	2	UJ	2	UJ	2	UJ	1.5	UJ	1.9	UJ
Toluene	1.4	UJ	1.6	UJ	1.7	UJ	1.7	UJ	1.3	UJ	1.6	UJ
Total Trihalomethane												
trans-1,2-Dichloroethene	1.2	UJ	1.4	UJ	1.4	UJ	1.4	UJ	1.1	UJ	1.4	UJ
trans-1,3-Dichloropropene	2.4	UJ	2.8	UJ	2.8	UJ	2.9	UJ	2.2	UJ	2.8	UJ
Trichloroethene	2.4	UJ	2.8	UJ	2.8	UJ	2.9	UJ	2.2	UJ	2.8	UJ
Vinyl chloride	1.2	UJ	1.4	UJ	1.4	UJ	1.4	UJ	1.1	UJ	1.4	UJ
Xylene, m/p	3.5	UJ	4.2	UJ	4.2	UJ	4.3	UJ	3.3	UJ	4.1	UJ

Table A-16  
June 2009 Sediment Analytical Results - Property 38  
TORX Facility  
Rochester, Indiana

Sample Delivery Group	906552		906552		906552		906552		906552		906552	
Location	4403 N 31 SS004		4403 N 31 SS004		4403 N 31 SS005		4403 N 31 SS005		4403 N 31 SS006		4403 N 31 SS006	
Field Sample ID	MTR-4403NOHWY31-		MTR-4403NOHWY31-		MTR-4403NOHWY31-		MTR-4403NOHWY31-		MTR-4403NOHWY31-		MTR-4403NOHWY31-	
Sample Date	6/24/2009		6/24/2009		6/24/2009		6/24/2009		6/24/2009		6/24/2009	
Sample Type	FS		FS		FS		FS		FS		FS	
Parameter Name	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Xylene, o	1.8 UJ		2.2 UJ		2.2 UJ		2.2 UJ		1.7 UJ		2.1 UJ	
Xylenes, Total	5.4 UJ		6.3 UJ		6.4 UJ		6.4 UJ		4.9 UJ		6.2 UJ	
Percent Moisture (%)												
Percent Moisture	79		82		82		82		77		82	

FS = field sample  
FD = field duplicate  
U = Not detected, value is the reporting limit  
J = value is estimated  
N = compound presumptively present  
R = value is rejected  
ug/Kg = microgram per kilogram

Prepared by / Date: KJC 02/15/11  
Checked by / Date: MJM 02/15/11

## **APPENDIX B**

### **JOHNSON & ETTINGER VAPOR INTRUSION MODELING**

DATA ENTRY SHEET  
PROPERTY 36 - 2-BUTANONE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
78933			0.003	Methylethylketone (2-butanone)	67641			1.40E-02

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	S	1.66	0.375	0.054	S	1.66	0.375	0.054

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	366	0.1	1	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET									
PROPERTY 26- 2-BUTANONE									
Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	Normal boiling point, T <sub>B</sub> (°K)	Critical temperature, T <sub>C</sub> (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.08E-02	9.80E-06	5.58E-05	25	7,481	352.50	536.78	72.11	0.0E+00	5.0E+00



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - 2-BUTANONE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.321	0.321	0.003	9.92E-08	0.998	9.91E-08	4,000	9.31E+00	1.02E+05

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	8,419	2.63E-05	1.13E-03	1.75E-04	1.31E-02	0.00E+00	0.00E+00	1.31E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	9.31E+00	0.10	8.33E+01	1.31E-02	4.00E+02	1.77E+69	4.73E-04	4.40E-03	NA	5.0E+00

END

RESULTS SHEET  
PROPERTY 36 - 2-BUTANONE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	8.4E-07

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 36 - 1,2,4-TRIMETHYLBENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
95636			0.002	1,2,4-Trimethylbenzene	67641			1.40E-02

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>S</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>S</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	S	1.66	0.375	0.054	S	1.66	0.375	0.054

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	366	0.1	1	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 36 - 1,2,4-TRIMETHYLBENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
6.06E-02	7.92E-06	6.14E-03	25	9,369	442.30	649.17	120.20	0.0E+00	6.0E-03

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - 1,2,4-TRIMETHYLBENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{ie}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_g$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc. ( $\mu$ g/m <sup>3</sup> )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.321	0.321	0.003	9.92E-08	0.998	9.91E-08	4,000	1.03E+01	1.02E+05
Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	11,692	2.16E-03	9.30E-02	1.75E-04	9.80E-03	0.00E+00	0.00E+00	9.80E-03	122
Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu$ g/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe')$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu$ g/m <sup>3</sup> )	Unit risk factor, URF ( $\mu$ g/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	
15	1.03E+01	0.10	8.33E+01	9.80E-03	4.00E+02	2.27E+92	4.14E-04	4.29E-03	NA	6.0E-03	
END											

RESULTS SHEET  
PROPERTY 36 - 1,2,4-TRIMETHYLBENZENE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.9E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 36 - ACETONE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
67641			0.014	Acetone	67641			1.40E-02

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)			ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
Thickness of soil stratum A, h <sub>A</sub> (cm)	Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)						
15	137	10	137			S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	S	1.66	0.375	0.054	S	1.66	0.375	0.054

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	366	0.1	1	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET									
PROPERTY 36 - ACETONE									
Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	Normal boiling point, T <sub>B</sub> (°K)	Critical temperature, T <sub>C</sub> (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
1.24E-01	1.14E-05	3.87E-05	25	6,955	329.20	508.10	58.08	0.0E+00	3.2E+00



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - ACETONE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc. ( $\mu$ g/m <sup>3</sup> )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.321	0.321	0.003	9.92E-08	0.998	9.91E-08	4,000	3.50E+01	1.02E+05
Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	7,559	1.97E-05	8.47E-04	1.75E-04	2.01E-02	0.00E+00	0.00E+00	2.01E-02	122
Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu$ g/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu$ g/m <sup>3</sup> )	Unit risk factor, URF ( $\mu$ g/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	
15	3.50E+01	0.10	8.33E+01	2.01E-02	4.00E+02	1.33E+45	5.54E-04	1.94E-02	NA	3.2E+00	
END											

RESULTS SHEET  
PROPERTY 36 - ACETONE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	5.9E-06

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 36 - BENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
71432			0.005	Benzene	67641			1.40E-02

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)			ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
Thickness of soil stratum A, h <sub>A</sub> (cm)	Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)						
15	137	10	137			S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	S	1.66	0.375	0.054	S	1.66	0.375	0.054

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	366	0.1	1	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET									
PROPERTY 36 - BENZENE									
Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	Normal boiling point, T <sub>B</sub> (°K)	Critical temperature, T <sub>C</sub> (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.80E-02	9.80E-06	5.54E-03	25	7,342	353.24	562.16	78.11	7.8E-06	3.0E-02

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - BENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu g/m^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.321	0.321	0.003	9.92E-08	0.998	9.91E-08	4,000	1.68E+01	1.02E+05

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	8,122	2.68E-03	1.15E-01	1.75E-04	1.42E-02	0.00E+00	0.00E+00	1.42E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu g/m^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu g/m^3$ )	Unit risk factor, URF ( $\mu g/m^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.68E+01	0.10	8.33E+01	1.42E-02	4.00E+02	3.99E+63	4.90E-04	8.23E-03	7.8E-06	3.0E-02

END

RESULTS SHEET  
PROPERTY 36 - BENZENE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.6E-08	2.6E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 36 - CARBON DISULFIDE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)
75150			0.002	Carbon disulfide	67641			1.40E-02

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ ( $^{\circ}\text{C}$ )	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054	S	1.66	0.375	0.054	S	1.66	0.375	0.054

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	366	0.1	1	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET									
PROPERTY 36: CARBON DISULFIDE									
Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	Normal boiling point, T <sub>B</sub> (°K)	Critical temperature, T <sub>C</sub> (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
1.04E-01	1.00E-05	3.02E-02	25	6,391	319.00	552.00	76.13	0.0E+00	7.0E-01



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - CARBON DISULFIDE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{le}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc. ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.321	0.321	0.003	9.92E-08	0.998	9.91E-08	4,000	6.55E+00	1.02E+05
Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	6,682	1.66E-02	7.16E-01	1.75E-04	1.68E-02	0.00E+00	0.00E+00	1.68E-02	122
Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	
15	6.55E+00	0.10	8.33E+01	1.68E-02	4.00E+02	6.54E+53	5.22E-04	3.42E-03	NA	7.0E-01	
END											

RESULTS SHEET  
PROPERTY 36 - CARBON DISULFIDE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	4.7E-06

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 36 - CHLOROBENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
108907			0.001	Chlorobenzene	67641			1.40E-02

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)			ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
Thickness of soil stratum A, h <sub>A</sub> (cm)	Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)						
15	137	10	137			S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	S	1.66	0.375	0.054	S	1.66	0.375	0.054

MORE  
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ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	366	0.1	1	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET									
PROPERTY 36, CHLOROBENZENE									
Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	Normal boiling point, T <sub>B</sub> (°K)	Critical temperature, T <sub>C</sub> (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.30E-02	8.70E-06	3.69E-03	25	8,410	404.87	632.40	112.56	0.0E+00	6.0E-02

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - CHLOROBENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.321	0.321	0.003	9.92E-08	0.998	9.91E-08	4,000	4.84E+00	1.02E+05

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	9,803	1.54E-03	6.61E-02	1.75E-04	1.18E-02	0.00E+00	0.00E+00	1.18E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	4.84E+00	0.10	8.33E+01	1.18E-02	4.00E+02	4.66E+76	4.52E-04	2.19E-03	NA	6.0E-02

END

RESULTS SHEET  
PROPERTY 36 - CHLOROBENZENE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.5E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 36 - DICHLORODIFLUOROMETHANE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
75718			0.004	Dichlorodifluoromethane	67641			1.40E-02

MORE  
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ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>S</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>S</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	S	1.66	0.375	0.054	S	1.66	0.375	0.054

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	366	0.1	1	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET									
PROPERTY 36, DICHLORODIFLUOROMETHANE									
Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	Normal boiling point, T <sub>B</sub> (°K)	Critical temperature, T <sub>C</sub> (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
6.65E-02	9.92E-06	3.42E-01	25	9,421	243.20	384.95	120.92	0.0E+00	2.0E-01



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - DICHLORODIFLUOROMETHANE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.321	0.321	0.003	9.92E-08	0.998	9.91E-08	4,000	2.08E+01	1.02E+05

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	8,386	1.62E-01	6.96E+00	1.75E-04	1.08E-02	0.00E+00	0.00E+00	1.08E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	2.08E+01	0.10	8.33E+01	1.08E-02	4.00E+02	1.46E+84	4.33E-04	9.02E-03	NA	2.0E-01

END

RESULTS SHEET  
PROPERTY 36 - DICHLORODIFLUOROMETHANE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	4.3E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 36 - ETHYLBENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
100414			0.003	Ethylbenzene	67641			1.40E-02

MORE  
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ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	S	1.66	0.375	0.054	S	1.66	0.375	0.054

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	366	0.1	1	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 36 - ETHYLBENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.50E-02	7.80E-06	7.86E-03	25	8,501	409.34	617.20	106.17	0.0E+00	1.0E+00

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - ETHYLBENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.321	0.321	0.003	9.92E-08	0.998	9.91E-08	4,000	1.37E+01	1.02E+05

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	10,155	3.17E-03	1.36E-01	1.75E-04	1.21E-02	0.00E+00	0.00E+00	1.21E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.37E+01	0.10	8.33E+01	1.21E-02	4.00E+02	4.21E+74	4.58E-04	6.27E-03	NA	1.0E+00

END

RESULTS SHEET  
PROPERTY 36 - ETHYLBENZENE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.0E-06

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 36 - HEXANE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
110543			0.002	Hexane	67641			1.40E-02

MORE  
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ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	S	1.66	0.375	0.054	S	1.66	0.375	0.054

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	366	0.1	1	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 36 - HEXANE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, $H$ (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
2.00E-01	7.77E-06	1.66E+00	25	6,895	341.70	508.00	86.18	0.0E+00	2.0E-01



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - HEXANE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.321	0.321	0.003	9.92E-08	0.998	9.91E-08	4,000	7.42E+00	1.02E+05

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	7,737	8.32E-01	3.58E+01	1.75E-04	3.23E-02	0.00E+00	0.00E+00	3.23E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	7.42E+00	0.10	8.33E+01	3.23E-02	4.00E+02	9.64E+27	6.32E-04	4.69E-03	NA	2.0E-01

END

RESULTS SHEET  
PROPERTY 36 - HEXANE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.3E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 36 - METHYLENE CHLORIDE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
75092			0.003	Methylene chloride	67641			1.40E-02

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>S</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>S</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	S	1.66	0.375	0.054	S	1.66	0.375	0.054

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	366	0.1	1	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 36 - METHYLENE CHLORIDE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
1.01E-01	1.17E-05	2.18E-03	25	6,706	313.00	510.00	84.93	4.7E-07	3.0E+00

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - METHYLENE CHLORIDE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.321	0.321	0.003	9.92E-08	0.998	9.91E-08	4,000	1.10E+01	1.02E+05

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	7,034	1.16E-03	5.01E-02	1.75E-04	1.63E-02	0.00E+00	0.00E+00	1.63E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.10E+01	0.10	8.33E+01	1.63E-02	4.00E+02	2.59E+55	5.16E-04	5.66E-03	4.7E-07	3.0E+00

END

RESULTS SHEET  
PROPERTY 36 - METHYLENE CHLORIDE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.1E-09	1.8E-06

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 36 - M,P-XYLENES

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
106423			0.01	p-Xylene	67641			1.40E-02

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	S	1.66	0.375	0.054	S	1.66	0.375	0.054

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	366	0.1	1	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 36 - M,P-XYLENES

Diffusivity in air, $D_a$ ( $\text{cm}^2/\text{s}$ )	Diffusivity in water, $D_w$ ( $\text{cm}^2/\text{s}$ )	Henry's law constant at reference temperature, H ( $\text{atm}\cdot\text{m}^3/\text{mol}$ )	Henry's law constant reference temperature, $T_R$ ( $^{\circ}\text{C}$ )	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ ( $\text{cal}/\text{mol}$ )	Normal boiling point, $T_B$ ( $^{\circ}\text{K}$ )	Critical temperature, $T_C$ ( $^{\circ}\text{K}$ )	Molecular weight, MW ( $\text{g}/\text{mol}$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) $^{-1}$	Reference conc., RfC ( $\text{mg}/\text{m}^3$ )
7.69E-02	8.44E-06	7.64E-03	25	8,525	411.52	616.20	106.17	0.0E+00	1.0E-01



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - M,P-XYLENES

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.321	0.321	0.003	9.92E-08	0.998	9.91E-08	4,000	4.57E+01	1.02E+05

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	10,248	3.06E-03	1.32E-01	1.75E-04	1.24E-02	0.00E+00	0.00E+00	1.24E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	4.57E+01	0.10	8.33E+01	1.24E-02	4.00E+02	6.04E+72	4.63E-04	2.11E-02	NA	1.0E-01

END

RESULTS SHEET  
PROPERTY 36 - M,P-XYLENES

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.0E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 36 - O-XYLENES

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
95476			0.003	<u>o-Xylene</u>	67641			1.40E-02

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	S	1.66	0.375	0.054	S	1.66	0.375	0.054

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	366	0.1	1	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET									
PROPERTY 36 - O-XYLENES									
Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	Normal boiling point, T <sub>B</sub> (°K)	Critical temperature, T <sub>C</sub> (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.70E-02	1.00E-05	5.18E-03	25	8,661	417.60	630.30	106.17	0.0E+00	1.0E-01

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - O-XYLENES

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.321	0.321	0.003	9.92E-08	0.998	9.91E-08	4,000	1.37E+01	1.02E+05

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	10,404	2.04E-03	8.79E-02	1.75E-04	1.41E-02	0.00E+00	0.00E+00	1.41E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.37E+01	0.10	8.33E+01	1.41E-02	4.00E+02	2.14E+64	4.87E-04	6.68E-03	NA	1.0E-01

END

RESULTS SHEET  
PROPERTY 36 - O-XYLENES

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.4E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 36 - TOLUENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)
108883			0.031	Toluene	67641			1.40E-02

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_s$ (cm)	ENTER Average soil temperature, $T_S$ (°C)	ENTER Totals must add up to value of $L_s$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054	S	1.66	0.375	0.054	S	1.66	0.375	0.054

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm} \cdot \text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	366	0.1	1	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 36 - TOLUENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.70E-02	8.60E-06	6.62E-03	25	7,930	383.78	591.79	92.14	0.0E+00	5.0E+00



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - TOLUENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu g/m^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.321	0.321	0.003	9.92E-08	0.998	9.91E-08	4,000	1.23E+02	1.02E+05

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	9,154	2.92E-03	1.26E-01	1.75E-04	1.41E-02	0.00E+00	0.00E+00	1.41E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu g/m^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu g/m^3$ )	Unit risk factor, URF ( $\mu g/m^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.23E+02	0.10	8.33E+01	1.41E-02	4.00E+02	2.15E+64	4.87E-04	5.99E-02	NA	5.0E+00

END

RESULTS SHEET  
PROPERTY 36 - TOLUENE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.1E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 36 - TRICHLOROFLUOROMETHANE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
75694			0.001	Trichlorofluoromethane	67641			1.40E-02

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>S</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>S</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	S	1.66	0.375	0.054	S	1.66	0.375	0.054

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	366	0.1	1	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 36 - TRICHLOROFLUOROMETHANE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.70E-02	9.70E-06	9.68E-02	25	5,999	296.70	471.00	137.36	0.0E+00	7.0E-01

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - TRICHLOROFLUOROMETHANE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc. ( $\mu$ g/m <sup>3</sup> )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.321	0.321	0.003	9.92E-08	0.998	9.91E-08	4,000	5.91E+00	1.02E+05
Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	6,158	5.58E-02	2.40E+00	1.75E-04	1.41E-02	0.00E+00	0.00E+00	1.41E-02	122
Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu$ g/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu$ g/m <sup>3</sup> )	Unit risk factor, URF ( $\mu$ g/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	
15	5.91E+00	0.10	8.33E+01	1.41E-02	4.00E+02	2.15E+64	4.87E-04	2.88E-03	NA	7.0E-01	
END											

RESULTS SHEET  
PROPERTY 36 - TRICHLOROFLUOROMETHANE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.9E-06

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

Reset to  
Defaults

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER Chemical CAS No. (numbers only, no dashes)		ENTER Initial groundwater conc., $C_W$ ( $\mu\text{g/L}$ )		Chemical							
75354	1.20E+00			1,1-Dichloroethylene							
ENTER Average soil/ groundwater temperature, $T_S$ ( $^{\circ}\text{C}$ )	ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Depth below grade to water table, $L_{WT}$ (cm)	ENTER Totals must add up to value of $L_{WT}$ (cell G28)			ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)		OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
Thickness of soil stratum A, $h_A$ (cm)	Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)									
10	15	640	640			A	S	S			

MORE  
↓

ENTER Stratum A SCS soil type Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g/cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g/cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g/cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054		Error	Error	Error		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g/cm-s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, $ER$ (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	366	0.1	1	

MORE  
↓

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, $ED$ (yrs)	ENTER Exposure frequency, $EF$ (days/yr)	ENTER Target risk for carcinogens, $TR$ (unitless)	ENTER Target hazard quotient for noncarcinogens, $THQ$ (unitless)
70	30	30	350	1.0E-06	1

END

Used to calculate risk-based  
groundwater concentration.

CHEMICAL PROPERTIES SHEET  
PROPERTY 36 - 1,1-DICHLOROETHENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Organic carbon partition coefficient, $K_{oc}$ (cm <sup>3</sup> /g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF (ug/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
9.00E-02	1.04E-05	2.60E-02	25	6,247	304.75	576.05	5.89E+01	2.25E+03	0.0E+00	2.0E-01

END



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - 1,1-DICHLOROETHENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_e$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{ra}$ (cm <sup>2</sup> )	Stratum A effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Thickness of capillary zone, $L_{cz}$ (cm)	Total porosity in capillary zone, $n_{cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)
9.46E+08	625	0.321	#VALUE!	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)	Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. groundwater temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Capillary zone effective diffusion coefficient, $D_{cz}^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.02E+05	1.06E+06	3.77E-04	15	6,392	1.47E-02	6.33E-01	1.75E-04	1.45E-02	0.00E+00	0.00E+00	5.78E-04	8.77E-03	625

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ (µg/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m <sup>3</sup> )	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	7.59E+02	0.10	9.95E+01	1.45E-02	4.00E+02	1.89E+74	1.27E-04	9.66E-02	NA	2.0E-01

END

RESULTS SHEET  
PROPERTY 36 - 1,1-DICHLOROETHENE  
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	2.25E+06	NA	NA	4.6E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

Reset to  
Defaults

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER Chemical CAS No. (numbers only, no dashes)		ENTER Initial groundwater conc., $C_W$ ( $\mu\text{g/L}$ )		Chemical							
156592	1.50E+02			cis-1,2-Dichloroethylene							
ENTER Average soil/ groundwater temperature, $T_S$ ( $^{\circ}\text{C}$ )	ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Depth below grade to water table, $L_{WT}$ (cm)	ENTER Totals must add up to value of $L_{WT}$ (cell G28)			ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)		OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
Thickness of soil stratum A, $h_A$ (cm)	Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)									
10	15	640	640			A	S	S			

MORE  
↓

ENTER Stratum A SCS soil type Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g/cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g/cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g/cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054		Error	Error	Error		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g/cm-s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, $ER$ (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	366	0.1	0.25	

MORE  
↓

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, $ED$ (yrs)	ENTER Exposure frequency, $EF$ (days/yr)	ENTER Target risk for carcinogens, $TR$ (unitless)	ENTER Target hazard quotient for noncarcinogens, $THQ$ (unitless)
70	30	30	350	1.0E-06	1

END

Used to calculate risk-based  
groundwater concentration.

CHEMICAL PROPERTIES SHEET  
PROPERTY 36 - CIS-1,2-DICHLOROETHENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Organic carbon partition coefficient, $K_{oc}$ (cm <sup>3</sup> /g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF (ug/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.36E-02	1.13E-05	4.07E-03	25	7,192	333.65	544.00	3.55E+01	3.50E+03	0.0E+00	3.5E-02

END

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - CIS-1,2-DICHLOROETHENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_e$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{ra}$ (cm <sup>2</sup> )	Stratum A effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Thickness of capillary zone, $L_{cz}$ (cm)	Total porosity in capillary zone, $n_{cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)
9.46E+08	625	0.321	#VALUE!	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)	Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. groundwater temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Capillary zone effective diffusion coefficient, $D_{cz}^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
2.54E+04	1.06E+06	3.77E-04	15	7,734	2.04E-03	8.77E-02	1.75E-04	1.19E-02	0.00E+00	0.00E+00	4.81E-04	7.22E-03	625

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ (µg/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m <sup>3</sup> )	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.32E+04	0.10	9.95E+01	1.19E-02	4.00E+02	6.70E+90	4.29E-04	5.65E+00	NA	3.5E-02

END

RESULTS SHEET  
PROPERTY 36 - CIS-1,2-DICHLOROETHENE  
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	3.50E+06	NA	NA	1.5E-01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL  
DOWN  
TO "END"

END

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

X

<b>ENTER</b> Chemical CAS No. (numbers only, no dashes)		<b>ENTER</b> Initial groundwater conc., $C_W$ ( $\mu\text{g/L}$ )		<b>Chemical</b>	
156605		3.20E+00		trans-1,2-Dichloroethylene	

<b>ENTER</b> Average soil/ groundwater temperature, $T_S$ ( $^{\circ}\text{C}$ )	<b>ENTER</b> Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	<b>ENTER</b> Depth below grade to water table, $L_{WT}$ (cm)	<b>ENTER</b> Totals must add up to value of $L_{WT}$ (cell G28)			<b>ENTER</b> Soil stratum directly above water table, (Enter A, B, or C)	<b>ENTER</b> SCS soil type directly above water table	<b>ENTER</b> Soil stratum A SCS soil type (used to estimate soil vapor permeability)	<b>ENTER</b> User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
Thickness of soil stratum A, $h_A$ (cm)	Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)							
10	15	640	640			A	S	S	

MORE  
↓

<b>ENTER</b> Stratum A SCS soil type  Lookup Soil Parameters	<b>ENTER</b> Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g/cm}^3$ )	<b>ENTER</b> Stratum A soil total porosity, $n^A$ (unitless)	<b>ENTER</b> Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	<b>ENTER</b> Stratum B SCS soil type  Lookup Soil Parameters	<b>ENTER</b> Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g/cm}^3$ )	<b>ENTER</b> Stratum B soil total porosity, $n^B$ (unitless)	<b>ENTER</b> Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	<b>ENTER</b> Stratum C SCS soil type  Lookup Soil Parameters	<b>ENTER</b> Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g/cm}^3$ )	<b>ENTER</b> Stratum C soil total porosity, $n^C$ (unitless)	<b>ENTER</b> Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054		Error	Error	Error		Error	Error	Error

MORE  
↓

<b>ENTER</b> Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	<b>ENTER</b> Soil-bldg. pressure differential, $\Delta P$ ( $\text{g/cm-s}^2$ )	<b>ENTER</b> Enclosed space floor length, $L_B$ (cm)	<b>ENTER</b> Enclosed space floor width, $W_B$ (cm)	<b>ENTER</b> Enclosed space height, $H_B$ (cm)	<b>ENTER</b> Floor-wall seam crack width, $w$ (cm)	<b>ENTER</b> Indoor air exchange rate, ER (1/h)	<b>ENTER</b> Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	366	0.1	1	

MORE  
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<b>ENTER</b> Averaging time for carcinogens, $AT_C$ (yrs)	<b>ENTER</b> Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	<b>ENTER</b> Exposure duration, ED (yrs)	<b>ENTER</b> Exposure frequency, EF (days/yr)	<b>ENTER</b> Target risk for carcinogens, TR (unitless)	<b>ENTER</b> Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

END

Used to calculate risk-based  
groundwater concentration.

CHEMICAL PROPERTIES SHEET  
PROPERTY 36 - TRANS-1,2-DICHLOROETHENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Organic carbon partition coefficient, $K_{oc}$ (cm <sup>3</sup> /g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF (ug/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.07E-02	1.19E-05	9.36E-03	25	6,717	320.85	516.50	5.25E+01	6.30E+03	0.0E+00	7.0E-02

END



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - TRANS-1,2-DICHLOROETHENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{se}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{ra}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Thickness of capillary zone, $L_{cz}$ (cm)	Total porosity in capillary zone, $n_{cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)
9.46E+08	625	0.321	#VALUE!	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)	Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. groundwater temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Capillary zone effective diffusion coefficient, $D_{cz}^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.02E+05	1.06E+06	3.77E-04	15	7,136	4.94E-03	2.13E-01	1.75E-04	1.14E-02	0.00E+00	0.00E+00	4.57E-04	6.91E-03	625

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ (µg/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m <sup>3</sup> )	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	6.81E+02	0.10	9.95E+01	1.14E-02	4.00E+02	3.56E+94	1.03E-04	7.02E-02	NA	7.0E-02

END

RESULTS SHEET  
PROPERTY 36 - TRANS-1,2-DICHLOROETHENE  
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	6.30E+06	NA	NA	9.6E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL  
DOWN  
TO "END"

END

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

Reset to  
Defaults

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER Chemical CAS No. (numbers only, no dashes)		ENTER Initial groundwater conc., $C_W$ ( $\mu\text{g/L}$ )		Chemical							
79016	8.20E+01			Trichloroethylene							
ENTER Average soil/ groundwater temperature, $T_S$ ( $^{\circ}\text{C}$ )	ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Depth below grade to water table, $L_{WT}$ (cm)	ENTER Totals must add up to value of $L_{WT}$ (cell G28)			ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)		OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
Thickness of soil stratum A, $h_A$ (cm)	Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)									
10	15	640	640			A	S	S			

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g/cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g/cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g/cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054		Error	Error	Error		Error	Error	Error

MORE  
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ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g/cm-s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, $ER$ (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	366	0.1	1	

MORE  
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ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, $ED$ (yrs)	ENTER Exposure frequency, $EF$ (days/yr)	ENTER Target risk for carcinogens, $TR$ (unitless)	ENTER Target hazard quotient for noncarcinogens, $THQ$ (unitless)
70	30	30	350	1.0E-06	1

END

Used to calculate risk-based  
groundwater concentration.

CHEMICAL PROPERTIES SHEET  
PROPERTY 36 - TRICHLOROETHENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, $H$ (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Organic carbon partition coefficient, $K_{oc}$ (cm <sup>3</sup> /g)	Pure component water solubility, $S$ (mg/L)	Unit risk factor, URF (ug/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	5.1E-06	3.5E-02

END

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - TRICHLOROETHENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_e$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{ra}$ (cm <sup>2</sup> )	Stratum A effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Thickness of capillary zone, $L_{cz}$ (cm)	Total porosity in capillary zone, $n_{cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)
9.46E+08	625	0.321	#VALUE!	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)	Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. groundwater temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Capillary zone effective diffusion coefficient, $D_{cz}^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.02E+05	1.06E+06	3.77E-04	15	8,557	4.78E-03	2.06E-01	1.75E-04	1.28E-02	0.00E+00	0.00E+00	5.09E-04	7.71E-03	625

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ (µg/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m <sup>3</sup> )	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.69E+04	0.10	9.95E+01	1.28E-02	4.00E+02	4.15E+84	1.14E-04	1.92E+00	5.1E-06	3.5E-02

END

RESULTS SHEET  
PROPERTY 36 - TRICHLOROETHENE

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	1.47E+06	NA	4.1E-06	5.3E-02

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL  
DOWN  
TO "END"

END

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER Chemical CAS No. (numbers only, no dashes)		ENTER Initial groundwater conc., $C_W$ ( $\mu\text{g/L}$ )		Chemical							
75014	3.50E+00			Vinyl chloride (chloroethene)							
ENTER Average soil/ groundwater temperature, $T_S$ ( $^{\circ}\text{C}$ )	ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Depth below grade to water table, $L_{WT}$ (cm)	ENTER Totals must add up to value of $L_{WT}$ (cell G28)			ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)		OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
Thickness of soil stratum A, $h_A$ (cm)	Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)									
10	15	640	640			A	S	S			

MORE  
↓

ENTER Stratum A SCS soil type Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g/cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g/cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g/cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054		Error	Error	Error		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g/cm-s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, $ER$ (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	366	0.1	1	

MORE  
↓

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

END

Used to calculate risk-based  
groundwater concentration.

CHEMICAL PROPERTIES SHEET  
PROPERTY 36 - VINYL CHLORIDE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, $H$ (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Organic carbon partition coefficient, $K_{oc}$ (cm <sup>3</sup> /g)	Pure component water solubility, $S$ (mg/L)	Unit risk factor, URF (ug/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
1.06E-01	1.23E-05	2.69E-02	25	5,250	259.25	432.00	1.86E+01	8.80E+03	4.4E-06	1.0E-01

END



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 36 - VINYL CHLORIDE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{se}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{ra}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Thickness of capillary zone, $L_{cz}$ (cm)	Total porosity in capillary zone, $n_{cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)
9.46E+08	625	0.321	#VALUE!	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)	Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. groundwater temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_{eff,A}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_{eff,B}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_{eff,C}$ (cm <sup>2</sup> /s)	Capillary zone effective diffusion coefficient, $D_{eff,cz}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_{eff,T}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.02E+05	1.06E+06	3.77E-04	15	5,000	1.72E-02	7.41E-01	1.75E-04	1.71E-02	0.00E+00	0.00E+00	6.80E-04	1.03E-02	625

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ (µg/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D_{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m <sup>3</sup> )	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	2.59E+03	0.10	9.95E+01	1.71E-02	4.00E+02	1.16E+63	1.46E-04	3.80E-01	4.4E-06	1.0E-01

END

RESULTS SHEET  
PROPERTY 36 - VINYL CHLORIDE  
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	8.80E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
6.9E-07	3.6E-03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 16A - 1,2,4-TRIMETHYLBENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
95636			3.00E-03	1,2,4-Trimethylbenzene	71432	5.00E+01		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>S</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>S</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	213	10	213				S		

MORE  
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ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
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ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 16A - 1,2,4-TRIMETHYLBENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, $H$ (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
6.06E-02	7.92E-06	6.14E-03	25	9,369	442.30	649.17	120.20	0.0E+00	6.0E-03

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 16A - 1,2,4-TRIMETHYLBENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	198	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	1.55E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	11,692	2.16E-03	9.30E-02	1.75E-04	9.80E-03	0.00E+00	0.00E+00	9.80E-03	198

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.55E+01	0.10	8.33E+01	9.80E-03	4.00E+02	2.27E+92	1.06E-03	1.64E-02	NA	6.0E-03

END

RESULTS SHEET  
PROPERTY 16A - 1,2,4-TRIMETHYLBENZENE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.6E-03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 16A - 1,3,5-TRIMETHYLBENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
108678			1.00E-03	1,3,5-Trimethylbenzene	71432	5.00E+01		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>S</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>S</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	213	10	213				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 16A - 1,3,5-TRIMETHYLBENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
6.02E-02	8.67E-06	5.87E-03	25	9,321	437.89	637.25	120.20	0.0E+00	6.0E-03



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 16A - 1,3,5-TRIMETHYLBENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	198	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	5.17E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	11,678	2.07E-03	8.89E-02	1.75E-04	9.73E-03	0.00E+00	0.00E+00	9.73E-03	198

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	5.17E+00	0.10	8.33E+01	9.73E-03	4.00E+02	9.34E+92	1.05E-03	5.44E-03	NA	6.0E-03

END

RESULTS SHEET  
PROPERTY 16A - 1,3,5-TRIMETHYLBENZENE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	8.8E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 16A - 2-BUTANONE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	
78933			3.00E-03	Methylethylketone (2-butanone)	71432	5.00E+01			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	213	10	213				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 16A - 2-BUTANONE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.08E-02	9.80E-06	5.58E-05	25	7,481	352.50	536.78	72.11	0.0E+00	5.0E+00

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 16A - 2-BUTANONE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	198	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	9.31E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	8,419	2.63E-05	1.13E-03	1.75E-04	1.31E-02	0.00E+00	0.00E+00	1.31E-02	198

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	9.31E+00	0.10	8.33E+01	1.31E-02	4.00E+02	1.77E+69	1.25E-03	1.16E-02	NA	5.0E+00

END

RESULTS SHEET  
PROPERTY 16A - 2-BUTANONE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.2E-06

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 16A - ACETONE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)
67641			2.40E-02	Acetone	71432	5.00E+01		

MORE  
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ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ (°C)	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	213	10	213				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 16A - ACETONE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
1.24E-01	1.14E-05	3.87E-05	25	6,955	329.20	508.10	58.08	0.0E+00	3.2E+00



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 16A - ACETONE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{le}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc. ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	198	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	6.00E+01	3.05E+04
Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	7,559	1.97E-05	8.47E-04	1.75E-04	2.01E-02	0.00E+00	0.00E+00	2.01E-02	198
Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(\text{Pe}^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	
15	6.00E+01	0.10	8.33E+01	2.01E-02	4.00E+02	1.33E+45	1.54E-03	9.23E-02	NA	3.2E+00	
END											

RESULTS SHEET  
PROPERTY 16A - ACETONE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.8E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 16A - BENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

<b>ENTER</b> Chemical CAS No. (numbers only, no dashes)	<b>ENTER</b> Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	<b>OR</b>	<b>ENTER</b> Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	<b>ENTER</b> Chemical CAS No. (numbers only, no dashes)	<b>ENTER</b> Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	<b>OR</b>	<b>ENTER</b> Soil gas conc., C <sub>g</sub> (ppmv)	
71432			3.00E-03	Benzene	71432	5.00E+01			

**MORE**  
↓

<b>ENTER</b> Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	<b>ENTER</b> Soil gas sampling depth below grade, L <sub>s</sub> (cm)	<b>ENTER</b> Average soil temperature, T <sub>S</sub> (°C)	<b>ENTER</b> Totals must add up to value of L <sub>s</sub> (cell F24)	<b>ENTER</b> Thickness of soil stratum A, h <sub>A</sub> (cm)	<b>ENTER</b> Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	<b>ENTER</b> Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	<b>ENTER</b> Soil stratum A SCS soil type (used to estimate soil vapor permeability)	<b>OR</b>	<b>ENTER</b> User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	213	10	213				S		

**MORE**  
↓

<b>ENTER</b> Stratum A SCS soil type  Lookup Soil Parameters	<b>ENTER</b> Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	<b>ENTER</b> Stratum A soil total porosity, n <sup>A</sup> (unitless)	<b>ENTER</b> Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	<b>ENTER</b> Stratum B SCS soil type  Lookup Soil Parameters	<b>ENTER</b> Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	<b>ENTER</b> Stratum B soil total porosity, n <sup>B</sup> (unitless)	<b>ENTER</b> Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	<b>ENTER</b> Stratum C SCS soil type  Lookup Soil Parameters	<b>ENTER</b> Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	<b>ENTER</b> Stratum C soil total porosity, n <sup>C</sup> (unitless)	<b>ENTER</b> Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

**MORE**  
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<b>ENTER</b> Enclosed space floor thickness, L <sub>crack</sub> (cm)	<b>ENTER</b> Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	<b>ENTER</b> Enclosed space floor length, L <sub>B</sub> (cm)	<b>ENTER</b> Enclosed space floor width, W <sub>B</sub> (cm)	<b>ENTER</b> Enclosed space height, H <sub>B</sub> (cm)	<b>ENTER</b> Floor-wall seam crack width, w (cm)	<b>ENTER</b> Indoor air exchange rate, ER (1/h)	<b>ENTER</b> Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

<b>ENTER</b> Averaging time for carcinogens, AT <sub>C</sub> (yrs)	<b>ENTER</b> Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	<b>ENTER</b> Exposure duration, ED (yrs)	<b>ENTER</b> Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 16A - BENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.80E-02	9.80E-06	5.54E-03	25	7,342	353.24	562.16	78.11	7.8E-06	3.0E-02

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 16A - BENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	198	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	1.01E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	8,122	2.68E-03	1.15E-01	1.75E-04	1.42E-02	0.00E+00	0.00E+00	1.42E-02	198

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.01E+01	0.10	8.33E+01	1.42E-02	4.00E+02	3.99E+63	1.30E-03	1.32E-02	7.8E-06	3.0E-02

END

RESULTS SHEET  
PROPERTY 16A - BENZENE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
4.2E-08	4.2E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 16A - CHLOROBENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)
108907			1.00E-03	Chlorobenzene	71432	5.00E+01		

MORE  
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ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ ( $^{\circ}\text{C}$ )	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	213	10	213				S		

MORE  
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ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 16A - CHLOROBENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.30E-02	8.70E-06	3.69E-03	25	8,410	404.87	632.40	112.56	0.0E+00	6.0E-02



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 16A - CHLOROBENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	198	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	4.84E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	9,803	1.54E-03	6.61E-02	1.75E-04	1.18E-02	0.00E+00	0.00E+00	1.18E-02	198

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	4.84E+00	0.10	8.33E+01	1.18E-02	4.00E+02	4.66E+76	1.18E-03	5.71E-03	NA	6.0E-02

END

RESULTS SHEET  
PROPERTY 16A - CHLOROBENZENE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	9.2E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 16A - ETHYLBENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)
100414			3.00E-03	Ethylbenzene	71432	5.00E+01		

MORE  
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ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ (°C)	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	213	10	213				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 16A - ETHYLBENZENE

Diffusivity in air, $D_a$ ( $\text{cm}^2/\text{s}$ )	Diffusivity in water, $D_w$ ( $\text{cm}^2/\text{s}$ )	Henry's law constant at reference temperature, $H$ ( $\text{atm}\cdot\text{m}^3/\text{mol}$ )	Henry's law constant reference temperature, $T_R$ ( $^{\circ}\text{C}$ )	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ ( $\text{cal}/\text{mol}$ )	Normal boiling point, $T_B$ ( $^{\circ}\text{K}$ )	Critical temperature, $T_C$ ( $^{\circ}\text{K}$ )	Molecular weight, MW ( $\text{g}/\text{mol}$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC ( $\text{mg}/\text{m}^3$ )
7.50E-02	7.80E-06	7.86E-03	25	8,501	409.34	617.20	106.17	0.0E+00	1.0E+00

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 16A - ETHYLBENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{ie}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{g}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc. ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	198	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	1.37E+01	3.05E+04
Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient,	Stratum B effective diffusion coefficient,	Stratum C effective diffusion coefficient,	Total overall effective diffusion coefficient, $D_{eff_T}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
							$D_{eff_A}$	$D_{eff_B}$	$D_{eff_C}$		
1.06E+06	3.77E-04	15	10,155	3.17E-03	1.36E-01	1.75E-04	1.21E-02	0.00E+00	0.00E+00	1.21E-02	198
Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D_{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe')$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	
15	1.37E+01	0.10	8.33E+01	1.21E-02	4.00E+02	4.21E+74	1.20E-03	1.64E-02	NA	1.0E+00	

END

RESULTS SHEET  
PROPERTY 16A - ETHYLBENZENE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.6E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 16A - HEXANE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
110543			2.00E-03	Hexane	71432	5.00E+01		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	213	10	213				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 16A - HEXANE

Diffusivity in air, $D_a$ ( $\text{cm}^2/\text{s}$ )	Diffusivity in water, $D_w$ ( $\text{cm}^2/\text{s}$ )	Henry's law constant at reference temperature, $H$ ( $\text{atm}\cdot\text{m}^3/\text{mol}$ )	Henry's law constant reference temperature, $T_R$ ( $^{\circ}\text{C}$ )	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ ( $\text{cal}/\text{mol}$ )	Normal boiling point, $T_B$ ( $^{\circ}\text{K}$ )	Critical temperature, $T_C$ ( $^{\circ}\text{K}$ )	Molecular weight, MW ( $\text{g}/\text{mol}$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC ( $\text{mg}/\text{m}^3$ )
2.00E-01	7.77E-06	1.66E+00	25	6,895	341.70	508.00	86.18	0.0E+00	2.0E-01



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 16A - HEXANE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu g/m^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	198	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	7.42E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	7,737	8.32E-01	3.58E+01	1.75E-04	3.23E-02	0.00E+00	0.00E+00	3.23E-02	198

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu g/m^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu g/m^3$ )	Unit risk factor, URF ( $\mu g/m^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	7.42E+00	0.10	8.33E+01	3.23E-02	4.00E+02	9.64E+27	1.84E-03	1.37E-02	NA	2.0E-01

END

RESULTS SHEET  
PROPERTY 16A - HEXANE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.6E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 16A - METHYLENE CHLORIDE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	
75092			1.00E-03	Methylene chloride	71432	5.00E+01			

MORE  
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ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ (°C)	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	213	10	213				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 16A - METHYLENE CHLORIDE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
1.01E-01	1.17E-05	2.18E-03	25	6,706	313.00	510.00	84.93	4.7E-07	3.0E+00

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 16A - METHYLENE CHLORIDE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	198	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	3.66E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	7,034	1.16E-03	5.01E-02	1.75E-04	1.63E-02	0.00E+00	0.00E+00	1.63E-02	198

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	3.66E+00	0.10	8.33E+01	1.63E-02	4.00E+02	2.59E+55	1.40E-03	5.11E-03	4.7E-07	3.0E+00

END

RESULTS SHEET  
PROPERTY 16A - METHYLENE CHLORIDE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
9.9E-10	1.6E-06

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 16A - M,P-XYLENES

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	
108383			1.20E-02	m-Xylene	71432	5.00E+01			

MORE  
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ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	213	10	213				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 16A - M,P-XYLENES

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.00E-02	7.80E-06	7.32E-03	25	8,523	412.27	617.05	106.17	0.0E+00	1.0E-01



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 16A - M,P-XYLENES

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	198	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	5.48E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	10,255	2.93E-03	1.26E-01	1.75E-04	1.13E-02	0.00E+00	0.00E+00	1.13E-02	198

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	5.48E+01	0.10	8.33E+01	1.13E-02	4.00E+02	9.01E+79	1.15E-03	6.31E-02	NA	1.0E-01

END

RESULTS SHEET  
PROPERTY 16A - M,P-XYLENES

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.0E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 16A - O-XYLENES

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
95476			4.00E-03	o-Xylene	71432	5.00E+01		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	213	10	213				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 16A - O-XYLENES

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.70E-02	1.00E-05	5.18E-03	25	8,661	417.60	630.30	106.17	0.0E+00	1.0E-01

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 16A - O-XYLENES

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	198	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	1.83E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	10,404	2.04E-03	8.79E-02	1.75E-04	1.41E-02	0.00E+00	0.00E+00	1.41E-02	198

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.83E+01	0.10	8.33E+01	1.41E-02	4.00E+02	2.14E+64	1.30E-03	2.37E-02	NA	1.0E-01

END

RESULTS SHEET  
PROPERTY 16A - O-XYLENES

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.3E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 16A - TOLUENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
108883			1.90E-02	Toluene	71432	5.00E+01		

MORE  
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ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	213	10	213				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 16A - TOLUENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.70E-02	8.60E-06	6.62E-03	25	7,930	383.78	591.79	92.14	0.0E+00	5.0E+00



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 16A - TOLUENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	198	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	7.54E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	9,154	2.92E-03	1.26E-01	1.75E-04	1.41E-02	0.00E+00	0.00E+00	1.41E-02	198

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	7.54E+01	0.10	8.33E+01	1.41E-02	4.00E+02	2.15E+64	1.30E-03	9.77E-02	NA	5.0E+00

END

RESULTS SHEET  
PROPERTY 16A - TOLUENE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.9E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 16A - TETRACHLOROETHYLENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)
127184			4.60E-03	Tetrachloroethylene	71432	5.00E+01		

MORE  
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ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ (°C)	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	213	10	213				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm} \cdot \text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 16A - TETRACHLOROETHYLENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	165.83	5.9E-06	6.0E-01

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 16A - TETRACHLOROETHYLENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc. ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	198	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	3.28E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	9,553	7.81E-03	3.36E-01	1.75E-04	1.16E-02	0.00E+00	0.00E+00	1.16E-02	198

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D_{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	3.28E+01	0.10	8.33E+01	1.16E-02	4.00E+02	5.42E+77	1.17E-03	3.84E-02	5.9E-06	6.0E-01

END

RESULTS SHEET  
PROPERTY 16A - TETRACHLOROETHYLENE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
9.3E-08	6.1E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 17 - 1,2,4-TRIMETHYLBENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
95636			2.00E-03	1,2,4-Trimethylbenzene	71432	5.00E+01		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>S</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>S</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 17 - 1,2,4-TRIMETHYLBENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
6.06E-02	7.92E-06	6.14E-03	25	9,369	442.30	649.17	120.20	0.0E+00	6.0E-03



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 17 - 1,2,4-TRIMETHYLBENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	1.03E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	11,692	2.16E-03	9.30E-02	1.75E-04	9.80E-03	0.00E+00	0.00E+00	9.80E-03	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.03E+01	0.10	8.33E+01	9.80E-03	4.00E+02	2.27E+92	1.38E-03	1.43E-02	NA	6.0E-03

END

RESULTS SHEET  
PROPERTY 17 - 1,2,4-TRIMETHYLBENZENE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.3E-03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 17 - BENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
71432			1.00E-03	Benzene	71432	5.00E+01		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 17 - BENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.80E-02	9.80E-06	5.54E-03	25	7,342	353.24	562.16	78.11	7.8E-06	3.0E-02

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 17 - BENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	3.36E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	8,122	2.68E-03	1.15E-01	1.75E-04	1.42E-02	0.00E+00	0.00E+00	1.42E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	3.36E+00	0.10	8.33E+01	1.42E-02	4.00E+02	3.99E+63	1.63E-03	5.49E-03	7.8E-06	3.0E-02

END

RESULTS SHEET  
PROPERTY 17 - BENZENE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.8E-08	1.8E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 17 - HEXANE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
110543			1.00E-03	Hexane	71432	5.00E+01		

MORE  
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ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 17 - HEXANE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, $H$ (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
2.00E-01	7.77E-06	1.66E+00	25	6,895	341.70	508.00	86.18	0.0E+00	2.0E-01



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 17 - HEXANE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $C_{soil}$ (µg/m <sup>3</sup> )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	3.71E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	7,737	8.32E-01	3.58E+01	1.75E-04	3.23E-02	0.00E+00	0.00E+00	3.23E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ (µg/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m <sup>3</sup> )	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	3.71E+00	0.10	8.33E+01	3.23E-02	4.00E+02	9.64E+27	2.11E-03	7.82E-03	NA	2.0E-01

END

RESULTS SHEET  
PROPERTY 17 - HEXANE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.7E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 17 - METHYLENE CHLORIDE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	
75092			3.00E-03	Methylene chloride	71432	5.00E+01			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ ( $^{\circ}\text{C}$ )	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 17 - METHYLENE CHLORIDE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
1.01E-01	1.17E-05	2.18E-03	25	6,706	313.00	510.00	84.93	4.7E-07	3.0E+00

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 17 - METHYLENE CHLORIDE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	1.10E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	7,034	1.16E-03	5.01E-02	1.75E-04	1.63E-02	0.00E+00	0.00E+00	1.63E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.10E+01	0.10	8.33E+01	1.63E-02	4.00E+02	2.59E+55	1.72E-03	1.89E-02	4.7E-07	3.0E+00

END

RESULTS SHEET  
PROPERTY 17 - METHYLENE CHLORIDE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.6E-09	6.0E-06

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 17 - M,P-XYLENES

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	
108383			3.00E-03	m-Xylene	71432	5.00E+01			

MORE  
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ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ (°C)	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 17 - M,P-XYLENES

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.00E-02	7.80E-06	7.32E-03	25	8,523	412.27	617.05	106.17	0.0E+00	1.0E-01



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 17 - M,P-XYLENES

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc. ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	1.37E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	10,255	2.93E-03	1.26E-01	1.75E-04	1.13E-02	0.00E+00	0.00E+00	1.13E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.37E+01	0.10	8.33E+01	1.13E-02	4.00E+02	9.01E+79	1.48E-03	2.03E-02	NA	1.0E-01

END

RESULTS SHEET  
PROPERTY 17 - M,P-XYLENES

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.9E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 17 - O-XYLENES

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)
95476			1.00E-03	o-Xylene	71432	5.00E+01		

MORE  
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ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ (°C)	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	137	10	137				S		

MORE  
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ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm} \cdot \text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 17 - O-XYLENES

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.70E-02	1.00E-05	5.18E-03	25	8,661	417.60	630.30	106.17	0.0E+00	1.0E-01

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 17 - O-XYLENES

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	4.57E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	10,404	2.04E-03	8.79E-02	1.75E-04	1.41E-02	0.00E+00	0.00E+00	1.41E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	4.57E+00	0.10	8.33E+01	1.41E-02	4.00E+02	2.14E+64	1.62E-03	7.42E-03	NA	1.0E-01

END

RESULTS SHEET  
PROPERTY 17 - O-XYLENES

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	7.1E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 17 - TOLUENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
108883			2.20E-02	Toluene	71432	5.00E+01		

MORE  
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ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
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ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 17 - TOLUENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.70E-02	8.60E-06	6.62E-03	25	7,930	383.78	591.79	92.14	0.0E+00	5.0E+00



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 17 - TOLUENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{ie}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc. ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	8.73E+01	3.05E+04
Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	9,154	2.92E-03	1.26E-01	1.75E-04	1.41E-02	0.00E+00	0.00E+00	1.41E-02	122
Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(\text{Pe})$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	
15	8.73E+01	0.10	8.33E+01	1.41E-02	4.00E+02	2.15E+64	1.62E-03	1.42E-01	NA	5.0E+00	

END

RESULTS SHEET  
PROPERTY 17 - TOLUENE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.7E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

Reset to  
Defaults

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER Chemical CAS No. (numbers only, no dashes)		ENTER Initial groundwater conc., $C_W$ ( $\mu\text{g/L}$ )		Chemical							
75014	1.80E+01			Vinyl chloride (chloroethene)							
ENTER Average soil/ groundwater temperature, $T_S$ ( $^{\circ}\text{C}$ )	ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Depth below grade to water table, $L_{WT}$ (cm)	ENTER Totals must add up to value of $L_{WT}$ (cell G28)			ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )	
Thickness of soil stratum A, $h_A$ (cm)	Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)									
10	15	1860	274	914	672	C	S	S			

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g/cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g/cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g/cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	S	1.66	0.375	0.054

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g/cm-s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, $ER$ (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	

MORE  
↓

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

END

Used to calculate risk-based  
groundwater concentration.

CHEMICAL PROPERTIES SHEET  
 PROPERTIES 18-19 - VINYL CHLORIDE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Organic carbon partition coefficient, $K_{oc}$ (cm <sup>3</sup> /g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF (ug/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
1.06E-01	1.23E-05	2.69E-02	25	5,250	259.25	432.00	1.86E+01	8.80E+03	8.8E-06	1.0E-01

END

INTERMEDIATE CALCULATIONS SHEET  
PROPERTIES 18-19 - VINYL CHLORIDE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_e$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{ra}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Thickness of capillary zone, $L_{cz}$ (cm)	Total porosity in capillary zone, $n_{cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)
9.46E+08	1845	0.321	0.244	0.321	0.003	9.92E-08	0.998	9.91E-08	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)	Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. groundwater temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_{eff,A}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_{eff,B}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_{eff,C}$ (cm <sup>2</sup> /s)	Capillary zone effective diffusion coefficient, $D_{eff,cz}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_{eff,T}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
3.05E+04	1.06E+06	3.77E-04	15	5,000	1.72E-02	7.41E-01	1.75E-04	1.71E-02	4.59E-03	1.71E-02	6.80E-04	6.65E-03	1845

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ (µg/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D_{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m <sup>3</sup> )	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.33E+04	0.10	9.95E+01	1.71E-02	4.00E+02	1.16E+63	1.21E-04	1.61E+00	8.8E-06	1.0E-01

END

RESULTS SHEET  
PROPERTIES 18-19 - VINYL CHLORIDE

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	8.80E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.8E-06	1.5E-02

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 20 - 1,2,4-TRIMETHYLBENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

<b>ENTER</b> Chemical CAS No. (numbers only, no dashes)	<b>ENTER</b> Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	<b>OR</b>	<b>ENTER</b> Soil gas conc., $C_g$ (ppmv)	Chemical	<b>ENTER</b> Chemical CAS No. (numbers only, no dashes)	<b>ENTER</b> Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	<b>OR</b>	<b>ENTER</b> Soil gas conc., $C_g$ (ppmv)
95636			1.00E-03	1,2,4-Trimethylbenzene	71432	5.00E+01		

**MORE**  
↓

<b>ENTER</b> Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	<b>ENTER</b> Soil gas sampling depth below grade, $L_S$ (cm)	<b>ENTER</b> Average soil temperature, $T_S$ ( $^{\circ}\text{C}$ )	<b>ENTER</b> Totals must add up to value of $L_S$ (cell F24)	<b>ENTER</b> Thickness of soil stratum A, $h_A$ (cm)	<b>ENTER</b> Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	<b>ENTER</b> Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	<b>ENTER</b> Soil stratum A SCS soil type (used to estimate soil vapor permeability)	<b>OR</b>	<b>ENTER</b> User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	122	10	122				SC		

**MORE**  
↓

<b>ENTER</b> Stratum A SCS soil type  Lookup Soil Parameters	<b>ENTER</b> Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	<b>ENTER</b> Stratum A soil total porosity, $n^A$ (unitless)	<b>ENTER</b> Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	<b>ENTER</b> Stratum B SCS soil type  Lookup Soil Parameters	<b>ENTER</b> Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	<b>ENTER</b> Stratum B soil total porosity, $n^B$ (unitless)	<b>ENTER</b> Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	<b>ENTER</b> Stratum C SCS soil type  Lookup Soil Parameters	<b>ENTER</b> Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	<b>ENTER</b> Stratum C soil total porosity, $n^C$ (unitless)	<b>ENTER</b> Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

**MORE**  
↓

<b>ENTER</b> Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	<b>ENTER</b> Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	<b>ENTER</b> Enclosed space floor length, $L_B$ (cm)	<b>ENTER</b> Enclosed space floor width, $W_B$ (cm)	<b>ENTER</b> Enclosed space height, $H_B$ (cm)	<b>ENTER</b> Floor-wall seam crack width, $w$ (cm)	<b>ENTER</b> Indoor air exchange rate, ER (1/h)	<b>ENTER</b> Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

<b>ENTER</b> Averaging time for carcinogens, $AT_C$ (yrs)	<b>ENTER</b> Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	<b>ENTER</b> Exposure duration, ED (yrs)	<b>ENTER</b> Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 20 - 1,2,4-TRIMETHYLBENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
6.06E-02	7.92E-06	6.14E-03	25	9,369	442.30	649.17	120.20	0.0E+00	6.0E-03



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 20 - 1,2,4-TRIMETHYLBENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	5.17E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	11,692	2.16E-03	9.30E-02	1.75E-04	1.57E-03	0.00E+00	0.00E+00	1.57E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	5.17E+00	0.10	8.33E+01	1.57E-03	4.00E+02	#NUM!	4.29E-04	2.22E-03	NA	6.0E-03

END

RESULTS SHEET  
PROPERTY 20 - 1,2,4-TRIMETHYLBENZENE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.6E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 20 - 2-BUTANONE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	
78933			1.00E-03	Methylethylketone (2-butanone)	71432	5.00E+01			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	122	10	122				SC		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 20 - 2-BUTANONE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, $H$ (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.08E-02	9.80E-06	5.58E-05	25	7,481	352.50	536.78	72.11	0.0E+00	5.0E+00

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 20 - 2-BUTANONE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	3.10E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	8,419	2.63E-05	1.13E-03	1.75E-04	2.35E-03	0.00E+00	0.00E+00	2.35E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	3.10E+00	0.10	8.33E+01	2.35E-03	4.00E+02	#NUM!	5.96E-04	1.85E-03	NA	5.0E+00

END

RESULTS SHEET  
PROPERTY 20 - 2-BUTANONE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.5E-07

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 20 - BENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

<b>ENTER</b> Chemical CAS No. (numbers only, no dashes)	<b>ENTER</b> Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	<b>OR</b>	<b>ENTER</b> Soil gas conc., $C_g$ (ppmv)	Chemical	<b>ENTER</b> Chemical CAS No. (numbers only, no dashes)	<b>ENTER</b> Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	<b>OR</b>	<b>ENTER</b> Soil gas conc., $C_g$ (ppmv)	
71432			3.00E-03	Benzene	71432	5.00E+01			

**MORE**  
↓

<b>ENTER</b> Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	<b>ENTER</b> Soil gas sampling depth below grade, $L_S$ (cm)	<b>ENTER</b> Average soil temperature, $T_S$ ( $^{\circ}\text{C}$ )	<b>ENTER</b> Totals must add up to value of $L_S$ (cell F24)	<b>ENTER</b> Thickness of soil stratum A, $h_A$ (cm)	<b>ENTER</b> Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	<b>ENTER</b> Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	<b>ENTER</b> Soil stratum A SCS soil type (used to estimate soil vapor permeability)	<b>OR</b>	<b>ENTER</b> User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
	122	10	122				SC		

**MORE**  
↓

<b>ENTER</b> Stratum A SCS soil type  Lookup Soil Parameters	<b>ENTER</b> Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	<b>ENTER</b> Stratum A soil total porosity, $n^A$ (unitless)	<b>ENTER</b> Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	<b>ENTER</b> Stratum B SCS soil type  Lookup Soil Parameters	<b>ENTER</b> Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	<b>ENTER</b> Stratum B soil total porosity, $n^B$ (unitless)	<b>ENTER</b> Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	<b>ENTER</b> Stratum C SCS soil type  Lookup Soil Parameters	<b>ENTER</b> Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	<b>ENTER</b> Stratum C soil total porosity, $n^C$ (unitless)	<b>ENTER</b> Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

**MORE**  
↓

<b>ENTER</b> Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	<b>ENTER</b> Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	<b>ENTER</b> Enclosed space floor length, $L_B$ (cm)	<b>ENTER</b> Enclosed space floor width, $W_B$ (cm)	<b>ENTER</b> Enclosed space height, $H_B$ (cm)	<b>ENTER</b> Floor-wall seam crack width, $w$ (cm)	<b>ENTER</b> Indoor air exchange rate, ER (1/h)	<b>ENTER</b> Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

<b>ENTER</b> Averaging time for carcinogens, $AT_C$ (yrs)	<b>ENTER</b> Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	<b>ENTER</b> Exposure duration, ED (yrs)	<b>ENTER</b> Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 20 - BENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.80E-02	9.80E-06	5.54E-03	25	7,342	353.24	562.16	78.11	7.8E-06	3.0E-02



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 20 - BENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	1.01E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.00E+06	4.00E-04	0	8,122	2.68E-03	1.15E-01	1.75E-04	2.28E-03	0.00E+00	0.00E+00	2.28E-03	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
0	1.01E+01	0.10	8.33E+01	2.28E-03	4.00E+02	#NUM!	5.00E-04	5.04E-03	7.8E-06	3.0E-02

END

RESULTS SHEET  
PROPERTY 20 - BENZENE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.6E-08	1.6E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

ERROR: Data entry/entries are missing, or entered data is out of range.

END

DATA ENTRY SHEET  
PROPERTY 20 - CARBON DISULFIDE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	
75150			6.00E-03	Carbon disulfide	71432	5.00E+01			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ ( $^{\circ}\text{C}$ )	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	122	10	122				SC		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 20 - CARBON DISULFIDE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, $H$ (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
1.04E-01	1.00E-05	3.02E-02	25	6,391	319.00	552.00	76.13	0.0E+00	7.0E-01

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 20 - CARBON DISULFIDE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	1.97E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	6,682	1.66E-02	7.16E-01	1.75E-04	2.69E-03	0.00E+00	0.00E+00	2.69E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.97E+01	0.10	8.33E+01	2.69E-03	4.00E+02	#NUM!	6.61E-04	1.30E-02	NA	7.0E-01

END

RESULTS SHEET  
PROPERTY 20 - CARBON DISULFIDE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.8E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 20 - FREON 113

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	
76131			2.00E-03	1,1,2-Trichloro-1,2,2-trifluoroethane	71432	5.00E+01			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ (°C)	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	122	10	122				SC		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 20 - FREON 113

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.80E-02	8.20E-06	4.80E-01	25	6,463	320.70	487.30	187.38	0.0E+00	3.0E+01



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 20 - FREON 113

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	1.61E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	6,969	2.57E-01	1.11E+01	1.75E-04	2.01E-03	0.00E+00	0.00E+00	2.01E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.61E+01	0.10	8.33E+01	2.01E-03	4.00E+02	#NUM!	5.28E-04	8.51E-03	NA	3.0E+01

END

RESULTS SHEET  
PROPERTY 20 - FREON 113

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.7E-07

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 20 - HEXANE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
110543			5.00E-03	Hexane	71432	5.00E+01		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	122	10	122				SC		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 20 - HEXANE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
2.00E-01	7.77E-06	1.66E+00	25	6.895	341.70	508.00	86.18	0.0E+00	2.0E-01

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 20 - HEXANE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	1.85E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	7,737	8.32E-01	3.58E+01	1.75E-04	5.16E-03	0.00E+00	0.00E+00	5.16E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.85E+01	0.10	8.33E+01	5.16E-03	4.00E+02	1.52E+175	1.04E-03	1.93E-02	NA	2.0E-01

END

RESULTS SHEET  
PROPERTY 20 - HEXANE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	9.2E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 20 - METHYLENE CHLORIDE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
75092			1.60E-02	Methylene chloride	71432	5.00E+01		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>S</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>S</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	122	10	122				SC		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 20 - METHYLENE CHLORIDE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
1.01E-01	1.17E-05	2.18E-03	25	6,706	313.00	510.00	84.93	4.7E-07	3.0E+00



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 20 - METHYLENE CHLORIDE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	5.85E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	7,034	1.16E-03	5.01E-02	1.75E-04	2.62E-03	0.00E+00	0.00E+00	2.62E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	5.85E+01	0.10	8.33E+01	2.62E-03	4.00E+02	#NUM!	6.48E-04	3.79E-02	4.7E-07	3.0E+00

END

RESULTS SHEET  
PROPERTY 20 - METHYLENE CHLORIDE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
7.3E-09	1.2E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 20 - M,P-XYLENES

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	
108383			3.00E-03	m-Xylene	71432	5.00E+01			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ (°C)	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	122	10	122				SC		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm} \cdot \text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 20 - M,P-XYLENES

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.00E-02	7.80E-06	7.32E-03	25	8,523	412.27	617.05	106.17	0.0E+00	1.0E-01

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 20 - M,P-XYLENES

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	1.37E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	10,255	2.93E-03	1.26E-01	1.75E-04	1.81E-03	0.00E+00	0.00E+00	1.81E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.37E+01	0.10	8.33E+01	1.81E-03	4.00E+02	#NUM!	4.84E-04	6.63E-03	NA	1.0E-01

END

RESULTS SHEET  
PROPERTY 20 - M,P-XYLENES

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.4E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 20 - TOLUENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
108883			3.10E-02	Toluene	71432	5.00E+01		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	122	10	122				SC		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 20 - TOLUENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.70E-02	8.60E-06	6.62E-03	25	7,930	383.78	591.79	92.14	0.0E+00	4.0E-01



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 20 - TOLUENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	1.23E+02	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	9,154	2.92E-03	1.26E-01	1.75E-04	2.25E-03	0.00E+00	0.00E+00	2.25E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.23E+02	0.10	8.33E+01	2.25E-03	4.00E+02	#NUM!	5.76E-04	7.09E-02	NA	4.0E-01

END

RESULTS SHEET  
PROPERTY 20 - TOLUENE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.7E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 21 - 1,2,4-TRIMETHYLBENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	
95636			3.00E-03	1,2,4-Trimethylbenzene	110543	1.00E-02			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ (°C)	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	122	10	122				SC		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 21 - 1,2,4-TRIMETHYLBENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
6.06E-02	7.92E-06	6.14E-03	25	9,369	442.30	649.17	120.20	0.0E+00	6.0E-03

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 21 - 1,2,4-TRIMETHYLBENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	1.55E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	11,692	2.16E-03	9.30E-02	1.75E-04	1.57E-03	0.00E+00	0.00E+00	1.57E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.55E+01	0.10	8.33E+01	1.57E-03	4.00E+02	#NUM!	4.29E-04	6.66E-03	NA	6.0E-03

END

RESULTS SHEET  
PROPERTY 21 - 1,2,4-TRIMETHYLBENZENE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.1E-03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 21 - 1,3,5-TRIMETHYLBENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	
108678			1.00E-03	1,3,5-Trimethylbenzene	110543	1.00E-02			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>S</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>S</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	122	10	122				SC		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 21 - 1,3,5-TRIMETHYLBENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, $H$ (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
6.02E-02	8.67E-06	5.87E-03	25	9,321	437.89	637.25	120.20	0.0E+00	6.0E-03



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 21 - 1,3,5-TRIMETHYLBENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	5.17E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	11,678	2.07E-03	8.89E-02	1.75E-04	1.56E-03	0.00E+00	0.00E+00	1.56E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	5.17E+00	0.10	8.33E+01	1.56E-03	4.00E+02	#NUM!	4.27E-04	2.21E-03	NA	6.0E-03

END

RESULTS SHEET  
PROPERTY 21 - 1,3,5-TRIMETHYLBENZENE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.6E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 21 - BENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
71432			4.00E-03	Benzene	71432	5.00E+01		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	122	10	122				SC		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 21 - BENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.80E-02	9.80E-06	5.54E-03	25	7,342	353.24	562.16	78.11	7.8E-06	3.0E-02

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 21 - BENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	1.34E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	8,122	2.68E-03	1.15E-01	1.75E-04	2.28E-03	0.00E+00	0.00E+00	2.28E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.34E+01	0.10	8.33E+01	2.28E-03	4.00E+02	#NUM!	5.82E-04	7.82E-03	7.8E-06	3.0E-02

END

RESULTS SHEET  
PROPERTY 21 - BENZENE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.5E-08	2.5E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 21 - CARBON DISULFIDE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	
75150			3.00E-03	Carbon disulfide	71432	5.00E+01			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ (°C)	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	122	10	122				SC		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 21 - CARBON DISULFIDE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
1.04E-01	1.00E-05	3.02E-02	25	6,391	319.00	552.00	76.13	0.0E+00	7.0E-01



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 21 - CARBON DISULFIDE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $C_{soil}$ (µg/m <sup>3</sup> )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	9.83E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	6,682	1.66E-02	7.16E-01	1.75E-04	2.69E-03	0.00E+00	0.00E+00	2.69E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ (µg/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m <sup>3</sup> )	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	9.83E+00	0.10	8.33E+01	2.69E-03	4.00E+02	#NUM!	6.61E-04	6.50E-03	NA	7.0E-01

END

RESULTS SHEET  
PROPERTY 21 - CARBON DISULFIDE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	8.9E-06

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 21 - ETHYLBENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

<b>ENTER</b> Chemical CAS No. (numbers only, no dashes)	<b>ENTER</b> Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	<b>OR</b>	<b>ENTER</b> Soil gas conc., $C_g$ (ppmv)	Chemical	<b>ENTER</b> Chemical CAS No. (numbers only, no dashes)	<b>ENTER</b> Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	<b>OR</b>	<b>ENTER</b> Soil gas conc., $C_g$ (ppmv)	
100414			2.00E-03	Ethylbenzene	71432	5.00E+01			

**MORE**  
↓

<b>ENTER</b> Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	<b>ENTER</b> Soil gas sampling depth below grade, $L_S$ (cm)	<b>ENTER</b> Average soil temperature, $T_S$ ( $^{\circ}\text{C}$ )	<b>ENTER</b> Totals must add up to value of $L_S$ (cell F24)	<b>ENTER</b> Thickness of soil stratum A, $h_A$ (cm)	<b>ENTER</b> Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	<b>ENTER</b> Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	<b>ENTER</b> Soil stratum A SCS soil type (used to estimate soil vapor permeability)	<b>OR</b>	<b>ENTER</b> User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	122	10	122				SC		

**MORE**  
↓

<b>ENTER</b> Stratum A SCS soil type  Lookup Soil Parameters	<b>ENTER</b> Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	<b>ENTER</b> Stratum A soil total porosity, $n^A$ (unitless)	<b>ENTER</b> Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	<b>ENTER</b> Stratum B SCS soil type  Lookup Soil Parameters	<b>ENTER</b> Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	<b>ENTER</b> Stratum B soil total porosity, $n^B$ (unitless)	<b>ENTER</b> Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	<b>ENTER</b> Stratum C SCS soil type  Lookup Soil Parameters	<b>ENTER</b> Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	<b>ENTER</b> Stratum C soil total porosity, $n^C$ (unitless)	<b>ENTER</b> Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

**MORE**  
↓

<b>ENTER</b> Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	<b>ENTER</b> Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	<b>ENTER</b> Enclosed space floor length, $L_B$ (cm)	<b>ENTER</b> Enclosed space floor width, $W_B$ (cm)	<b>ENTER</b> Enclosed space height, $H_B$ (cm)	<b>ENTER</b> Floor-wall seam crack width, $w$ (cm)	<b>ENTER</b> Indoor air exchange rate, ER (1/h)	<b>ENTER</b> Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

<b>ENTER</b> Averaging time for carcinogens, $AT_C$ (yrs)	<b>ENTER</b> Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	<b>ENTER</b> Exposure duration, ED (yrs)	<b>ENTER</b> Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 21 - ETHYLBENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.50E-02	7.80E-06	7.86E-03	25	8,501	409.34	617.20	106.17	0.0E+00	1.0E+00

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 21 - ETHYLBENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	9.14E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	10,155	3.17E-03	1.36E-01	1.75E-04	1.94E-03	0.00E+00	0.00E+00	1.94E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	9.14E+00	0.10	8.33E+01	1.94E-03	4.00E+02	#NUM!	5.12E-04	4.68E-03	NA	1.0E+00

END

RESULTS SHEET  
PROPERTY 21 - ETHYLBENZENE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	4.5E-06

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 21 - FREON 113

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	
76131			2.00E-03	1,1,2-Trichloro-1,2,2-trifluoroethane	71432	5.00E+01			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ (°C)	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	122	10	122				SC		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 21 - FREON 113

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.80E-02	8.20E-06	4.80E-01	25	6,463	320.70	487.30	187.38	0.0E+00	3.0E+01



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 21 - FREON 113

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	1.61E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	6,969	2.57E-01	1.11E+01	1.75E-04	2.01E-03	0.00E+00	0.00E+00	2.01E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.61E+01	0.10	8.33E+01	2.01E-03	4.00E+02	#NUM!	5.28E-04	8.51E-03	NA	3.0E+01

END

RESULTS SHEET  
PROPERTY 21 - FREON 113

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.7E-07

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 21 - HEXANE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
110543			1.00E-02	Hexane	110543	1.00E-02		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	122	10	122				SC		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 21 - HEXANE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
2.00E-01	7.77E-06	1.66E+00	25	6,895	341.70	508.00	86.18	0.0E+00	2.0E-01

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 21 - HEXANE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	3.71E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	7,737	8.32E-01	3.58E+01	1.75E-04	5.16E-03	0.00E+00	0.00E+00	5.16E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	3.71E+01	0.10	8.33E+01	5.16E-03	4.00E+02	1.52E+175	1.04E-03	3.86E-02	NA	2.0E-01

END

RESULTS SHEET  
PROPERTY 21 - HEXANE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.8E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 21 - METHYLENE CHLORIDE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	
75092			1.40E-02	Methylene chloride	110543	1.00E-02			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ (°C)	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	122	10	122				SC		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 21 - METHYLENE CHLORIDE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
1.01E-01	1.17E-05	2.18E-03	25	6,706	313.00	510.00	84.93	4.7E-07	3.0E+00



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 21 - METHYLENE CHLORIDE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	5.12E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	7,034	1.16E-03	5.01E-02	1.75E-04	2.62E-03	0.00E+00	0.00E+00	2.62E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	5.12E+01	0.10	8.33E+01	2.62E-03	4.00E+02	#NUM!	6.48E-04	3.32E-02	4.7E-07	3.0E+00

END

RESULTS SHEET  
PROPERTY 21 - METHYLENE CHLORIDE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
6.4E-09	1.1E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 21 - M,P-XYLENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	
108383			8.00E-03	m-Xylene	110543	1.00E-02			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	122	10	122				SC		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 21 - M,P-XYLENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.00E-02	7.80E-06	7.32E-03	25	8,523	412.27	617.05	106.17	0.0E+00	1.0E-01

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 21 - M,P-XYLENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	3.66E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	10,255	2.93E-03	1.26E-01	1.75E-04	1.81E-03	0.00E+00	0.00E+00	1.81E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	3.66E+01	0.10	8.33E+01	1.81E-03	4.00E+02	#NUM!	4.84E-04	1.77E-02	NA	1.0E-01

END

RESULTS SHEET  
PROPERTY 21 - M,P-XYLENE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.7E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 21 - O-XYLENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)
95476			3.00E-03	o-Xylene	110543	1.00E-02		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ ( $^{\circ}\text{C}$ )	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	122	10	122				SC		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 21 - O-XYLENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.70E-02	1.00E-05	5.18E-03	25	8,661	417.60	630.30	106.17	0.0E+00	1.0E-01



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 21 - O-XYLENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	1.37E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	10,404	2.04E-03	8.79E-02	1.75E-04	2.25E-03	0.00E+00	0.00E+00	2.25E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.37E+01	0.10	8.33E+01	2.25E-03	4.00E+02	#NUM!	5.77E-04	7.91E-03	NA	1.0E-01

END

RESULTS SHEET  
PROPERTY 21 - O-XYLENE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	7.6E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 21 - TOLUENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	
108883			5.90E-02	Toluene	110543	1.00E-02			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ (°C)	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	122	10	122				SC		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
SC	1.63	0.385	0.197	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 21 - TOLUENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, $H$ (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.70E-02	8.60E-06	6.62E-03	25	7,930	383.78	591.79	92.14	0.0E+00	5.0E+00

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 21 - TOLUENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	107	0.188	0.244	0.244	0.299	1.74E-09	0.837	1.46E-09	4,000	2.34E+02	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	9,154	2.92E-03	1.26E-01	1.75E-04	2.25E-03	0.00E+00	0.00E+00	2.25E-03	107

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	2.34E+02	0.10	8.33E+01	2.25E-03	4.00E+02	#NUM!	5.76E-04	1.35E-01	NA	5.0E+00

END

RESULTS SHEET  
PROPERTY 21 - TOLUENE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.6E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 23 - 1,2,4-TRIMETHYLBENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
95636			3.00E-03	1,2,4-Trimethylbenzene	71432	5.00E+01		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>S</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>S</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	274	10	213	61			S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	SC	1.63	0.385	0.197		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 23 - 1,2,4-TRIMETHYLBENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
6.06E-02	7.92E-06	6.14E-03	25	9,369	442.30	649.17	120.20	0.0E+00	6.0E-03



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 23 - 1,2,4-TRIMETHYLBENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	259	0.321	0.188	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	4,000	1.55E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	11,692	2.16E-03	9.30E-02	1.75E-04	9.80E-03	1.57E-03	0.00E+00	4.38E-03	259

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.55E+01	0.10	8.33E+01	9.80E-03	4.00E+02	2.27E+92	4.84E-04	7.51E-03	NA	6.0E-03

END

RESULTS SHEET  
PROPERTY 23 - 1,2,4-TRIMETHYLBENZENE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.2E-03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 23 - 1,3,5-TRIMETHYLBENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
108678			1.00E-03	1,3,5-Trimethylbenzene	71432	5.00E+01		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>S</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>S</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	274	10	213	61			S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	SC	1.63	0.385	0.197		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 23 - 1,3,5-TRIMETHYLBENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
6.02E-02	8.67E-06	5.87E-03	25	9,321	437.89	637.25	120.20	0.0E+00	6.0E-03

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 23 - 1,3,5-TRIMETHYLBENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu g/m^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	259	0.321	0.188	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	4,000	5.17E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	11,678	2.07E-03	8.89E-02	1.75E-04	9.73E-03	1.56E-03	0.00E+00	4.35E-03	259

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu g/m^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu g/m^3$ )	Unit risk factor, URF ( $\mu g/m^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	5.17E+00	0.10	8.33E+01	9.73E-03	4.00E+02	9.34E+92	4.81E-04	2.49E-03	NA	6.0E-03

END

RESULTS SHEET  
PROPERTY 23 - 1,3,5-TRIMETHYLBENZENE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	4.0E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 23 - BENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
71432			5.00E-03	Benzene	71432	5.00E+01		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	274	10	213	61			S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	SC	1.63	0.385	0.197		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 23 - BENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.80E-02	9.80E-06	5.54E-03	25	7,342	353.24	562.16	78.11	7.8E-06	3.0E-02



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 23 - BENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu g/m^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	259	0.321	0.188	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	4,000	1.68E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	8,122	2.68E-03	1.15E-01	1.75E-04	1.42E-02	2.28E-03	0.00E+00	6.36E-03	259

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu g/m^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu g/m^3$ )	Unit risk factor, URF ( $\mu g/m^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.68E+01	0.10	8.33E+01	1.42E-02	4.00E+02	3.99E+63	6.50E-04	1.09E-02	7.8E-06	3.0E-02

END

RESULTS SHEET  
PROPERTY 23 - BENZENE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.5E-08	3.5E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 23 - CARBON DISULFIDE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	
75150			6.00E-03	Carbon disulfide	71432	5.00E+01			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	274	10	213	61			S		

MORE  
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ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	SC	1.63	0.385	0.197		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 23 - CARBON DISULFIDE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
1.04E-01	1.00E-05	3.02E-02	25	6,391	319.00	552.00	76.13	0.0E+00	7.0E-01

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 23 - CARBON DISULFIDE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	259	0.321	0.188	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	4,000	1.97E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	6,682	1.66E-02	7.16E-01	1.75E-04	1.68E-02	2.69E-03	0.00E+00	7.51E-03	259

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.97E+01	0.10	8.33E+01	1.68E-02	4.00E+02	6.54E+53	7.36E-04	1.45E-02	NA	7.0E-01

END

RESULTS SHEET  
PROPERTY 23 - CARBON DISULFIDE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.0E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 23 - CHLOROBENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	
108907			1.00E-03	Chlorobenzene	71432	5.00E+01			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ (°C)	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	274	10	213	61			S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054	SC	1.63	0.385	0.197		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 23 - CHLOROBENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.30E-02	8.70E-06	3.69E-03	25	8,410	404.87	632.40	112.56	0.0E+00	6.0E-02



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 23 - CHLOROBENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $C_{soil}$ (µg/m <sup>3</sup> )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	259	0.321	0.188	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	4,000	4.84E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_{eff,A}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_{eff,B}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_{eff,C}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_{eff,T}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	9,803	1.54E-03	6.61E-02	1.75E-04	1.18E-02	1.89E-03	0.00E+00	5.28E-03	259

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ (µg/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D_{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m <sup>3</sup> )	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	4.84E+00	0.10	8.33E+01	1.18E-02	4.00E+02	4.66E+76	5.62E-04	2.73E-03	NA	6.0E-02

END

RESULTS SHEET  
PROPERTY 23 - CHLOROBENZENE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	4.4E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 23 - ETHYLBENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	
100414			2.00E-03	Ethylbenzene	71432	5.00E+01			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_S$ (cm)	ENTER Average soil temperature, $T_S$ ( $^{\circ}\text{C}$ )	ENTER Totals must add up to value of $L_S$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	274	10	213	61			S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054	SC	1.63	0.385	0.197		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 23 - ETHYLBENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.50E-02	7.80E-06	7.86E-03	25	8,501	409.34	617.20	106.17	0.0E+00	1.0E+00

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 23 - ETHYLBENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	259	0.321	0.188	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	4,000	9.14E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	10,155	3.17E-03	1.36E-01	1.75E-04	1.21E-02	1.94E-03	0.00E+00	5.42E-03	259

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	9.14E+00	0.10	8.33E+01	1.21E-02	4.00E+02	4.21E+74	5.74E-04	5.25E-03	NA	1.0E+00

END

RESULTS SHEET  
PROPERTY 23 - ETHYLBENZENE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	5.0E-06

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 23 - FREON 113

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	
76131			2.00E-03	1,1,2-Trichloro-1,2,2-trifluoroethane	71432	5.00E+01			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>S</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>S</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	274	10	213	61			S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	SC	1.63	0.385	0.197		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 23 - FREON 113

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.80E-02	8.20E-06	4.80E-01	25	6,463	320.70	487.30	187.38	0.0E+00	3.0E+01



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 23 - FREON 113

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{we}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	259	0.321	0.188	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	4,000	1.61E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	6,969	2.57E-01	1.11E+01	1.75E-04	1.26E-02	2.01E-03	0.00E+00	5.63E-03	259

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.61E+01	0.10	8.33E+01	1.26E-02	4.00E+02	5.68E+71	5.92E-04	9.55E-03	NA	3.0E+01

END

RESULTS SHEET  
PROPERTY 23 - FREON 113

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.0E-07

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 23 - HEXANE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	
110543			1.40E-02	Hexane	71432	5.00E+01			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	274	10	213	61			S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	SC	1.63	0.385	0.197		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 23 - HEXANE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
2.00E-01	7.77E-06	1.66E+00	25	6,895	341.70	508.00	86.18	0.0E+00	2.0E-01

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 23 - HEXANE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	259	0.321	0.188	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	4,000	5.19E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	7,737	8.32E-01	3.58E+01	1.75E-04	3.23E-02	5.16E-03	0.00E+00	1.44E-02	259

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	5.19E+01	0.10	8.33E+01	3.23E-02	4.00E+02	9.64E+27	1.13E-03	5.89E-02	NA	2.0E-01

END

RESULTS SHEET  
PROPERTY 23 - HEXANE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.8E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 23 - METHYLENE CHLORIDE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	
75092			1.20E-02	Methylene chloride	71432	5.00E+01			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>S</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>S</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	274	10	213	61			S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	SC	1.63	0.385	0.197		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 23 - METHYLENE CHLORIDE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
1.01E-01	1.17E-05	2.18E-03	25	6,706	313.00	510.00	84.93	4.7E-07	3.0E+00



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 23 - METHYLENE CHLORIDE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu g/m^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	259	0.321	0.188	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	4,000	4.39E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	7,034	1.16E-03	5.01E-02	1.75E-04	1.63E-02	2.62E-03	0.00E+00	7.31E-03	259

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu g/m^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu g/m^3$ )	Unit risk factor, URF ( $\mu g/m^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	4.39E+01	0.10	8.33E+01	1.63E-02	4.00E+02	2.59E+55	7.21E-04	3.16E-02	4.7E-07	3.0E+00

END

RESULTS SHEET  
PROPERTY 23 - METHYLENE CHLORIDE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
6.1E-09	1.0E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 23 - M,P-XYLENES

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	
106423			7.00E-03	p-Xylene	71432	5.00E+01			

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of Ls (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	274	10	213	61			S		

MORE  
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ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	SC	1.63	0.385	0.197		Error	Error	Error

MORE  
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ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 23 - M,P-XYLENES

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.69E-02	8.44E-06	7.64E-03	25	8,525	411.52	616.20	106.17	0.0E+00	1.0E-01

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 23 - M,P-XYLENES

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	259	0.321	0.188	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	4,000	3.20E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	10,248	3.06E-03	1.32E-01	1.75E-04	1.24E-02	1.99E-03	0.00E+00	5.56E-03	259

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	3.20E+01	0.10	8.33E+01	1.24E-02	4.00E+02	6.04E+72	5.86E-04	1.87E-02	NA	1.0E-01

END

RESULTS SHEET  
PROPERTY 23 - M,P-XYLENES

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.8E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 23 - O-XYLENES

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
95476			2.00E-03	<a href="#">o-Xylene</a>	71432	5.00E+01		

MORE  
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ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	274	10	213	61			S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	SC	1.63	0.385	0.197		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 23 - O-XYLENES

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.70E-02	1.00E-05	5.18E-03	25	8,661	417.60	630.30	106.17	0.0E+00	1.0E-01



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 23 - O-XYLENES

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc. ( $\mu$ g/m <sup>3</sup> )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	259	0.321	0.188	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	4,000	9.14E+00	3.05E+04
Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	10,404	2.04E-03	8.79E-02	1.75E-04	1.41E-02	2.25E-03	0.00E+00	6.29E-03	259
Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu$ g/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu$ g/m <sup>3</sup> )	Unit risk factor, URF ( $\mu$ g/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	
15	9.14E+00	0.10	8.33E+01	1.41E-02	4.00E+02	2.14E+64	6.45E-04	5.89E-03	NA	1.0E-01	
END											

RESULTS SHEET  
PROPERTY 23 - O-XYLENES

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	5.7E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 23 - TOLUENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
108883			5.10E-02	Toluene	71432	5.00E+01		

MORE  
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ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	274	10	213	61			S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	SC	1.63	0.385	0.197		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 23 - TOLUENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.70E-02	8.60E-06	6.62E-03	25	7,930	383.78	591.79	92.14	0.0E+00	5.0E+00

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 23 - TOLUENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu g/m^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	259	0.321	0.188	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	4,000	2.02E+02	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	9,154	2.92E-03	1.26E-01	1.75E-04	1.41E-02	2.25E-03	0.00E+00	6.29E-03	259

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu g/m^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu g/m^3$ )	Unit risk factor, URF ( $\mu g/m^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	2.02E+02	0.10	8.33E+01	1.41E-02	4.00E+02	2.15E+64	6.44E-04	1.30E-01	NA	5.0E+00

END

RESULTS SHEET  
PROPERTY 23 - TOLUENE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.5E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 23 - ACETONE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (µg/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (µg/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
67641	1.80E+01			Acetone	71432	5.00E+01		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>S</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>S</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	274	10	213	61			S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	SC	1.63	0.385	0.197		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 23 - ACETONE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
1.24E-01	1.14E-05	3.87E-05	25	6,955	329.20	508.10	58.08	0.0E+00	3.5E-01



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 23 - ACETONE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc. ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	259	0.321	0.188	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	4,000	1.80E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	7,559	1.97E-05	8.47E-04	1.75E-04	2.01E-02	3.61E-03	0.00E+00	9.67E-03	259

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D_{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.80E+01	0.10	8.33E+01	2.01E-02	4.00E+02	1.33E+45	8.80E-04	1.58E-02	NA	3.5E-01

END

RESULTS SHEET  
PROPERTY 23 - ACETONE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	4.3E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 23 - 4-METHYL-2-PENTANONE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (µg/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (µg/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
108101	7.80E-01			Methylisobutylketone (4-methyl-2-pentanone)	71432	5.00E+01		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>S</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>S</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	274	10	213	61			S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	SC	1.63	0.385	0.197		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 23 - 4-METHYL-2-PENTANONE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.50E-02	7.80E-06	1.38E-04	25	8,243	389.50	571.00	100.16	0.0E+00	3.0E+00

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 23 - 4-METHYL-2-PENTANONE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{ra}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc. ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	259	0.321	0.188	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	4,000	7.80E-01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	9,862	5.70E-05	2.45E-03	1.75E-04	1.21E-02	2.03E-03	0.00E+00	5.59E-03	259

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D_{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	7.80E-01	0.10	8.33E+01	1.21E-02	4.00E+02	4.13E+74	5.88E-04	4.59E-04	NA	3.0E+00

END

RESULTS SHEET  
PROPERTY 23 - 4-METHYL-2-PENTANONE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.5E-07

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 23 - 2-BUTANONE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (µg/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (µg/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
78933	2.60E+00			Methylethylketone (2-butanone)	71432	5.00E+01		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>S</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>S</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	274	10	213	61			S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	SC	1.63	0.385	0.197		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 23 - 2-BUTANONE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.08E-02	9.80E-06	5.58E-05	25	7,481	352.50	536.78	72.11	0.0E+00	5.0E+00



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 23 - 2-BUTANONE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{ra}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc. (μg/m <sup>3</sup> )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	259	0.321	0.188	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	4,000	2.60E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	8,419	2.63E-05	1.13E-03	1.75E-04	1.31E-02	2.35E-03	0.00E+00	6.30E-03	259

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ (μg/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D_{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m <sup>3</sup> )	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	2.60E+00	0.10	8.33E+01	1.31E-02	4.00E+02	1.77E+69	6.45E-04	1.68E-03	NA	5.0E+00

END

RESULTS SHEET  
PROPERTY 23 - 2-BUTANONE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.2E-07

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 23 - 1,4-DICHLOROBENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (µg/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (µg/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
106467	1.50E+00			1,4-Dichlorobenzene	71432	5.00E+01		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>S</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>S</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	274	10	213	61			S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	SC	1.63	0.385	0.197		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 23 - 1,4-DICHLOROBENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
6.90E-02	7.90E-06	2.39E-03	25	9,271	447.21	684.75	147.00	0.0E+00	8.0E-01

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 23 - 1,4-DICHLOROBENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{ra}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc. ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	259	0.321	0.188	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	4,000	1.50E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	11,243	8.76E-04	3.77E-02	1.75E-04	1.12E-02	1.79E-03	0.00E+00	4.99E-03	259

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D_{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	1.50E+00	0.10	8.33E+01	1.12E-02	4.00E+02	1.30E+81	5.38E-04	8.07E-04	NA	8.0E-01

END

RESULTS SHEET  
PROPERTY 23 - 1,4-DICHLOROBENZENE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	9.7E-07

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 23 - DICHLORODIFLUOROMETHANE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (µg/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (µg/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
75718	3.20E+00			Dichlorodifluoromethane	71432	5.00E+01		

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>S</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)			ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
Thickness of soil stratum A, h <sub>A</sub> (cm)	Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)						
15	274	10	213	61		S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	SC	1.63	0.385	0.197		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 23 - DICHLORODIFLUOROMETHANE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
6.65E-02	9.92E-06	3.42E-01	25	9,421	243.20	384.95	120.92	0.0E+00	2.0E-01



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 23 - DICHLORODIFLUOROMETHANE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{ra}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc. ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	259	0.321	0.188	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	4,000	3.20E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm·m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm·s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	8,386	1.62E-01	6.96E+00	1.75E-04	1.08E-02	1.72E-03	0.00E+00	4.80E-03	259

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D_{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	3.20E+00	0.10	8.33E+01	1.08E-02	4.00E+02	1.46E+84	5.21E-04	1.67E-03	NA	2.0E-01

END

RESULTS SHEET  
PROPERTY 23 - DICHLORODIFLUOROMETHANE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	8.0E-06

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER Chemical CAS No. (numbers only, no dashes)		ENTER Initial groundwater conc., $C_W$ ( $\mu\text{g/L}$ )		Chemical							
79016	3.40E+00			Trichloroethylene							
ENTER Average soil/ groundwater temperature, $T_S$ ( $^{\circ}\text{C}$ )	ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Depth below grade to water table, $L_{WT}$ (cm)	ENTER Totals must add up to value of $L_{WT}$ (cell G28)			ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)		OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
Thickness of soil stratum A, $h_A$ (cm)	Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)									
10	15	762	183	579		B	S	SC			

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g/cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g/cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g/cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
SC	1.63	0.385	0.197	S	1.66	0.375	0.054		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g/cm-s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, $ER$ (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	

MORE  
↓

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, $ED$ (yrs)	ENTER Exposure frequency, $EF$ (days/yr)	ENTER Target risk for carcinogens, $TR$ (unitless)	ENTER Target hazard quotient for noncarcinogens, $THQ$ (unitless)
70	30	30	350	1.0E-06	1

END

Used to calculate risk-based  
groundwater concentration.

CHEMICAL PROPERTIES SHEET  
PROPERTY 37 - TRICHLOROETHENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Organic carbon partition coefficient, $K_{oc}$ (cm <sup>3</sup> /g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	5.1E-06	3.5E-02

END

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 37 - TRICHLOROETHENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_e$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{ra}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Thickness of capillary zone, $L_{cz}$ (cm)	Total porosity in capillary zone, $n_{cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)
9.46E+08	747	0.188	0.321	#VALUE!	0.299	1.74E-09	0.837	1.46E-09	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)	Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. groundwater temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_{eff,A}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_{eff,B}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_{eff,C}$ (cm <sup>2</sup> /s)	Capillary zone effective diffusion coefficient, $D_{eff,cz}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_{eff,T}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
3.05E+04	1.06E+06	3.77E-04	15	8,557	4.78E-03	2.06E-01	1.75E-04	2.04E-03	1.28E-02	0.00E+00	5.09E-04	4.68E-03	747

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ (µg/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m <sup>3</sup> )	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	7.00E+02	0.10	1.47E+00	2.04E-03	4.00E+02	6.21E+07	3.94E-05	2.75E-02	5.1E-06	3.5E-02

END

RESULTS SHEET  
PROPERTY 37 - TRICHLOROETHENE

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	1.47E+06	NA	5.8E-08	7.5E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL  
DOWN  
TO "END"

END

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

Reset to  
Defaults

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER Chemical CAS No. (numbers only, no dashes)		ENTER Initial groundwater conc., $C_W$ ( $\mu\text{g/L}$ )		Chemical							
156592	3.50E+00			cis-1,2-Dichloroethylene							
ENTER Average soil/ groundwater temperature, $T_S$ ( $^{\circ}\text{C}$ )	ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Depth below grade to water table, $L_{WT}$ (cm)	ENTER Totals must add up to value of $L_{WT}$ (cell G28)			ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)		OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
Thickness of soil stratum A, $h_A$ (cm)	Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)									
10	15	762	183	579		B	S	SC			

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g/cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g/cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g/cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
SC	1.63	0.385	0.197	S	1.66	0.375	0.054		Error	Error	Error

MORE  
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ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g/cm-s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, $ER$ (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	

MORE  
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ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, $ED$ (yrs)	ENTER Exposure frequency, $EF$ (days/yr)	ENTER Target risk for carcinogens, $TR$ (unitless)	ENTER Target hazard quotient for noncarcinogens, $THQ$ (unitless)
70	30	30	350	1.0E-06	1

END

Used to calculate risk-based  
groundwater concentration.

CHEMICAL PROPERTIES SHEET  
PROPERTY 37 - CIS-1,2-DICHLOROETHENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, $H$ (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Organic carbon partition coefficient, $K_{oc}$ (cm <sup>3</sup> /g)	Pure component water solubility, $S$ (mg/L)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.36E-02	1.13E-05	4.07E-03	25	7,192	333.65	544.00	3.55E+01	3.50E+03	0.0E+00	3.5E-02

END



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 37 - CIS-1,2-DICHLOROETHENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{ie}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Thickness of capillary zone, $L_{cz}$ (cm)	Total porosity in capillary zone, $n_{cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)
9.46E+08	747	0.188	0.321	#VALUE!	0.299	1.74E-09	0.837	1.46E-09	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)	Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. groundwater temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Capillary zone effective diffusion coefficient, $D_{cz}^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
3.05E+04	1.06E+06	3.77E-04	15	7,734	2.04E-03	8.77E-02	1.75E-04	1.90E-03	1.19E-02	0.00E+00	4.81E-04	4.37E-03	747

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ (μg/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m <sup>3</sup> )	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	3.07E+02	0.10	1.47E+00	1.90E-03	4.00E+02	2.26E+08	3.89E-05	1.19E-02	NA	3.5E-02

END

RESULTS SHEET  
PROPERTY 37 - CIS-1,2-DICHLOROETHENE  
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	3.50E+06	NA	NA	3.3E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL  
DOWN  
TO "END"

END

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

Reset to  
Defaults

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER Chemical CAS No. (numbers only, no dashes)		ENTER Initial groundwater conc., $C_w$ ( $\mu\text{g/L}$ )		Chemical							
75014	7.80E+00			Vinyl chloride (chloroethene)							
ENTER Average soil/ groundwater temperature, $T_s$ ( $^{\circ}\text{C}$ )	ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Depth below grade to water table, $L_{WT}$ (cm)	ENTER Totals must add up to value of $L_{WT}$ (cell G28)			ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )	
Thickness of soil stratum A, $h_A$ (cm)	Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)									
10	15	762	183	579		B	S	SC			

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g/cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g/cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g/cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
SC	1.63	0.385	0.197	S	1.66	0.375	0.054		Error	Error	Error

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g/cm-s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	

MORE  
↓

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

END

Used to calculate risk-based  
groundwater concentration.

CHEMICAL PROPERTIES SHEET  
PROPERTY 37 - VINYL CHLORIDE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Organic carbon partition coefficient, $K_{oc}$ (cm <sup>3</sup> /g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
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1.06E-01	1.23E-05	2.69E-02	25	5,250	259.25	432.00	1.86E+01	8.80E+03	8.8E-06	1.0E-01
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END

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 37 - VINYL CHLORIDE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{ie}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Thickness of capillary zone, $L_{cz}$ (cm)	Total porosity in capillary zone, $n_{cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)
9.46E+08	747	0.188	0.321	#VALUE!	0.299	1.74E-09	0.837	1.46E-09	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)	Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. groundwater temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Capillary zone effective diffusion coefficient, $D_{cz}^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
3.05E+04	1.06E+06	3.77E-04	15	5,000	1.72E-02	7.41E-01	1.75E-04	2.74E-03	1.71E-02	0.00E+00	6.80E-04	6.27E-03	747

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ (μg/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m <sup>3</sup> )	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	5.78E+03	0.10	1.47E+00	2.74E-03	4.00E+02	6.47E+05	4.12E-05	2.38E-01	8.8E-06	1.0E-01

END

RESULTS SHEET  
PROPERTY 37 - VINYL CHLORIDE  
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	8.80E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.6E-07	2.3E-03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 38 - 2-BUTANONE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
78933			3.00E-03	Methylethylketone (2-butanone)	67641			1.40E-02

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 38 - 2-BUTANONE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.08E-02	9.80E-06	5.58E-05	25	7,481	352.50	536.78	72.11	0.0E+00	5.0E+00



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 38 - 2-BUTANONE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	9.31E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	8,419	2.63E-05	1.13E-03	1.75E-04	1.31E-02	0.00E+00	0.00E+00	1.31E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	9.31E+00	0.10	8.33E+01	1.31E-02	4.00E+02	1.77E+69	1.58E-03	1.47E-02	NA	5.0E+00

END

RESULTS SHEET  
PROPERTY 38 - 2-BUTANONE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.8E-06

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 38 - ACETONE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
67641			1.40E-02	Acetone	67641			1.40E-02

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 38 - ACETONE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, $H$ (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
1.24E-01	1.14E-05	3.87E-05	25	6,955	329.20	508.10	58.08	0.0E+00	3.2E+00

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 38 - ACETONE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	3.50E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	7,559	1.97E-05	8.47E-04	1.75E-04	2.01E-02	0.00E+00	0.00E+00	2.01E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	3.50E+01	0.10	8.33E+01	2.01E-02	4.00E+02	1.33E+45	1.85E-03	6.47E-02	NA	3.2E+00

END

RESULTS SHEET  
PROPERTY 38 - ACETONE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.9E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 38 - BENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
71432			2.00E-03	Benzene	67641			1.40E-02

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 38 - BENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.80E-02	9.80E-06	5.54E-03	25	7,342	353.24	562.16	78.11	7.8E-06	3.0E-02



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 38 - BENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., $\mu\text{g}/\text{m}^3$	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	6.72E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	8,122	2.68E-03	1.15E-01	1.75E-04	1.42E-02	0.00E+00	0.00E+00	1.42E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	6.72E+00	0.10	8.33E+01	1.42E-02	4.00E+02	3.99E+63	1.63E-03	1.10E-02	7.8E-06	3.0E-02

END

RESULTS SHEET  
PROPERTY 38 - BENZENE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.5E-08	3.5E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 38 - CHLOROBENZENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)
108907			1.00E-03	Chlorobenzene	67641			1.40E-02

MORE  
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ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 38 - CHLOROBENZENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.30E-02	8.70E-06	3.69E-03	25	8,410	404.87	632.40	112.56	0.0E+00	6.0E-02

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 38 - CHLOROBENZENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	4.84E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	9,803	1.54E-03	6.61E-02	1.75E-04	1.18E-02	0.00E+00	0.00E+00	1.18E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	4.84E+00	0.10	8.33E+01	1.18E-02	4.00E+02	4.66E+76	1.51E-03	7.30E-03	NA	6.0E-02

END

RESULTS SHEET  
PROPERTY 38 - CHLOROBENZENE  
INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.2E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 38 - M,P-XYLENES

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	
108383			2.00E-03	m-Xylene	67641			1.40E-02	

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of L <sub>s</sub> (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
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ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 38 - M,P-XYLENES

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.00E-02	7.80E-06	7.32E-03	25	8,523	412.27	617.05	106.17	0.0E+00	1.0E-01



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 38 - M,P-XYLENES

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{le}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc. ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	9.14E+00	3.05E+04
Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	10,255	2.93E-03	1.26E-01	1.75E-04	1.13E-02	0.00E+00	0.00E+00	1.13E-02	122
Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	
15	9.14E+00	0.10	8.33E+01	1.13E-02	4.00E+02	9.01E+79	1.48E-03	1.35E-02	NA	1.0E-01	
END											

RESULTS SHEET  
PROPERTY 38 - M,P-XYLENES

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.3E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 38 - O-XYLENES

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., $C_g$ ( $\mu\text{g}/\text{m}^3$ )	OR	ENTER Soil gas conc., $C_g$ (ppmv)	
95476			1.00E-03	<a href="#">o-Xylene</a>	67641			1.40E-02	

MORE  
↓

ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Soil gas sampling depth below grade, $L_s$ (cm)	ENTER Average soil temperature, $T_S$ (°C)	ENTER Totals must add up to value of $L_s$ (cell F24)	ENTER Thickness of soil stratum A, $h_A$ (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g}/\text{cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g}/\text{cm}\cdot\text{s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 38 - O-XYLENES

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.70E-02	1.00E-05	5.18E-03	25	8,661	417.60	630.30	106.17	0.0E+00	1.0E-01

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 38 - O-XYLENES

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	4.57E+00	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	10,404	2.04E-03	8.79E-02	1.75E-04	1.41E-02	0.00E+00	0.00E+00	1.41E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	4.57E+00	0.10	8.33E+01	1.41E-02	4.00E+02	2.14E+64	1.62E-03	7.42E-03	NA	1.0E-01

END

RESULTS SHEET  
PROPERTY 38 - O-XYLENES

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	7.1E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

DATA ENTRY SHEET  
PROPERTY 38 - TOLUENE

SG-ADV  
Version 3.1; 02/04

Reset to  
Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	Chemical	ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C <sub>g</sub> (ug/m <sup>3</sup> )	OR	ENTER Soil gas conc., C <sub>g</sub> (ppmv)	
108883			1.50E-02	Toluene	67641			1.40E-02	

MORE  
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ENTER Depth below grade to bottom of enclosed space floor, L <sub>F</sub> (cm)	ENTER Soil gas sampling depth below grade, L <sub>s</sub> (cm)	ENTER Average soil temperature, T <sub>S</sub> (°C)	ENTER Totals must add up to value of Ls (cell F24)	ENTER Thickness of soil stratum A, h <sub>A</sub> (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h <sub>B</sub> (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h <sub>C</sub> (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k <sub>v</sub> (cm <sup>2</sup> )
15	137	10	137				S		

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, ρ <sub>b</sub> <sup>A</sup> (g/cm <sup>3</sup> )	ENTER Stratum A soil total porosity, n <sup>A</sup> (unitless)	ENTER Stratum A soil water-filled porosity, θ <sub>w</sub> <sup>A</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, ρ <sub>b</sub> <sup>B</sup> (g/cm <sup>3</sup> )	ENTER Stratum B soil total porosity, n <sup>B</sup> (unitless)	ENTER Stratum B soil water-filled porosity, θ <sub>w</sub> <sup>B</sup> (cm <sup>3</sup> /cm <sup>3</sup> )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, ρ <sub>b</sub> <sup>C</sup> (g/cm <sup>3</sup> )	ENTER Stratum C soil total porosity, n <sup>C</sup> (unitless)	ENTER Stratum C soil water-filled porosity, θ <sub>w</sub> <sup>C</sup> (cm <sup>3</sup> /cm <sup>3</sup> )
S	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
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ENTER Enclosed space floor thickness, L <sub>crack</sub> (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s <sup>2</sup> )	ENTER Enclosed space floor length, L <sub>B</sub> (cm)	ENTER Enclosed space floor width, W <sub>B</sub> (cm)	ENTER Enclosed space height, H <sub>B</sub> (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q <sub>soil</sub> (L/m)
10	40	1000	1000	244	0.1	0.45	5

ENTER Averaging time for carcinogens, AT <sub>C</sub> (yrs)	ENTER Averaging time for noncarcinogens, AT <sub>NC</sub> (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET  
PROPERTY 38 - TOLUENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Molecular weight, MW (g/mol)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
8.70E-02	8.60E-06	6.62E-03	25	7,930	383.78	591.79	92.14	0.0E+00	5.0E+00



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 38 - TOLUENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{te}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)	Soil gas conc., ( $\mu\text{g}/\text{m}^3$ )	Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)
9.46E+08	122	0.321	0.244	0.244	0.003	9.92E-08	0.998	9.91E-08	4,000	5.95E+01	3.05E+04

Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. soil temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D^{eff}_A$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D^{eff}_B$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D^{eff}_C$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D^{eff}_T$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.06E+06	3.77E-04	15	9,154	2.92E-03	1.26E-01	1.75E-04	1.41E-02	0.00E+00	0.00E+00	1.41E-02	122

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ ( $\mu\text{g}/\text{m}^3$ )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ ( $\mu\text{g}/\text{m}^3$ )	Unit risk factor, URF ( $\mu\text{g}/\text{m}^3$ ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	5.95E+01	0.10	8.33E+01	1.41E-02	4.00E+02	2.15E+64	1.62E-03	9.66E-02	NA	5.0E+00

END

RESULTS SHEET  
PROPERTY 38 - TOLUENE

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.9E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL  
DOWN  
TO "END"

END

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

Reset to  
Defaults

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER Chemical CAS No. (numbers only, no dashes)		ENTER Initial groundwater conc., $C_W$ ( $\mu\text{g/L}$ )		Chemical							
79016	3.80E-01			Trichloroethylene							
ENTER Average soil/ groundwater temperature, $T_S$ ( $^{\circ}\text{C}$ )	ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Depth below grade to water table, $L_{WT}$ (cm)	ENTER Totals must add up to value of $L_{WT}$ (cell G28)			ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)		OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
Thickness of soil stratum A, $h_A$ (cm)	Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)									
10	15	549	549			A	SIC	SIC			

MORE  
↓

ENTER Stratum A SCS soil type Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g/cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g/cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g/cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
SIC	1.38	0.481	0.216	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE  
↓

ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g/cm-s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, $ER$ (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	244	0.1	0.45	

MORE  
↓

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, $ED$ (yrs)	ENTER Exposure frequency, $EF$ (days/yr)	ENTER Target risk for carcinogens, $TR$ (unitless)	ENTER Target hazard quotient for noncarcinogens, $THQ$ (unitless)
70	30	30	350	1.0E-06	1

END

Used to calculate risk-based  
groundwater concentration.

CHEMICAL PROPERTIES SHEET  
PROPERTY 39 - TRICHLOROETHENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, $H$ (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Organic carbon partition coefficient, $K_{oc}$ (cm <sup>3</sup> /g)	Pure component water solubility, $S$ (mg/L)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	5.1E-06	3.5E-02

END

INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 39 - TRICHLOROETHENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{se}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{ra}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Thickness of capillary zone, $L_{cz}$ (cm)	Total porosity in capillary zone, $n_{cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)
9.46E+08	534	0.265	0.244	0.244	0.284	1.48E-09	0.844	1.25E-09	192.31	0.481	0.057	0.424	4,000

Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)	Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. groundwater temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_{eff,A}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_{eff,B}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_{eff,C}$ (cm <sup>2</sup> /s)	Capillary zone effective diffusion coefficient, $D_{eff,cz}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_{eff,T}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
3.05E+04	1.06E+06	3.77E-04	15	8,557	4.78E-03	2.06E-01	1.75E-04	4.10E-03	0.00E+00	0.00E+00	3.60E-05	9.85E-05	534

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ (µg/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m <sup>3</sup> )	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	7.82E+01	0.10	1.26E+00	4.10E-03	4.00E+02	2.13E+03	5.55E-06	4.34E-04	5.1E-06	3.5E-02

END

RESULTS SHEET  
PROPERTY 39 - TRICHLOROETHENE

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	1.47E+06	NA	9.2E-10	1.2E-05

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL  
DOWN  
TO "END"

END

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

Reset to  
Defaults

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER Chemical CAS No. (numbers only, no dashes)		ENTER Initial groundwater conc., $C_W$ ( $\mu\text{g/L}$ )		Chemical							
156592	4.50E+00			cis-1,2-Dichloroethylene							
ENTER Average soil/ groundwater temperature, $T_S$ ( $^{\circ}\text{C}$ )	ENTER Depth below grade to bottom of enclosed space floor, $L_F$ (cm)	ENTER Depth below grade to water table, $L_{WT}$ (cm)	ENTER Totals must add up to value of $L_{WT}$ (cell G28)			ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)		OR	ENTER User-defined stratum A soil vapor permeability, $k_v$ ( $\text{cm}^2$ )
Thickness of soil stratum A, $h_A$ (cm)	Thickness of soil stratum B, (Enter value or 0) $h_B$ (cm)	Thickness of soil stratum C, (Enter value or 0) $h_C$ (cm)									
10	15	640	640			A	S	S			

MORE  
↓

ENTER Stratum A SCS soil type  Lookup Soil Parameters	ENTER Stratum A soil dry bulk density, $\rho_b^A$ ( $\text{g/cm}^3$ )	ENTER Stratum A soil total porosity, $n^A$ (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w^A$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum B SCS soil type  Lookup Soil Parameters	ENTER Stratum B soil dry bulk density, $\rho_b^B$ ( $\text{g/cm}^3$ )	ENTER Stratum B soil total porosity, $n^B$ (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w^B$ ( $\text{cm}^3/\text{cm}^3$ )	ENTER Stratum C SCS soil type  Lookup Soil Parameters	ENTER Stratum C soil dry bulk density, $\rho_b^C$ ( $\text{g/cm}^3$ )	ENTER Stratum C soil total porosity, $n^C$ (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w^C$ ( $\text{cm}^3/\text{cm}^3$ )
S	1.66	0.375	0.054		Error	Error	Error		Error	Error	Error

MORE  
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ENTER Enclosed space floor thickness, $L_{\text{crack}}$ (cm)	ENTER Soil-bldg. pressure differential, $\Delta P$ ( $\text{g/cm-s}^2$ )	ENTER Enclosed space floor length, $L_B$ (cm)	ENTER Enclosed space floor width, $W_B$ (cm)	ENTER Enclosed space height, $H_B$ (cm)	ENTER Floor-wall seam crack width, $w$ (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate $Q_{\text{soil}}$ (L/m)
10	40	1000	1000	366	0.1	1	

MORE  
↓

ENTER Averaging time for carcinogens, $AT_C$ (yrs)	ENTER Averaging time for noncarcinogens, $AT_{NC}$ (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

END

Used to calculate risk-based  
groundwater concentration.

CHEMICAL PROPERTIES SHEET  
PROPERTY 8 - CIS-1,2-DICHLOROETHYLENE

Diffusivity in air, $D_a$ (cm <sup>2</sup> /s)	Diffusivity in water, $D_w$ (cm <sup>2</sup> /s)	Henry's law constant at reference temperature, $H$ (atm-m <sup>3</sup> /mol)	Henry's law constant reference temperature, $T_R$ (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, $T_B$ (°K)	Critical temperature, $T_C$ (°K)	Organic carbon partition coefficient, $K_{oc}$ (cm <sup>3</sup> /g)	Pure component water solubility, $S$ (mg/L)	Unit risk factor, URF (µg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
7.36E-02	1.13E-05	4.07E-03	25	7,192	333.65	544.00	3.55E+01	3.50E+03	0.0E+00	3.5E-02

END



INTERMEDIATE CALCULATIONS SHEET  
PROPERTY 8 - CIS-1,2-DICHLOROETHYLENE

Exposure duration, $\tau$ (sec)	Source-building separation, $L_T$ (cm)	Stratum A soil air-filled porosity, $\theta_a^A$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum B soil air-filled porosity, $\theta_a^B$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum C soil air-filled porosity, $\theta_a^C$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A effective total fluid saturation, $S_{ie}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Stratum A soil intrinsic permeability, $k_i$ (cm <sup>2</sup> )	Stratum A soil relative air permeability, $k_{rg}$ (cm <sup>2</sup> )	Stratum A soil effective vapor permeability, $k_v$ (cm <sup>2</sup> )	Thickness of capillary zone, $L_{cz}$ (cm)	Total porosity in capillary zone, $n_{cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm <sup>3</sup> /cm <sup>3</sup> )	Floor-wall seam perimeter, $X_{crack}$ (cm)
9.46E+08	625	0.321	#VALUE!	#VALUE!	0.003	9.92E-08	0.998	9.91E-08	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm <sup>3</sup> /s)	Area of enclosed space below grade, $A_B$ (cm <sup>2</sup> )	Crack-to-total area ratio, $\eta$ (unitless)	Crack depth below grade, $Z_{crack}$ (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, $H_{TS}$ (atm-m <sup>3</sup> /mol)	Henry's law constant at ave. groundwater temperature, $H'_{TS}$ (unitless)	Vapor viscosity at ave. soil temperature, $\mu_{TS}$ (g/cm-s)	Stratum A effective diffusion coefficient, $D_A^{eff}$ (cm <sup>2</sup> /s)	Stratum B effective diffusion coefficient, $D_B^{eff}$ (cm <sup>2</sup> /s)	Stratum C effective diffusion coefficient, $D_C^{eff}$ (cm <sup>2</sup> /s)	Capillary zone effective diffusion coefficient, $D_{cz}^{eff}$ (cm <sup>2</sup> /s)	Total overall effective diffusion coefficient, $D_T^{eff}$ (cm <sup>2</sup> /s)	Diffusion path length, $L_d$ (cm)
1.02E+05	1.06E+06	3.77E-04	15	7,734	2.04E-03	8.77E-02	1.75E-04	1.19E-02	0.00E+00	0.00E+00	4.81E-04	7.22E-03	625

Convection path length, $L_p$ (cm)	Source vapor conc., $C_{source}$ (μg/m <sup>3</sup> )	Crack radius, $r_{crack}$ (cm)	Average vapor flow rate into bldg., $Q_{soil}$ (cm <sup>3</sup> /s)	Crack effective diffusion coefficient, $D^{crack}$ (cm <sup>2</sup> /s)	Area of crack, $A_{crack}$ (cm <sup>2</sup> )	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, $\alpha$ (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m <sup>3</sup> )	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )
15	3.95E+02	0.10	9.95E+01	1.19E-02	4.00E+02	6.70E+90	1.07E-04	4.23E-02	NA	3.5E-02

END

RESULTS SHEET  
PROPERTY 8 - CIS-1,2-DICHLOROETHYLENE  
RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	3.50E+06	NA	NA	1.2E-03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL  
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TO "END"

END

## VLOOKUP TABLES

SCS Soil Type	Soil Properties Lookup Table							Bulk Density		
	K <sub>s</sub> (cm/h)	α <sub>1</sub> (1/cm)	N (unitless)	M (unitless)	n (cm <sup>3</sup> /cm <sup>3</sup> )	θ <sub>r</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	Mean Grain Diameter (cm)	(g/cm <sup>3</sup> )	θ <sub>w</sub> (cm <sup>3</sup> /cm <sup>3</sup> )	SCS Soil Name
C	0.61	0.01496	1.253	0.2019	0.459	0.098	0.0092	1.43	0.215	Clay
CL	0.34	0.01581	1.416	0.2938	0.442	0.079	0.016	1.48	0.168	Clay Loam
L	0.50	0.01112	1.472	0.3207	0.399	0.061	0.020	1.59	0.148	Loam
LS	4.38	0.03475	1.746	0.4273	0.390	0.049	0.040	1.62	0.076	Loamy Sand
S	26.78	0.03524	3.177	0.6852	0.375	0.053	0.044	1.66	0.054	Sand
SC	0.47	0.03342	1.208	0.1722	0.385	0.117	0.025	1.63	0.197	Sandy Clay
SCL	0.55	0.02109	1.330	0.2481	0.384	0.063	0.029	1.63	0.146	Sandy Clay Loam
SI	1.82	0.00658	1.679	0.4044	0.489	0.050	0.0046	1.35	0.167	Silt
SIC	0.40	0.01622	1.321	0.2430	0.481	0.111	0.0039	1.38	0.216	Silty Clay
SICL	0.46	0.00839	1.521	0.3425	0.482	0.090	0.0056	1.37	0.198	Silty Clay Loam
SIL	0.76	0.00506	1.663	0.3987	0.439	0.065	0.011	1.49	0.180	Silt Loam
SL	1.60	0.02667	1.449	0.3099	0.387	0.039	0.030	1.62	0.103	Sandy Loam

Chemical Properties Lookup Table															
CAS No.	Chemical	Organic carbon partition coefficient, K <sub>oc</sub> (cm <sup>3</sup> /g)	Diffusivity in air, D <sub>a</sub> (cm <sup>2</sup> /s)	Diffusivity in water, D <sub>w</sub> (cm <sup>2</sup> /s)	Pure component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H (atm·m <sup>3</sup> /mol)	Henry's law constant reference temperature, T <sub>R</sub> (°C)	Normal boiling point, T <sub>B</sub> (°K)	Critical temperature, T <sub>C</sub> (°K)	Enthalpy of vaporization at the normal boiling point, ΔH <sub>v,b</sub> (cal/mol)	Unit risk factor, URF (μg/m <sup>3</sup> ) <sup>-1</sup>	Reference conc., RfC (mg/m <sup>3</sup> )	URF extrapolated (X)	RfC extrapolated (X)
56235	Carbon tetrachloride	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.24E+00	3.03E-02	25	349.90	556.60	7,127	1.5E-05	0.0E+00		
57749	Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05	25	624.24	885.73	14,000	1.0E-04	7.0E-04		
58899	gamma-HCH (Lindane)	1.07E+03	1.42E-02	7.34E-06	7.30E+00	5.73E-04	1.40E-05	25	596.55	839.36	15,000	3.7E-04	1.1E-03	X	X
60297	Ethyl ether	5.73E+00	7.82E-02	8.61E-06	5.68E+04	1.35E+00	3.29E-02	25	307.50	466.74	6,338	0.0E+00	7.0E-01		
60571	Dieldrin	2.14E+04	1.25E-02	4.74E-06	1.95E-01	6.18E-04	1.51E-05	25	613.32	842.25	17,000	4.6E-03	1.8E-04		X
67641	Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.87E-05	25	329.20	508.10	6,955	0.0E+00	3.5E-01		X
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	2.3E-05	0.0E+00		
67721	Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00	695.00	9,510	4.0E-06	3.5E-03		X
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24	562.16	7,342	7.8E-06	3.0E-02		
71556	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02	25	347.24	545.00	7,136	0.0E+00	2.2E+00		
72435	Methoxychlor	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	1.58E-05	25	651.02	848.49	16,000	0.0E+00	1.8E-02		X
72559	DDE	4.47E+06	1.44E-02	5.87E-06	1.20E-01	8.59E-04	2.09E-05	25	634.44	860.38	15,000	9.7E-05	0.0E+00	X	
74839	Methyl bromide	1.05E+01	7.28E-02	1.21E-05	1.52E+04	2.55E-01	6.22E-03	25	276.71	467.00	5,714	0.0E+00	5.0E-03		
74873	Methyl chloride (chloromethane)	2.12E+00	1.26E-01	6.50E-06	5.33E+03	3.61E-01	8.80E-03	25	249.00	416.25	5,115	1.0E-06	9.0E-02		
74908	Hydrogen cyanide	3.80E+00	1.93E-01	2.10E-05	1.00E+06	5.44E-03	1.33E-04	25	299.00	456.70	6,676	0.0E+00	3.0E-03		
74953	Methylene bromide	1.26E+01	4.30E-02	8.44E-06	1.19E+04	3.52E-02	8.59E-04	25	370.00	583.00	7,868	0.0E+00	3.5E-02		X
75003	Chloroethane (ethyl chloride)	4.40E+00	2.71E-01	1.15E-05	5.68E+03	3.61E-01	8.80E-03	25	285.30	460.40	5,879	8.3E-07	1.0E+01	X	
75014	Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02	25	259.25	432.00	5,250	8.8E-06	1.0E-01		
75058	Acetonitrile	4.20E+00	1.28E-01	1.66E-05	1.00E+06	1.42E-03	3.45E-05	25	354.60	545.50	7,110	0.0E+00	6.0E-02		
75070	Acetaldehyde	1.06E+00	1.24E-01	1.41E-05	1.00E+06	3.23E-03	7.87E-05	25	293.10	466.00	6,157	2.2E-06	9.0E-03		
75092	Methylene chloride	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.96E-02	2.18E-03	25	313.00	510.00	6,706	4.7E-07	3.0E+00		
75150	Carbon disulfide	4.57E+01	1.04E-01	1.00E-05	1.19E+03	1.24E+00	3.02E-02	25	319.00	552.00	6,391	0.0E+00	7.0E-01		
75218	Ethylene oxide	1.33E+00	1.04E-01	1.45E-05	3.04E+05	2.27E-02	5.54E-04	25	283.60	469.00	6,104	1.0E-04	0.0E+00		
75252	Bromoform	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	5.88E-04	25	422.35	696.00	9,479	1.1E-06	7.0E-02		X
75274	Bromodichloromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.54E-02	1.60E-03	25	363.15	585.85	7,800	1.8E-05	7.0E-02	X	X
75296	2-Chloropropane	9.14E+00	8.88E-02	1.01E-05	3.73E+03	5.93E-01	1.45E-02	25	308.70	485.00	6,286	0.0E+00	1.0E-01		
75343	1,1-Dichloroethane	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	5.61E-03	25	330.55	523.00	6,895	0.0E+00	5.0E-01		
75354	1,1-Dichloroethylene	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.60E-02	25	304.75	576.05	6,247	0.0E+00	2.0E-01		
75456	Chlorodifluoromethane	4.79E+01	1.01E-01	1.28E-05	2.00E+00	1.10E+00	2.70E-02	25	232.40	369.30	4,836	0.0E+00	5.0E+01		
75694	Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	9.68E-02	25	296.70	471.00	5,999	0.0E+00	7.0E-01		
75718	Dichlorodifluoromethane	4.57E+02	6.65E-02	9.92E-06	2.80E+02	1.40E+01	3.42E-01	25	243.20	384.95	9,421	0.0E+00	2.0E-01		
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	1.11E+04	7.80E-02	8.20E-06	1.70E+02	1.97E+01	4.80E-01	25	320.70	487.30	6,463	0.0E+00	3.0E+01		
76448	Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.05E+01	1.48E+00	25	603.69	846.31	13,000	1.3E-03	1.8E-03		X
77474	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02	25	512.15	746.00	10,931	0.0E+00	2.0E-04		
78831	Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05	25	381.04	547.78	10,936	0.0E+00	1.1E+00		X
78875	1,2-Dichloropropane	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.79E-03	25	369.52	572.00	7,590	1.9E-05	4.0E-03	X	
78933	Methylethylketone (2-butanone)	2.30E+00	8.08E-02	9.80E-06	2.23E+05	2.29E-03	5.58E-05	25	352.50	536.78	7,481	0.0E+00	5.0E+00		
79005	1,1,2-Trichloroethane	5.01E+01	7.80E-02	8.80E-06	4.42E+03	3.73E-02	9.11E-04	25	386.15	602.00	8,322	1.6E-05	1.4E-02		X
79016	Trichloroethylene	1.66E+02	7.90E-02	9.10E-06	1.47E+03	4.21E-01	1.03E-02	25	360.36	544.20	7,505	1.1E-04	4.0E-02	X	
79209	Methyl acetate	3.26E+00	1.04E-01	1.00E-05	2.00E+03	4.84E-03	1.18E-04	25	329.80	506.70	7,260	0.0E+00	3.5E+00		X
79345	1,1,2,2-Tetrachloroethane	9.33E+01	7.10E-02	7.90E-06	2.96E+03	1.41E-02	3.44E-04	25	419.60	661.15	8,996	5.8E-05	2.1E-01		X
79469	2-Nitropropane	1.17E+01	9.23E-02	1.01E-05	1.70E+04	5.03E-03	1.23E-04	25	393.20	594.00	8,383	2.7E-03	2.0E-02		
80626	Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	3.36E-04	25	373.50	567.00	8,975	0.0E+00	7.0E-01		
83329	Acenaphthene	7.08E+03	4.21E-02	7.69E-06	3.57E+00	6.34E-03	1.55E-04	25	550.54	803.15	12,155	0.0E+00	2.1E-01		X
86737	Fluorene	1.38E+04	3.63E-02	7.88E-06	1.98E+00	2.60E-03	6.34E-05	25	570.44	870.00	12,666	0.0E+00	1.4E-01		X
87683	Hexachloro-1,3-butadiene	5.37E+04	5.61E-02	6.16E-06	3.20E+00	3.33E-01	8.13E-03	25	486.15	738.00	10,206	2.2E-05	7.0E-04		X
88722	o-Nitrotoluene	3.24E+02	5.87E-02	8.67E-06	6.50E+02	5.11E-04	1.25E-05	25	495.00	720.00	12,239	0.0E+00	3.5E-02		X

## VLOOKUP TABLES

91203 Naphthalene	2.00E+03	5.90E-02	7.50E-06	3.10E+01	1.98E-02	4.82E-04	25	491.14	748.40	10,373	0.0E+00	3.0E-03	
91576 2-Methylnaphthalene	2.81E+03	5.22E-02	7.75E-06	2.46E+01	2.12E-02	5.17E-04	25	514.26	761.00	12,600	0.0E+00	7.0E-02	X
92524 Biphenyl	4.38E+03	4.04E-02	8.15E-06	7.45E+00	1.23E-02	2.99E-04	25	529.10	789.00	10,890	0.0E+00	1.8E-01	X
95476 o-Xylene	3.63E+02	8.70E-02	1.00E-05	1.78E+02	2.12E-01	5.18E-03	25	417.60	630.30	8,661	0.0E+00	1.0E-01	
95501 1,2-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	1.56E+02	7.77E-02	1.90E-03	25	453.57	705.00	9,700	0.0E+00	2.0E-01	
95578 2-Chlorophenol	3.88E+02	5.01E-02	9.46E-06	2.20E+04	1.60E-02	3.90E-04	25	447.53	675.00	9,572	0.0E+00	1.8E-02	X
95636 1,2,4-Trimethylbenzene	1.35E+03	6.06E-02	7.92E-06	5.70E+01	2.52E-01	6.14E-03	25	442.30	649.17	9,369	0.0E+00	6.0E-03	
96184 1,2,3-Trichloropropane	2.20E+01	7.10E-02	7.90E-06	1.75E+03	1.67E-02	4.08E-04	25	430.00	652.00	9,171	5.7E-04	4.9E-03	X
96333 Methyl acrylate	4.53E+00	9.76E-02	1.02E-05	6.00E+04	7.68E-03	1.87E-04	25	353.70	536.00	7,749	0.0E+00	1.1E-01	
97632 Ethylmethacrylate	2.95E+01	6.53E-02	8.37E-06	3.67E+03	3.44E-02	8.40E-04	25	390.00	571.00	10,957	0.0E+00	3.2E-01	X
98066 tert-Butylbenzene	7.71E+02	5.65E-02	8.02E-06	2.95E+01	4.87E-01	1.19E-02	25	442.10	1220.00	8,980	0.0E+00	1.4E-01	X
98828 Cumene	4.89E+02	6.50E-02	7.10E-06	6.13E+01	4.74E+01	1.46E-02	25	425.56	631.10	10,335	0.0E+00	4.0E-01	
98862 Acetophenone	5.77E+01	6.00E-02	8.73E-06	6.13E+03	4.38E-04	1.07E-05	25	475.00	709.50	11,732	0.0E+00	3.5E-01	X
98953 Nitrobenzene	6.46E+01	7.60E-02	8.60E-06	2.09E+03	9.82E-04	2.39E-05	25	483.95	719.00	10,566	0.0E+00	2.0E-03	
100414 Ethylbenzene	3.63E+02	7.50E-02	7.80E-06	1.69E+02	3.22E-01	7.86E-03	25	409.34	617.20	8,501	0.0E+00	1.0E+00	
100425 Styrene	7.76E+02	7.10E-02	8.00E-06	3.10E+02	1.12E-01	2.74E-03	25	418.31	636.00	8,737	0.0E+00	1.0E+00	
100447 Benzylchloride	6.14E+01	7.50E-02	7.80E-06	5.25E+02	1.70E-02	4.14E-04	25	452.00	685.00	8,773	4.9E-05	0.0E+00	X
100527 Benzaldehyde	4.59E+01	7.21E-02	9.07E-06	3.30E+03	9.73E-04	2.37E-05	25	452.00	695.00	11,658	0.0E+00	3.5E-01	X
103651 n-Propylbenzene	5.62E+02	6.01E-02	7.83E-06	6.00E+01	4.37E-01	1.07E-02	25	432.20	630.00	9,123	0.0E+00	1.4E-01	X
104518 n-Butylbenzene	1.11E+03	5.70E-02	8.12E-06	2.00E+00	5.38E-01	1.31E-02	25	456.46	660.50	9,290	0.0E+00	1.4E-01	X
106423 p-Xylene	3.89E+02	7.69E-02	8.44E-06	1.85E+02	3.13E-01	7.64E-03	25	411.52	616.20	8,525	0.0E+00	1.0E-01	
106467 1,4-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	7.90E+01	9.82E-02	2.39E-03	25	447.21	684.75	9,271	0.0E+00	8.0E-01	
106934 1,2-Dibromoethane (ethylene dib	2.50E+01	2.17E-02	1.19E-05	4.18E+03	3.04E-02	7.41E-04	25	404.60	583.00	8,310	2.2E-04	2.0E-04	
106990 1,3-Butadiene	1.91E+01	2.49E-01	1.08E-05	7.35E+02	3.01E+00	7.34E-02	25	268.60	425.00	5,370	3.0E-02	2.0E-03	
107028 Acrolein	2.76E+00	1.05E-01	1.22E-05	2.13E+05	4.99E-03	1.22E-04	25	325.60	506.00	6,731	0.0E+00	2.0E-05	
107062 1,2-Dichloroethane	1.74E+01	1.04E-01	9.90E-06	8.52E+03	4.00E-02	9.77E-04	25	356.65	561.00	7,643	2.6E-05	0.0E+00	
107131 Acrylonitrile	5.90E+00	1.22E-01	1.34E-05	7.40E+04	4.21E-03	1.03E-04	25	350.30	519.00	7,786	6.8E-05	2.0E+00	
108054 Vinyl acetate	5.25E+00	8.50E-02	9.20E-06	2.00E+04	2.09E-02	5.10E-04	25	345.65	519.13	7,800	0.0E+00	2.0E-01	
108101 Methylisobutylketone (4-methyl-2	9.06E+00	7.50E-02	7.80E-06	1.90E+04	5.64E-03	1.38E-04	25	389.50	571.00	8,243	0.0E+00	3.0E+00	
108383 m-Xylene	4.07E+02	7.00E-02	7.80E-06	1.61E+02	3.00E-01	7.32E-03	25	412.27	617.05	8,523	0.0E+00	1.0E-01	
108678 1,3,5-Trimethylbenzene	1.35E+03	6.02E-02	8.67E-06	2.00E+00	2.41E-01	5.87E-03	25	437.89	637.25	9,321	0.0E+00	6.0E-03	
108872 Methylcyclohexane	7.85E+01	7.35E-02	8.52E-06	1.40E+01	4.22E+00	1.03E-01	25	373.90	572.20	7,474	0.0E+00	3.0E+00	
108883 Toluene	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-01	6.62E-03	25	383.78	591.79	7,930	0.0E+00	4.0E-01	
108907 Chlorobenzene	2.19E+02	7.30E-02	8.70E-06	4.72E+02	1.51E-01	3.69E-03	25	404.87	632.40	8,410	0.0E+00	6.0E-02	
109693 1-Chlorobutane	1.72E+01	8.26E-02	1.00E-05	1.10E+03	6.93E-01	1.69E-02	25	351.60	542.00	7,263	0.0E+00	1.4E+00	X
110009 Furan	1.86E+01	1.04E-01	1.22E-05	1.00E+04	2.21E-01	5.39E-03	25	304.60	490.20	6,477	0.0E+00	3.5E-03	X
110543 Hexane	4.34E+01	2.00E-01	7.77E-06	1.24E+01	6.82E+01	1.66E+00	25	341.70	508.00	6,895	0.0E+00	2.0E-01	
111444 Bis(2-chloroethyl)ether	1.55E+01	6.92E-02	7.53E-06	1.72E+04	7.36E-04	1.80E-05	25	451.15	659.79	10,803	3.3E-04	0.0E+00	
115297 Endosulfan	2.14E+03	1.15E-02	4.55E-06	5.10E-01	4.58E-04	1.12E-05	25	674.43	942.94	14,000	0.0E+00	2.1E-02	X
118741 Hexachlorobenzene	5.50E+04	5.42E-02	5.91E-06	5.00E-03	5.40E-02	1.32E-03	25	582.55	825.00	14,447	4.6E-04	2.8E-03	X
120821 1,2,4-Trichlorobenzene	1.78E+03	3.00E-02	8.23E-06	4.88E+01	5.81E-02	1.42E-03	25	486.15	725.00	10,471	0.0E+00	4.0E-03	
123739 Crotonaldehyde (2-butenal)	4.82E+00	9.56E-02	1.07E-05	3.69E+04	7.99E-04	1.95E-05	25	375.20	568.00	9	5.4E-04	0.0E+00	X
124481 Chlorodibromomethane	6.31E+01	1.96E-02	1.05E-05	2.60E+03	3.20E-02	7.81E-04	25	416.14	678.20	5,900	2.4E-05	7.0E-02	X
126987 Methacrylonitrile	3.58E+01	1.12E-01	1.32E-05	2.54E+04	1.01E-02	2.46E-04	25	363.30	554.00	7,600	0.0E+00	7.0E-04	
126998 2-Chloro-1,3-butadiene (chloropr	6.73E+01	8.58E-02	1.03E-05	2.12E+03	4.91E-01	1.20E-02	25	332.40	525.00	8,075	0.0E+00	7.0E-03	
127184 Tetrachloroethylene	1.55E+02	7.20E-02	8.20E-06	2.00E+02	7.53E-01	1.84E-02	25	394.40	620.20	8,288	5.9E-06	6.0E-01	
129000 Pyrene	1.05E+05	2.72E-02	7.24E-06	1.35E+00	4.50E-04	1.10E-05	25	667.95	936	14370	0.0E+00	1.1E-01	X
132649 Dibenzofuran	5.15E+03	2.38E-02	6.00E-06	3.10E+00	5.15E-04	1.26E-05	25	560	824	66400	0.0E+00	1.4E-02	X
135988 sec-Butylbenzene	9.66E+02	5.70E-02	8.12E-06	3.94E+00	5.68E-01	1.39E-02	25	446.5	679	88730	0.0E+00	1.4E-01	X
141786 Ethylacetate	6.44E+00	7.32E-02	9.70E-06	8.03E+04	5.64E-03	1.38E-04	25	350.26	523.3	7633.66	0.0E+00	3.2E+00	X
156592 cis-1,2-Dichloroethylene	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	4.07E-03	25	333.65	544	7192	0.0E+00	3.5E-02	X
156605 trans-1,2-Dichloroethylene	5.25E+01	7.07E-02	1.19E-05	6.30E+03	3.84E-01	9.36E-03	25	320.85	516.5	6717	0.0E+00	7.0E-02	X
205992 Benzo(b)fluoranthene	1.23E+06	2.26E-02	5.56E-06	1.50E-03	4.54E-03	1.11E-04	25	715.9	969.27	17000	2.1E-04	0.0E+00	X
218019 Chrysene	3.98E+05	2.48E-02	6.21E-06	6.30E-03	3.87E-03	9.44E-05	25	714.15	979	16455	2.1E-06	0.0E+00	X
309002 Aldrin	2.45E+06	1.32E-02	4.86E-06	1.70E-02	6.95E-03	1.70E-04	25	603.01	839.37	15000	4.9E-03	1.1E-04	X
319846 alpha-HCH (alpha-BHC)	1.23E+03	1.42E-02	7.34E-06	2.00E+00	4.34E-04	1.06E-05	25	596.55	839.36	15000	1.8E-03	0.0E+00	
541731 1,3-Dichlorobenzene	1.98E+03	6.92E-02	7.86E-06	1.34E+02	1.27E-01	3.09E-03	25	446	684	9230.18	0.0E+00	1.1E-01	X
542756 1,3-Dichloropropene	4.57E+01	6.26E-02	1.00E-05	2.80E+03	7.24E-01	1.77E-02	25	381.15	587.38	7900	4.0E-06	2.0E-02	
630206 1,1,1,2-Tetrachloroethane	1.16E+02	7.10E-02	7.90E-06	1.10E+03	9.90E-02	2.41E-03	25	403.5	624	9768.282525	7.4E-06	1.1E-01	X
1634044 MTBE	7.26E+00	1.02E-01	1.05E-05	5.10E+04	2.56E-02	6.23E-04	25	328.3	497.1	6677.66	0.0E+00	3.0E+00	
7439976 Mercury (elemental)	5.20E+01	3.07E-02	6.30E-06	2.00E+01	4.40E-01	1.07E-02	25	629.88	1750	14127	0.0E+00	3.0E-04	

## **APPENDIX C**

### **OUTDOOR WATER USE RISK ASSESSMENT**

### 1.0 INTRODUCTION

AMEC Environment & Infrastructure (AMEC) has prepared, on behalf of Textron, this screening risk assessment (risk assessment) for non-potable outdoor water use at seven residential properties located downgradient of the TORX facility located at 4366 North Old US Highway 31 in Rochester, Fulton County, Indiana (Site). As reported in the Phase 2 Further Site Investigation (FSI) Report (MACTEC, 2010), site-related chlorinated volatile organic compounds (site-related VOCs) have been detected in potable water samples collected from six residential properties located down-gradient of the Site. The residential properties that are the focus of this risk assessment include the six residential properties with detectable VOCs in private well samples and one additional residence where livestock are raised, are herein referred to as Properties of Interest (POIs), and are listed below.

- 3597 North Old US Highway 31 (Property 8)
- 3719 North Old US Highway 31 (Property 15) 3791 North Old US Highway 31 (Property 16A/16B)
- 1082 E 375 N (Property 17)
- 3796 North Old US Highway 31 (Property 18)
- 3842 North Old US Highway 31 (Property 19)
- 3868 North Old US Highway 31 (Property 20)

Water treatment systems have been installed at the six POIs with detectable VOCs in private well samples, and quarterly sampling has demonstrated that the water treatment systems are effectively removing site-related VOCs. In addition to installing water treatment systems at the POIs, two private wells located at Property 39 and Property 40 (locations shown on **Figure C-1**) have been taken out of service. Therefore, Properties 39 and 40 are not included in this risk assessment because the properties are vacant and no longer used for residential purposes.

Other residences in the area have private wells that are currently being monitored and have not been impacted by site-related VOCs to date. The potential for vapor intrusion from groundwater and/or subsurface soil into homes has also been investigated and it has been concluded that vapor intrusion is not a complete exposure pathway.

## APPENDIX C – OUTDOOR WATER USE RISK ASSESSMENT

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Indiana Department of Environmental Management (IDEM) originally requested that a risk assessment be prepared to evaluate the potential risks associated with the non-potable uses of groundwater and the presence of livestock at two properties, Property 15 and another property comprised of two parcels with the same owner (Property 16A/16B). This risk assessment addresses Properties 15 and 16A/16B and, in addition, evaluates non-potable uses of groundwater at five additional properties (Property 8, Property 17, Property 18, Property 19, and Property 20). The seven POIs are located between 2,600 and 3,400 feet southeast of the Site. The locations of the properties are shown on **Figure C-1**.

### 2.0 APPROACH

This risk assessment is focused on the site-related VOCs, which include trichloroethene (TCE) and the following TCE degradation products cis-1,2-dichloroethene (DCE), 1,1-DCE, and vinyl chloride (VC). Although these are compounds that have been detected in groundwater at the source area and/or elsewhere within the area of impacted groundwater, it is not necessarily the case that all of these compounds are present at the POIs. This technical evaluation and the results for the seven properties are considered transferable to any other property within the footprint of the identified groundwater impact, as long as groundwater concentrations and exposure potential are similar to those evaluated in this risk assessment.

This risk assessment includes the technical components of risk assessments typically conducted for Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA) sites and other federal and state regulatory programs. These are: Hazard Identification, Exposure Assessment, Toxicity Assessment, Risk Characterization, Uncertainty Analysis, and Conclusions. The technical scope of risk assessments is typically based on a Conceptual Site Model (CSM) that summarizes the available information concerning the chemical releases, physical characteristics of the site, land uses, potential receptors, and potential exposure pathways.

It is typical to conduct quantitative exposure assessments and risk calculations when the CSM indicates that there is one or more complete exposure pathways (potential receptors are contacting environmental media that contain a chemical release). In cases where there is no complete exposure pathways (e.g. no receptor contact with environmental media that contain a chemical release), the risks are characterized qualitatively rather than by calculation of exposure levels and risk estimates.

### 3.0 CONCEPTUAL SITE MODEL

The risk assessment has been prepared based on a CSM that summarizes the sources of chlorinated VOCs, migration pathways, mechanisms of inter-media transfer, receiving media, potential receptors, exposure points, exposure media, and exposure routes. The site investigation (sources, nature and extent of contamination, migration pathways, mechanisms of inter-media transfer, receiving media) components of the CSM are summarized below and the exposure assessment components of the CSM (potential receptors, pathways, exposure points, exposure media, and exposure routes) are contained in Section 5.0 of this risk assessment.

The source of the site-related VOCs has been identified as the area in the vicinity of the former degreaser pit and the area immediately west of the former degreaser pit between the building and the Western Pond.

The nature and extent of Site-related VOCs in groundwater has been investigated and delineated as reported in the Phase II FSI (MACTEC, 2010). The approximate extent of the impacted groundwater area is depicted in Figure 4 in the HHRA Report. Based on historic Site investigations, the site-related VOCs migrated into the overburden aquifer (receiving medium) but not the bedrock aquifer beneath the facility. Once in the overburden aquifer, site-related VOCs migrated downgradient of the Site within the overburden aquifer. Historic groundwater contour maps indicate there appears to be two dominant components of groundwater flow in the shallow overburden aquifer. Groundwater from the Site flows toward the east-southeast. In the vicinity of the Eastern Pond and E 425N, the direction of groundwater flow changes from the east-southeast to the south-southeast. Then, south of E 425N, groundwater flow moves in a more southerly direction. Concentrations of VOCs in groundwater decrease with distance from the facility.

Groundwater discharge to surface water has also been investigated. Surface water flows north to south from the Eastern Pond (east of the facility and north of Property 16A/16B and Property 15) through a wetland, to a stream that flows into Pond A, and then from Pond A through a stream to the Tippecanoe River. **Figure C-2** presents the locations of the ponds and general flow from the Ponds to the river. Pond B appears to be an isolated surface water feature, with no apparent surface water inlet or outlet. Surface water sampling and analysis indicated the presence of low levels of site-related VOCs in surface water of



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the Eastern Pond (closer to the source area) and upward vertical gradients for groundwater have been identified in that area. This suggests discharge of impacted shallow groundwater to surface water (receiving medium) at that location. Site-related VOCs have not been detected in either Pond A nor in the stream located at Property 15. Downward vertical gradients for groundwater have been identified in the area immediately north of Properties 15 and 16A/16B. There are no surface water bodies on Properties 8, 16A/16B, 17, 18, 19, or 20. The available information indicates the down gradient extent of the impacted groundwater does not extend to the Tippecanoe River.

### 4.0 HAZARD IDENTIFICATION

The analytical data and associated summary statistics for groundwater samples collected in the area (the seven private wells and the closest monitoring wells (MW-32, MW-34, MW-36, MW-37, MW-38, MW-39, MW-50, and MW-51)) are presented in **Table C-1**. **Figure C-3** identifies the locations of private water supply wells and monitoring wells in the area. The analytical data for the surface water samples collected in April 2009 from the Eastern Pond upstream of the properties under evaluation (MTR-EP001-SW(1.5)040809-FL through MTR-EP004-SW(2.4)040809-FL), and surface water samples collected in January 2009 from Pond A (PRA-Pond-0109), and from the stream on Property 15 (PRA-Stream-0109), and the water sample from the tile drain at Property 8 to the south of Property 15 (PRA-Drain-0109) are included in **Table C-2** and **Table C-3** respectively. The surface water sample locations are shown in **Figure C-2**.

There are two monitoring wells located on Property 8, MW-37 and MW-39 in addition to a private well. Cis-1,2-DCE and trans-1,2-Dichloroethene (trans-1,2-DCE) have been detected in the private well on Property 8. Cis-1,2-DCE has also been detected in MW-37. No chlorinated VOCs have been detected in MW-39.

While a portion of Property 15 is within the approximate extent of VOCs in groundwater, no chlorinated VOCs were detected in a water sample collected from the private well at that property (sampled by IDEM personnel on October 19, 2008 and MACTEC personnel on April 12, 2011). There are two monitoring wells (MW-50 and MW-51) located in the eastern portion of this property. Cis-1,2-DCE was detected in

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5 of 24 samples (maximum of 4.2 µg/L), trans-1,2-DCE was detected in 1 of 24 samples (0.54 µg/L), and VC was detected in 1 of 24 samples (0.53 µg/L).

Vinyl chloride has been detected in the raw (untreated) water samples collected from the private well located at Property 16A/16B (maximum detected concentration of 18 micrograms per Liter, µg/L). As a result, a groundwater treatment system for removal of VOCs has been installed, operated, and monitored at that property. The system has been effective in removing VOCs from the well water at Property 16A/16B. One monitoring well (MW-34) is located immediately adjacent to Property 16A/16B. TCE has been detected in water sample(s) from that monitoring well at a concentration of 12 µg/L. Monitoring well MW-36 is located in close proximity (immediately to the west) to both Property 16A/16B and Property 15. Vinyl chloride was detected in MW-36 at an estimated concentration in April 2010, but has not been detected since. In other words, the monitoring well is outside the aerial extent of groundwater impact.

Vinyl chloride has been detected in the raw (untreated) water samples collected from the private well located at Property 17 at a maximum concentration of 1.9 µg/L. As a result, a groundwater treatment system for removal of VOCs has been installed, operated, and monitored at that property. The system has been effective in removing vinyl chloride from the well water at Property 17. No other chlorinated VOCs have been detected in the private well at Property 17.

Vinyl chloride has been detected in the raw (untreated) water samples collected from the private well located at Property 18 at a maximum concentration of 10 µg/L. As a result, a groundwater treatment system for removal of VOCs has been installed, operated, and monitored at that property. The system has been effective in removing VOCs from the well water at Property 18. No other chlorinated VOCs have been detected in the private well at Property 18.

Vinyl chloride has been detected in the raw (untreated) water samples collected from the private well located at Property 19 at a maximum concentration of 1.8 µg/L. As a result, a groundwater treatment system for removal of VOCs has been installed, operated, and monitored at that property. The system has been effective in removing VOCs from the well water at Property 19. No other chlorinated VOCs have been detected in the private well at Property 19.

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Vinyl chloride has been detected in the raw (untreated) water samples collected from the private well located at Property 20 at a maximum concentration of 12 µg/L. As a result, a groundwater treatment system for removal of VOCs has been installed, operated, and monitored at that property. The system has been effective in removing VOCs from the well water at Property 20. Methylene chloride was also detected in the private well at Property 20 at a maximum concentration of 1.8 µg/L.

Although low levels of only one Site-related VOC (cis-1,2-dichloroethene) were previously detected in two of the four surface water samples collected from the upstream Eastern Pond (Eastern Pond is upstream of the properties evaluated in this risk assessment and thus is not included in this evaluation) (**Table C-2**), no VOCs were detected in any of the two surface water samples collected from Property 15 (PRA-Pond-0109, PRA--Stream) or in the water sample collected from a tile drain at Property 8 (PRA-Drain-0109) as shown in **Table C-3**.

### 5.0 EXPOSURE ASSESSMENT

As defined by the USEPA (USEPA, 1989), exposure to a chemical is the contact of that chemical with the outer boundary of the body (i.e., skin and openings such as mouth, nostrils, or punctures and lesions). An exposure assessment is the quantitative or qualitative evaluation of that contact. It describes the intensity, frequency, and duration of contact, as well as the rates at which the chemical crosses the boundary (chemical intake or uptake rates), the route by which it crosses the boundary, and the resulting amount of chemical that actually crosses the boundary (a dose) and the amount absorbed (internal dose).

The exposure assessment is conducted to evaluate the receptors that may potentially be present at the Site, the mechanisms or exposure pathways by which those receptors may be potentially exposed to contamination at the Site, and the magnitude of exposure that may occur through the potential exposure pathways. This process involves three steps:

1. Characterization of the exposure setting in terms of physical characteristics, current and future uses of the Site, and the receptors that may be potentially exposed under the current and future land uses;
2. Identification of potential exposure pathways and exposure points to which the receptors may be exposed; and
3. Quantification of exposure for each receptor in terms of the amount of chemical ingested, inhaled, or absorbed through the skin from all exposure pathways. Exposures are quantified by

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developing receptor exposure scenarios, identifying EPs and quantifying exposure point concentrations (EPCs), and then calculating chemical intakes based on EPCS and a series of exposure factors.

### Potential Receptors

Potential receptors have been identified below based on the available land use information and the presence of livestock at the seven properties.

#### **Properties 8, 17, 18, 19, and 20**

- Potential receptors at these properties include residents using groundwater for non-potable outdoor uses. Currently these properties have operating treatment systems on their private wells which remove VOCs and therefore there is no current exposure. However if the treatment systems were removed, when the homes are connected to a public water source, there could be future exposure during outdoor water use. No livestock is present on these properties.

#### **Property 15**

- Potential receptors at this property include residents using groundwater for non-potable outdoor uses. No VOCs have been detected in private well samples collected at this property therefore there is no exposure from VOCs during outdoor water use.
- A questionnaire was used to identify the types of livestock and other potential non-human receptors present at the Property and to identify consumers of livestock and food resources. The questionnaire was completed by the owner of the property and returned to Textron. A copy of the completed questionnaire is included as Attachment A of this risk assessment. The questionnaire identified Black Angus Beef Cattle ( 90 head) raised for meat consumption by residents and by commercial consumers. The questionnaire indicates that during rainy time periods, the cattle obtain their water from the two ponds and ditch. At other times, including the winter, water is provided by the residential well, through a hose, to troughs twice daily. The cattle graze on the property, and as reported in the questionnaire, the grazing area is not irrigated. It appears the only potential exposure pathway for the beef cattle is the consumption of water from the two ponds during rainy time periods and the consumption of water from the drinking water troughs that are connected to the residential well by a hose. Although this potential exposure pathway has been identified, no VOCs have been detected in surface water samples from Pond A and from the “ditch” (stream) nor in the sample from the residential well. Therefore, there has been no complete exposure pathway for exposure of cattle to the water that they consume. **In other words, the available information indicates that the cattle are not currently exposed to VOCs. This indicates that there is no risk to**

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the cattle, that VOCs are not accumulating in the cattle, and that consumption of the beef from these cattle would not be associated with any Site-related VOCs.

- The questionnaire also identified fish in the two ponds at **Property 15 as receptors and sources of food. The questionnaire indicates that the two ponds are stocked with fish. Fishing takes place year round, but consumption of fish is mostly seasonal. Consumption rates were not estimated in the questionnaire. No VOCs were detected in the water sample collected from Pond A. This indicates that fish from the pond would not be exposed to VOCs, that VOCs would not be accumulating in fish, and that consumption of fish from the pond would not be associated with any Site-related VOCs exposure.**
- The questionnaire reports that the Black Angus Beef Cattle are consumed by residents (home-grown food source) at a rate of six servings per month. Cattle are also raised for sale for meat. Typically, cattle are sold at age 1 – 1.5 years. **The available data indicate that there is currently no VOC exposure associated with consumption of beef from cattle raised at Property 15.**
- Recreational fishing occurs year round and fish from the stocked ponds are reportedly consumed by extended family and neighbors on a seasonal basis and no specific consumption rates are identified in the questionnaire. The questionnaire does not identify the type of fish that are stocked. **The available data indicate that there is currently no VOC exposure associated with consumption of fish taken from Pond A at Property 15.**

### **Property 16A/16B**

- Potential receptors at this property included residents using groundwater for non-potable outdoor uses. Currently this property has an operating treatment system on its private well which removes VOCs and therefore there is no current exposure. However if the treatment system were removed, when the home is connected to a public water source, there could be future exposure during outdoor water use.
- A questionnaire was transmitted to the owner to identify the types of livestock and other potential non-human receptors are present at the property and to identify consumers of livestock and food resources. In the absence of a completed questionnaire, it is assumed here the scenario evaluated for Property 15 is generally representative of conditions at Property 16A/16B.

### Potential Exposure Pathways

An exposure pathway describes the course a chemical takes from the source to the exposed receptor. Exposure pathway analysis links the sources, locations, and types of environmental releases with receptor

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locations and activity patterns to determine the significant pathways of receptor exposure. Exposure pathways generally consist of four elements: (1) a source and mechanism of chemical release, (2) a retention or transport medium, (3) a point of potential receptor contact with the contaminated medium (known as the exposure point), and (4) an exposure route at the contact point (e.g., ingestion of water) (USEPA, 1989). In order for the exposure pathway to be considered potentially complete, all elements must be present.

Based on the potential receptors identified at each property and knowledge of the nature and extent of contamination and migration pathways, potential exposure pathways were identified as complete or incomplete as indicated below:

- Current Scenario
  - Cattle consuming water from troughs at that are supplied by the residential drinking water well – currently no VOCs in residential well water that supply water to cattle. Therefore there is not current exposure pathway. Cattle consuming water from ponds/ditch (stream) – the pond and stream are not impacted by VOCS.
  - Cattle grazing on plants is not an exposure pathway for VOCs – the grazing land is not irrigated and there would be no other transport or migration mechanism that could impact vegetation at the property.
  - Stocked fish in two ponds (Pond B does not appear to be associated with surface water flow from the north, although the questionnaire returned by the owner of Property 15 states that the pond is fed by surface water in a wetland to the north of the pond). No groundwater/surface water interaction investigation has been conducted specifically for Pond B. The Pond B surface water has not been sampled. Fish in Pond A could hypothetically be exposed to VOCs if they were present in surface water – however, VOCs were not detected in the surface water sample from this pond. No exposure to fish in the ponds has been identified.
  - Residents and others consuming home-grown beef at the property – however, no VOCs have been detected in either surface water or groundwater from the residential well – therefore this is not a current exposure scenario.
  - Consumers (extended family and neighbors) of stocked fish from two ponds caught for consumption – however, no VOCs have been detected in surface water and impact to fish is therefore not a concern.

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- Potential Future Scenario
  - Residents occasionally drinking untreated, contaminated private well water from a garden hose while outdoors. This is assumed to be a complete pathway relative to potential future use.
  - Residents exposed to VOCs during watering of lawns/gardens via a sprinkler using untreated private well water. This is assumed to be a complete pathway relative to potential future use.
  - Residents exposed via dermal contact while swimming in a pool filled using untreated private well water. It is assumed that VOCs would volatilize in a short period of time and since water would be added to a pool infrequently such that exposure is unlikely.
  - Cattle consuming water from troughs that are supplied by the residential drinking water well. It is assumed that VOCs would volatilize from a trough. However since water may be added to a trough twice a day there is potential for exposure and thus risk was conservatively evaluated.

In summary, no complete current exposure scenarios for residents, livestock, fish, or consumers of livestock or fish were identified. No hypothetical future surface water-related exposure scenarios/pathways were identified or evaluated. However, the hypothetical future exposure scenario that has been evaluated is the outdoor use of untreated residential well water. This includes water used for watering of lawns and garden via a sprinkler, the occasional drink from a garden hose while outdoors, and water as the source of drinking water for livestock (with the assumption that human receptors have an alternative source of potable water).

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### Exposure Points

The hypothetical exposure point for this hypothetical future exposure scenario includes all properties previously discussed. Because groundwater is a mobile medium, the analytical data considered potentially representative of the hypothetical future exposure point includes data associated with raw (untreated) private well water samples from several properties and with groundwater samples collected from several monitoring wells in the area of Properties 8, 15, 16A/16B, 17, 18, 19 and 20. The private well samples and the monitoring well samples considered are identified in **Table C-1** and all of the VOC analytical data are presented in that same table. The area/location of the private wells and monitoring wells considered in this evaluation are identified in **Figure C-3**.

### Exposure Point Concentrations ( EPCs)

#### Water

In this conservative (health-protective) risk assessment, the EPCs used in the calculation of risks to receptors for groundwater are derived from the maximum detected concentrations of each of the detected VOCs in the area. The detected VOCs include cis-1,2-DCE, trans-1,2-DCE, methylene chloride, trichloroethene, and vinyl chloride. The maximum detected concentrations for these compounds are presented in **Table C-1**. It is recognized that VOCs in water in a trough or other open vessel (pool) would typically volatilize and migrate from the water to the atmosphere. As shown in **Table C-4**, using published volatilization half lives for the detected VOCs, concentrations of VOCs in water one hour and two hours after filling of the trough or other vessel (pool) have been calculated. As shown in **Table C-4**, VOC concentrations decrease overtime and it is assumed that measurable concentrations of VOCs would volatilize before dermal contact from swimming would occur. For livestock, it is assumed livestock would drink water throughout the day. Conservatively, the concentration in water one hour after the trough is filled has been selected as the representative concentration that would be consumed by the livestock. Those concentrations are identified in **Table C-4**.



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### Ambient Air

Residents may also be exposed to vapors in ambient air via inhalation during sprinkler use of lawns or gardens. To estimate potential ambient air concentrations arising from release of VOCs from a sprinkler, a simple “box” model was applied. The model assumed all VOCs are released from water as it exits a sprinkler head and mixes into a box of air whose dimensions are controlled by typical radius of water release from a sprinkler head (1 meter was assumed), the breathing zone (assumed to be 1 meter for the hypothetical residential scenario), and wind speed (assumed to be 3.8 meters per second, the average wind speed in Fort Wayne, IN for the months of May, June, July, August, and September). Thus, the “loading term” for the calculation is a function of the volumetric rate of water use by the sprinkler head and steady-state at a “plane” within the box, and can be calculated as:

$$C_a = \frac{C_w \times R_w \times tr \times f}{U \times H \times W}$$

Where:

Ca = steady state concentration of VOC in air (mass/volume)

Cw = concentration of VOC in water (mass/volume)

Rw = water release rate by a sprinkler head (volume/time)

f = Frequency that winds are blowing in the direction of the receptor (unitless)

tr = water to air transfer factor (unitless, assumed to be 1)

U = wind speed (length/time)

H = height of hypothetical box (length)

W = width of hypothetical box (length)

Water release rate from a sprinkler head was assumed to be 5 gallons per minute. Other parameter values are shown in the computation spreadsheets contained in **Table C-6**.

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This model estimates the steady-state air concentration of COPC released from a single sprinkler head.

### Quantification of Exposure

This section describes the quantification of exposure for both human receptors and livestock receptors evaluated in this risk assessment.

#### *Human Receptors*

The calculation of cancer risk and non-cancer Hazard Quotients (HQs) require the quantification of exposure (as a dose (or intake) or as a representative concentration) and the evaluation of the exposure using dose-response values or exposure-response values. Exposures to COPCs are quantified by calculating COPC-specific doses (or intakes) (ingestion and dermal contact) or representative concentrations (air/inhalation exposures) for the receptors at the various exposure points or exposure areas for possible future land uses. This section describes the process that is used to quantify COPC exposure for ingestion and dermal contact of outdoor water and inhalation of vapors from irrigation water. Children and adults who live at each property may be exposed to untreated groundwater via ingestion of water from a garden hose, dermal contact of water from a sprinkler, or inhalation of ambient vapors during use of sprinklers. The quantification of exposures is based on the specifics of the exposure scenarios for the receptors evaluated.

Exposures are quantified in two major ways – via the calculation of a daily intake (oral and dermal exposures) or by calculating a representative exposure concentration (inhalation).

By combining the EPC and the receptor exposure parameters, the daily dose (water) or representative exposure concentration (air) is calculated. Those measures of exposure are subsequently used with toxicity values to characterize health risks.

Fundamentally, the calculated dose/intake is a function of EPC and exposure parameters:

$$Dose/Intake = (EPC) \times (Exposure\ Parameters)$$

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For ingestion and dermal exposure routes, the general equation for calculating intake is as follows:

$$Dose = \frac{EPC \times CR \times EF \times ED}{AT \times BW}$$

Where:

- Dose = Average daily dose of COPC from water at the exposure point during the period of exposure (mg/kg/day)
- EPC = Exposure Point Concentration (mg/L)
- CR = Contact Rate (mg/day)
- Ingestion: Ingestion rate (L/day)
- Dermal absorption: Skin surface area (cm<sup>2</sup>/day) x PC Event (mg/cm<sup>2</sup>)
- EF = Exposure Frequency (days/year)
- ED = Exposure Duration (years)
- AT = Averaging Time (days) (equal to ED for non-cancer evaluation; equal to 70 years for cancer evaluation)
- BW = Body Weight (kg)

The ingestion exposure calculations reflect the applied dose (amount of the COPC in the mass of the medium that is ingested), not the dose absorbed through the gastrointestinal tract. Oral dose-response values are used to evaluate those doses. For dermal exposure calculations, the general equation format shown above is supplemented by calculations of the absorbed dose. Dermal dose-response values are used to evaluate the dermal doses. The dose rate is typically expressed as a bodyweight-normalized dose for risk calculations (mass per time per unit bodyweight or mg/kg-bw/day). Dose is calculated as an average daily dose for non-cancer risk calculations and as a lifetime average daily dose for cancer risk

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calculations. The calculated doses are conservative because they are calculated using EPCs which are maximum concentrations for the private wells and monitoring wells in the vicinity of the properties.

The methodology for evaluating inhalation exposures differs from that used for the ingestion and dermal routes because toxic effects associated with inhalation exposures are a function of the COPC *concentration* in air rather than of the *intake/dose* as is the case for ingestion and dermal exposures. Hence, inhalation exposures are quantified in terms of average COPC concentration in air over the exposure period for non-cancer risk calculations and the lifetime average COPC concentration in air for cancer risk calculations. The exposure-response values used to calculate these risks are Reference Concentrations (RfCs) presented in dimensions of milligrams per cubic meter (mg/m<sup>3</sup>) and Inhalation Unit Risks (URs) presented in dimensions of (micrograms per cubic meter [μg/m<sup>3</sup>])<sup>-1</sup> instead of Reference Doses (RfDs) and Cancer Slope Factors (CSFs). Because a representative concentration and not dose is the basis for inhalation risk assessment, exposure parameters such as body weight and ventilation rate are not typically used in calculating risk estimates for inhalation exposures (USEPA, 2009). The general equation for calculating chemical exposure via inhalation is as follows:

$$EC_{air} = \frac{CA \times ET \times EF \times ED}{CF \times AT}$$

Where:

EC <sub>air</sub>	=	representative concentration of COPC in the air at the exposure point during the period of exposure (mg/m <sup>3</sup> )
CA	=	concentration of the COPC in air (mg/m <sup>3</sup> )
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
ET	=	exposure time (hours/day)
CF	=	conversion factor (24 hours/day)
AT	=	averaging time (for carcinogens, AT = 70 years times 365 days per year; for noncarcinogens, AT = ED times 365 days per year).

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### Exposure Parameters

Exposure parameters are used in the equations identified above to calculate intake of a COPC. The exposure parameters are presented in **Table C-5**. Some of the assumptions used in the exposure parameters are identified below.

It is assumed that a child or adult ingests 2 ounces of water (0.06 liters) each time they drink from a garden hose. It is also assumed that the frequency of drinking from a garden hose would be 24 days per year (2 days per week during the months of June, July and August). The frequency of drinking from a garden hose is a conservative assumption especially for an adult since typically adults would not drink from a hose. Residents are also assumed to be exposed via dermal contact from untreated groundwater during watering of lawns or playing in a sprinkler as well as exposed to VOCs via inhalation of vapors during sprinkler use. It is assumed that an adult would be exposed to groundwater via dermal contact 24 days per year (2 days per week during the months of June, July and August) and a child 36 days per year (3 days per week during the months of June, July and August). As a conservative assumption it is assumed that an adult or child's entire body is exposure to groundwater. It is assumed that both an adult and a child would be exposed to vapors in ambient air 60 days per year (3 days per week from May to September) for one hour per day. Exposure parameters are presented in **Table C-5**.

### *Livestock Receptors*

The risk assessment evaluated livestock ingestion of water at the target Properties. For the purpose of this risk assessment exposure parameters are based on the results receive from a survey of livestock at Property 15. Livestock at Property 15 drink from a trough which is filled twice a day during dry periods. During rainy periods the livestock drink from the two ponds and stream located on the Property (no VOCs detected). For the purpose of this risk assessment it is assumed that the livestock weigh 1200 lbs. and drink 38 liters of water per day. It is further assumed for the purpose of this risk assessment that livestock are only drinking water from the trough.

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Livestock exposure to COPCs by ingestion of water was estimated using a food chain model approach. Water EPCs were entered into the food chain model to calculate an estimated daily intake (EDI) to which a livestock receptor may be exposed. The EDI of water was calculated using the following equation:

$$EDI_{water} = C_{water} \times IR_{water} \times \frac{1}{BW}$$

Where:

EDI<sub>water</sub> = Estimated daily intake of water

C<sub>water</sub> = Chemical concentration in water

IR<sub>water</sub> = Ingestion rate of water

BW = Body weight

The calculated EDIs (also called doses) are presented in **Table C-7**.

## 6.0 TOXICITY ASSESSMENT

Toxicity values are described below for both human and livestock receptors.

### Resident

There are two major types of adverse health effects evaluated in the risk assessment: non-carcinogenic, and carcinogenic. Non-carcinogenic health effects refer to toxicological effects other than cancer which may result from exposure to a substance, such as toxicity to the liver, skin, or central nervous system. Carcinogenic health effects refer to the development of cancer which may result from exposure to a substance. Following USEPA guidance (USEPA, 1989), these two types of effects (non-carcinogenic and carcinogenic) are evaluated separately.

There are two types of toxicity values, or dose-response values, for evaluating health risks: CSFs and UR values for carcinogens; and RfDs and RfCs for non-carcinogens. For potentially carcinogenic COPCs, both types of values have been developed by USEPA because these COPCs may elicit both carcinogenic and non-carcinogenic (systemic) effects. In addition, because toxicity and/or carcinogenicity can depend

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on the route of exposure (i.e., oral or inhalation), unique dose-response values have been developed for the oral, dermal, and inhalation exposure routes. Toxicity values used to evaluate the resident are presented in **Tables C-8 through C-11**.

The following hierarchy of sources for dose-response values (USEPA, 2003) has been utilized in identifying dose-response values for this HHRA.

*Tier 1 - IRIS* (<http://www.epa.gov/iris/>). In accordance with USEPA guidance, the main source of dose-response values is IRIS, which is a database established by USEPA containing all validated data on many toxic substances found at hazardous waste sites. This database (USEPA, 2011), current as of August 2011, was used to identify the CSFs, URs, RfDs, and RfCs applied in this risk assessment.

*Tier 2 - National Center for Environmental Assessment (NCEA) provisional peer reviewed toxicity values (PPRTVs)* (<http://hhpprtv.ornl.gov/>). NCEA's PPRTVs are developed by the Superfund Technical Support Center (STSC) for the USEPA Superfund program. STSC's reassessment of USEPA Health Effects Assessment Summary Tables (HEAST) toxicity values, as well as development of PPRTVs in response to Regional or Headquarters Superfund program requests, are consistent with Agency practices on toxicity value development, use the most recent scientific literature, and are supported by both internal and external peer review, providing a high level of confidence in the use of these values in the Superfund Program. The PPRTVs used in this HHRA were obtained from the USEPA-recommended website and are current as of March 2011.

*Tier 3 - Other Toxicity Values:*

- California Environmental Protection Agency (CALEPA) toxicity values (CALEPA, 2009). CALEPA develops toxicity values for both cancer and non-cancer effects. CALEPA toxicity values were obtained from the CALEPA website at <http://www.oehha.ca.gov/risk/chemicalDB//index.asp>. The CALEPA toxicity values used in this risk assessment were obtained from the listed source and are current as of March 2011.
- Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs) (ATSDR, 2009) address noncancer effects only, and are available on the ATSDR website at <http://www.atsdr.cdc.gov/mrls.html>. MRL values for intermediate exposure were used as subchronic RfD and RfC values, and MRL values for chronic exposures were used as chronic RfD and RfC values. The MRL values used in this HHRA were obtained from that source in March 2011.

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- Toxicity values remaining in current versions of HEAST.
- Indiana Department of Environmental Management (IDEM) toxicity values (IDEM, 2009) from 2006 RISC Default Closure Tool version 1.2.

### **Livestock**

Toxicity Reference Values (TRVs) were obtained from studies published in primary literature resources or review articles that reported No Observed Adverse Effect Level (NOAELs) and Lowest Observed Adverse Effect Level (LOAELs) with survival, growth, or reproductive endpoints. Chronic studies were generally selected over acute or subchronic studies. USEPA-derived TRVs established to calculate Eco-SSLs were used preferentially when available. NOAEL and LOAEL TRVs are roughly analogous to screening and effects benchmarks used for other media, except that they represent screening and effects doses, rather than concentrations. Wildlife TRVs used in the food chain model are presented in **Table C-12**.

There are uncertainties associated with these literature-based NOAEL and LOAEL values. Studies upon which these TRVs are based are typically performed in a laboratory setting, and are often based on common laboratory test species that may or may not be closely related to receptors being evaluated in the risk assessment. Strains of laboratory rats and mice have been specifically bred to be sensitive to various toxicological effects, and effects that may be observed in laboratory species may not be observed in wild populations of the same or similar species.

## **7.0 RISK CHARACTERIZATION**

This section describes the process by which risks are calculated for receptor groups, residents and livestock.

### **Residents**

Quantitative estimates of both carcinogenic and non-carcinogenic risks are calculated for each exposure scenario selected for evaluation in the exposure assessment, in accordance with USEPA (1989) guidance.



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An estimate of the Excess Lifetime Cancer Risk (ELCR) associated with exposure to each COPC in a given medium is calculated by multiplying the exposure route pathway-specific lifetime average daily dose (e.g., ingestion of groundwater) or lifetime average exposure concentration (e.g., inhalation of vapors) by its exposure route-specific CSF (e.g., oral CSF) or UR.

$$ELCR = \text{Lifetime Average Daily Dose or Exposure (mg/kg/day or } \mu\text{g/m}^3) \times CSF \text{ (mg/kg/day)}^{-1} \text{ or } UR \text{ (}\mu\text{g/m}^3\text{)}^{-1}$$

The ELCR represents an upper bound of the probability of an individual developing cancer over a lifetime as the result of exposure to a COPC. The ELCR is calculated for each carcinogenic COPC for each medium and exposure route combination for each receptor at each exposure area. The ELCR for all exposure routes for a given receptor/medium combination (e.g., groundwater ingestion and dermal contact) are summed to yield a total medium ELCR (e.g., for groundwater).

The non-cancer Hazard Quotient (HQ) associated with exposure to each COPC is calculated by dividing the exposure route pathway-specific average daily dose or exposure concentration by its exposure route-specific RfD or RfC.

$$HQ = \text{Average Daily Dose or Exposure (mg/kg/day or } \mu\text{g/m}^3) / RfD \text{ (mg/kg/day) or RfC (}\mu\text{g/m}^3\text{)}$$

The HQ is calculated for each COPC for each medium and exposure route combination for each receptor at each exposure area. For a given medium/receptor/age group combination (e.g., groundwater and adult), HQs for all COPCs are summed by route (e.g., dermal contact) to identify a medium/route Hazard Index (HI), and the HIs for multiple exposure routes (e.g., incidental ingestion and dermal contact) are summed to identify a medium-specific total HI (e.g., for groundwater ingestion and dermal contact). Because HIs are not additive across age groups, the higher HI between the two age groups is selected as the representative HI for the resident. An HI less than 1 indicates that non-carcinogenic toxic effects are

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unlikely to occur as a result of COPC exposure. HIs greater than 1 may be indicative of a possible non-carcinogenic toxic effect. As the HI increases, so does the likelihood that adverse effects might be associated with exposure.

Risk calculations for the resident are documented in **Tables C-13 and C-14**.

The calculated cancer and non-cancer risks are evaluated in the context of risk management criteria established in the NCP and discussed in the preamble to the NCP (USEPA, 1990). The results of the risk assessment are evaluated by comparing them to the USEPA's remedial goals. With respect to cancer risk, USEPA sets remediation goals for total cancer risk "that represent an excess upper bound lifetime cancer risk to an individual of between  $10^{-4}$  to  $10^{-6}$  lifetime excess cancer risk." USEPA sets remediation goals for noncancer risk "such that exposures present no appreciable risk of significant adverse effects to individuals, based on comparison of exposures to the concentration associated with reliable toxicity information such as USEPA's reference doses." For cumulative risks due to noncarcinogens, "EPA will set the remediation goals at levels for individual chemicals such that cumulative effects of multiple chemicals will not result in adverse effects." USEPA has stated that "acceptable exposure for noncarcinogens is one to which human populations, including sensitive subgroups such as pregnant women and children may be exposed without adverse effects during a lifetime or part of a lifetime, incorporating an adequate margin of safety." Given the stated remediation goals, the results of the risk assessment are evaluated in accordance with the NCP - cancer risk estimates for a site are compared to an ELCR range of  $10^{-6}$  (one in a million) to  $10^{-4}$  (one in ten-thousand). Total risks at or below  $10^{-4}$  do not generally warrant a response action. Risks greater than  $10^{-4}$  generally warrant development and evaluation of remedial alternatives. Non-cancer risks are compared to a HI value of 1, which corresponds to levels of exposure that people (including sensitive individuals) could experience without expected adverse effects.

A residential scenario for both children and adults was evaluated for ingestion of outdoor water, dermal contact to outdoor water and inhalation of vapors from outdoor water. The risk calculations for the child and adult are shown in **Tables C-13 and C-14**, respectively. The total ELCR is the sum of the three pathways evaluated, ingestion of water, dermal contact to water, and inhalation of vapors. As shown in **Table C-15** the total ELCR for the resident (child and adult) is  $3 \times 10^{-6}$ , which is below the high end of the USEPA risk range of  $1 \times 10^{-4}$ .

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The HIs for children and adults as shown in **Tables C-13 and C-14** were, 0.09 and 0.02 respectively. The HI for the resident is below 1 and therefore below the acceptable USEPA threshold.

### **Livestock**

The doses for individual VOCs were compared to wildlife TRVs, expressed as milligrams per kilogram body weight per day (mg/kg-BW/day), to evaluate the effect of VOC exposure on livestock. The comparison was quantified using the HQ approach, as follows:

$$HQ = \frac{EDI_{water}}{TRV}$$

Where:

HQ = Hazard quotient

EDI<sub>water</sub> = Estimated daily intake of water

TRV = Toxicity reference value

The calculated HQs for cattle are presented in **Table C-7**. As shown in the table, the HQs are well below a value of one, indicating that risk to livestock from VOCs in groundwater (hypothetical future exposure scenario) are not of concern.

## **8.0 UNCERTAINTY ANALYSIS**

The properties have been investigated by Textron and IDEM as a component of the on-going Site Investigation and Remediation of the TORX facility. The sampling of the private wells and the surface water of Pond A and the stream that carries water from that pond towards the Tippecanoe River, in conjunction with visual inspection of the properties and the collection of information concerning the presence of livestock and fish via a questionnaire, are appropriate for the evaluation of risks associated with the presence of livestock and fish at the properties. Some additional information might be useful in reinforcing the findings to date, but are not necessary in the context of this risk assessment. There are some uncertainties with respect to presence of volatile organics in potential exposure media over time, but those uncertainties are not uncommon in site investigation/remediation work and they temper the results

## APPENDIX C – OUTDOOR WATER USE RISK ASSESSMENT

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and conclusions of the risk assessment. These uncertainties are not critical data gaps and they do not materially affect the results and conclusions of the assessment.

The surface water samples and private well samples were analyzed using standard USEPA analytical methods with detection limits that are sufficiently low to support the risk assessment. The detection limit for the private well sample was 0.5 µg/L per compound, a very low concentration that is below any corresponding drinking water standards. The detection limits for chlorinated volatile organics in surface water samples were also sufficiently low to properly support the risk assessment. For the Eastern Pond samples, detection limits ranged from 1 µg/L to 2 µg/L, again, below corresponding drinking water standards. For the pond and stream surface water samples on The Property, detection limits for chlorinated volatile organics were 0.5 µg/L. With no volatiles reported in those samples and these very low detection limits, the conclusion of an incomplete exposure pathway is well supported for both the private well and the surface water.

There is some uncertainty with the residential exposure scenarios used for risk calculations. However whenever assumptions were made in this risk assessment, conservative assumptions were used. The exposure frequency of drinking from a garden hose and dermal contact from outdoor water were conservative assumptions. Also when calculating the risk from dermal contact it was assumed that an adult's entire body would be exposure to water. This is a conservative assumption used to overestimate the risk from untreated private well water. It is also notable that maximum concentrations from the subject private well and nearby monitoring well data set were used. This is also a conservative assumption that likely produces overestimates of potential exposure and risk.

### 9.0 CONCLUSIONS

No current exposure pathways have been identified for surface water or private wells at the properties. A hypothetical future exposure scenario (untreated groundwater from private wells used for outdoor activities) has been evaluated. The calculations indicate that risks to livestock would not be of concern. The calculations indicate that risk to residents using untreated groundwater for outdoor uses is within the acceptable Superfund Risk Range of  $10^{-4}$  to  $10^{-6}$ .

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### 10.0 REFERENCES

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## **APPENDIX C – OUTDOOR WATER USE RISK ASSESSMENT**

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### **TABLES**

**C-1**

**Monitoring Well and Private Well Analytical Data for Detected Volatile Organic Compounds Used in the Risk Assessment  
TORX Facility  
Rochester, Indiana**

Paramter	Frequency of Detection		Range of Reporting Limits for Non Detects		Range of Detected Concentrations		Average of All Samples
<b>Volatile Organics (mg/L)</b>							
1,2-Dichloroethene (total)	10	/ 86	0.002	: 0.002	0.0014	- 0.0047	0.0013
Cis-1,2-Dichloroethene	32	/ 326	0.0005	: 0.0037	0.00025	- 0.0069	0.00068
Methylene chloride	3	/ 326	0.0005	: 0.005	0.0018	- 0.0028	0.0014
trans-1,2-Dichloroethene	6	/ 326	0.0005	: 0.001	0.00027	- 0.00054	0.00037
Trichloroethene	7	/ 326	0.0005	: 0.001	0.012	- 0.019	0.00068
Vinyl chloride	76	/ 326	0.0002	: 0.001	0.00039	- 0.018	0.0019

## C-1

## Monitoring Well and Private Well Analytical Data for Detected Volatile Organic Compounds Used in the Risk Assessment

TORX Facility  
Rochester, Indiana

Parameter	1082 E 375 N 1082 E375N- RAW-0609 6/2/2009	1082 E 375 N 1082 E375N- TRT-0609 6/2/2009	1082 E 375 N 1082E375N- RAW-0111 1/5/2011	1082 E 375 N 1082E375N- RAW-0310 3/9/2010	1082 E 375 N 1082E375N- RAW-0411 4/12/2011	1082 E 375 N 1082E375N- RAW-0610 6/3/2010	1082 E 375 N 1082E375N- RAW-0711 7/27/2011	1082 E 375 N 1082E375N- RAW-0909 9/10/2009	1082 E 375 N 1082E375N- RAW-0910 9/16/2010
<b>Volatile Organics (mg/L)</b>									
Cis-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Methylene chloride	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
trans-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Trichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Vinyl chloride	0.00097	0.0005 UJ	0.0014	0.0016	0.0014	0.0013	0.0019	0.0012	0.0015

Parameter	MW-32 MTR- MW32 (110) - G050609 5/6/2009	MW-32 MTR- MW32 (24_1) - G050609 5/6/2009	MW-32 MTR- MW32 (82) - G050609 5/6/2009	MW-32 MTR- MW32(110)- G032911 3/29/2011	MW-32 MTR- MW32(110)- G041510 4/15/2010	MW-32 MTR- MW32(110)- G081010 8/10/2010	MW-32 MTR- MW32(110)- G090309 9/3/2009	MW-32 MTR- MW32(110)- G120809 12/8/2009	MW-32 MTR- MW32(110)- G121410 12/14/2010
<b>Volatile Organics (mg/L)</b>									
Cis-1,2-Dichloroethene	0.001 U	0.0038	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methylene chloride	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
trans-1,2-Dichloroethene	0.001 U	0.00043 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl chloride	0.001 U	0.001 U	0.012	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U



## C-1

## Monitoring Well and Private Well Analytical Data for Detected Volatile Organic Compounds Used in the Risk Assessment

TORX Facility  
Rochester, Indiana

Parameter	1082 E 375 N 1082E375N- RAW-1209 12/11/2009	1082 E 375 N 1082E375N- RAW-1210 12/14/2010	1082 E 375 N 1082E375N- TRT-0111 1/5/2011	1082 E 375 N 1082E375N- TRT-0310 3/9/2010	1082 E 375 N 1082E375N- TRT-0411 4/12/2011	1082 E 375 N 1082E375N- TRT-0610 6/3/2010	1082 E 375 N 1082E375N- TRT-0711 7/27/2011	1082 E 375 N 1082E375N- TRT-0909 9/10/2009	1082 E 375 N 1082E375N- TRT-0910 9/16/2010
<b>Volatile Organics (mg/L)</b>									
Cis-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Methylene chloride	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
trans-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Trichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Vinyl chloride	0.0005 U	0.0014	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U

Parameter	MW-32 MTR- MW32(24_1)- G032911 3/29/2011	MW-32 MTR- MW32(24_1)- G041510 4/15/2010	MW-32 MTR- MW32(24_1)- G081010 8/10/2010	MW-32 MTR- MW32(24_1)- G090309 9/3/2009	MW-32 MTR- MW32(24_1)- G120809 12/8/2009	MW-32 MTR- MW32(24_1)- G121410 12/14/2010	MW-32 MTR- MW32(89)- G032911 3/29/2011	MW-32 MTR- MW32(89)- G041510 4/15/2010	MW-32 MTR- MW32(89)- G081010 8/10/2010
<b>Volatile Organics (mg/L)</b>									
Cis-1,2-Dichloroethene	0.0051	0.0042	0.0069 J	0.0034	0.0042	0.0046	0.001 U	0.001 U	0.001 U
Methylene chloride	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
trans-1,2-Dichloroethene	0.001 U	0.00047 J	0.001 U	0.001 U	0.00045 J	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl chloride	0.0057	0.0052	0.0036 J	0.001 U	0.0022	0.0024	0.01	0.0094	0.012 J

## C-1

## Monitoring Well and Private Well Analytical Data for Detected Volatile Organic Compounds Used in the Risk Assessment

TORX Facility  
Rochester, Indiana

Parameter	1082 E 375 N 1082E375N- TRT-1209 12/11/2009	1082 E 375 N 1082E375N- TRT-1210 12/14/2010	3597 N 31 3597 N Hwy 31-RAW-0609 6/2/2009	3597 N 31 3597 N Hwy 31-TRT-0609 6/2/2009	3597 N 31 3597 N Old SR 31-pre 11/19/2008	3597 N 31 3597NHWY 31-RAW- 0111 1/5/2011	3597 N 31 3597NHWY 31-RAW- 0310 3/9/2010	3597 N 31 3597NHWY 31-RAW- 0610 6/30/2010	3597 N 31 3597NHWY 31-RAW- 0909 9/10/2009	3597 N 31 3597NHWY 31-RAW- 1209 12/8/2009
<b>Volatile Organics (mg/L)</b>										
Cis-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0035	0.0005 U	0.0045	0.0033	0.0029	0.0037 U	0.0029	0.0028
Methylene chloride	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
trans-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Trichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Vinyl chloride	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0002 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U

Parameter	MW-32 MTR- MW32(89)- G090309 9/3/2009	MW-32 MTR- MW32(89)- G120809 12/8/2009	MW-32 MTR- MW32(89)- G121410 12/14/2010	MW-34 MTR- MW34(110)- G032511 3/25/2011	MW-34 MTR- MW34(110)- G041510 4/15/2010	MW-34 MTR- MW34(110)- G050609 5/6/2009	MW-34 MTR- MW34(110)- G080910 8/9/2010	MW-34 MTR- MW34(110)- G090309 9/3/2009	MW-34 MTR- MW34(110)- G120809 12/8/2009	MW-34 MTR- MW34(110)- G121010 12/10/2010
<b>Volatile Organics (mg/L)</b>										
Cis-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.0035	0.0028	0.0031	0.0024	0.0033	0.0028	0.0027
Methylene chloride	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
trans-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.00029 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl chloride	0.015	0.012	0.011	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

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## Monitoring Well and Private Well Analytical Data for Detected Volatile Organic Compounds Used in the Risk Assessment

TORX Facility  
Rochester, Indiana

Parameter	3597 N 31 3597NHWY 31-RAW- 1210 12/14/2010	3597 N 31 3597NHWY 31-RAW- 1910 9/16/2010	3597 N 31 3597NHWY 31-TRT- 0111 1/5/2011	3597 N 31 3597NHWY 31-TRT- 0310 3/9/2010	3597 N 31 3597NHWY 31-TRT- 0610 6/30/2010	3597 N 31 3597NHWY 31-TRT- 0909 9/10/2009	3597 N 31 3597NHWY 31-TRT- 0910 9/16/2010	3597 N 31 3597NHWY 31-TRT- 1209 12/8/2009	3597 N 31 3597NHWY 31-TRT- 1210 12/14/2010	3597 N 31 3597NHWY FNL-0610 6/3/2010	3597 N 31 3597NHWY RAW-0610 6/3/2010
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.0032	0.0033	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Methylene chloride	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
trans-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Trichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 UJ	0.0005 U
Vinyl chloride	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 UJ	0.0005 U

Parameter	MW-34 MTR- MW34(135)- G041510 4/15/2010	MW-34 MTR- MW34(135)- G050609 5/6/2009	MW-34 MTR- MW34(135)- G090309 9/3/2009	MW-34 MTR- MW34(135)- G120809 12/8/2009	MW-34 MTR- MW34(37)- G032511 3/25/2011	MW-34 MTR- MW34(37)- G041510 4/15/2010	MW-34 MTR- MW34(37)- G050609 5/6/2009	MW-34 MTR- MW34(37)- G080910 8/9/2010	MW-34 MTR- MW34(37)- G090309 9/3/2009	MW-34 MTR- MW34(37)- G120809 12/8/2009	MW-34 MTR- MW34(37)- G121010 12/10/2010
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methylene chloride	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
trans-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl chloride	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

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## Monitoring Well and Private Well Analytical Data for Detected Volatile Organic Compounds Used in the Risk Assessment

TORX Facility  
Rochester, Indiana

Parameter	3597 N 31 3597NHWY- TRT-0610 6/3/2010	3597 N 31 3597NOHW Y31-RAW- 0411 4/12/2011	3597 N 31 3597NOHW Y31-RAW- 0711 7/27/2011	3597 N 31 3597NOHW Y31-TRT- 0411 4/12/2011	3597 N 31 3597NOHW Y31-TRT- 0711 7/27/2011	3597 N 31 PRA-Drain- 0109 1/7/2009	3597 N 31 PRA-RAW- 0309 3/19/2009	3597 N 31 PRA-TRT- 0309 3/19/2009	3719 N 31 3719 N Old SR 31 11/19/2008	3719 N 31 3719NHWY 31-TRT- 0410 4/8/2010	3719 N 31 3719NOHW Y31-RAW- 0411 4/12/2011
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.0037	0.0034	0.0033	0.0005 U	0.0005 U	0.0005 U	0.0037	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Methylene chloride	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
trans-1,2-Dichloroethene	0.0005 U	0.0005 U	0.00027 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Trichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Vinyl chloride	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0002 U	0.0005 U	0.0005 U

Parameter	MW-34 MTR- MW34(85)- G032511 3/25/2011	MW-34 MTR- MW34(85)- G041510 4/15/2010	MW-34 MTR- MW34(85)- G050609 5/6/2009	MW-34 MTR- MW34(85)- G080910 8/9/2010	MW-34 MTR- MW34(85)- G090309 9/3/2009	MW-34 MTR- MW34(85)- G120809 12/8/2009	MW-34 MTR- MW34(85)- G121010 12/10/2010	MW-36 MTR-MW36 (124_5) - G040610 4/6/2010	MW-36 MTR-MW36 (35_2) - G040610 4/6/2010	MW-36 MTR-MW36 (92_4) - G040610 4/6/2010	MW-36 MTR- MW36(124_ 5) - G032211 3/22/2011
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methylene chloride	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
trans-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.019	0.015	0.012	0.015	0.014	0.013	0.016	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl chloride	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00039 J	0.001 U	0.0004 J	0.001 U

## C-1

## Monitoring Well and Private Well Analytical Data for Detected Volatile Organic Compounds Used in the Risk Assessment

TORX Facility  
Rochester, Indiana

Parameter	3719 N 31 3719NOHW Y31-TRT- 0411 4/12/2011	3791 N 31 3791 N Hwy 31 - Raw - 1109 11/17/2009	3791 N 31 3791 N Hwy 31 - TRT - 1109 11/17/2009	3791 N 31 3791 N Hwy 31-RAW- 0609 6/2/2009	3791 N 31 3791 N Hwy 31-TRT- 0609 6/2/2009	3791 N 31 3791 N Hwy 31-TRT- 0809 8/31/2009	3791 N 31 3791 N Hwy31- RAW-0809 8/31/2009	3791 N 31 3791 N Old SR 31-pre 11/19/2008	3791 N 31 3791NHWW 31-FNL- 0909 9/10/2009	3791 N 31 3791NHWW 31-FNL- 1209 12/8/2009	3791 N 31 3791NHWW 31-FNL- 1210 12/14/2010
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Methylene chloride	0.0005 U	0.0005 UJ	0.0005 UJ	0.0005 U	0.0005 U	0.0005 UJ	0.0005 UJ	0.0005 U	0.0005 U	0.0005 U	0.0005 U
trans-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Trichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Vinyl chloride	0.0005 U	0.012 J	0.0005 UJ	0.0081	0.0005 U	0.0005 U	0.012	0.01	0.0005 U	0.0005 U	0.0005 U

Parameter	MW-36 MTR- MW36(124_5)-G050609 5/6/2009	MW-36 MTR- MW36(124_5)-G080410 8/4/2010	MW-36 MTR- MW36(124_5)-G082509 8/25/2009	MW-36 MTR- MW36(124_5)-G120109 12/1/2009	MW-36 MTR- MW36(124_5)-G120710 12/7/2010	MW-36 MTR- MW36(35_2)-G032211 3/22/2011	MW-36 MTR- MW36(35_2)-G050609 5/6/2009	MW-36 MTR- MW36(35_2)-G080410 8/4/2010	MW-36 MTR- MW36(35_2)-G082509 8/25/2009	MW-36 MTR- MW36(35_2)-G120109 12/1/2009	MW-36 MTR- MW36(35_2)-G120710 12/7/2010
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methylene chloride	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
trans-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl chloride	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

## C-1

## Monitoring Well and Private Well Analytical Data for Detected Volatile Organic Compounds Used in the Risk Assessment

TORX Facility  
Rochester, Indiana

Parameter	3791 N 31 3791NHWY 31-RAW- 0110 1/13/2010	3791 N 31 3791NHWY 31-RAW- 0111 1/5/2011	3791 N 31 3791NHWY 31-RAW- 0310 3/10/2010	3791 N 31 3791NHWY 31-RAW- 0709 7/23/2009	3791 N 31 3791NHWY 31-RAW- 0909 9/10/2009	3791 N 31 3791NHWY 31-RAW- 0910 9/16/2010	3791 N 31 3791NHWY 31-RAW- 1009 10/6/2009	3791 N 31 3791NHWY 31-RAW- 1209 12/8/2009	3791 N 31 3791NHWY 31-RAW- 1210 12/14/2010	3791 N 31 3791NHWY 31-TRT- 0110 1/13/2010	3791 N 31 3791NHWY 31-TRT- 0111 1/5/2011
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Methylene chloride	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
trans-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Trichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Vinyl chloride	0.011	0.01	0.018	0.0098	0.011	0.011	0.012	0.0005 U	0.011	0.0005 U	0.0005 U

Parameter	MW-36 MTR- MW36(92_4 ) - G032211 3/22/2011	MW-36 MTR- MW36(92_4 ) - G050609 5/6/2009	MW-36 MTR- MW36(92_4 ) - G080410 8/4/2010	MW-36 MTR- MW36(92_4 ) - G082509 8/25/2009	MW-36 MTR- MW36(92_4 ) - G120109 12/1/2009	MW-36 MTR- MW36(92_4 ) - G120710 12/7/2010	MW-37 MTR-MW37 (23_3) - G040610 4/6/2010	MW-37 MTR-MW37 (23_3) - G050409 5/4/2009	MW-37 MTR-MW37 (70) - G040610 4/6/2010	MW-37 MTR-MW37 (70) - G050409 5/4/2009	MW-37 MTR-MW37 (70) - G082509 8/25/2009
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methylene chloride	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
trans-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl chloride	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

## C-1

## Monitoring Well and Private Well Analytical Data for Detected Volatile Organic Compounds Used in the Risk Assessment

TORX Facility  
Rochester, Indiana

Parameter	3791 N 31 3791NHWY 31-TRT- 0310 3/10/2010	3791 N 31 3791NHWY 31-TRT- 0709 7/23/2009	3791 N 31 3791NHWY 31-TRT- 0909 9/10/2009	3791 N 31 3791NHWY 31-TRT- 0910 9/16/2010	3791 N 31 3791NHWY 31-TRT- 1009 10/6/2009	3791 N 31 3791NHWY 31-TRT- 1209 12/8/2009	3791 N 31 3791NHWY 31-TRT- 1210 12/14/2010	3791 N 31 3791NHWY RAW-0610 6/3/2010	3791 N 31 3791NHWY TRT-0610 6/3/2010	3791 N 31 3791NOHW Y31-RAW- 0411 4/12/2011	3791 N 31 3791NOHW Y31-RAW- 0711 7/27/2011
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Methylene chloride	0.0005 U	0.0026	0.0028 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
trans-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Trichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Vinyl chloride	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.011	0.00092	0.01 *	0.0005 U	0.013 *	0.015 *

Parameter	MW-37 MTR-MW37 (98) - G040610 4/6/2010	MW-37 MTR-MW37 (98) - G050409 5/4/2009	MW-37 MTR- MW37(23_3 ) - G032211 3/22/2011	MW-37 MTR- MW37(23_3 ) - G080310 8/3/2010	MW-37 MTR- MW37(23_3 ) - G082509 8/25/2009	MW-37 MTR- MW37(23_3 ) - G120109 12/1/2009	MW-37 MTR- MW37(23_3 ) - G120710 12/7/2010	MW-37 MTR- MW37(70) - G032211 3/22/2011	MW-37 MTR- MW37(70)- G080310 8/3/2010	MW-37 MTR- MW37(70)- G120109 12/1/2009	MW-37 MTR- MW37(70)- G120710 12/7/2010
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.00025 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methylene chloride	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
trans-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl chloride	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

## C-1

## Monitoring Well and Private Well Analytical Data for Detected Volatile Organic Compounds Used in the Risk Assessment

TORX Facility  
Rochester, Indiana

Parameter	3791 N 31 3791NOHW Y31-TRT- 0711 7/27/2011	3791 N 31 3791NOWH Y31-TRT- 0411 4/12/2011	3791 N 31 MIL-RAW- 0309 3/19/2009	3791 N 31 MIL-TRT- 0309 3/19/2009	3791 N 31 Raw-3791 N Old US 31 5/20/2009	3791 N 31 TRT-3791 N Old US 31 5/20/2009	3796 N 31 3796 N Hwy 31-RAW- 0609 6/2/2009	3796 N 31 3796 N Hwy 31-TRT- 0609 6/2/2009	3796 N 31 3796NHWY 31-RAW- 0111 1/5/2011	3796 N 31 3796NHWY 31-RAW- 0310 3/10/2010	3796 N 31 3796NHWY 31-RAW- 0909 9/10/2009
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Methylene chloride	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
trans-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Trichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Vinyl chloride	0.0005 U	0.0005 U	0.0085	0.0005 U	0.0098 *	0.0005 U	0.0066	0.0005 U	0.0095	0.0005 U	0.0088

Parameter	MW-37 MTR- MW37(98)- G032211 3/22/2011	MW-37 MTR- MW37(98)- G080310 8/3/2010	MW-37 MTR- MW37(98)- G082509 8/25/2009	MW-37 MTR- MW37(98)- G120109 12/1/2009	MW-37 MTR- MW37(98)- G120710 12/7/2010	MW-38 MTR-MW38 (102_5) - G040610 4/6/2010	MW-38 MTR-MW38 (102_5) - G050409 5/4/2009	MW-38 MTR-MW38 (20_8) - G040610 4/6/2010	MW-38 MTR-MW38 (20_8) - G050409 5/4/2009	MW-38 MTR-MW38 (29_1) - G040610 4/6/2010	MW-38 MTR-MW38 (29_1) - G050409 5/4/2009
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methylene chloride	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
trans-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl chloride	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U



## C-1

## Monitoring Well and Private Well Analytical Data for Detected Volatile Organic Compounds Used in the Risk Assessment

TORX Facility  
Rochester, Indiana

Parameter	3796 N 31 3796NHWY 31-RAW- 0910 9/16/2010	3796 N 31 3796NHWY 31-RAW- 1209 12/8/2009	3796 N 31 3796NHWY 31-RAW- 1210 12/14/2010	3796 N 31 3796NHWY 31-TRT- 0111 1/5/2011	3796 N 31 3796NHWY 31-TRT- 0310 3/10/2010	3796 N 31 3796NHWY 31-TRT- 0909 9/10/2009	3796 N 31 3796NHWY 31-TRT- 0910 9/16/2010	3796 N 31 3796NHWY 31-TRT- 1209 12/8/2009	3796 N 31 3796NHWY 31-TRT- 1210 12/14/2010	3796 N 31 3796NHWY- RAW-0610 6/3/2010	3796 N 31 3796NHWY- TRT-0610 6/3/2010
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Methylene chloride	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
trans-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Trichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Vinyl chloride	0.0087	0.0091	0.0085	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0078 *	0.0005 U

Parameter	MW-38 MTR-MW38 (69_9) - G040610 4/6/2010	MW-38 MTR-MW38 (69_9) - G050409 5/4/2009	MW-38 MTR- MW38(102_ 5) - G032211 3/22/2011	MW-38 MTR- MW38(102_ 5)-G080310 8/3/2010	MW-38 MTR- MW38(102_ 5)-G082509 8/25/2009	MW-38 MTR- MW38(102_ 5)-G120109 12/1/2009	MW-38 MTR- MW38(102_ 5)-G120710 12/7/2010	MW-38 MTR- MW38(20_8 ) - G032211 3/22/2011	MW-38 MTR- MW38(20_8 ) -G080310 8/3/2010	MW-38 MTR- MW38(20_8 ) -G082509 8/25/2009	MW-38 MTR- MW38(20_8 ) -G120109 12/1/2009
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methylene chloride	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
trans-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl chloride	0.00047 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

## C-1

## Monitoring Well and Private Well Analytical Data for Detected Volatile Organic Compounds Used in the Risk Assessment

TORX Facility  
Rochester, Indiana

Parameter	3796 N 31 3796NOHW Y31-RAW- 0411 4/12/2011	3796 N 31 3796NOHW Y31-RAW- 0711 7/27/2011	3796 N 31 3796NOHW Y31-TRT- 0411 4/12/2011	3796 N 31 3796NOHW Y31-TRT- 0711 7/27/2011	3842 N 31 3842 N Hwy 31-RAW- 0609 6/2/2009	3842 N 31 3842 N Hwy 31-TRT- 0609 6/2/2009	3842 N 31 3842 N Old SR 31-pre 11/19/2008	3842 N 31 3842NHWW 31-RAW- 0111 1/5/2011	3842 N 31 3842NHWW 31-RAW- 0310 3/9/2010	3842 N 31 3842NHWW 31-RAW- 0610 6/30/2010	3842 N 31 3842NHWW 31-RAW- 0909 9/10/2009
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Methylene chloride	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
trans-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Trichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Vinyl chloride	0.0096 *	0.01 *	0.0005 U	0.0005 U	0.00096	0.0005 U	0.0012	0.0013	0.0018	0.0013	0.0013

Parameter	MW-38 MTR- MW38(20_8 ) - G120710 12/7/2010	MW-38 MTR- MW38(29_1 ) - G032211 3/22/2011	MW-38 MTR- MW38(29_1 ) - G080310 8/3/2010	MW-38 MTR- MW38(29_1 ) - G082509 8/25/2009	MW-38 MTR- MW38(29_1 ) - G120109 12/1/2009	MW-38 MTR- MW38(29_1 ) - G120710 12/7/2010	MW-38 MTR- MW38(69_9 ) - G032211 3/22/2011	MW-38 MTR- MW38(69_9 ) - G080310 8/3/2010	MW-38 MTR- MW38(69_9 ) - G082509 8/25/2009	MW-38 MTR- MW38(69_9 ) - G120109 12/1/2009	MW-38 MTR- MW38(69_9 ) - G120710 12/7/2010
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methylene chloride	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
trans-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl chloride	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

## C-1

## Monitoring Well and Private Well Analytical Data for Detected Volatile Organic Compounds Used in the Risk Assessment

TORX Facility  
Rochester, Indiana

Parameter	3842 N 31 3842NHWWY 31-RAW- 0910 9/16/2010	3842 N 31 3842NHWWY 31-RAW- 1209 12/8/2009	3842 N 31 3842NHWWY 31-RAW- 1210 12/14/2010	3842 N 31 3842NHWWY 31-TRT- 0111 1/5/2011	3842 N 31 3842NHWWY 31-TRT- 0310 3/9/2010	3842 N 31 3842NHWWY 31-TRT- 0610 6/30/2010	3842 N 31 3842NHWWY 31-TRT- 0909 9/10/2009	3842 N 31 3842NHWWY 31-TRT- 0910 9/16/2010	3842 N 31 3842NHWWY 31-TRT- 1209 12/8/2009	3842 N 31 3842NHWWY 31-TRT- 1210 12/14/2010	3842 N 31 3842NOHWY Y31-RAW- 0411 4/12/2011
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Methylene chloride	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
trans-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Trichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Vinyl chloride	0.0016	0.0005 U	0.0016	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0018

Parameter	MW-39 MTR-MW39 (13) - G040610 4/6/2010	MW-39 MTR-MW39 (13) - G050409 5/4/2009	MW-39 MTR-MW39 (29_3) - G040610 4/6/2010	MW-39 MTR-MW39 (29_3) - G050409 5/4/2009	MW-39 MTR-MW39 (76_8) - G040610 4/6/2010	MW-39 MTR-MW39 (76_8) - G050409 5/4/2009	MW-39 MTR- MW39(13) - G032211 3/22/2011	MW-39 MTR- MW39(13)- G080310 8/3/2010	MW-39 MTR- MW39(13)- G082509 8/25/2009	MW-39 MTR- MW39(13)- G120109 12/1/2009	MW-39 MTR- MW39(13)- G120710 12/7/2010
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methylene chloride	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
trans-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl chloride	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

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## Monitoring Well and Private Well Analytical Data for Detected Volatile Organic Compounds Used in the Risk Assessment

TORX Facility  
Rochester, Indiana

Parameter	3842 N 31 3842NOHW Y31-RAW- 0711 7/27/2011	3842 N 31 3842NOHW Y31-TRT- 0411 4/12/2011	3842 N 31 3842NOHW Y31-TRT- 0711 7/27/2011	3842 N 31 TOW-RAW- 0309 3/19/2009	3842 N 31 TOW-TRT- 0309 3/19/2009	3868 N 31 3868 N Hwy 31-RAW- 0609 6/2/2009	3868 N 31 3868 N Hwy 31-TRT- 0609 6/2/2009	3868 N 31 3868NHwy 31-FNL- 0909 9/10/2009	3868 N 31 3868NHwy 31-RAW- 0110 1/13/2010	3868 N 31 3868NHwy 31-RAW- 0111 1/5/2011	3868 N 31 3868NHwy 31-RAW- 0310 3/13/2010
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Methylene chloride	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
trans-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Trichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Vinyl chloride	0.0018	0.0005 U	0.0005 U	0.00089	0.0005 U	0.0052	0.0005 U	0.0005 U	0.0091	0.0071	0.012

Parameter	MW-39 MTR- MW39(29_3 ) - G032211 3/22/2011	MW-39 MTR- MW39(29_3 ) - G080310 8/3/2010	MW-39 MTR- MW39(29_3 ) - G082509 8/25/2009	MW-39 MTR- MW39(29_3 ) - G120109 12/1/2009	MW-39 MTR- MW39(29_3 ) - G120710 12/7/2010	MW-39 MTR- MW39(76_8 ) - G032211 3/22/2011	MW-39 MTR- MW39(76_8 ) - G080310 8/3/2010	MW-39 MTR- MW39(76_8 ) - G082509 8/25/2009	MW-39 MTR- MW39(76_8 ) - G120109 12/1/2009	MW-39 MTR- MW39(76_8 ) - G120710 12/7/2010	MW-50 MTR- MW50(130)- G032911 3/29/2011
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methylene chloride	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
trans-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl chloride	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

## C-1

## Monitoring Well and Private Well Analytical Data for Detected Volatile Organic Compounds Used in the Risk Assessment

TORX Facility  
Rochester, Indiana

Parameter	3868 N 31 3868NHWY 31-RAW- 0909 9/10/2009	3868 N 31 3868NHWY 31-RAW- 0910 9/16/2010	3868 N 31 3868NHWY 31-RAW- 1210 12/14/2010	3868 N 31 3868NHWY 31-TRT- 0110 1/13/2010	3868 N 31 3868NHWY 31-TRT- 0111 1/5/2011	3868 N 31 3868NHWY 31-TRT- 0310 3/13/2010	3868 N 31 3868NHWY 31-TRT- 0909 9/10/2009	3868 N 31 3868NHWY 31-TRT- 0910 9/16/2010	3868 N 31 3868NHWY 31-TRT- 1210 12/14/2010	3868 N 31 3868NHWY- RAW-0610 6/3/2010	3868 N 31 3868NHWY- TRT-0610 6/3/2010
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Methylene chloride	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0018	0.0005 U	0.0005 U	0.0005 U	0.0005 U
trans-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Trichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Vinyl chloride	0.0086	0.0092	0.0083	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0076 *	0.0005 U

Parameter	MW-50 MTR- MW50(130)- G041510 4/15/2010	MW-50 MTR- MW50(130)- G081010 8/10/2010	MW-50 MTR- MW50(130)- G121410 12/14/2010	MW-50 MTR- MW50(45)- G032911 3/29/2011	MW-50 MTR- MW50(45)- G041510 4/15/2010	MW-50 MTR- MW50(45)- G081010 8/10/2010	MW-50 MTR- MW50(45)- G121410 12/14/2010	MW-50 MTR- MW50(80)- G032911 3/29/2011	MW-50 MTR- MW50(80)- G041510 4/15/2010	MW-50 MTR- MW50(80)- G081010 8/10/2010	MW-50 MTR- MW50(80)- G121410 12/14/2010
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.0042	0.0037	0.0041	0.0041	0.001 U	0.001 U	0.001 U	0.001 U
Methylene chloride	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
trans-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.00054 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl chloride	0.001 U	0.001 U	0.001 U	0.001 U	0.00053 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

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## Monitoring Well and Private Well Analytical Data for Detected Volatile Organic Compounds Used in the Risk Assessment

TORX Facility  
Rochester, Indiana

Parameter	3868 N 31 3868NOHW Y31-RAW- 0411 4/12/2011	3868 N 31 3868NOHW Y31-RAW- 0711 7/27/2011	3868 N 31 3868NOHW Y31-TRT- 0411 4/12/2011	3868 N 31 3868NOHW Y31-TRT- 0711 7/27/2011	3868 N 31 NOR-FNC- 0209 2/11/2009	3868 N 31 NOR-RAW- 0209 2/11/2009	3868 N 31 NOR-RAW- 0309 3/19/2009	3868 N 31 NOR-TRT- 0209 2/11/2009	3868 N 31 NOR-TRT- 0309 3/19/2009	3998 N 31 3998 N Old SR 31 11/19/2008	3998 N 31 3998NHWS 31-TRT- 0310 3/30/2010
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Methylene chloride	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
trans-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Trichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Vinyl chloride	0.0096 *	0.012 *	0.0005 U	0.0005 U	0.0005 U	0.0048	0.006	0.0005 U	0.0005 U	0.0002 U	0.0005 U

Parameter	MW-51 MTR- MW51(117)- G032911 3/29/2011	MW-51 MTR- MW51(117)- G041510 4/15/2010	MW-51 MTR- MW51(117)- G081010 8/10/2010	MW-51 MTR- MW51(117)- G121410 12/14/2010	MW-51 MTR- MW51(25)- G032911 3/29/2011	MW-51 MTR- MW51(25)- G041510 4/15/2010	MW-51 MTR- MW51(25)- G081010 8/10/2010	MW-51 MTR- MW51(25)- G121410 12/14/2010	MW-51 MTR- MW51(70)- G032911 3/29/2011	MW-51 MTR- MW51(70)- G041510 4/15/2010	MW-51 MTR- MW51(70)- G081010 8/10/2010
<b>Volatile Organics (mg/L)</b>											
Cis-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00035 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methylene chloride	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
trans-1,2-Dichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl chloride	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

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**Monitoring Well and Private Well Analytical Data for Detected Volatile Organic Compounds Used in the Risk Assessment**

**TORX Facility  
Rochester, Indiana**

Parameter	3998 N 31 3998NOHW Y31-RAW- 0411 4/12/2011	3998 N 31 3998NOHW Y31-TRT- 0411 4/12/2011	4008 N 31 4008 N Old SR 31 11/19/2008	4008 N 31 4008NOHW Y31-RAW- 0411 4/13/2011	4008 N 31 4008NOHW Y31-TRT- 0411 4/13/2011
<b>Volatile Organics (mg/L)</b>					
Cis-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Methylene chloride	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
trans-1,2-Dichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Trichloroethene	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Vinyl chloride	0.0005 U	0.0005 U	0.0002 U	0.0005 U	0.0005 U

Parameter	MW-51 MTR- MW51(70)- G121410 12/14/2010
<b>Volatile Organics (mg/L)</b>	
Cis-1,2-Dichloroethene	0.001 U
Methylene chloride	0.005 U
trans-1,2-Dichloroethene	0.001 U
Trichloroethene	0.001 U
Vinyl chloride	0.001 U

Prepared/Date: BJR 9/1/11

Checked/Date: KJC 9/6/11

**Table C-2**  
**April 2009 Surface Water Analytical Results - Eastern Pond**  
**TORX Facility**  
**Rochester, Indiana**

Sample Delivery Group Location Field Sample ID Sample Date Sample Type	0904153 EP-001 MTR-EP001- SW(1.5)040809-FL 4/8/2009 FS	0904153 EP-002 MTR-EP002- SW(1.5)040809-FL 4/8/2009 FS	0904153 EP-003 MTR-EP003- SW(3.6)040809-FL 4/8/2009 FS	0904153 EP-004 MTR-EP004- SW(2.4)040809-FL 4/8/2009 FS
Parameter Name	Result Qual	Result Qualifier	Result Qualifier	Result Qualifier
<b>Volatile Organics (ug/L)</b>				
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U
1,2-Dichloroethene (total)	2 U	2.1	1.2 J	2 U
1,2-Dichloropropane	2 U	2 U	2 U	2 U
1,3-Dichloropropene (total)	2 U	2 U	2 U	2 U
2-Butanone	5 UJ	5 UJ	5 UJ	5 UJ
2-Hexanone	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U
Acetone	20 UJ	20 UJ	20 UJ	20 UJ
Benzene	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U
Carbon disulfide	2.5 U	2.5 U	2.5 U	2.5 U
Carbon tetrachloride	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U
Chlorodibromomethane	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U
Chloroform	1 U	1 U	1 U	1 U
Chloromethane	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethene	1 U	2.1	1.2	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U
Ethyl benzene	1 U	1 U	1 U	1 U
Methylene chloride	5 U	5 U	5 U	5 U
Styrene	1 U	1 U	1 U	1 U
Tetrachloroethene	2 U	2 U	2 U	2 U
Toluene	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U
Vinyl chloride	1 U	1 U	1 U	1 U
Xylene, m/p	2 U	2 U	2 U	2 U
Xylene, o	1 U	1 U	1 U	1 U
Xylenes, Total	2 U	2 U	2 U	2 U
1,4-Dioxane	1 U	1 U	1 U	1 U

FS - field sample

U - not detected, value is the reporting limit

J - value is estimated

ug/L - micrograms per liter

Prepared by / Date: KJC 02/15/11

Checked by / Date: MJM 02/15/11



**Table C-3**  
**January 2009 Surface Water Analytical Results - Properties 15 and 8**  
**TORX Facility**  
**Rochester, Indiana**

Sample ID Date	PRA-Drain-0109 1/7/2009	PRA-Pond-0109 1/7/2009	PRA-Stream-0109 1/7/2009
<b>Parameter</b>			
<b>Volatile Organics (ug/L) by EPA 524.2</b>			
Acetone	ND	ND	ND
Benzene	0.5 U	0.5 U	0.5 U
Bromobenzene	0.5 U	0.5 U	0.5 U
Bromochloromethane	0.5 U	0.5 U	0.5 U
Bromodichloromethane	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U
Bromomethane	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.5 U	0.5 U	0.5 U
Chlorobenzene	0.5 U	0.5 U	0.5 U
Chloroethane	0.5 U	0.5 U	0.5 U
Chloroform	0.5 U	0.5 U	0.5 U
Chloromethane	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	0.5 U	0.5 U	0.5 U
Dibromomethane	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene (total)	0.5 U	0.5 U	0.5 U
Ethylbenzene	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	0.5 U	0.5 U	0.5 U
Isopropylbenzene (Cumene)	0.5 U	0.5 U	0.5 U
Methyl tert-butyl ether	5 U	5 U	5 U
Methylene chloride	0.5 U	0.5 U	0.5 U
Naphthalene	0.5 U	0.5 U	0.5 U
n-Butylbenzene	0.5 U	0.5 U	0.5 U
n-Propylbenzene	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	0.5 U	0.5 U	0.5 U
Styrene	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5 U	0.5 U	0.5 U
Toluene	0.5 U	0.5 U	0.5 U
Total THMs	0.5 U	0.5 U	0.5 U
Trichloroethene	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	0.5 U	0.5 U	0.5 U
Vinyl chloride	0.5 U	0.5 U	0.5 U
Xylene, m,p-	1 U	1 U	1 U
Xylene, o-	0.5 U	0.5 U	0.5 U
Xylenes (total)	1.5 U	1.5 U	1.5 U

ND - Not detected

U - not detected, value is the reporting limit

ug/L - microgram per liter

Prepared by / Date:

KJC 11/24/09

Checked by / Date:

kask 11/24/09

Table C-4  
Calculation of Hypothetical Exposure Concentrations for Volatiles in Drinking Water for Livestock (Decay of Volatile Organics Using Half Life)  
TORX Facility  
Rochester, Indiana

Parameter	Maximum Concentration	Half Life (mins)	Half Life (hours)	Half Life Source	k	Concentration after 1 hour	Concentration after 2 hours
<b>Volatile Organics (mg/L)</b>							
1,2-Dichloroethene (total)	0.0047	22	0.37	ATSDR	-1.89	0.00071	0.00011
Cis-1,2-Dichloroethene	0.0069	22	0.37	ATSDR	-1.89	0.001042	0.00016
Methylene chloride	0.0028	240	4.0	EPA Technical Factsheet	-0.17	0.0024	0.0020
trans-1,2-Dichloroethene	0.00047	22	0.37	ATSDR	-1.89	0.000071	0.000011
Trichloroethene	0.019	20	0.33	Ground Water Issue Jan 1992	-2.08	0.0024	0.00030
Vinyl chloride	0.018	48.3	0.81	EPA Technical Factsheet	-0.86	0.0076	0.0032

Agency for Toxic Substances and Disease Registry (ATSDR), Toxicological Profile For 1,2-Dichloroethene, U.S. Department Of Health and Human Services. August 1996.

USEPA, Technical Factsheet on: Dichloromethane. <http://www.epa.gov/safewater/pdfs/factsheets/voc/tech/dichloro.pdf>

USEPA, Technical Factsheet on: Vinyl Chloride. <http://www.epa.gov/safewater/pdfs/factsheets/voc/tech/vinylchl.pdf>

Russell, Hugh H., John E. Matthews, Guy W. Sewell, TCE Removal from Contaminated Soil and Groundwater. EPA Ground Water Issue, January 1992.

Concentration at time is calculated using the following equation:

$$C_t = C_o e^{-kt}$$

where,

C<sub>t</sub> = Concentration at time

C<sub>o</sub> = Original concentration

k = Ln(1/2)/half life

t = time

Prepared By: BJR  
Checked by: MJM

**Table C-5**  
**Values Used For Daily Intake Calculations**  
**Reasonable Maximum Exposure - Outdoor Groundwater Use**

**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current and Future Land Use  
Medium: Groundwater  
Exposure Medium: Outdoor Use of Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Points	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation / Model Name
Ingestion	Resident	Adult (ages 7-30)	Garden Hose	CW-c	Chemical Concentration in Water	Maximum	mg/l	USEPA, 2000	CHEMICAL INTAKE-INGESTION (mg/kg-day)= CW-c x IR-W x FI x EF x ED x 1/BW x 1/AT
				IR-W	Ingestion Rate of Water	0.06	l/day	Assumption	
				FI	Fraction Ingested	1	unitless	Assumption	
				EF	Exposure Frequency	24	day/yr	Assumption [b]	
				ED	Exposure Duration	24	yr	USEPA, 2000	
				BW	Body Weight	70	kg	USEPA, 2000	
				AT-C	Averaging Time (Cancer)	25550	day	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8760	day	USEPA, 1989 / equal to ED	
		Child (ages 1-7)	Garden Hose	CW-c	Chemical Concentration in Water	Maximum	mg/l	USEPA, 2000	CHEMICAL INTAKE-INGESTION (mg/kg-day)= CW-c x IR-W x FI x EF x ED x 1/BW x 1/AT
				IR-W	Ingestion Rate of Water	0.06	l/day	Assumption	
				FI	Fraction Ingested	1	unitless	Assumption	
				EF	Exposure Frequency	24	day/yr	Assumption [b]	
				ED	Exposure Duration	6	yr	USEPA, 2000	
				BW	Body Weight	15	kg	USEPA, 2000	
				AT-C	Averaging Time (Cancer)	25550	day	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2190	day	USEPA, 1989 / equal to ED	
Dermal	Resident	Adult (ages 7-30)	Sprinkler	CW	Chemical Concentration in Water	Maximum	mg/l	USEPA, 2000	INTAKE-DERMAL (mg/kg-day)= DAevent x SA x EF x ED x EV x 1/BW x 1/AT DAevent = CW x CF x PCevent where: PCevent is tevent multiplied by chemical-specific parameters B, t*, Tevent, and Kp, using the algorithm that is appropriate for the relationship between tevent and t*, per USEPA (2004) and as described in the risk assessment text. Calculations are documented in the risk calculations appendix.
				DAevent	Permeability Constant Per Event	chemical-specific	mg/cm <sup>2</sup> -event	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	18000	cm <sup>2</sup>	USEPA, 2004	
				tevent	Exposure Time	0.5	hr/event	Assumption	
				EF	Exposure Frequency	24	day/yr	Assumption [b]	
				ED	Exposure Duration	24	yr	USEPA, 2000	
				EV	Event Frequency	1	event/day	USEPA, 2004	
				BW	Body Weight	70	kg	USEPA, 2000	
				AT-C	Averaging Time (Cancer)	25550	day	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8760	day	USEPA, 1989 / equal to ED	
				CF	Conversion Factor	0.001	l/cm <sup>3</sup>		
	Resident	Child (ages 1 - 7)	Sprinkler	CW	Chemical Concentration in Water	Maximum	mg/l	USEPA, 2000	INTAKE-DERMAL (mg/kg-day)= DAevent x SA x EF x ED x EV x 1/BW x 1/AT DAevent = CW x CF x PCevent where: PCevent is tevent multiplied by chemical-specific parameters B, t*, Tevent, and Kp, using the algorithm that is appropriate for the relationship between tevent and t*, per USEPA (2004) and as described in the risk assessment text. Calculations are documented in the risk calculations appendix.
				DAevent	Permeability Constant Per Event	chemical-specific	mg/cm <sup>2</sup> -event	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	6600	cm <sup>2</sup>	USEPA, 2004	
				tevent	Exposure Time	1	hr/event	Assumption	
				EF	Exposure Frequency	36	day/yr	Assumption [c]	
				ED	Exposure Duration	6	yr	USEPA, 2000	
				EV	Event Frequency	1	event/day	USEPA, 2004	
				BW	Body Weight	15	kg	USEPA, 2000	
				AT-C	Averaging Time (Cancer)	25550	day	USEPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2190	day	USEPA, 1989 / equal to ED	
				CF	Conversion Factor	0.001	l/cm <sup>3</sup>		

**Table C-5**  
**Values Used For Daily Intake Calculations**  
**Reasonable Maximum Exposure - Outdoor Groundwater Use**

**TORX Facility**  
**Rochester, Indiana**

Scenario Timeframe: Current and Future Land Use
Medium: Groundwater
Exposure Medium: Outdoor Use of Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Points	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation / Model Name
Inhalation	Resident	Adult (ages 7-30)	Ambient Air During Sprinkler Use	Cair	Chemical Concentration in Air	calculated	ug/m3	Assumption Assumption [d] USEPA, 2000 USEPA, 1989 USEPA, 1989 / equal to ED	AIR AVG. CONC. (µg/m³) = Cair x ET x EF x ED x 1/AT x 1/CF 1
				ET	Exposure Time	1	hr/day		
				EF	Exposure Frequency	60	day/yr		
				ED	Exposure Duration	24	yr		
				AT-C	Averaging Time (Cancer)	25550	day		
				AT-N	Averaging Time (Non-Cancer)	8760	day		
				CF1	Conversion Factor	24	hr/day		
	Resident	Child (ages 1-7)	Ambient Air During Sprinkler Use	Cair	Chemical Concentration in Air	calculated	ug/m3	Assumption Assumption [d] USEPA, 2000 USEPA, 1989 USEPA, 1989 / equal to ED	AIR AVG. CONC. (µg/m³) = Cair x ET x EF x ED x 1/AT x 1/CF 1
				ET	Exposure Time	1	hr/day		
				EF	Exposure Frequency	60	day/yr		
				ED	Exposure Duration	6	yr		

USEPA, 1989. "Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A)"; Office of Emergency and Remedial Response; EPA-540/1-89/002 (interim final); Washington, D.C., December.

USEPA, 2000. Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment Bulletins. EPA Region 4, originally published November 1995, Website version last updated May 2000 (currently under revision).

USEPA, 2004. "Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part E)"; Office of Solid Waste and Emergency Response; EPA-540/R-99/005 (Final); Washington, D.C.

[a] - Assumes each drink from a hose is 2 ounces or 0.06 liters.

[b] - Assumes two times a week for the months of June, July and August.

[c] - Assumes three times a week for the months of June, July and August.

[d] - Assumes three times per week for the months of May through September.

mg - milligrams  
kg - kilograms  
hr - hour  
cm<sup>2</sup> - centimeter squared

yr - year  
l - liter  
cm<sup>3</sup> - cubic centimeter  
ug - microgram

Prepared by / Date: BJR 9/2/11

Checked by / Date: SDM 9/6/11

**Table C-6**  
**Sprinkler Scenario - Hypothetical Resident**  
**TORX Facility**  
**Rochester, Indiana**

Receptor:	<b>Resident</b>
Scenario:	<b>Sprinkler</b>
Medium:	<b>Ambient Air</b>
Exposure Pathway:	<b>Inhalation</b>

**Air Concentrations: Volatile Organic Compounds from a sprinkler head**

$$S = C_w \times R_w \times tr$$

$$C_a = \frac{S \times f}{U \times H \times W}$$

Cw	see below	
Rw	1135.5	water release from sprinkler (l/hr)
tr	1	proportional transfer to air (unitless)
f	0.5	frequency that winds blows in direction of receptor
U	13680	windspeed (m/hr) (1)
H	1	height of exposure box (m)
W	1	width of exposure box (m)
S	see above	source release rate (mg/h)
Ca	see above	steady-state air concentration (mg/m <sup>3</sup> )

<b>Compound</b>	<b>Cw (mg/L)</b>	<b>S (mg/hr)</b>	<b>Ca (mg/m<sup>3</sup>)</b>
Cis-1,2-Dichloroethene	6.9E-03	8	2.9E-04
Methylene chloride	2.8E-03	3	1.2E-04
trans-1,2-Dichloroethene	5.4E-04	1	2.2E-05
Trichloroethene	1.9E-02	22	7.9E-04
Vinyl chloride	1.8E-02	20	7.5E-04

(1) Average wind speed in Fort Wayne, IN from May to September

Table C-7  
Calculation of Hazard Quotients for Cattle  
TORX Facility  
Rochester, Indiana

Parameter	Range of Detected Concentrations			Concentration after 1 hour	Concentration after 2 hours	NOAEL (mg/kg-day)	NOAEL Source	Dose (mg/kg-day) (1)	HQ (2)
<b>Volatile Organics (mg/L)</b>									
Cis-1,2-Dichloroethene	0.0028	-	0.0069	0.001042	0.00016	6.4	ATSDR, 1996; McCauley et al., 1990	0.00022	0.00003
Methylene chloride	0.0018	-	0.0028	0.0024	0.0020	5.85	Sample et al., 1996; NCA, 1982	0.000089	0.00002
trans-1,2-Dichloroethene	0.00043	-	0.00047	0.000071	0.000011	5153	ATSDR, 1996; Hurtt et al., 1993	0.000015	0.000000003
Trichloroethene	0.012	-	0.019	0.0024	0.00030	75	RAIS, 2002; NTP, 1986b	0.00060	0.000008
Vinyl chloride	0.00089	-	0.018	0.0063	0.0027	0.17	Sample et al., 1996; Feron et al., 1981	0.00057	0.003

Assumptions:

Cattle are assumed to drink 38 liter of water per day.

Cattle are assumed to have a weight of 1200 lbs.

(1) Dose is calculated using the following equation:

$$Dose = C \times IR \times \frac{1}{BW}$$

where,

C = Concentration in water

IR = Ingestion rate of water

BW = Body weight

(2) HQ calculated using the maximum concentration. HQ = Dose/NOAEL

HQ - Hazard Quotient

NOAEL - No Observed Adverse Effects Level

Prepared by: BJR

Checked by: MJM

TABLE C-8  
CANCER TOXICITY DATA -- ORAL/DERMAL  
TORX FACILITY  
ROCHESTER, INDIANA

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal (2)		Weight of Evidence/ Cancer Guideline Description	Oral Cancer Slope Factor	
	Value	Units		Value	Units		Source(s)	Date(s)
<b>VOLATILES</b>								
1,2-Dichloroethene (cis)	ND			ND		ND	IRIS	August 2011
1,2-Dichloroethene (trans)	ND			ND		ND	IRIS	August 2011
Methylene Chloride (Dichloromethane)	7.5E-03	(mg/kg/day) <sup>-1</sup>	100%	7.5E-03	(mg/kg/day) <sup>-1</sup>	B2	IRIS	August 2011
Trichloroethene	1.0E-01	(mg/kg/day) <sup>-1</sup>	100%	1.0E-01	(mg/kg/day) <sup>-1</sup>	NA	IDEM	May 2009
Vinyl Chloride (child and adult)	1.5E+00	(mg/kg/day) <sup>-1</sup>	100%	1.5E+00	(mg/kg/day) <sup>-1</sup>	Known carcinogen (A)	IRIS	August 2011

**Notes:**

In accordance with OSWER 9285.7-53, slope factors are identified from the following heirarchy of sources:

Tier 1:

IRIS = Integrated Risk Information System:

August 2011

Tier 2:

PPRTV = Preliminary Peer-Reviewed Reference Toxicity Value December 2009

Obtained from Oak Ridge National Laboratory Regional Screening Levels for Chemical Contaminants at Superfund Sites

Tier 3:

HEAST97= Health Effects Assessment Summary Tables:

FY 1997

From HEAST FY 1997 Update

HEAST= Health Effects Assessment Summary Tables:

December 2009

Obtained from Oak Ridge National Laboratory Regional Screening Levels for Chemical Contaminants at Superfund Sites

CALEPA - California Environmental Protection Agency

July 2009

In addition, provisional RfDs developed by NCEA are presented for informational purposes and to be used on a case-by-case basis:

NCEA = National Center for Environmental Assessment:

April 2007

Obtained from Region III RBC Table

WHO = World Health Organization

December 2009

Obtained from Oak Ridge National Laboratory Regional Screening Levels for Chemical Contaminants at Superfund Sites

IDEM = Indiana Department of Environmental Managemet

May 2009

(1) Values obtained from RAGS Volume 1 (Part E, Supplemental Guidance for Dermal Risk Assessment, Interim Guidance) (EPA, 2004)

Per this guidance, a value of 100% is used for analytes without published values.

(2) Adjusted Dermal SF = Oral SF / Oral to Dermal Adjustment Factor. Per RAGS Part E (USEPA, 2004), adjustments are only performed for chemicals that have an oral absorption efficiency of less than 50%.

mg = milligram

kg = kilogram

BW = body weight

ND = no data available

Weight of Evidence:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

TABLE C-9  
CANCER TOXICITY DATA -- INHALATION  
TORX FACILITY  
ROCHESTER, INDIANA

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor (1)		Weight of Evidence/ Cancer Guideline Description	Unit Risk: Inhalation Cancer Slope Factor	
	Value	Units	Value	Units		Source(s)	Date(s)
<b>VOLATILES</b>							
1,2-Dichloroethene (cis)	ND		ND		ND	IRIS	August 2011
1,2-Dichloroethene (trans)	ND		ND		ND	IRIS	August 2011
Methylene chloride (Dichloromethane)	4.70E-07	(ug/m <sup>3</sup> ) <sup>-1</sup>	1.60E-03	(mg/kg/day) <sup>-1</sup>	B2	IRIS	August 2011
Trichloroethene	2.00E-06	(ug/m <sup>3</sup> ) <sup>-1</sup>	7.00E-03	(mg/kg/day) <sup>-1</sup>	NA	CALEPA	July 2009
Vinyl Chloride (adult and child)	8.80E-06	(ug/m <sup>3</sup> ) <sup>-1</sup>	3.10E-02	(mg/kg/day) <sup>-1</sup>	Known human carcinogen	IRIS	August 2011

**Notes:**

In accordance with OSWER 9285.7-53, unit risk values are identified from the following heirarchy of sources:

Tier 1:

IRIS = Integrated Risk Information System: August 2011

Tier 2:

PPRTV = Preliminary Peer-Reviewed Reference Toxicity Value December 2009 Obtained from Oak Ridge National Laboratory Regional Screening Levels for Chemical Contaminants at Superfund Sites

Tier 3:

HEAST-97= Health Effects Assessment Summary Tables: FY 1997 From HEAST FY 1997 Update

HEAST= Health Effects Assessment Summary Tables: December 2009 Obtained from Oak Ridge National Laboratory Regional Screening Levels for Chemical Contaminants at Superfund Sites

CALEPA - California Environmental Protection Agency July 2009

In addition, provisional RfDs developed by NCEA are presented for informational purposes and to be used on a case-by-case basis:

NCEA = National Center for Environmental Assessment: April 2007 Obtained from Region III RBC Table

Weight of Evidence:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are av

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

mg = milligram

ug = microgram

kg = kilogram

m<sup>3</sup> = cubic meter

BW = body weight

ND = no data available

(1) - Inhalation cancer dose-response values are typically published as unit risk values. Unit risk values

may be converted to slope factors using the following equation (HEAST, 1997):

Adjustment = 70 kg [adult body weight] \* 1000 ug/mg [conversion factor] / 20 m3/day [inhalation rate]

and: Inhalation Slope Factor = Unit Risk \* Adjustment

Except for vinyl chloride where child exposure factors are used 30 kg body weight and 10m3/day inhalation rate



TABLE C-10  
NON-CANCER TOXICITY DATA -- ORAL/DERMAL  
TORX FACILITY  
ROCHESTER, INDIANA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Adjusted Dermal RfD (2)		Primary Target Organ or System / Critical Effect	Combined Uncertainty/Modifying Factors	RfD: Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)
<b>VOLATILES</b>										
1,2-Dichloroethene (cis)	chronic	2.0E-03	mg/kg/day	100%	2.0E-03	mg/kg/day	Kidney, increased relative kidney weight in male rats	3,000/1	IRIS	August 2011
1,2-Dichloroethene (trans)	chronic	2.0E-02	mg/kg/day	100%	2.0E-02	mg/kg/day	Liver; increased serum alkaline phosphatase	3,000/1	IRIS	August 2011
Methylene Chloride (Dichloromethane)	chronic	6.0E-02	mg/kg/day	100%	6.0E-02	mg/kg/day	Liver; liver toxicity	100/1	IRIS	August 2011
Trichloroethene	chronic	3.0E-04	mg/kg/day	100%	3.0E-04	mg/kg/day	Liver and kidney		IDEM	May 2009
Vinyl Chloride	chronic	3.0E-03	mg/kg/day	100%	3.0E-03	mg/kg/day	Liver; liver cell polymorphism	30/1	IRIS	August 2011

**Notes:**

In accordance with OSWER 9285.7-53, chronic RfDs are identified from the following heirarchy of sources:

Tier 1:

IRIS = Integrated Risk Information System: August 2011

Tier 2:

PPRTV = Preliminary Peer-Reviewed Toxicity Value: December 2009 Obtained from Oak Ridge National Laboratory Regional Screening Levels for Chemical Contaminants at Superfund Sites

Tier 3:

HEAST97= Health Effects Assessment Summary Tables: FY 1997 From HEAST FY 1997 Update

HEAST= Health Effects Assessment Summary Tables: December 2009 Obtained from Oak Ridge National Laboratory Regional Screening Levels for Chemical Contaminants at Superfund Sites

MRL = Minimum Risk Level (ATSDR: chronic MRLs): December 2009

In addition, provisional RfDs developed by NCEA are presented for informational purposes and to be used on a case-by-case basis:

NCEA = National Center for Environmental Assessment: September 2004 Obtained from Region IX PRG Table

April 2007 Obtained from Region III RBC Table

IDEM = Indiana Department of Environmental Managemet May 2009

[1] - Superfund Technical Support Center. Value provided by USEPA Region 1, January 2010.

w = PPRTV was withdrawn based on most up-to-date Regional Screening Levels Table.

n = Value is an NCEA provisional value provided for informational purposes only.

Subchronic RfDs are obtained from:

- ATSDR: Intermittent MRLs

- HEAST: subchronic RfDs (from HEAST FY 1997)

- Equal to chronic RfDs when values are not published in HEAST or by ATSDR

(1) Values obtained from RAGS Volume 1 (Part E, Supplemental Guidance for Dermal Risk Assessment, Interim Guidance) (EPA, 2004)

Per this guidance, a value of 100% is used for analytes without published values.

(2) Adjusted Dermal RfD = Oral RfD x Oral to Dermal Adjustment Factor. Per RAGS Part E (USEPA, 2004), adjustments are only performed for chemicals that have an oral absorption efficiency of less than 50%.

mg = milligram

kg = kilogram

surrogate - a value for a closely related chemical is used as the RfD

BW = body weight

chronic - the chronic value is used as the subchronic RfD

ND = no data available

TABLE C-11  
NON-CANCER TOXICITY DATA -- INHALATION  
TORX FACILITY  
ROCHESTER, INDIANA

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC (1)		Extrapolated RfD (1)		Primary Target Organ or System / Critical Effect	Combined Uncertainty/Modifying Factors	RfC: Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s)
<b>VOLATILES</b>									
1,2-Dichloroethene (cis)	chronic	ND		ND				IRIS	August 2011
1,2-Dichloroethene (trans)	chronic	6.0E-02	mg/m3	1.7E-02	mg/kg/day	Lung, pulmonary capillary hyperemia	3,000	PPRTV	December 2009
Methylene Chloride (Dichloromethane)	chronic	1.1E+00	mg/m3	3.0E-01	mg/kg/day	Liver	30	MRL	December 2009
Trichloroethene	chronic	6.0E-01	mg/m3	1.7E-01	mg/kg/day	Nervous system, Eyes		CALEPA	September 2011
Vinyl Chloride	chronic	1.0E-01	mg/m3	2.9E-02	mg/kg/day	Liver; liver cell polymorphism	30/1	IRIS	August 2011

**Notes:**

In accordance with OSWER 9285.7-53, chronic RfDs are identified from the following heirarchy of sources:

**Tier 1:**

IRIS = Integrated Risk Information System: August 2011

**Tier 2:**

PPRTV = Preliminary Peer-Reviewed Toxicity Value: December 2009 Obtained from Oak Ridge National Laboratory Regional Screening Levels for Chemical Contaminants at Superfund Sites

**Tier 3:**

HEAST97= Health Effects Assessment Summary Tables: FY 1997 From HEAST FY 1997 Update

HEAST= Health Effects Assessment Summary Tables: December 2009 Obtained from Oak Ridge National Laboratory Regional Screening Levels for Chemical Contaminants at Superfund Sites

MRL = Minimum Risk Level (ATSDR: chronic MRLs): December 2009

REL - CALEPA December 2008

mg = milligram

In addition, provisional RfDs developed by NCEA are presented for informational purposes and to be used on a case-by-case basis:

kg = kilogram

NCEA = National Center for Environmental Assessment: September 2004 Obtained from Region IX PRG Table

ug - microgram

April 2007 Obtained from Region III RBC Table

m<sup>3</sup> - cubic meter

NYSDOH = New York State Department of Health June 2008

BW = body weight

[1] - Superfund Technical Support Center. Value provided by USEPA Region 1, January 2010.

w = PPRTV was withdrawn based on most up-to-date Regional Screening Levels Table.

n = Value is an NCEA provisional value provided for informational purposes only.

(1) - Inhalation non-cancer dose-response values are typically published as RfC values. RfC values

may be converted to RfDs using the following equation (HEAST, 1997):

RfD (mg/kg-d) = RfC (mg/m<sup>3</sup>) x 20 m<sup>3</sup>/d / 70 kg, unless otherwise indicated

Table C-12  
Mammalian Toxicity Data  
TORX Facility  
Rochester, Indiana

CAS #	Chemical Name	Toxicity Reference Dose NOAELa (mg/kg/d)	Toxicity Reference Dose LOAELa (mg/kg/d)	Study Type	Exposure Route	Test Species	Dose	Effect	Relevancec	Study/Database Confidenced	Reference	Study Endpoint	Study Results	Reported LOAELa	Exposure Durationc	Exposure Regime (# d/w)	UFN	UFC	MF
156-59-2	1,2-Dichloroethene (cis)	6.4E+00	5.8E+01	sc	inhalation	rat		decreased body weight (males)	intermediate	tbd	ATSDR, 1996; McCauley et al., 1990	NOAEL	32	290	90 d	7	1	5	1
75-09-2	Methylene chloride	5.9E+00	5.0E+01	c	food	rat		liver toxicity	intermediate	tbd	Sample et al., 1996; NCA, 1982	NOAEL	5.85	50	2 y	7	1	1	1
156-60-5	trans-1,2-Dichloroethene	5.2E+03	1.0E+04	c	inhalation	rat		reduction in mean fetal weights in exposed dams	high	tbd	ATSDR, 1996; Hurtt et al., 1993	NOAEL	5152.66806	10305.3361	7 - 16 (gesta	7	1	1	1
79-01-6	Trichloroethene	7.5E+01	1.5E+02	c	oral (diet)	rat		reduction in number of live pups/litter	high	tbd	RAIS, 2002; NTP, 1986b	NOAEL	75	150	2 g	7	1	1	1
75-01-4	Vinyl Chloride	1.7E-01	1.7E+00	c	oral in diet	rat	1.7, 5.0, and 14.1 mg/kg/d	Significantly reduced survivorship at all dose levels			Sample et al., 1996; Feron et al., 1981	LOAEL	1.7	1.7	144 w	7	10	1	1

NOAEL - No Observed Adverse Effects Level

LOAEL - Lowest Observed Adverse Effects Level

mg/kg/d - milligrams per kilogram bodyweight per day

TABLE C-13  
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS -- REASONABLE MAXIMUM EXPOSURE - FUTURE - RESIDENT - CHILD  
TORX FACILITY  
4366 NORTH OLD US HIGHWAY 31  
ROCHESTER, INDIANA

SCENARIO TIMEFRAME: FUTURE RECEPTOR POPULATION: RESIDENT RECEPTOR AGE: CHILD
--

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK CALCULATIONS					NON-CANCER HAZARD CALCULATIONS						
					VALUE	UNITS	INTAKE/EXPOSURE CONCENTRATION		CSF/UNIT RISK		CANCER RISK	INTAKE/EXPOSURE CONCENTRATION		RfD/RfC (1)		HAZARD QUOTIENT		
							VALUE	UNITS	VALUE	UNITS		VALUE	UNITS	VALUE	UNITS			
GROUND WATER	GROUND WATER	OUTDOOR WATER	INGESTION	Cis-1,2-Dichloroethene	0.0069	mg/l	NC		NC			1.8E-06	mg/kg/day	2.0E-03	mg/kg/day	9.E-04		
				Methylene chloride	0.0028	mg/l	6.3E-08	mg/kg/day	7.5E-03	(mg/kg/day)-1	5.E-10	7.4E-07	mg/kg/day	6.0E-02	mg/kg/day	1.E-05		
				Trans-1,2-Dichloroethene	0.00054	mg/l	NC		NC			1.4E-07	mg/kg/day	2.0E-02	mg/kg/day	7.E-06		
				Trichloroethene	0.019	mg/l	4.3E-07	mg/kg/day	1.0E-01	(mg/kg/day)-1	4.E-08	5.0E-06	mg/kg/day	3.0E-04	mg/kg/day	2.E-02		
				Vinyl chloride	0.018	mg/l	4.1E-07	mg/kg/day	1.5E+00	(mg/kg/day)-1	6.E-07	4.7E-06	mg/kg/day	3.0E-03	mg/kg/day	2.E-03		
			EXPOSURE ROUTE TOTAL							7.E-07						2.E-02		
			DERMAL	Cis-1,2-Dichloroethene	0.0069	mg/l	NC		NC			--		2.0E-03	mg/kg/day			
				Methylene chloride	0.0028	mg/l	6.0E-08	mg/kg/day	7.5E-03	(mg/kg/day)-1	5.E-10	7.0E-07	mg/kg/day	6.0E-02	mg/kg/day	1.E-05		
				Trans-1,2-Dichloroethene	0.00054	mg/l	NC		NC			--		2.0E-02	mg/kg/day			
				Trichloroethene	0.019	mg/l	1.7E-06	mg/kg/day	1.0E-01	(mg/kg/day)-1	2.E-07	2.0E-05	mg/kg/day	3.0E-04	mg/kg/day	7.E-02		
				Vinyl chloride	0.018	mg/l	5.5E-07	mg/kg/day	1.5E+00	(mg/kg/day)-1	8.E-07	6.4E-06	mg/kg/day	3.0E-03	mg/kg/day	2.E-03		
			EXPOSURE ROUTE TOTAL							1.E-06						7.E-02		
		EXPOSURE POINT TOTAL							2.E-06						9.E-02			
	EXPOSURE MEDIUM TOTAL							2.E-06						9.E-02				
GROUNDWATER TOTAL							2.E-06						9.E-02					
AIR	AIR	SPRINKLER	VAPOR INHALATION	Cis-1,2-Dichloroethene	0.286365132	ug/m3	NC		NC			2.0E-03	ug/m3	ND				
				Methylene chloride	0.11620614	ug/m3	6.8E-05	ug/m3	4.7E-07		3.E-11	8.0E-04	ug/m3	1.1E+03	ug/m3	8.E-07		
				Trans-1,2-Dichloroethene	0.022411184	ug/m3	NC		NC			1.5E-04	ug/m3	6.0E+01	ug/m3	3.E-06		
				Trichloroethene	0.788541667	ug/m3	4.6E-04	ug/m3	2.0E-06	(ug/m3)-1	9.E-10	5.4E-03	ug/m3	6.0E+02	ug/m3	9.E-06		
				Vinyl chloride	0.747039474	ug/m3	4.4E-04	ug/m3	8.8E-06	(ug/m3)-1	4.E-09	5.1E-03	ug/m3	1.0E+02	ug/m3	5.E-05		
			EXPOSURE ROUTE TOTAL							5.E-09						6.E-05		
			EXPOSURE POINT TOTAL							5.E-09						6.E-05		
		EXPOSURE MEDIUM TOTAL							5.E-09						6.E-05			
	AIR TOTAL							5.E-09						6.E-05				
TOTAL RECEPTOR RISK ACROSS ALL MEDIA											2.E-06		TOTAL RECEPTOR HAZARD ACROSS ALL MEDIA				9.E-02	

NOTES:

(1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.

NC - Not carcinogenic by this exposure route.

NA - Not applicable; exposure route not applicable for this chemical/exposure medium.

NV - Not volatile; exposure route not complete for this chemical.

-- - Not calculated; dose-response data and/or dermal absorption values are not available.

Prepared by: BJR 9/2/11

Checked by: SDM 9/7/11

**TABLE C-14**  
**CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS -- REASONABLE MAXIMUM EXPOSURE - FUTURE - RESIDENT - ADULT**  
**TORX FACILITY**  
**4366 NORTH OLD US HIGHWAY 31**  
**ROCHESTER, INDIANA**

<b>SCENARIO TIMEFRAME: FUTURE</b> <b>RECEPTOR POPULATION: RESIDENT</b> <b>RECEPTOR AGE: ADULT</b>
---

MEDIUM	EXPOSURE MEDIUM	EXPOSURE POINT	EXPOSURE ROUTE	CHEMICAL	EPC		CANCER RISK CALCULATIONS					NON-CANCER HAZARD CALCULATIONS					
					VALUE	UNITS	INTAKE/EXPOSURE CONCENTRATION		CSF/UNIT RISK		CANCER RISK	INTAKE/EXPOSURE CONCENTRATION		RfD/RfC (1)		HAZARD QUOTIENT	
							VALUE	UNITS	VALUE	UNITS		VALUE	UNITS	VALUE	UNITS		
GROUND WATER	GROUND WATER	OUTDOOR WATER	INGESTION	Cis-1,2-Dichloroethene	0.0069	mg/l	NC		NC				3.9E-07	mg/kg/day	2.0E-03	mg/kg/day	2.E-04
				Methylene chloride	0.0028	mg/l	5.4E-08	mg/kg/day	7.5E-03	(mg/kg/day)-1	4.E-10	1.6E-07	mg/kg/day	6.0E-02	mg/kg/day	3.E-06	
				Trans-1,2-Dichloroethene	0.00054	mg/l	NC		NC			3.0E-08	mg/kg/day	2.0E-02	mg/kg/day	2.E-06	
				Trichloroethene	0.019	mg/l	3.7E-07	mg/kg/day	1.0E-01	(mg/kg/day)-1	4.E-08	1.1E-06	mg/kg/day	3.0E-04	mg/kg/day	4.E-03	
				Vinyl chloride	0.018	mg/l	3.5E-07	mg/kg/day	1.5E+00	(mg/kg/day)-1	5.E-07	1.0E-06	mg/kg/day	3.0E-03	mg/kg/day	3.E-04	
			EXPOSURE ROUTE TOTAL							6.E-07						4.E-03	
			DERMAL	Cis-1,2-Dichloroethene	0.0069	mg/l	NC		NC			--		2.0E-03	mg/kg/day		
				Methylene chloride	0.0028	mg/l	6.3E-08	mg/kg/day	7.5E-03	(mg/kg/day)-1	5.E-10	1.8E-07	mg/kg/day	6.0E-02	mg/kg/day	3.E-06	
				Trans-1,2-Dichloroethene	0.00054	mg/l	NC		NC			--		2.0E-02	mg/kg/day		
				Trichloroethene	0.019	mg/l	1.9E-06	mg/kg/day	1.0E-01	(mg/kg/day)-1	2.E-07	5.6E-06	mg/kg/day	3.0E-04	mg/kg/day	2.E-02	
				Vinyl chloride	0.018	mg/l	5.6E-07	mg/kg/day	1.5E+00	(mg/kg/day)-1	8.E-07	1.6E-06	mg/kg/day	3.0E-03	mg/kg/day	5.E-04	
			EXPOSURE ROUTE TOTAL								1.E-06					2.E-02	
		EXPOSURE POINT TOTAL								2.E-06					2.E-02		
	EXPOSURE MEDIUM TOTAL								2.E-06					2.E-02			
GROUNDWATER TOTAL											2.E-06	2.E-02					
AIR	AIR	SPRINKLER	VAPOR INHALATION	Cis-1,2-Dichloroethene	0.286365132	ug/m3	NC		NC			2.0E-03	ug/m3	ND			
				Methylene chloride	0.11620614	ug/m3	2.7E-04	ug/m3	4.7E-07	(ug/m3)-1	1.E-10	8.0E-04	ug/m3	1.1E+03	ug/m3	8.E-07	
				Trans-1,2-Dichloroethene	0.022411184	ug/m3	NC		NC			1.5E-04	ug/m3	6.0E+01	ug/m3	3.E-06	
				Trichloroethene	0.788541667	ug/m3	1.9E-03	ug/m3	2.0E-06	(ug/m3)-1	4.E-09	5.4E-03	ug/m3	6.0E+02	ug/m3	9.E-06	
				Vinyl chloride	0.747039474	ug/m3	1.8E-03	ug/m3	8.8E-06	(ug/m3)-1	2.E-08	5.1E-03	ug/m3	1.0E+02	ug/m3	5.E-05	
			EXPOSURE ROUTE TOTAL							2.E-08					6.E-05		
		EXPOSURE POINT TOTAL								2.E-08					6.E-05		
		EXPOSURE MEDIUM TOTAL								2.E-08					6.E-05		
AIR TOTAL											2.E-08	6.E-05					
TOTAL RECEPTOR RISK ACROSS ALL MEDIA											2.E-06	TOTAL RECEPTOR HAZARD ACROSS ALL MEDIA					2.E-02

NOTES:

(1) - Blank cells indicate that an RfD or RfC is not available from the sources used to obtain dose-response data for this risk assessment.  
 NC - Not carcinogenic by this exposure route.  
 NA - Not applicable; exposure route not applicable for this chemical/exposure medium.  
 NV - Not volatile; exposure route not complete for this chemical.  
 -- - Not calculated; dose-response data and/or dermal absorption values are not available.

Prepared by: BJR 9/2/11  
 Checked by: SDM 9/7/11

**Table C-15**  
**Risk Summary Table - Future Land Use - Resident**

**TORX Facility**  
**Rochester, Indiana**

Exposure Area / Medium	Receptor	Exposure Route	Excess Lifetime Cancer Risk	Hazard Index
Outdoor Water Use				
Groundwater	Child (ages 1-6)	Incidental Ingestion	7.E-07	0.02
		Dermal Contact	1.E-06	0.07
		Inhalation	5.E-09	0.00006
Groundwater	Adult *	Incidental Ingestion	6.E-07	0.004
		Dermal Contact	1.E-06	0.02
		Inhalation	2.E-08	0.00006
Total Groundwater Risk:			3.E-06	0.09

Risk calculations are presented in Tables C-13 and C-14.

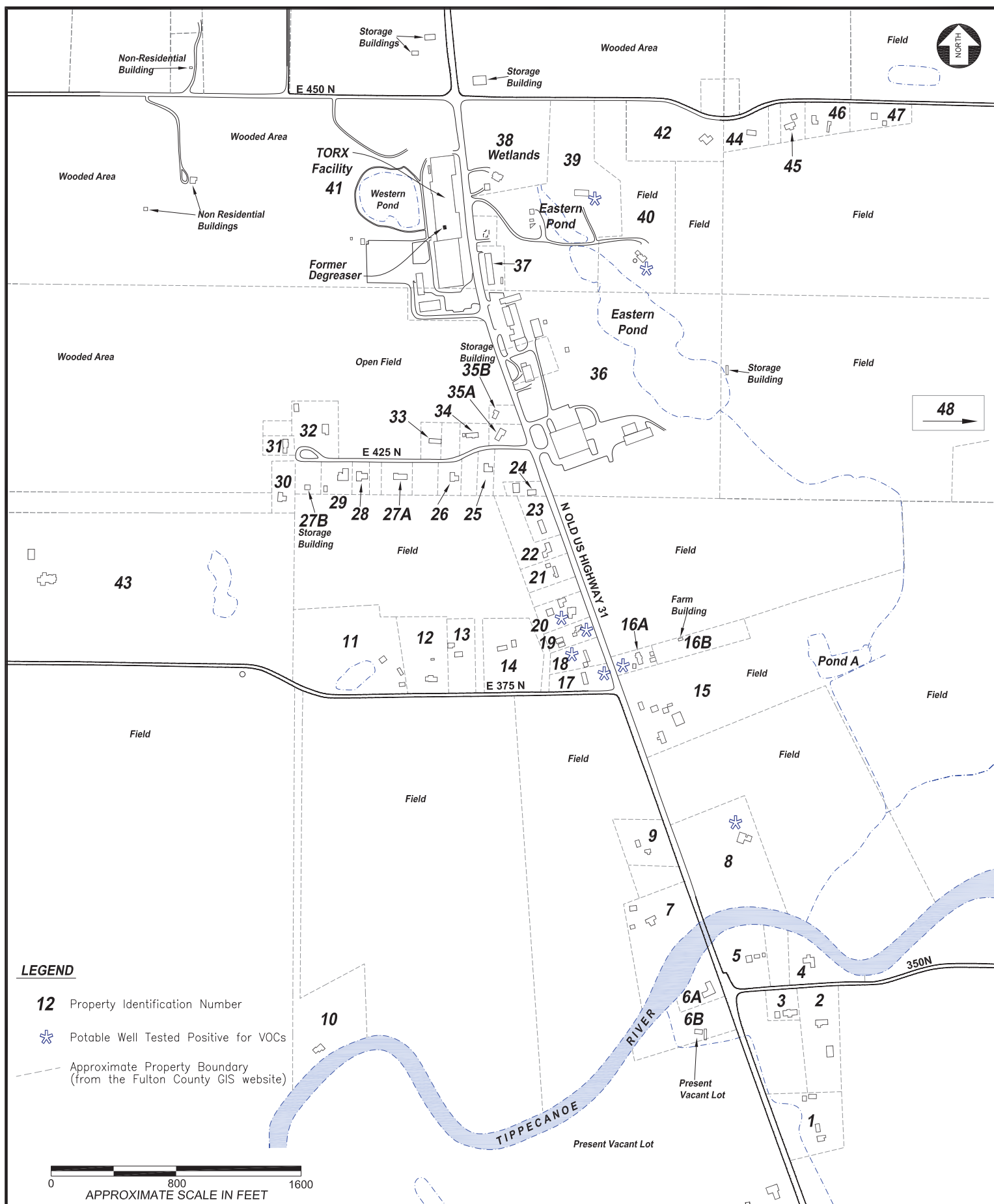
Total Hazard Index is the highest total hazard index among the age groups evaluated.

\* - Includes ages 7 through 18

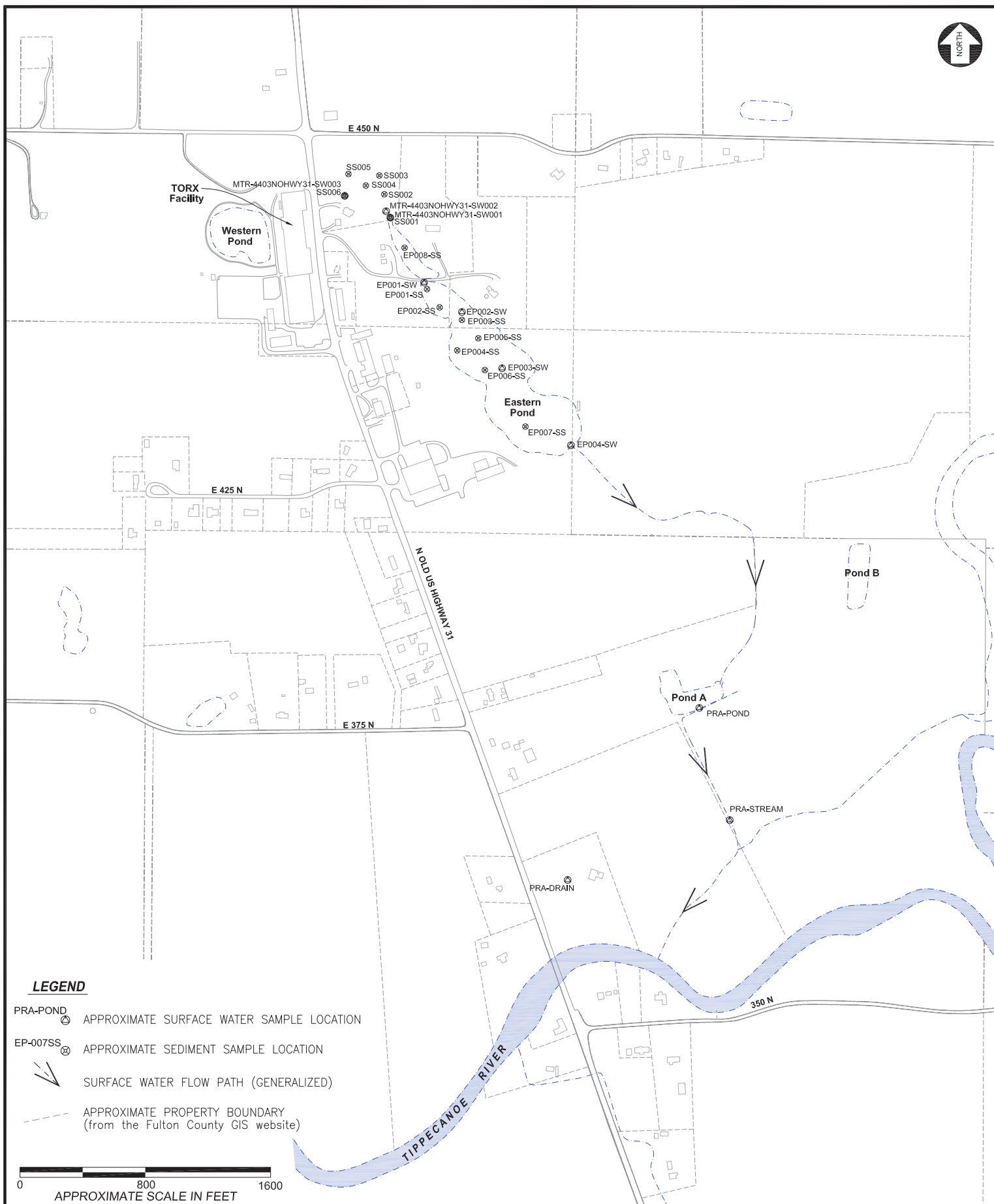
Prepared by / Date: BJR 9/6/11

Checked by / Date: KJC 9/8/11

**FIGURES**







#### LEGEND

- PRA-POND APPROXIMATE SURFACE WATER SAMPLE LOCATION
- EP-007SS APPROXIMATE SEDIMENT SAMPLE LOCATION
- SURFACE WATER FLOW PATH (GENERALIZED)
- APPROXIMATE PROPERTY BOUNDARY  
(from the Fulton County GIS website)

0 800 1600  
APPROXIMATE SCALE IN FEET

DRAWN BY P:\Texttron\TFS\ FILE NO.  
RLB Drawings\TFS Risk Asmnt.dwg  
APPROVED BY DATE  
08/12/2011  
SOURCE Wells surveyed by Territorial Engineering,  
2009; Fulton County, IN GIS, 2005.  
PROJECT NO. SCALE  
3359 09 2469 SEE ABOVE

**TORX FACILITY**  
4366 NORTH OLD US HIGHWAY 31  
ROCHESTER, INDIANA



**SURFACE WATER AND  
SEDIMENT SAMPLE  
LOCATIONS**

DRAWING NO.

**C-2**

SHEET 1 of 1



## **APPENDIX C – OUTDOOR WATER USE RISK ASSESSMENT**

---

### **ATTACHMENT A QUESTIONNAIRE CONCERNING LIVESTOCK**

## **Livestock Risk Assessment – Information Needs**

What livestock are currently kept at your property? Please list details of livestock types.

- **Black Angus Beef Cattle**
- **Fish**

Please fill out one copy of this questionnaire for each livestock type listed above. For each type of livestock currently kept on the property, answers to the following questions would be very important to the completion of a site-specific risk assessment (one sheet per livestock type).

1. Livestock type? **Black Angus Beef Cattle**
2. Number currently kept at the property? **90**
3. What are the livestock used for?
  - ☒ **X** raised for sale for meat
  - ☐ egg production
  - ☐ milk production
  - ☒ **X** home-grown meat source
  - ☐ riding (horses)
  - ☐ breeding for sale
  - ☐ other please specify \_\_\_\_\_
4. What is the source of drinking water for this type of livestock? (identify specific well or possibly surface water) **During rainy time periods, the cattle drink from the ponds and ditch. During dry periods and during winter, the water source is the Horban's residential well.**
5. How is the water delivered to the livestock? (for example, is the water placed in an outdoor trough in a common area?) **A hose connects the well to drinking troughs.**
6. How often is water delivered to the livestock? **Unlimited during rainy times; two times per day in dry/winter conditions.**
7. Does the method of delivery vary by season (winter vs. summer)? **X** yes  
 \_\_\_\_\_ no  
 If so, how? **See above.**
8. Does the livestock graze on the property? **X** yes \_\_\_\_\_ no  
 If so, is the grazing area irrigated? \_\_\_\_\_ yes **X** no  
 If yes, what is the source of irrigation water? \_\_\_\_\_  
 \_\_\_\_\_  
 What part of the year does irrigation occur? \_\_\_\_\_  
 \_\_\_\_\_
9. If your family consumes food products from this livestock type, please estimate amount consumed per person
  - ☐ eggs \_\_\_\_\_ per week per person \_\_\_\_\_ continuous \_\_\_\_\_ seasonal
  - ☐ milk \_\_\_\_\_ servings per week per person \_\_\_\_\_ continuous \_\_\_\_\_ seasonal
  - ☐ **home-grown meat** **6** servings per month per person \_\_\_\_\_ continuous  
 \_\_\_\_\_ seasonal
  - ☐ other please specify \_\_\_\_\_
10. Are any food products from this livestock type sold to others?
  - ☐ eggs \_\_\_\_\_ yes \_\_\_\_\_ no
  - ☐ milk \_\_\_\_\_ yes \_\_\_\_\_ no

○ home-grown meat   X   yes \_\_\_\_ no

11. For how many years has this livestock type been kept at the property? 55 years

12. For animals that are sold, how long is an animal of this livestock type kept at the property before it is sold? If used for breeding purposes, the cattle remain on the property for approximately 16 years. Otherwise, the cattle are sold at approximately 1 – 1½ years old.

Please fill out one copy of this questionnaire for each livestock type listed above. For each type of livestock currently kept on the property, answers to the following questions would be very important to the completion of a site-specific risk assessment (one sheet per livestock type).

1. Livestock type? **Fish**
2. Number currently kept at the property? **Specific number unknown; 2 ponds are stocked.**
3. What are the livestock used for?
  - ☐ \_\_\_\_\_ raised for sale for meat
  - ☐ \_\_\_\_\_ egg production
  - ☐ \_\_\_\_\_ milk production
  - ☐ \_\_\_\_\_ home-grown meat source
  - ☐ \_\_\_\_\_ riding (horses)
  - ☐ \_\_\_\_\_ breeding for sale
  - ☒ **X** other please specify **home-grown food source and recreational activity for extended family and neighbors.**
4. What is the source of drinking water for this type of livestock? (identify specific well or possibly surface water) **Ponds are fed from upgradient wetland area.**
5. How is the water delivered to the livestock? (for example, is the water placed in an outdoor trough in a common area?) **From the wetland area, the water flows via ditches into the ponds.**
6. How often is water delivered to the livestock? \_\_\_\_\_
7. Does the method of delivery vary by season (winter vs. summer)? \_\_\_\_\_yes  
\_\_\_\_\_no  
If so, how? \_\_\_\_\_
8. Does the livestock graze on the property? \_\_\_\_\_yes \_\_\_\_\_no  
If so, is the grazing area irrigated? \_\_\_\_\_yes \_\_\_\_\_no  
If yes, what is the source of irrigation water? \_\_\_\_\_  
\_\_\_\_\_  
What part of the year does irrigation occur? \_\_\_\_\_  
\_\_\_\_\_
9. If your family consumes food products from this livestock type, please estimate amount consumed per person
  - ☐ eggs \_\_\_\_\_ per week per person \_\_\_\_\_continuous \_\_\_\_\_seasonal
  - ☐ milk \_\_\_\_\_ servings per week per person \_\_\_\_\_continuous \_\_\_\_\_seasonal
  - ☐ home-grown meat \_\_\_\_\_ servings per month per person \_\_\_\_\_continuous  
\_\_\_\_\_seasonal
  - ☒ **X** other please specify **year-round fishing; consumption is mostly seasonal.**
10. Are any food products from this livestock type sold to others?
  - ☐ eggs \_\_\_\_\_yes \_\_\_\_\_no
  - ☐ milk \_\_\_\_\_yes \_\_\_\_\_no

○ home-grown meat \_\_\_\_\_ yes \_\_\_\_\_ no

11. For how many years has this livestock type been kept at the property? 30 years

12. For animals that are sold, how long is an animal of this livestock type kept at the property before it is sold?





Textron, Inc.  
TORX Facility, Rochester, Indiana  
Remediation Feasibility Study

## **APPENDIX F**

### **BIOCHLOR FATE AND TRANSPORT SIMULATIONS**

**Table F1**  
**BIOCHLOR Input Parameters for TCE, Cis-1,2-DCE, and Vinyl Chloride**  
**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

**Section 1. Hydrogeology**

Seepage Velocity (Vs)	2.31E+02 (ft/yr)	Source: Equation = $(K * i * 1 \text{ inch} / 2.54 \text{ cm} * 1 \text{ foot} / 12 \text{ inches} * 60 \text{ sec} / 1 \text{ min} * 60 \text{ min} / 1 \text{ hr} * 24 \text{ hr} / 1 \text{ day} * 365 \text{ day} / \text{yr}) / n$
Hydraulic Conductivity (K)	1.63E-02 cm/sec	Source: Table D2 - Geometric Mean of Measured Hydraulic Conductivity Values
Hydraulic Gradient (i)	0.0039 ft/ft	Source: Table D3 - Average of Groundwater Gradients
Effective Porosity (n)	0.28 unitless	Source: BIOCHLOR User Manual Typical Range for Sands = 0.10 - 0.35

**Section 2. Dispersion**

Longitudinal Dispersivity (alpha x)	44.6 ft	Source: BIOCHLOR Dispersion Equation (Option 3) = $(0.82 * 3.28 * (\log(1p/3.28))^{2.446})$
Transverse Dispersivity (alpha y)	4.4 ft	Source: BIOCHLOR Dispersion Equation = Alpha Y: Alpha X = 0.1
Vertical Dispersivity (alpha z)	1.00E-99 ft	Source: BIOCHLOR Default Value (1.00E-99)
Plume Length (Lp)	4684 ft	Source: Radial Distance from Source Area to MW-38 (Figure 26)

**Section 3. Adsorption**

Common Retardation Factor (R)	1.45	Source: BIOCHLOR Calculated, See User Manual
Soil Bulk Density (rho)	1.7 kg/l	Source: BIOCHLOR User Manual Typical Value = 1.7
PCE Partition Coefficient (Koc)	NA L/kg	Source: IDEM RISC Technical Guidance Manual (Appendix 1, Table B)
TCE Partition Coefficient (Koc)	166 L/kg	Source: IDEM RISC Technical Guidance Manual (Appendix 1, Table B)
Cis Partition Coefficient (Koc)	35.5 L/kg	Source: IDEM RISC Technical Guidance Manual (Appendix 1, Table B)
VC Partition Coefficient (Koc)	18.6 L/kg	Source: IDEM RISC Technical Guidance Manual (Appendix 1, Table B)
Ethene Partition Coefficient (Koc)	NA L/kg	Source: Value of zero used for calculating no retardation factor
Fraction Organic Carbon (foc)	0.001 g/g	Source: BIOCHLOR User Manual Default Value = 0.001

**Section 4. Biotransformation**

1st Order Decay Coefficient - TCE	2.7E-01 1/yr	Source: Best Fit Rate Constant From BIOCHLOR Literature Range Values
1st Order Decay Coefficient - Cis	1.5E+00 1/yr	Source: Best Fit Rate Constant From BIOCHLOR Literature Range Values
1st Order Decay Coefficient - VC	3.5E+00 1/yr	Source: Best Fit Rate Constant From BIOCHLOR Literature Range Values

**Section 5. General**

Modeled Area Length	Varies ft	Source: Figure 26
Modeled Area Width	200 ft	Source: Plume width varies, estimated
Simulation Time	Varies yr	Source: Report Text

**Section 6. Source Data**

Source Thickness in Sat. Zone	Varies ft	Source: Shallow Aquifer Thickness Varies from 15 to 30 feet. 25 feet used for model.
Source Type	Continuous	Source: BIOCHLOR Default Value. A source decay was not used (lack of data). Continuous source used as a conservative measure
Source Type	Single Planar	Source: BIOCHLOR Default Value. A single plane of constant concentrations used as a conservative measure
Source Zone TCE Concentration	8 mg/l	Source: Maximum TCE Concentration in MW-59 (February 2010) = 8.8 mg/l (9.4 mg/L replicate). (Cross-Section E-E') Adjusted for best fit to field data
Source Zone Cis Concentration	80 mg/l	Source: Maximum Cis Concentration in MW-72 (December 2011) = 100 mg/l. (Table 2) Adjusted for best fit to field data
Source Zone VC Concentration	15 mg/l	Source: Maximum VC Concentration in MW-72 (December 2011) = 23 mg/l. (Table 2) Adjusted for best fit to field data

**Section 7. Field Data For Comparison**

Distance from Source	Varies ft	Source: Figure 26, distance from source to monitoring well along inferred plume centerline
TCE Concentrations	Varies mg/l	Source: Table D4, Report Section 6.2
Cis Concentrations	Varies mg/l	Source: Table D5, Report Section 6.2
VC Concentrations	Varies mg/l	Source: Table D5, Report Section 6.2

Prepared By: RJC  
Checked By: PJS

**Table F2**

**Hydraulic Conductivity Evaluation Table  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Well Location	Test Run <sup>(1)</sup>	Hydraulic Conductivity (K) (cm/sec)	Hydraulic Conductivity (log K)
MW20(35)	1	2.72E-02	-1.57
MW25(16.4)	1	1.03E-02	-1.99
MW25(45.2)	2	1.95E-02	-1.71
MW26(17.5)	1	1.18E-02	-1.93
MW26(17.5)	2	1.12E-02	-1.95
MW26(28.8)	1	2.36E-02	-1.63
MW26(28.8)	2	1.50E-02	-1.82
MW30(41.1)	1	1.83E-02	-1.74
MW30(41.1)	2	1.60E-02	-1.80
MW30(41.1)	3	1.80E-02	-1.74
<b>Calculations and Comparisons of Ranges</b>			
Maximum		2.72E-02	-1.57
Minimum		1.03E-02	-1.99
Geometric Mean		<b>1.63E-02</b>	Not Applicable
Arithmetic Mean		Not Applicable	-1.79
Mean plus one order of Magnitude		1.63E-01	-0.79
Mean minus one order of Magnitude		1.63E-03	-2.79
Notes:			
1) Slug Tests were performed on April 21, 2010 and analyzed using the Hvorslev (1951) Basoc Time Lag Method.			
Prepared By: <u>RJC</u> Checked By: <u>PJS</u>			

**Table F3**

**Groundwater Gradients Along Inferred Plume Centerline  
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

<b>Locations</b>	<b>Distance Between Well Locations (feet)</b>	<b>Elevation Change Between Wells (feet)</b>	<b>Groundwater Gradient (foot/foot)</b>
MW- 59(29) to MW- 67(30)	102	0.04	<b>0.0004</b>
MW- 67(30) to MW- 68(32)	19	0.02	<b>0.0011</b>
MW- 68(32) to MW- 6C	117	0.19	<b>0.0016</b>
MW- 6C to MW- 12	91	0.10	<b>0.0011</b>
MW- 12 to MW- 13	112	0.06	<b>0.0005</b>
MW- 12 to MW- 14	242	0.28	<b>0.0012</b>
MW- 14 to MW- 27(18)	373	1.98	<b>0.0053</b>
MW- 27(18) to MW- 17	113	1.01	<b>0.0089</b>
MW- 17 to MW- 30(24.1)	837	5.68	<b>0.0068</b>
MW- 30(41.1) to MW- 34(37)	1,585	23.30	<b>0.0147</b>
MW- 34(37) to MW- 38(20.8)	1,350	2.01	<b>0.0014</b>
		<b>Average:</b>	<b>0.0039</b>
<p>Notes:</p> <p>Groundwater elevations calculated from depth to water measurements (Table 4) obtained on August 2, 2010.</p> <p>Prepared By: <u>RJC</u> Checked By: <u>PJS</u></p>			

**Table F4**

**Plume Centerline TCE Concentrations and Distances From Source Area**

**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

<b>Location</b>	<b>Distance (feet)</b>	<b>TCE Concentrations* (ug/L)</b>
MW-14	449	667
MW-17	925	342
MW-30(41.1)	1762	79
MW-34(85)	3346	16

Distance measurements along inferred plume centerline (Figure 26)

\* = Concentrations calculated by averaging (May 2008 thru December 2010) and using 95% upper confidence limit

\*\* = Non-detect at 1 ug/L. One-half the detection used for plotting.

Prepared By: RJC

Checked By: PJS

**Table F5**

**Plume Centerline c-1,2-DCE/Vinyl Chloride Concentrations and Distances From Source Area**

**TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana**

<b>Location</b>	<b>Distance (feet)</b>	<b>c-1,2-DCE Concentrations* (ug/L)</b>	<b>Vinyl Chloride Concentrations* (ug/L)</b>
Source	0	53,685	13,381
MW-6C	122	14,655	3142
MW-12	208	7,816	1911
MW-13	317	5,298	951
MW-15	589	2,927	695
MW-25(16.4)	614	1,662	1148
MW-27(18)	811	1,200	478
MW-30(41.1)	1,762	135	3.1
MW-34(110)	3,346	3.2	0.5**

Distance measurements along inferred plume centerline adjacent to monitoring well location (Figure 26)

\* = Concentrations calculated by averaging (May 2009 through December 2010) and using 95% upper confidence limit

\*\* = Non-detect at 1 ug/L. One-half the detection used for plotting.

Prepared By: RJC

Checked By: PJS

# BIOCHLOR Natural Attenuation Decision Support System

Version 2.2  
Excel 2000

Simulation #1  
Former Torx Facility

## Data Input Instructions:

1. Enter value directly....or
  2. Calculate by filling in gray cells. Press Enter, then **C**
- (To restore formulas, hit "Restore Formulas" button )  
Variable\* → Data used directly in model.

Test if Biotransformation is Occurring → Natural Attenuation Screening Protocol

TYPE OF CHLORINATED SOLVENT:

Ethenes ☒  
Ethanes ☐

## 1. ADVECTION

Seepage Velocity\* Vs 230.6 (ft/yr)  
or  
Hydraulic Conductivity K 1.6E-02 (cm/sec)  
Hydraulic Gradient i 0.0039 (ft/ft)  
Effective Porosity n 0.28 (-)

## 2. DISPERSION

Alpha x\* 44.684 (ft)  
(Alpha y) / (Alpha x)\* 4.4 (-)  
(Alpha z) / (Alpha x)\* 1.E-99 (-)  
Calc. Alpha x

## 3. ADSORPTION

Retardation Factor\* R  
or  
Soil Bulk Density, rho 1.7 (kg/L)  
Fraction Organic Carbon, foc 1.0E-3 (-)  
Partition Coefficient Koc  
PCE (L/kg) 2.01 (-)  
TCE (L/kg) 1.22 (-)  
DCE (L/kg) 1.11 (-)  
VC (L/kg) 1.11 (-)  
ETH (L/kg) 1.11 (-)  
Common R (used in model)\* = 1.45

## 4. BIOTRANSFORMATION

Zone 1  
PCE → TCE 0.000 half-life (yrs) 0.79 Yield 0.79  
TCE → DCE 0.270 half-life (yrs) 0.74 Yield 0.74  
DCE → VC 1.500 half-life (yrs) 0.64 Yield 0.64  
VC → ETH 3.500 half-life (yrs) 0.45 Yield 0.45  
Zone 2  
PCE → TCE 0.000 half-life (yrs) 0.79 Yield 0.79  
TCE → DCE 0.000 half-life (yrs) 0.74 Yield 0.74  
DCE → VC 0.000 half-life (yrs) 0.64 Yield 0.64  
VC → ETH 0.000 half-life (yrs) 0.45 Yield 0.45

## 5. GENERAL

Simulation Time\* 43 (yr)  
Modeled Area Width\* 200 (ft)  
Modeled Area Length\* 4684 (ft)  
Zone 1 Length\* 4684 (ft)  
Zone 2 Length\* 0 (ft)  
Zone 2= L - Zone 1

## 6. SOURCE DATA

Source Options  
Source Thickness in Sat. Zone\* 25 (ft)  
Width\* (ft) 200  
Conc. (mg/L)\* C1  
PCE  
TCE 8.0  
DCE 80.0  
VC 15.0  
ETH

## 7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)	.667	.342	.079	.016															
TCE Conc. (mg/L)	.188	.146	.135	.0032	.0005														
DCE Conc. (mg/L)	.188	.146	.135	.0032	.0005														
VC Conc. (mg/L)	0.021	.0023	.0031	.0005	.0005														
ETH Conc. (mg/L)																			
Distance from Source (ft)	449	925	1762	3346	4696														
MW location	MW-14	MW-17	MW-30	MW-34	MW-37/38														

## 8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE

RUN ARRAY

Help

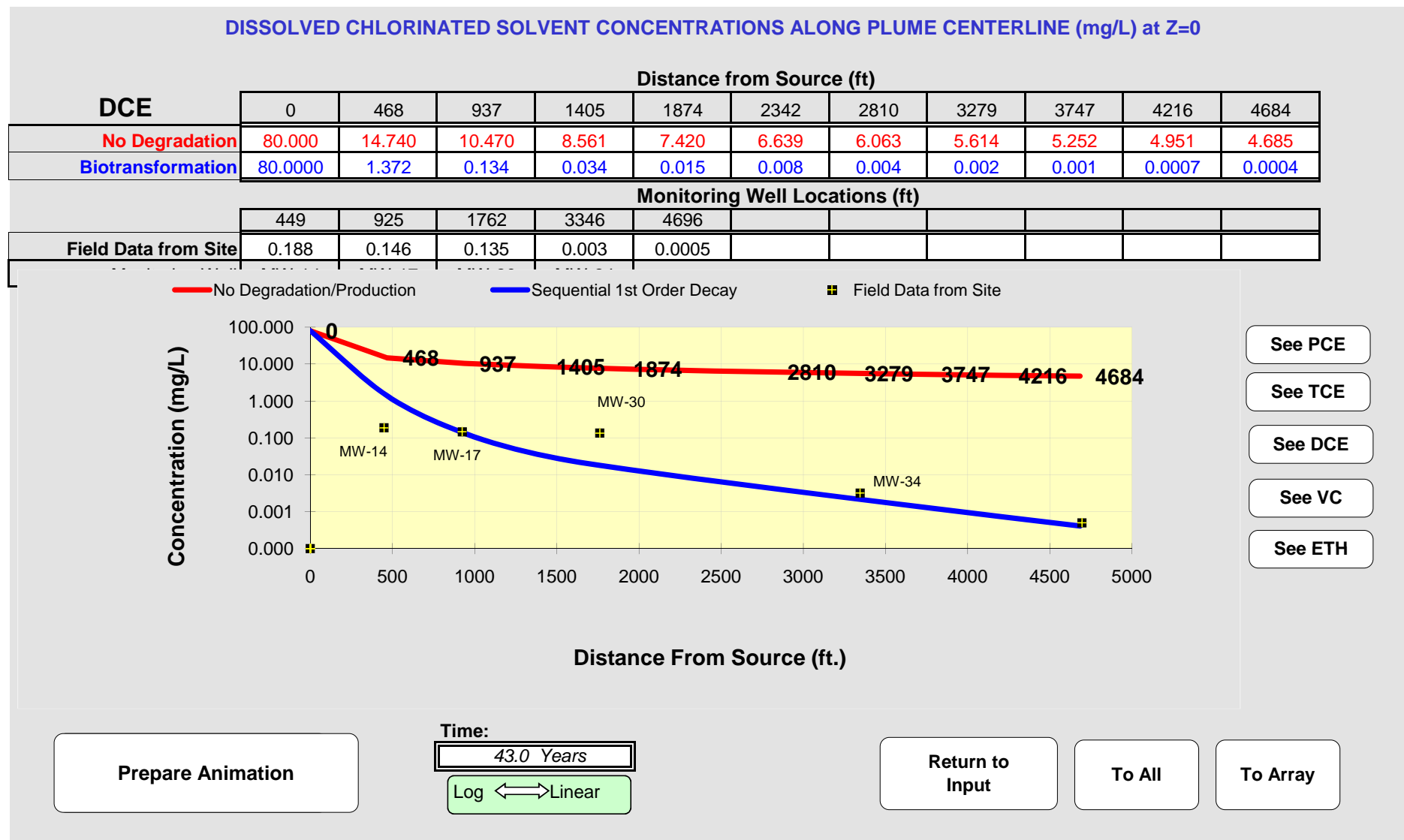
Restore Formulas

RESET

SEE OUTPUT

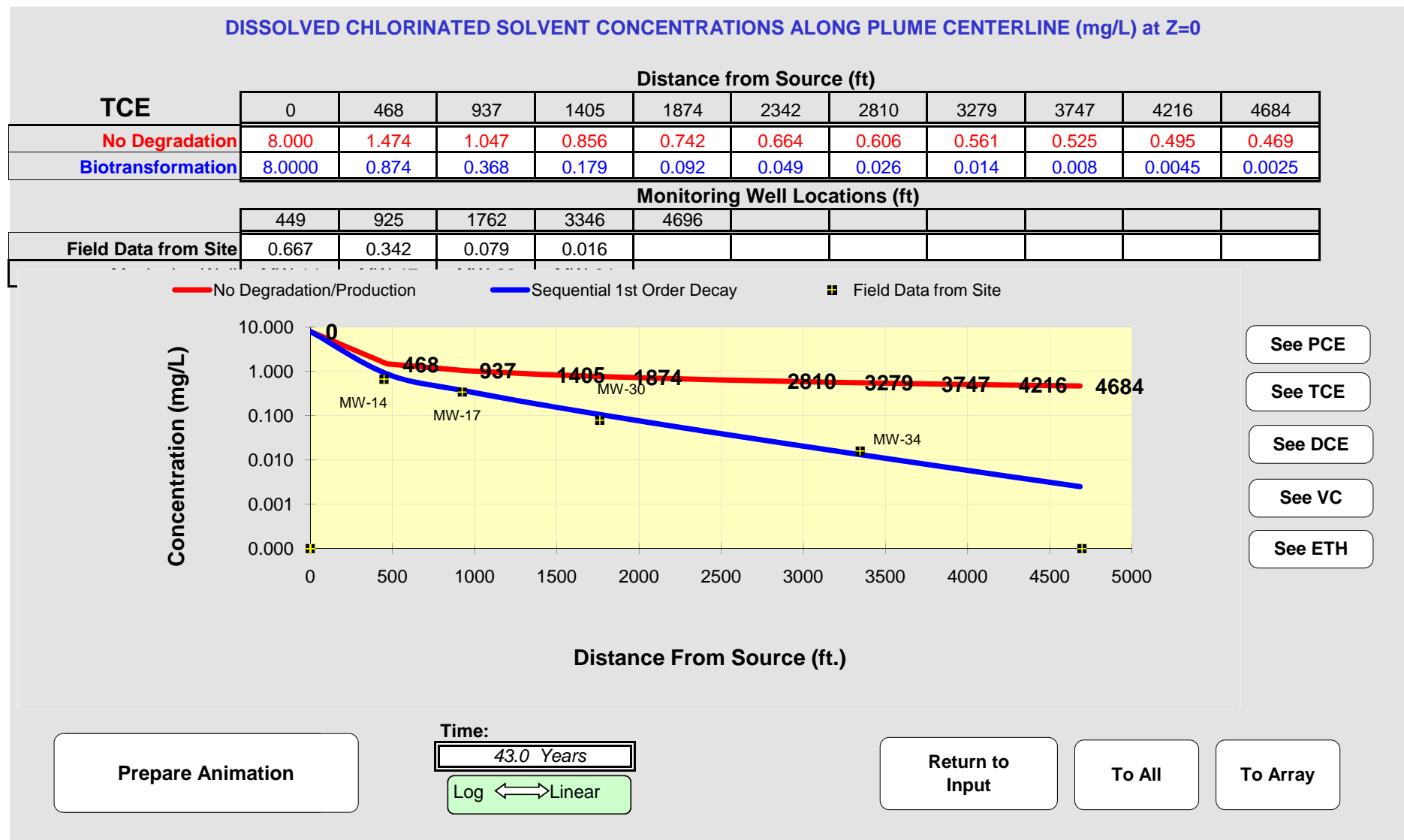
Paste Example

# Simulation #1 - cis-1,2-DCE

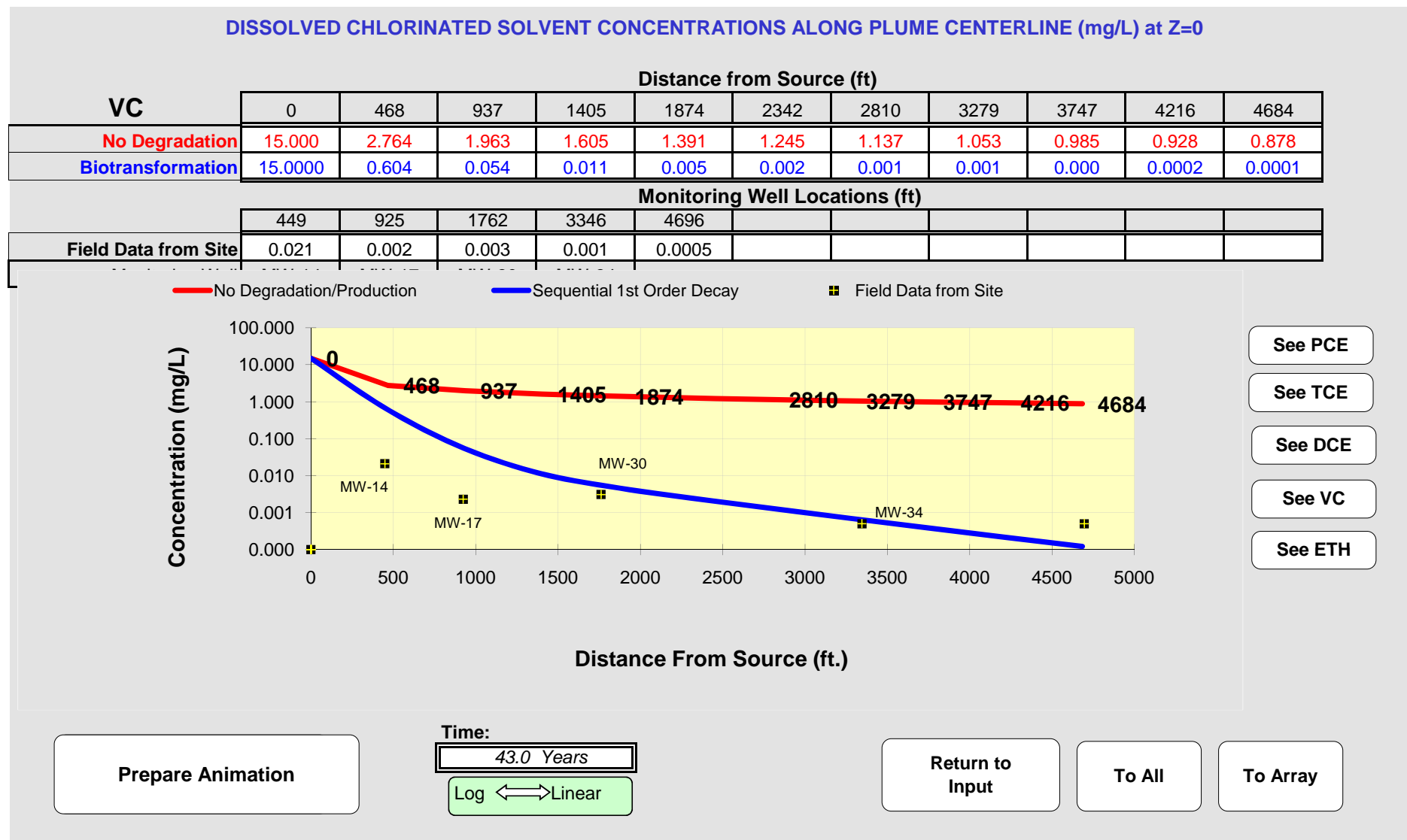




# Simulation #1 - TCE

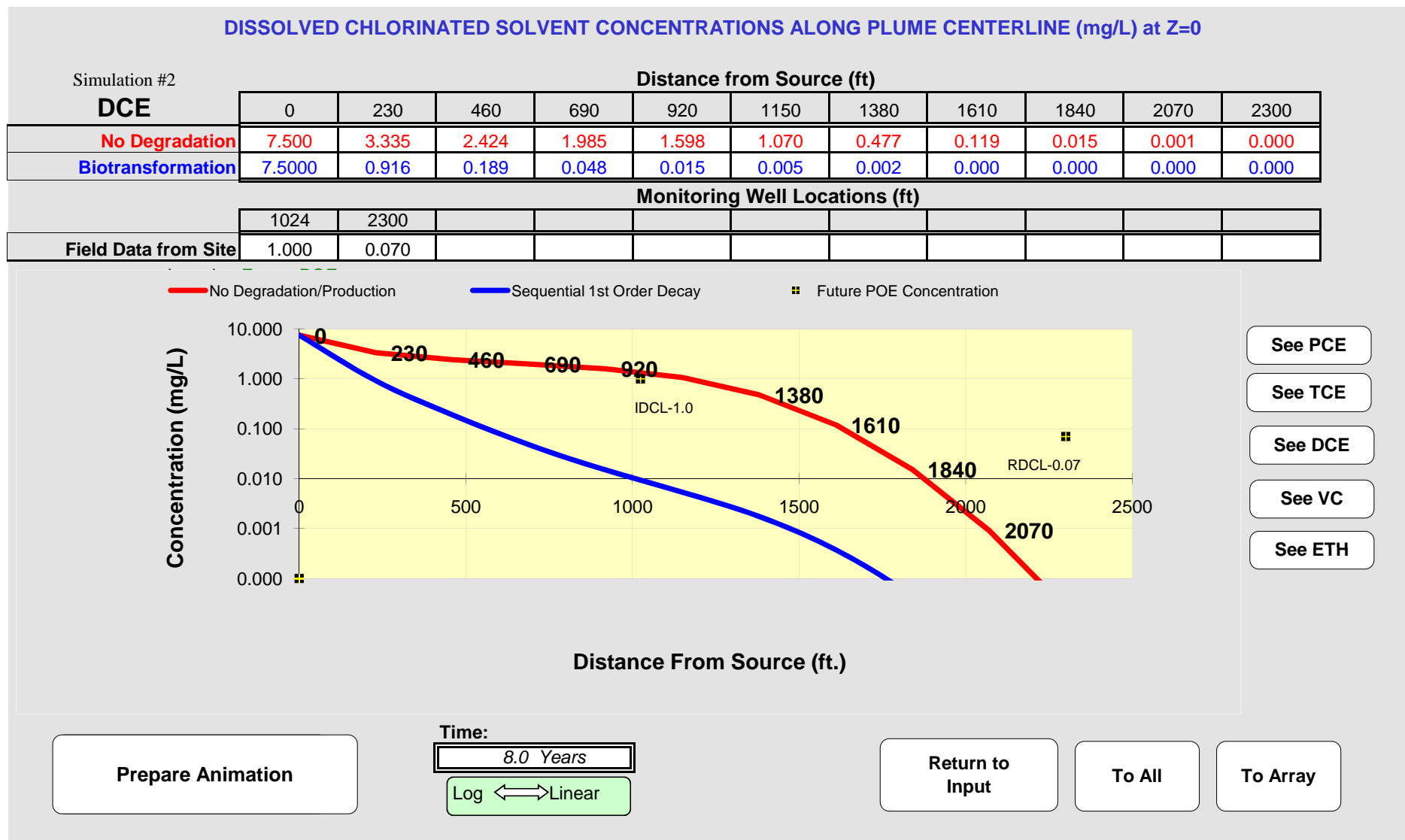


## Simulation #1 - Vinyl Chloride

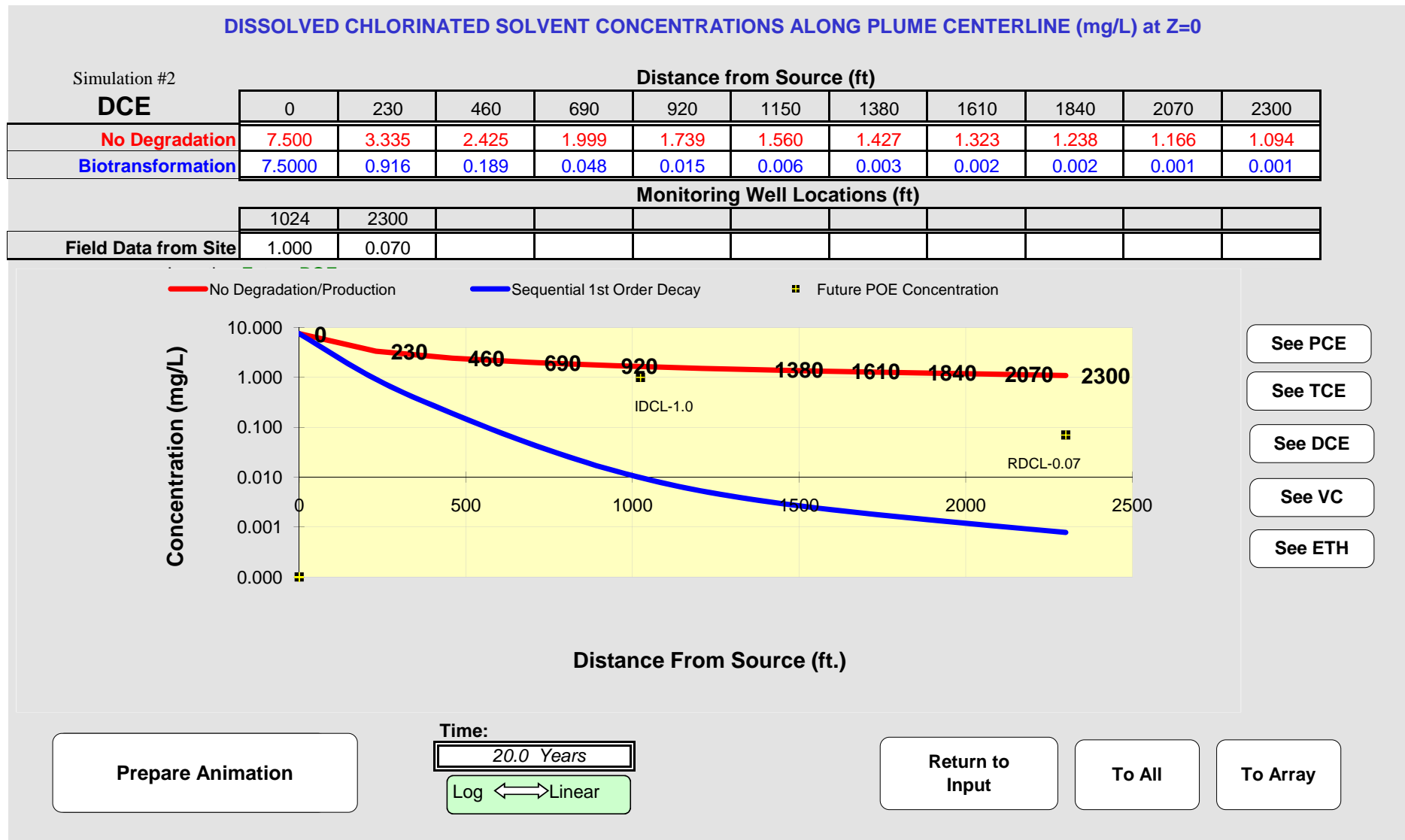


BIOCHLOR22\_5-13-11 simulation #2rjc.xls

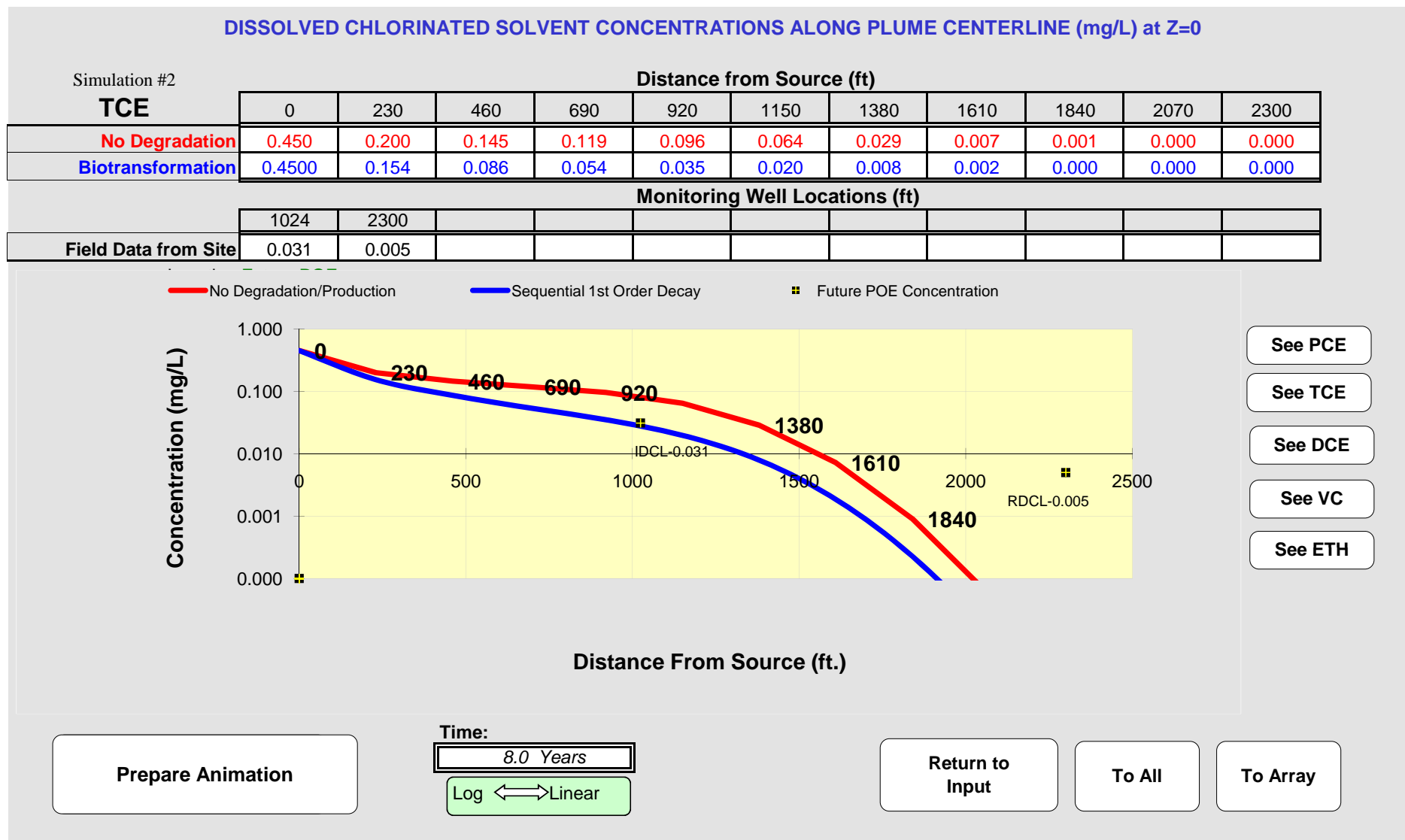
## Simulation #2 - cis-1,2-DCE



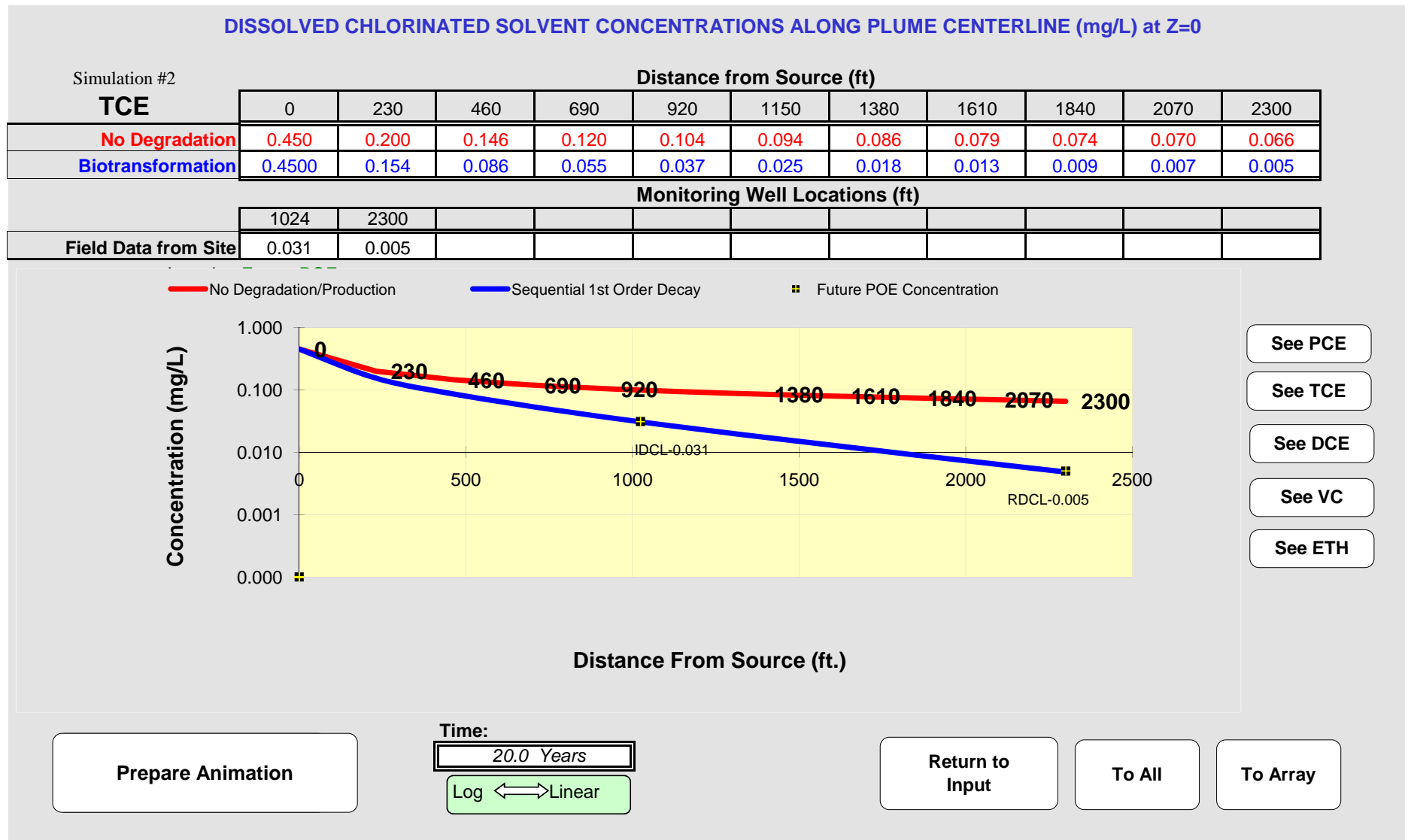
## Simulation #2 - cis-1,2-DCE



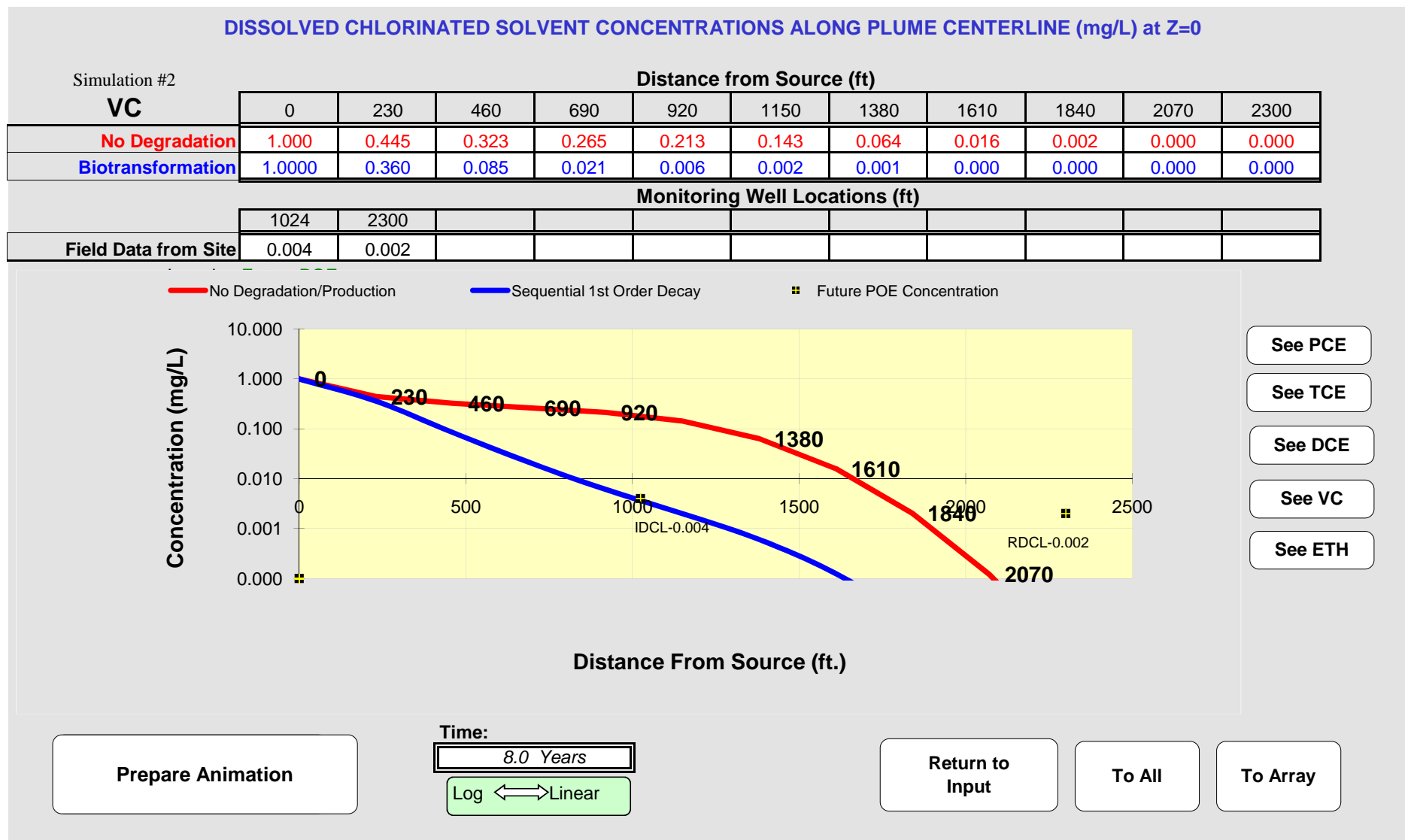
## Simulation #2 - TCE



## Simulation #2 - TCE

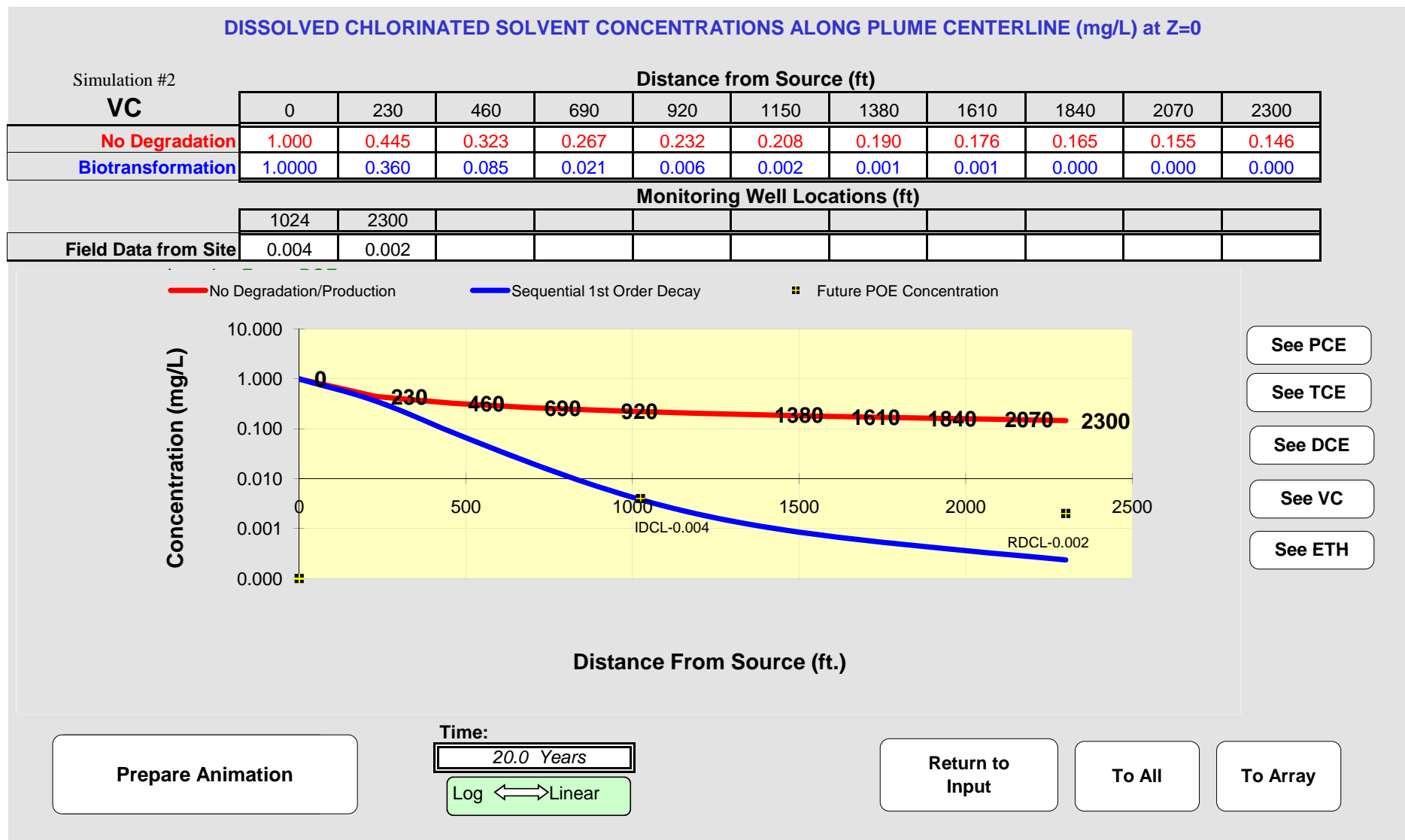


## Simulation #2 - Vinyl Chloride



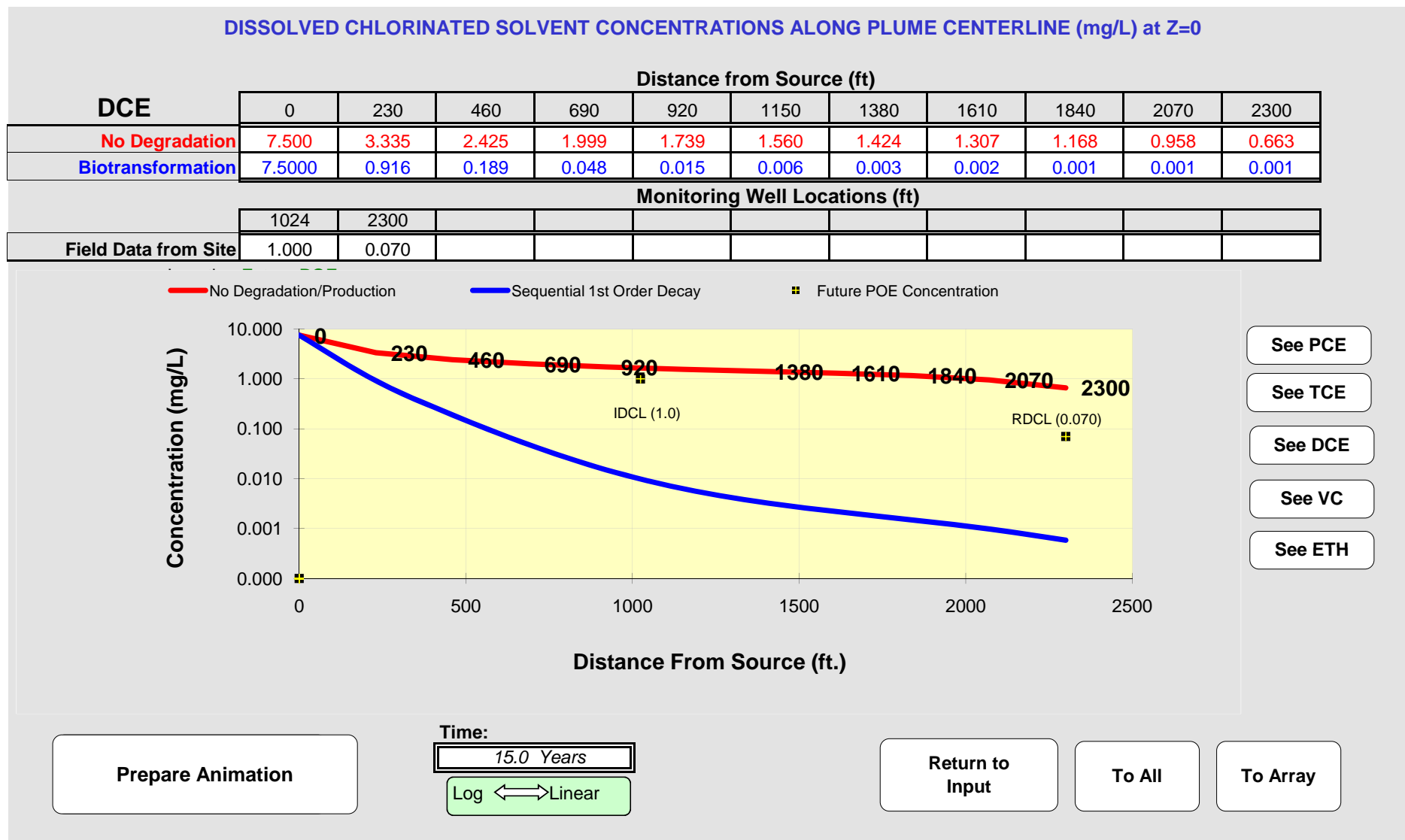


## Simulation #2 - Vinyl Chloride

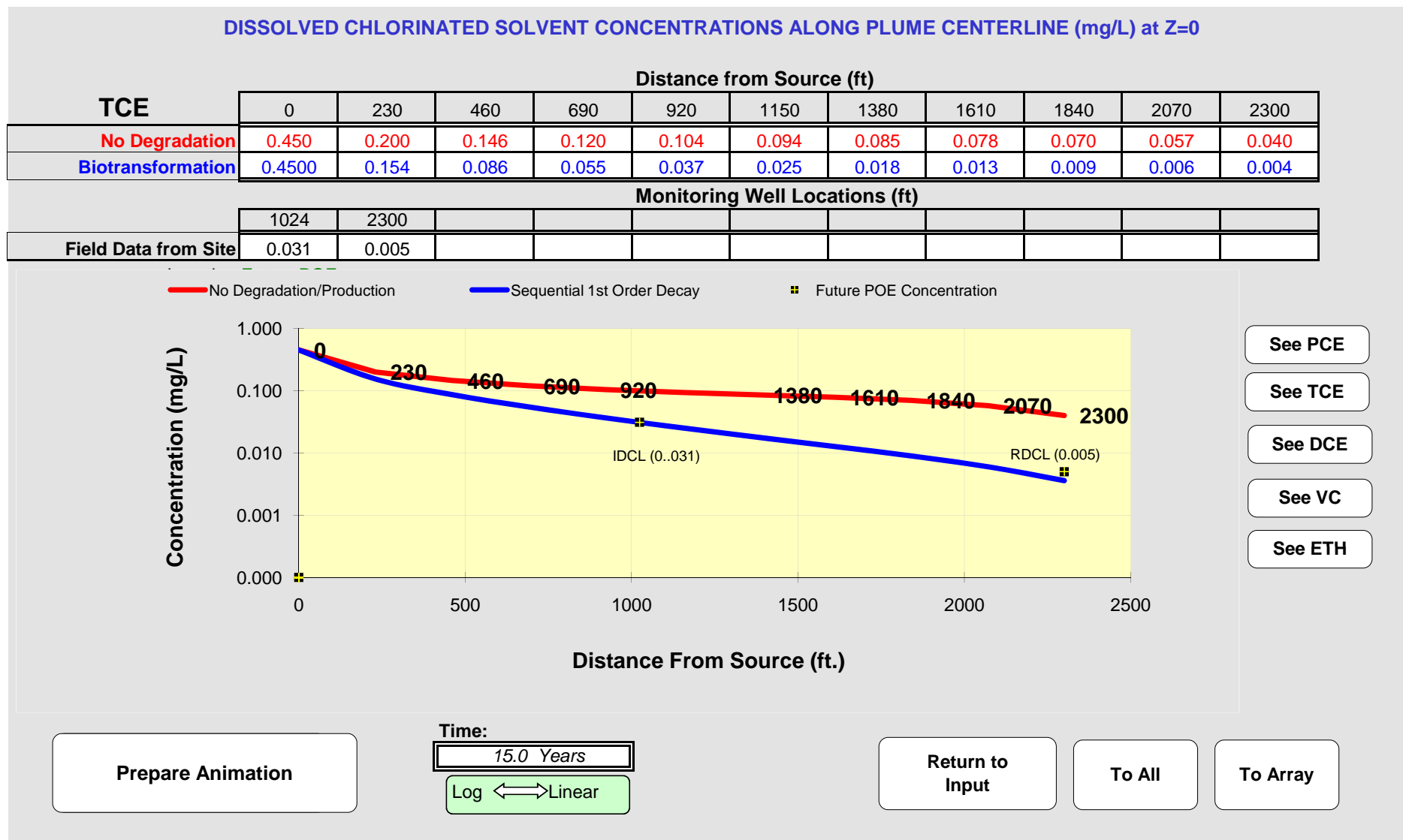




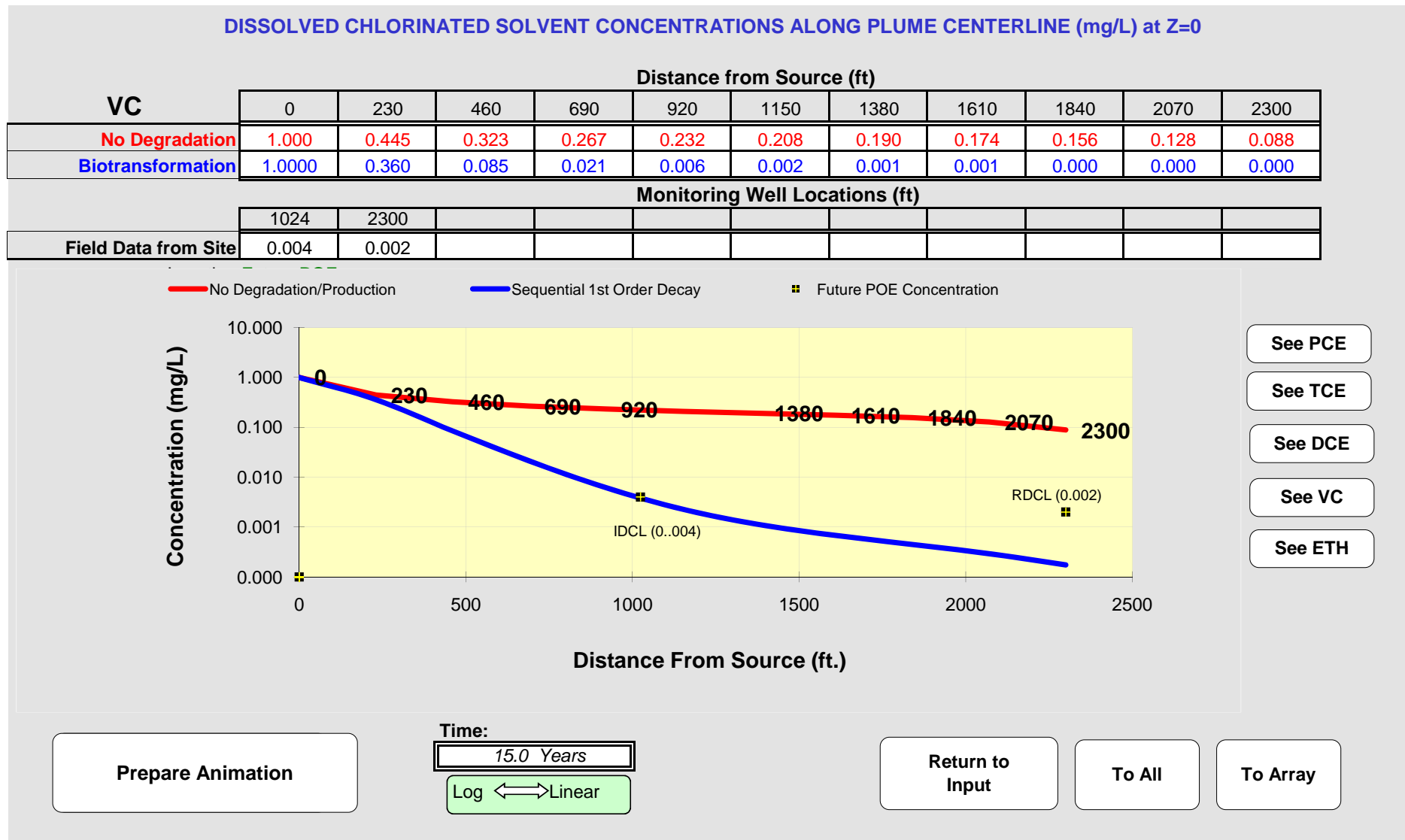
### Simulation #3 - cis-1,2-DCE



## Simulation #3 - TCE



## Simulation #3 - Vinyl Chloride





Textron, Inc.  
TORX Facility, Rochester, Indiana  
Remediation Feasibility Study

## **APPENDIX G**

### **ENVIRONMENTAL RESTRICTIVE CONVENANT**

## **Environmental Restrictive Covenant**

THIS ENVIRONMENTAL RESTRICTIVE COVENANT ("Covenant") is made this \_\_\_\_\_ day of [*month*], 20\_\_\_\_, by [*insert name and address of property owner*].

WHEREAS: Owner is the fee owner of certain real estate in the County of Fulton, Indiana, which is located at [*insert address of site*] and more particularly described in the attached Exhibit "A" ("Real Estate"), which is hereby incorporated and made a part hereof. This Real Estate was acquired by deed on \_\_\_\_\_, and recorded on \_\_\_\_\_, as Deed Record \_\_\_\_\_, in the Office of the Recorder of \_\_\_\_\_ County, Indiana. The Real Estate consists of approximately \_\_\_\_\_ acres and has also been identified by the county as parcel identification number[s] [*insert 18-digit parcel identification number(s) as described in 50 IAC 23-8-1*]. [*Optional: The Real Estate, to which the restrictions in this Covenant apply, is depicted on a map attached hereto as Exhibit \_\_\_\_.*]

WHEREAS: Certain contaminants have been identified in groundwater at and in the vicinity of the Torx facility located at 4366 N Old US 31, Rochester, and Textron Inc. ("Textron") will be conducting remediation activities under the oversight of the Indiana Department of Environmental Management ("Department"), State Cleanup Site Number 7100149.

WHEREAS: Certain contaminants will remain in groundwater at and in the vicinity of the Torx facility and land use restrictions must be maintained to ensure the protection of public health, safety, or welfare, and the environment.

WHEREAS: It is Textron's plan to extend the City of Rochester water line to the area that includes the Real Estate and distribute water from that line for potable uses to area properties, including the Real Estate.

WHEREAS: The water line and distribution system would be operated under the oversight of the South Richland Conservancy District ("District") and managed and funded by Textron pursuant to a conservancy district plan to be approved by the Indiana Natural Resources Commission and the Fulton County Circuit Court.

WHEREAS: Environmental investigation reports and other related documents may be examined at the offices of the Department, which is located in the Indiana Government Center North building at 100 N. Senate Avenue, Indianapolis, Indiana. The documents may also be viewed electronically in the Department's Virtual File Cabinet by accessing the Department's Web Site (currently [www.in.gov/idem/](http://www.in.gov/idem/)).

NOW THEREFORE, [*insert name of Owner*] subjects the Real Estate to the following restrictions and provisions, which shall be binding on the current Owner and all future Owners:

## I. RESTRICTIONS

### 1. Restrictions.

Effective from the date that water from the City of Rochester is available to the Real Estate, there shall be no installation or use of water wells on the Real Estate for potable purposes or for any purpose inside any home or business. There shall be no City water used for outdoor uses, such as irrigation and agricultural uses; instead the well at the Real Estate shall be used for outdoor uses. *[The following will be included if there is a ground monitoring well at the property in question: The Owner shall not damage or destroy the groundwater monitoring well(s) located on the Real Estate].*

## II. GENERAL PROVISIONS

2. Restrictions to Run with the Land. The restrictions and other requirements described in this Covenant shall run with the land and be binding upon, and inure to the benefit of the Owner of the Real Estate and the Owner's successors, assignees, heirs, lessees licensees, invitees, guests, or persons acting under their direction or control (hereinafter "Related Parties"). No transfer, mortgage, lease, license, easement, or other conveyance of any interest in or right to occupancy in all or any part of the Real Estate by any person shall affect the restrictions set forth herein. This Covenant is imposed upon the entire Real Estate unless expressly stated as applicable only to a specific portion thereof.
3. Binding upon Future Owners. By taking title to an interest in or occupancy of the Real Estate, any subsequent Owner or Related Party agrees to comply with all other terms of this Covenant.
4. Access for Department. The Owner on Owner's behalf and the behalf of Owner's successors shall grant to the Department and its designated representatives the right to enter upon the Real Estate at reasonable times for the purpose of monitoring compliance with this Covenant and ensuring its protectiveness.
5. Access for Textron. Owner on Owner's behalf and on behalf of Owner's successors grants to Textron access to the Real Estate for the purpose of constructing and maintaining the lateral connection to the water main *[The following will be included if there is a ground monitoring well at the property in question: and sampling groundwater monitoring wells on the Real Estate].*



6. Written Notice of the Presence of Contamination. Owner agrees to include in any instrument conveying any interest in any portion of the Real Estate, including but not limited to deeds, leases and subleases (excluding mortgages, liens, similar financing interests, and other non-possessory encumbrances), the following notice provision (with blanks to be filled in):

**NOTICE: THE INTEREST CONVEYED HEREBY IS SUBJECT TO AN ENVIRONMENTAL RESTRICTIVE COVENANT, DATED \_\_\_\_\_ 20\_\_, RECORDED IN THE OFFICE OF THE RECORDER OF \_\_\_\_\_ COUNTY ON \_\_\_\_\_, 20\_\_, INSTRUMENT NUMBER (or other identifying reference) \_\_\_\_\_ IN FAVOR OF AND ENFORCEABLE BY THE INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT.**

7. Indiana Law. This Covenant shall be governed by, and shall be construed and enforced according to, the laws of the State of Indiana.

### III. ENFORCEMENT

8. Enforcement. Pursuant to IC 13-14-2-6 and other applicable law, the Department may proceed in court by appropriate action to enforce this Covenant. If any owner of the Real Estate, or any owner's Related Parties, breach this Covenant or otherwise default hereunder, IDEM shall have the right to request specific performance and/or immediate injunctive relief to enforce this Covenant in addition to any other remedies it may have at law or at equity. Owner agrees that the provisions of this Covenant are enforceable and agrees not to challenge the provisions or the appropriate court's jurisdiction.

### IV. TERM, MODIFICATION AND TERMINATION

9. Term. The restrictions shall apply until the Department determines that the contaminants of concern no longer present an unacceptable risk to the public health, safety, or welfare, or to the environment.
10. Modification and Termination. This Covenant shall not be amended, modified, or terminated without the Department's prior written approval. Within thirty (30) days of executing an amendment, modification, or termination of the Covenant, Owner shall record such amendment, modification, or termination with the Office of the Recorder of Fulton County and within thirty (30) days after recording, provide a true copy of the recorded amendment, modification, or termination to the Department.

### V. MISCELLANEOUS

11. Waiver. No failure on the part of the Department at any time to require performance by

any person of any term of this Covenant shall be taken or held to be a waiver of such term or in any way affect the Department's right to enforce such term, and no waiver on the part of the Department of any term hereof shall be taken or held to be a waiver of any other term hereof or the breach thereof.

12. Change in Law, Policy or Regulation. In no event shall this Covenant be rendered unenforceable if Indiana's laws, regulations, RISC guidelines, or remediation policies (including those concerning environmental restrictive covenants, or institutional or engineering controls) change as to form or content.

13. Notices. Any notice, demand, request, consent, approval or communication that either party desires or is required to give to the other pursuant to this Covenant shall be in writing and shall either be served personally or sent by first class mail, postage prepaid, addressed as follows:

To Owner: [*insert owner's name and address*]

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To Textron:

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To Department:

IDEM, Office of Land Quality  
100 N. Senate Avenue  
IGCN 1101  
Indianapolis, IN 46204-2251  
Attn: Section Chief, Leaking Underground Storage Tank Program

14. Severability. If any portion of this Covenant or other term set forth herein is determined by a court of competent jurisdiction to be invalid for any reason, the surviving portions or terms of this Covenant shall remain in full force and effect as if such portion found invalid had not been included herein.

15. Authority to Execute and Record. The undersigned person executing this Covenant represents that he or she is the current fee Owner of the Real Estate or is the authorized representative of the Owner, and further represents and certifies that he or she is duly

authorized and fully empowered to execute and record, or have recorded, this Covenant.

IN WITNESS WHEREOF, *[Insert Owner's Name]*, the said Owner of the Real Estate described above has caused this Environmental Restrictive Covenant to be executed on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

I affirm, under the penalties for perjury, that I have taken reasonable care to redact each Social Security number in this document, as required by law.

\_\_\_\_\_  
*[Insert Owner's Name]*

STATE OF \_\_\_\_\_ )  
 ) SS:  
COUNTY OF \_\_\_\_\_ )

Before me, the undersigned, a Notary Public in and for said County and State, personally appeared \_\_\_\_\_, the \_\_\_\_\_ of the Owner, \_\_\_\_\_, who acknowledged the execution of the foregoing instrument for and on behalf of said entity.

Witness my hand and Notarial Seal this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
\_\_\_\_\_, Notary Public

Residing in \_\_\_\_\_ County, \_\_\_\_\_

My Commission Expires:

This instrument prepared by:  
*[insert name and address]*

**I affirm, under the penalties for perjury, that I have taken reasonable care to redact each Social Security number in this document, unless required by law:**  
***[insert name and address]***

**EXHIBIT A**

**LEGAL DESCRIPTION OF REAL ESTATE**



Textron, Inc.  
TORX Facility, Rochester, Indiana  
Remediation Feasibility Study

## APPENDIX H

### MASS BALANCE CALCULATIONS

**Alternative 2 - Perozone System Mass Balance Calculations**  
**Torx Facility, 4366 North Old US Highway 31, Rochester, Indiana**

Treatment Location: Source Area			
Soluble Mass Calculation		Adsorbed Mass Calculation	
Source Area Square Feet	19,429	Source Area Square Feet	19,429
Source Area Saturated Depth	15	Source Area Saturated Depth	15
Source Area Cubic Feet	291,435	Source Area Cubic Feet	291,435
Porosity (estimated)	0.30	Porosity (estimated)	0.30
Estimated CVOC concentration (mg/L)	70	Estimated CVOC concentration (mg/kg)	30
Other Organic Concentration (mg/L), estimated	10	Other Organic Concentration (mg/kg), estimated	20
Total Organic Concentration (mg/L)	80	Total Organic Concentration (mg/kg)	50
Groundwater Density	1.0	Soil Bulk Density (cm <sup>3</sup> )	1.7
Total Soluble Mass (kg)	198	Total Mass (kg)	701
Oxidant Correction Factor	3	Oxidant Correction Factor	3
Required Oxidant	594	Required Oxidant	2,103
Adsorbed/Soluble Mass Calculated Safety Factor* = 3.54			
Total Oxidant Required (kg) = 2,697			
Perozone System Oxidant Delivery (kg/day) = 2.88			
Perozone System Operating Efficiency (%) = 80%			
Estimated Time to Treat Organic Mass (days) = 1,171			
Estimated Time to Treat Organic Mass (years) = 3.2			
Notes:			
Soluble Mass Calculation:			
Source volume (ft3) x porosity x concentration (mg/l) x 28.3l/ft3 x g/1000 mg x 1 kg/1000 g			
Adsorbed Mass Calculation:			
Source volume (ft <sup>3</sup> ) x density (g/cm <sup>3</sup> ) x 1cm/3.53 <sup>10-5</sup> ft <sup>3</sup> x concentration (mg/kg) x 1 kg/1000g x 1.0 <sup>10-6</sup> kg/1000 mg			
mg/kg = milligrams per kilogram			
mg/L = milligrams per liter			
kg = kilograms			
* = Safety factor between 2 and 4 recommended by Kerfoot			
Oxidation Correction Factor: Mass ratio of oxidant to oxidize organic compounds			
Prepared By: RJC			
Checked By: PJS			

**Alternative 3  
Source Area Treatment  
Zero Valent Iron**

Source Area: 19,700 ft<sup>2</sup>  
Thickness: 15 - 20 feet  
Porosity: 30%  
Soil Mass: 14,416,818 kg  
Groundwater Mass: 3,352,580 kg  
Groundwater Volume: 3,380,520 liters

**Contaminant Concentrations:**

TCE ..... 8.8 mg/L  
1,2-DCE ..... 74 mg/L  
Vinyl Chloride ..... 23 mg/L

**Groundwater Mols:**

TCE ..... 227 mol  
1,2-DCE ..... 1,830 mol  
Vinyl Chloride ..... 122 mol

**Soil Mols:**

TCE ..... 3,214 mol  
1,2-DCE ..... 7,803 mol  
Vinyl Chloride ..... 1,984 mol

Mass ZVI: ..... 158,00 lbs

Mass ABC: ..... 52,660 lbs

Total Volume 20% Slurry:.. 90,000 gallons

Percent Pore Volume: ..... 10.1%

### Alternative 3 Biostimulation Areas

Area	Total (ft <sup>2</sup> )	Saturated Volume (ft <sup>3</sup> )	Soil Mass (kg)	Groundwater Concentration			Total Mols CVOC (mols)	Stoichiometric Mass Lactate (lbs)	Competing Acceptor Demand (lbs)	Nonspeciated Demands (lbs)	ABC Mass (lbs)	ABC Volume (gallons)	Dilution Volume (gallons)	Total Volume (gallons)	Percent Pore Volume
				TCE (mg/L)	1,2-DCE (mg/L)	Vinyl Chloride (mg/L)									
A	28,200	84,600	9,870,000	0.012	17.0	3.0	2,255.5	119	328.0	20,720	42,400	5,019	30,000	34,952	5.5
B	19,200	172,800	20,160,000	0.18	5.7	0.94	1,415	80	670.1	31,960	65,000	7,700	54,000	61,700	4.77
C	12,000	162,000	18,900,000	0.15	5.0	1.3	1,251.7	69.7	634.8	29,300	60,010	7,100	57,500	64,600	5.33
D	30,000	270,000	31,500,000	0.049	1.5	1.3	906.4	45.1	1,045.1	32,979	68,141	8,016	92,000	100,016	4.95



### **Alternative 4 On-Site ZVI Reactive Zone**

Source Area:	19,700 ft <sup>2</sup>
Source Thickness:	15 feet
Wall Area:	9,000 ft <sup>2</sup>
Wall Saturated Thickness:	20 feet
Groundwater Upgradient:	2,535,390 liters
Soil Mass Upgradient:	10,342,500 kg
Groundwater at Wall:	1,544,400 liters
Soil Mass at Wall:	6,300,000 kg

Residual Source Concentrations: -20%

Residual Source CVOC mols:

TCE .....	687.4 mol
1,2-DCE .....	1,926 mol
Vinyl Chloride .....	420 mol

Wall Area Mols:

TCE .....	2.05 mol
1,2-DCE .....	1,049 mol
Vinyl Chloride .....	252.5 mol

Total CVOC Mols: ..... 4,336.95 mol

ZVI Wall Loading:..... 75,000 lbs

Mass ABC: ..... 31,714 lbs

Total Volume 20% Slurry: .. 49,950 gallons

Percent Pore VOC ..... 12.1%

**Alternative 4**  
**Downgradient ZVI Reactive Zone**

Area Downgradient from Biostimulation: 27,000 ft<sup>2</sup>

Thickness:	30 feet
Porosity:	30%
Soil Mass Upgradient:	28,266,000 kg
Groundwater Mass:	6,887,258 kg
Groundwater Volume:	6,929,200 liters

Contaminant Concentrations:

TCE .....	0.049 mg/L
1,2-DCE .....	1.5 mg/L
Vinyl Chloride .....	1.3 mg/L

Groundwater mols:

TCE .....	2.6 mol
1,2-DCE .....	107 mol
Vinyl Chloride .....	143 mol

Soil mols:

TCE .....	34.6 mol
1,2-DCE .....	312.8 mol
Vinyl Chloride .....	216 mol

Mass ZVI:..... 140,000 lbs

Mass ABC: ..... 60,000 lbs

Total Volume 21% Slurry: 79,800 gallons

### Alternative 4 Biostimulation Areas

Area	Total (ft <sup>2</sup> )	Saturated Volume (ft <sup>3</sup> )	Soil Mass (kg)	Groundwater Concentration			Total Mols CVOC (mols)	Stoichiometric Mass Lactate (lbs)	Competing Acceptor Demand (lbs)	Nonspeciated Demands (lbs)	ABC Mass (lbs)	ABC Volume (gallons)	Dilution Volume (gallons)	Total Volume (gallons)	Percent Pore Volume
				TCE (mg/L)	1,2-DCE (mg/L)	Vinyl Chloride (mg/L)									
Source	19,700	118,200	14,416,818	8.8	74.0	23.0	15,177	928.5	457.0	20,760	44,300	5,200	36,000	41,200	4.66
A	19,200	86,400	10,080,000	0.014	4.9	1.4	627.9	34.8	334.0	15,988	32,700	3,850	27,000	30,850	4.77
B	19,800	178,200	20,790,000	0.18	5.7	0.94	1,458.7	84.5	689.9	32,920	67,388	7,928	58,000	65,929	4.95
C	12,000	162,200	18,900,000	0.15	5.0	1.3	1,251.7	69.7	634.8	24,795	57,000	6,000	54,000	60,000	4.95



Textron, Inc.  
TORX Facility, Rochester, Indiana  
Remediation Feasibility Study

## **APPENDIX I**


### **SUMMARY OF COST ESTIMATES**

Alternative 2					
Perozone Treatment and Natural Attenuation with Institutional/Engineering Controls					
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana					
Direct Capital Costs		Cost	Subtotal Cost	Total Section Cost	Total Alternative Cost
Pre-Design Assessment		\$ 75,000			
Pilot Scale Test		\$ 120,000			
Work Plan/Permitting	Source Area	\$ 55,000			
	Limited Off-Site Treatment Areas	\$ 10,000			
Drilling Costs	Source Area	\$ 330,000			
	Limited Off-Site Treatment Areas	\$ 150,000			
Remediation System and Building Cost	Source Area	\$ 660,000			
	Limited Off-Site Treatment Areas	\$ 470,000			
System Ancillary Piping Installation	Source Area	\$ 180,000			
	Limited Off-Site Treatment Areas	\$ 85,000			
Sub-Slab Depressurization System		\$ 60,000			
Waste Management		\$ 8,000			
Direct Cost Subtotal			\$2,203,000		
Indirect Capital Costs		1%	\$ 22,030		
Health and Safety		1%	\$ 22,030		
Legal, Administrative, and Permitting		2%	\$ 44,060		
Services During Construction		1%	\$ 22,030		
Contingency		5%	\$ 110,150		
Indirect Cost Subtotal			\$ 220,300		
Total Capital Costs				\$2,423,300	
Operation & Maintenance (O&M) and Groundwater Monitoring Costs					
O&M and Reporting for 5 years (monthly visits)		\$ 640,000			
Additional O&M/Reporting based on remedial technology		NA			
Annual Groundwater Monitoring (GW) of 56 wells for 12 years <sup>(1)</sup>		\$ 600,000			
Additional Groundwater Monitoring (89 wells, Semi-Annual) based on remedial technology for 5 years (includes ISCO analytical parameters)		NA			
Remediation Performance Monitoring (Quarterly) for 5 years - 23 Wells		\$ 655,000			
Post Remediation Closure GW Monitoring (Quarterly) for 7 years - 23 Wells		\$ 875,000			
Total Alternative 2 Costs					\$ 5,193,300

(1) Includes sampling of 79 wells as 23 wells are sampled quarterly as part of remediation and closure monitoring.

<b>Alternative 3</b> <b>Insitu Chemical Reduction of Source Area and Down-Gradient Anaerobic Treatment and Natural Attenuation with Institutional/Engineering Controls</b> <b>TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana</b>					
Direct Capital Costs		Cost	Subtotal Cost	Total Section Cost	Total Alternative Cost
Pre-Design Assessment		\$ 88,000			
Pilot Scale Test		\$ 95,000			
Work Plan/Permitting	Source Area	\$ 55,000			
	Off-Site Treatment Areas	\$ 5,000			
Drilling/Application Costs	Source Area ISCR (2 applications)	\$ 1,318,000			
	Off-Site Treatment Areas	\$ 330,000			
Remediation System and Building Cost	Source Area	NA			
	Off-Site Treatment Areas	NA			
HRC/Inoculum Injections (3 Applications)	Source Area	N/A			
	Off-Site Treatment Areas (3 applications)	\$ 710,000			
Sub-Slab Depressurization System		\$ 80,000			
Waste Management		\$ 2,000			
Direct Cost Subtotal			\$2,683,000		
<b>Indirect Capital Costs</b>		1%	\$ 26,830		
Health and Safety		1%	\$ 26,830		
Legal, Administrative, and Permitting		2%	\$ 53,660		
Services During Construction		1%	\$ 26,830		
Contingency		5%	\$ 134,150		
Indirect Cost Subtotal			\$ 268,300		
Total Capital Costs				\$2,951,300	
<b>Operation &amp; Maintenance (O&amp;M) and Groundwater Monitoring Costs</b>					
O&M and Reporting for 5 years (monthly visits)		NA			
Additional O&M/Reporting (5 years) based on remedial technology		NA			
Annual Groundwater Monitoring (GW) of 56 wells for 9 years <sup>(1)</sup>		\$ 450,000			
Additional Groundwater Monitoring (89 wells, Semi-Annual) based on remedial technology (5 years)		N/A			
Remediation Performance Monitoring (Quarterly) for 3 years - 23 Wells (includes anaerobic degradation analytical parameters)		\$ 530,000			
Post Remediation Closure GW Monitoring (Quarterly) for 7 years - 23 Wells		\$ 875,000			
<b>Total Alternative 3 Costs</b>					\$ 4,806,300

(1) Includes sampling of 79 wells as 23 wells are sampled quarterly as part of remediation and closure monitoring.

Prepared By: RJC  
Checked By: PJS 

Alternative 4					
Anaerobic Biostimulation and ZVI Reactive Zones at Source Area and Down-Gradient Treatment Areas					
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana					
Direct Capital Costs		Cost	Subtotal Cost	Total Section Cost	Total Alternative Cost
Pre-Design Assessment		\$ 88,000			
Pilot Scale Test		\$ 95,000			
Work Plan/Permitting	Source Area	\$ 55,000			
	Off-Site Treatment Areas	\$ 5,000			
Biostimulation Injections (3 injections)	Source Area	\$ 437,000			
	Off-Site Treatment Areas	\$ 698,000			
Remediation System and Building Cost		N/A			
ZVI Reactive Zones (2 injections)	Source Area	\$ 668,000			
	Off-Site Treatment Areas	\$ 968,000			
Sub-Slab Depressurization System		\$ 80,000			
Waste Management		\$ 2,000			
Direct Cost Subtotal			\$3,096,000		
Indirect Capital Costs		1%	\$ 30,960		
Health and Safety		1%	\$ 30,960		
Legal, Administrative, and Permitting		2%	\$ 61,920		
Services During Construction		1%	\$ 30,960		
Contingency		5%	\$ 154,800		
Indirect Cost Subtotal			\$ 309,600		
Total Capital Costs				\$3,405,600	
Operation & Maintenance (O&M) and Groundwater Monitoring Costs					
O&M and Reporting for 5 years (monthly visits)		N/A			
Additional O&M/Reporting (10 years) based on remedial technology		N/A			
Annual Groundwater Monitoring (GW) of 56 wells for 9 years <sup>(1)</sup>		\$ 450,000			
Additional Groundwater Monitoring (89 wells, Semi-Annual) based on remedial technology (5 years)		N/A			
Remediation Performance Monitoring (Quarterly) for 3 years - 23 Wells (includes anaerobic degradation analytical parameters)		\$ 530,000			
Post Remediation Closure GW Monitoring (Quarterly) for 7 years - 23 Wells		\$ 875,000			
Total Alternative #4 Costs					\$ 5,260,600

(1) Includes sampling of 79 wells as 23 wells are sampled quarterly as part of remediation and closure monitoring.

Alternative 5					
Pump and Treat and Natural Attenuation with Institutional/Engineering Controls					
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana					
Direct Capital Costs		Cost	Subtotal Cost	Total Section Cost	Total Alternative Cost
Pre-Design Assessment		\$ 75,000			
Pilot Scale Test		\$ 140,000			
Work Plan/Permitting	Source Area	\$ 55,000			
	Limited Off-Site Treatment Areas	\$ 10,000			
Drilling Costs	Source Area	\$ 300,000			
	Limited Off-Site Treatment Areas	\$ 200,000			
Remediation System and Building Cost		\$ 580,000			
System Ancillary Piping Installation	Source Area	\$ 160,000			
	Limited Off-Site Treatment Areas	\$ 100,000			
Sub-Slab Depressurization System		\$ 60,000			
Waste Management		\$ 8,000			
Direct Cost Subtotal			\$ 1,688,000		
Indirect Capital Costs		1%	\$ 16,880		
Health and Safety		1%	\$ 16,880		
Legal, Administrative, and Permitting		2%	\$ 33,760		
Services During Construction		1%	\$ 16,880		
Contingency		5%	\$ 84,400		
Indirect Cost Subtotal			\$ 168,800		
Total Capital Costs				\$ 1,856,800	
Operation & Maintenance (O&M) and Groundwater Monitoring Costs					
O&M and Reporting for 5 years (monthly visits)		\$ 660,000			
Additional O&M/Reporting (10 years) based on remedial technology		\$ 1,320,000			
Annual Groundwater Monitoring (GW) of 56 wells for 22 years <sup>(1)</sup>		\$ 1,100,000			
Remediation Performance Monitoring (Quarterly) for 15 years - 23 Wells		\$ 1,967,000			
Post Remediation Closure GW Monitoring (Quarterly) for 7 years - 23 Wells		\$ 875,000			
Total Alternative #5 Costs					\$ 7,778,800

(1) Includes sampling of 79 wells as 23 wells are sampled quarterly as part of remediation and closure monitoring.

Prepared By: RJC  
Checked By: PJS





Alternative 6					
Air Sparge and SVE/Aerobic Biodegradation and Natural Attenuation with Institutional/Engineering Controls					
TORX Facility, 4366 North Old US Highway 31, Rochester, Indiana					
Direct Capital Costs		Cost	Subtotal Cost	Total Section Cost	Total Alternative Cost
Pre-Design Assessment		\$ 100,000			
Pilot Scale Test		\$ 100,000			
Work Plan/Permitting	Source Area	\$ 55,000			
	Limited Off-Site Treatment Areas	\$ 10,000			
Drilling Costs	Source Area	\$ 320,000			
	Limited Off-Site Treatment Areas	\$ 180,000			
Remediation System and Building Cost	Source Area	\$ 320,000			
	Limited Off-Site Treatment Areas	\$ 300,000			
System Ancillary Piping Installation	Source Area	\$ 180,000			
	Limited Off-Site Treatment Areas	\$ 150,000			
Sub-Slab Depressurization System		\$ -			
Waste Management		\$ 8,000			
Direct Cost Subtotal			\$1,723,000		
Indirect Capital Costs		1%	\$ 17,230		
Health and Safety		1%	\$ 17,230		
Legal, Administrative, and Permitting		2%	\$ 34,460		
Services During Construction		1%	\$ 17,230		
Contingency		5%	\$ 86,150		
Indirect Cost Subtotal			\$ 172,300		
Total Capital Costs				\$1,895,300	
Operation & Maintenance (O&M) and Groundwater Monitoring Costs					
O&M and Reporting for 5 years (monthly visits)		\$ 850,000			
Additional O&M/Reporting (5 years) based on remedial technology		NA			
Annual Groundwater Monitoring (GW) of 56 wells for 12 years <sup>(1)</sup>		\$ 600,000			
Additional Groundwater Monitoring (89 wells, Semi-Annual) based on remedial technology for 5 years (includes ISCO analytical parameters)		NA			
Remediation Performance Monitoring (Quarterly) for 5 years - 23 Wells		\$ 655,000			
Post Remediation Closure GW Monitoring (Quarterly) for 7 years - 23 Wells		\$ 875,000			
Total Alternative 3 Costs					\$4,875,300

(1) Includes sampling of 79 wells as 23 wells are sampled quarterly as part of remediation and closure monitoring.