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August 29, 2013

Mr. Peter Quackenbush
Senior Environmental Engineer
Hazardous Waste Section, Resource Management Division
Michigan Department of Environmental Quality
301 E. Louis Glick Highway
Jackson, Michigan 49201-1556

Subject: Former Tecumseh Products Company Site, Tecumseh, Michigan – Request for MDEQ
Review of Site-Specific GSI Criteria

Dear Mr. Quackenbush:

As you are aware, site clean-up and investigation activities at the former Tecumseh Products Company (TPC) site in Tecumseh, Michigan are being conducted under the direction of the United States Environmental Protection Agency (USEPA) as specified in Administrative Order on Consent (AOC) dated March 29, 2010 (RCRA-05-2010-0012). During a March 2012 meeting, USEPA indicated that the Michigan Department of Environmental Quality (MDEQ) Part 201 guidance/rules would be used to assess the acceptability of any discharge of groundwater to surface water. Consequently, TPC submitted the Request to MDEQ for Mixing Zone-Based GSI Criteria on June 19, 2012.

Based on USEPA feedback, MDEQ postponed determination of the Mixing Zone-Based GSI Criteria until USEPA comments on the September 2012 Remedial Investigation and Groundwater Environmental Indicators Report (RI/EI Report) were addressed. The findings of those investigation activities are documented in the July 15, 2013 Technical Memorandum titled, Summary of the Supplemental Groundwater Investigation Activities and First Quarter and Second Quarter 2013 Compliance Monitoring Events. An electronic copy of both the RI/EI Report and the July 15, 2013 Technical Memorandum are attached for reference.

The findings of those investigation activities support the conceptual site model used to develop the June 19, 2012 Request to MDEQ for Mixing Zone-Based GSI Criteria. On June 20, 2012, the components of Part 201, which address groundwater venting to surface water, were amended by the addition of new section 20120e. The attached Technical Memorandum titled Notice of Determination of No Effect or Only De Minimis Effect on Surface Water Body Pursuant to Section 20120e(14) of Part 201 of NREPA: Former Tecumseh Products Company Site in Tecumseh, Michigan (RCRA-05-2010-0012) provides an evaluation of venting groundwater at the site in accordance with the recently

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amended Part 201 statute. As described in the attached, that evaluation demonstrates that affected groundwater which originates in the vicinity of the former TPC site has either no effect or only **de minimis** effect on the River Raisin; therefore, no further response activity with regard to the GSI pathway is required pursuant to Section 20120e(14) of NREPA.

If you have any questions or comments, please feel free to contact me by phone at (734) 585-7813, or by email at gcrockford@trcsolutions.com.

Sincerely,

TRC Environmental Corporation



Graham Crockford, C.P.G.
Project Manager

Attachments:

- Attachment 1 – Request for DEQ Review of Response Activity Plan form
- Attachment 2 – August 23, 2013 Technical Memorandum: Notice of Determination of No Effect or Only De Minimis Effect on Surface Water Body Pursuant to Section 20120e(14) of Part 201 of NREPA: Former Tecumseh Products Company Site in Tecumseh, Michigan (RCRA-05-2010-0012)
- Attachment 3 – July 15, 2013 Technical Memorandum: Summary of the Supplemental Groundwater Investigation Activities and First Quarter and Second Quarter 2013 Compliance Monitoring Events: Former Tecumseh Products Company Site in Tecumseh, Michigan (RCRA-05-2010-0012)
- Attachment 4 – September 2012 Remedial Investigation and Groundwater Environmental Indicator Report

cc: Joseph Kelly, USEPA
Susan Perdomo, USEPA
Daniel Mazur, USEPA
Chris DeWetter, Tecumseh Products Company
Jason Smith, Tecumseh Products Company
Douglas McClure, Conlin, McKenney & Philbrick, PC
Stacy Metz – TRC Environmental Corporation
Central Files

Attachment 1

Request for DEQ Review of Response Activity Plan



Request for DEQ Review of Response Activity Plan

This form is required for submittal of a request for the DEQ to review a Response Activity Plan, under Section 20114b, Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

Section A: Type of Response Activity Plan being Submitted:

Remedial Investigation	☐	Site Specific Criteria	☒
Evaluation Plan	☐	Mixing Zone	☒
Feasibility Study	☐	Section 20118(5) and (6) Request	☐
Remedial Action Plan	☐	Institutional Controls	☐
Interim Response Plan	☐	Other, Specify:	

Section B: Facility/Property Subject to (Check all that apply):

Facility regulated under Part 201, other source, or source unknown Part 201 Site ID, if known:	☒
Leaking Underground Storage Tank regulated pursuant to Part 213 Part 211/213. Facility ID, if known:	☐
Oil or gas production and development regulated pursuant to Part 615 or 625	☐
Licensed landfill regulated pursuant to Part 115	☐
Licensed hazardous waste treatment, storage, or disposal facility regulated pursuant to Part 111	☐
Consent Agreement or other legal agreement with the MDEQ	☐

Section C: Facility and Locational Information:

Facility Name: Former Tecumseh Products Company	County: Lenawee
Street Address of Property: 100 East Patterson Street	City/Village/Township: Tecumseh
City: Tecumseh State: MI Zip: 49286	Town: 5S Range: 4 E Section: 34
Property Tax ID (include all applicable IDs): 325-0250-00 325-0241-00	Quarter: SW Quarter-Quarter: NW and SW
Status of submitter relative to the property (check all that apply):	Decimal Degrees Latitude: 41° 59' 56" north
	Decimal Degrees Longitude: 83° 56' 37" west
	Reference point for latitude and longitude:
	Center of site ☐ Main/front door ☐
	Front gate/main entrance ☒ Other ☐
	Collection method:
	Survey ☐ GPS ☐ Interpolation ☒
Former Current Prospective	
Owner ☒ ☐ ☐	
Operator ☒ ☐ ☐	

Section D: Submitter Information:

Entity requesting review: Tecumseh Products Company	
Contact Person (name and title): Jason Smith	
Submitter Address: 2700 W. Wood Street	State: Tennessee Zip: 38242
City: Paris	E-Mail: jason.smith@tecumseh.com
Telephone: 731-644-8127	
Relationship: Corporate Environmental Director	Company: Tecumseh Products Company
Owner Name, if different from submitter: Tecumseh Food Machinery & Engineering, LLC	State: Michigan Zip: 49286
Address: 100 East Patterson Street	E-Mail: daver12@gmail.com
City: Tecumseh	

Request for DEQ Review of Response Activity Plan

Section E: Are/were the following present at the facility (Check all that apply):

	Current	Previous	Unknown
Free product / Non Aqueous Phase Liquid (NAPL)	☐	☐	☐
Soil contamination above any residential criteria	☒	☐	☐
Soil contamination above any non-residential criteria	☒	☐	☐
Soil aesthetic impacts	☐	☐	☐
Groundwater contamination above any residential criteria	☒	☐	☐
Groundwater contamination above any non-residential criteria	☒	☐	☐
Groundwater contamination above the Acute Inhalation screening level	☐	☐	☐
Groundwater aesthetic impacts	☐	☐	☐
Soil Gas contamination above residential vapor intrusion (VI) screening levels	☒	☐	☐
Soil Gas contamination above non-residential VI screening levels	☒	☐	☐
Conditions immediately dangerous to life or health (IDLH)	☐	☐	☐
Fire & Explosion hazards related to releases	☐	☐	☐
Contamination existing in drinking water supply	☐	☐	☐
Imminent threat to drinking water supply	☐	☐	☐
Impact to Surface Water	☐	☐	☐
Surface Water Sediments above screening levels	☐	☐	☐

Section F: The following questions assist DEQ in evaluating this request.

Known or Suspected Contaminant(s) Type (Check all that apply):

Petroleum ☒ Volatile Organic Compounds ☒ Metals ☐ Other ☐

Current Site Status (Check all that apply):

Undergoing property transfer ☐ Active operations ☐ Inactive operation ☒

Current Property Use:

Residential/Institutional (including schools, nursing homes, hospitals, etc.) ☐
Non-residential ☒

Anticipated Property Use:

Residential/Institutional (including schools, nursing homes, hospitals, etc.) ☐
Non-residential ☒

Estimated Area of Contamination Addressed in Response Action Plan (Cumulative):

Currently undetermined ☐ < 0.5 acre ☐ > 0.5 acre ☒

Migration:

	Yes	No	Unknown
Has contamination migrated beyond the property boundaries?	☒	☐	☐
Has the Notice of Migration been submitted?	☒	☐	☐

Facility Investigation Status:

Ongoing ☒ Complete ☐

Facility Response Activity Status (Check all that apply):

None ☐ IR Implemented ☒ Response Activity Ongoing ☒ Response Activity Completed ☐

Drinking Water Supply for Facility (Check all that apply):

Municipal ☒ Private Well(s) ☐ No Current Water Supply ☐ Municipal Available ☐

On-site Well(s) (Check all that apply):

Drinking Water ☐ Industrial/Commercial Production ☐ Agricultural/Irrigation ☐ No well on-site ☒
Approximate Depth of Well(s):

Local Drinking Water Supply:

Is facility in a designated Wellhead Protection Area? Yes ☐ No ☒
Distance to nearest off-site drinking water well: Private ☐ Municipal ☒ approx. 1,500 ft (up gradient)

Request for DEQ Review of Response Activity Plan

Surface Water Bodies on or Adjacent to Facility (Check all that apply):

Wetlands ☐ Ditch ☐ Stream/River ☒ Lake/Pond ☐

Local Surface Water Bodies:

Distance to nearest wetland: Ditch: Stream/River: **River Raisin (1,800-2,500 ft away)** Lake/Pond:

Have other plans been submitted for this facility? Yes

Facility Name, if different than this submittal:

Date and Name of most recent submittal: **A Request to MDEQ for Mixing Zone-Based GSI Criteria was submitted on June 19, 2012.**

Section G: Environmental Professional Signature:

With my signature below, I certify that this plan and all related materials are true, accurate, and complete to the best of my knowledge and belief.

Signature:



Date: **8-19-13**

Printed Name: **Graham Crockford**

Company of Environmental Professional: **TRC Environmental Corporation**

Address: **1540 Eisenhower Place**

City: **Ann Arbor**

State: **Michigan**

Zip: **48108**

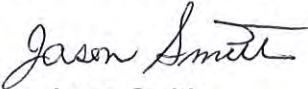
Telephone: **734-585-7813**

E-mail address: **gcrockford@trcsolutions.com**

Section H: Submitter Signature:

With my signature below, I certify that this plan and all related materials are true, accurate, and complete to the best of my knowledge and belief and I am legally authorized to sign for the submitter

Signature:



Date: **8-19-13**

Printed name: **Jason Smith**

Title/Relationship of signatory to submitter: **Corporate Environmental Director, Tecumseh Products Company**

Address: **2700 W. Wood Street**

City: **Paris**

State: **Tennessee**

Zip: **38242**

Telephone: **731-644-8127**

E-Mail address: **jason.smith@tecumseh.com**

This form and the Response Activity Plan should be submitted to the MDEQ Remediation & Redevelopment Division District Office for the county in which the property is located, unless the response activity is related to a facility that is regulated by another MDEQ Division. A district map is located at www.michigan.gov/deqrrd. If regulated by another division, contact should be made with that division for information on where to submit the form and plan.

Attachment 2

Notice of Determination of No Effect or Only De Minimis Effect on Surface Water Body

Technical Memorandum

To: Peter Quackenbush and Dale Bridgford, MDEQ

From: Stacy Metz and Graham Crockford, TRC

Subject: Notice of Determination of No Effect or Only De Minimis Effect on Surface Water Body Pursuant to Section 20120e(14) of Part 201 of NREPA:
Former Tecumseh Products Company Site in Tecumseh, Michigan
(RCRA-05-2010-0012)

Date: August 29, 2013

cc: Jason Smith, Tecumseh Products Company
Chris DeWetter, Tecumseh Products Company
Douglas McClure, Conlin, McKenney and Philbrick, PC
Joseph Kelly, USEPA
Susan Perdomo, USEPA
Daniel Mazur, USEPA

Project No.: 004311.0001, Phase 3

Tecumseh Products Company (TPC) retained TRC Environmental Corporation (TRC), to investigate soil and groundwater conditions at the former TPC site located in Tecumseh, Michigan (W ½ of the SW ¼ of Section 34, T5S, R4E) (Figure 1). TRC is assisting TPC with investigative activities for the site in accordance with the RCRA Administrative Order on Consent (“AOC”)(RCRA 05-2010-0012). TRC, on behalf of TPC, has prepared this Determination of No Effect or Only De Minimis Effect on Surface Water Body (“Section 20120e(14) Determination”) in accordance with Section 20120e(14) of Part 201 of the Natural Resources and Environmental Protection Act, 1994 PA 451 (NREPA). Because volatile organic compounds (VOCs) are detected in monitoring wells up gradient of the River Raisin above the generic groundwater-surface water interface (GSI) criteria, an evaluation of the GSI pathway was conducted to determine the significance of these VOCs on the River Raisin. As described below, that evaluation demonstrates that affected groundwater which originates in the vicinity of the former TPC site has either no effect or only a **de minimis** effect on the River Raisin in accordance with Section 20120e(14) of NREPA.

Background

Extensive investigation activities have been conducted to define the nature and extent of groundwater contamination in the vicinity of the site. Results of previous investigation activities were documented

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as they became available in a series of technical memoranda and reports, including the ATC Phase II Report, the Current Conditions Report (September 2009), the Technical Memorandum titled “Summary of 2010 Soil and Groundwater Source Area Investigation Activities” (Appendix A of the Fourth Quarter 2010 Progress Report), etc. Results of previous investigation activities were used to select locations for further investigation and to develop the proposed investigation scope. As required under the AOC with USEPA, a Remedial Investigation and Groundwater Environmental Indicators Report (RI/EI Report) was submitted in September 2012. That report outlined the conceptual site model (CSM) using data collected through August 2012, and included a copy of the June 19, 2012, Request to MDEQ for Mixing Zone-Based GSI Criteria. Based on the data and associated CSM provided in the RI/EI Report, TRC concluded that the groundwater contaminant plume is stable and that venting groundwater does **NOT** pose an unacceptable risk to either human or ecological receptors. Appendix A provides a list of reference documents related to this Section 20120e(14) Determination.

On October 29-30, 2012, TPC met with the USEPA at USEPA Region V Headquarters in Chicago, Illinois to discuss the findings of the RI/EI Report and the work to be undertaken pursuant to the AOC. During that meeting, USEPA provided comments on ecological risk, groundwater stability, and the nature and extent of contamination. Based on USEPA feedback, the Michigan Department of Environmental Quality (MDEQ) postponed determination of the Mixing Zone-Based GSI Criteria until those comments had been addressed. Additionally, TRC, on behalf of TPC, prepared and implemented a Supplemental Groundwater Investigation Workplan to address those comments. The findings of those investigation activities are documented in the July 15, 2013 Technical Memorandum titled, Summary of the Supplemental Groundwater Investigation Activities and First Quarter and Second Quarter 2013 Compliance Monitoring Events.

The findings of the March 2013 investigation activities support the CSM used to develop the June 19, 2012 Request to MDEQ for Mixing Zone-Based GSI Criteria, pursuant to MDEQ Remediation and Redevelopment Division (RRD) Operational Memorandum No. 5. Effective June 20, 2012, the components of Part 201, which address groundwater venting to surface water, were amended by the addition of new section 20120e. This Section 20120e(14) Determination provides an evaluation of venting groundwater at the site in accordance with Section 20120e(14) of the recently amended Part 201 statute. As described below, that evaluation demonstrates that affected groundwater emanating from the former TPC site has either no effect or only a **de minimis** effect on the River Raisin, therefore no further response activity with regard to the GSI pathway is required pursuant to Section 20120e(14) of NREPA.

Geology/Hydrogeology

The site is located near the southeast rim of the Michigan Basin. Topographically, the region is relatively flat (Figure 1) and characterized by glaciofluvial sediments at the surface. The geology consists of a series of unconsolidated Holocene and Pleistocene age glacial deposits, predominantly gravel and sand with areas of silt and clay overlying Mississippian age shales. The thickness of the glacial deposits varies from a few feet to over 200 feet thick throughout the region. Local water well

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logs within one mile of the site indicate that bedrock in the area is 150 to 200 feet below ground surface (ft bgs).

Soil boring logs, groundwater elevation data and groundwater chemistry data were used to prepare series of cross section through the study area. Figure 2 shows the orientation of the cross-section transects (A-A', B-B', C-C', D-D', E-E', F-F', G-G', H-H', and I-I'), while Figures 3 through 6 present the cross sections. As illustrated in these cross sections, the site geology generally consists of a **surficial** silty/sandy clay interval ranging from 3 to 7 feet thick, underlain by unconsolidated fine to coarse sand and gravel. Visual classification, as recorded on soil boring logs, found that the sand and gravel unit is composed almost entirely of permeably soils ranging in composition from silty sand to gravel. Shallow groundwater typically ranges in depth from 3 to 30 ft bgs within this unit. The variation in groundwater depth is largely a result of site topography, which slopes downward to the east, toward the Raisin River.

A **deeper** clay layer having a hydraulic conductivity between 1.8×10^{-8} centimeters per second (cm/s) to 1.9×10^{-8} cm/s, based on laboratory tests performed by TRC, is present beneath the sand and gravel aquifer. Soil boring data show that this deep clay layer is laterally continuous across the entire study area. The elevation of the top of the clay confining unit is illustrated on Figure 7. As illustrated on Figure 7, the top of the clay confining unit forms a ridge which transects the site from monitoring well MW-37s (768.7 ft MSL) in the west to investigation location B-69 (767.2 ft MSL) in the east. The elevation of the clay confining unit decreases to the northeast (MW-29s/d [725.0 ft MSL]) and to the southeast (MW-40s/d [733.7 ft MSL]).

Groundwater flow at the former TPC site and surrounding study area is generally east toward the River Raisin, the nearest body of water, located 1,500 to 2,500 feet east of the site. Four years of water level data (March 2009 through April 2013) have been collected (Table 1). Horizontal flow patterns have remained relatively consistent throughout this period. A groundwater contour map developed using the most recent groundwater elevation data (April 2013) is provided as Figure 8. The River Raisin is the regional discharge feature for groundwater beneath the former TPC site. Horizontal groundwater flow was used to designate a series of 9 sentinel monitoring wells as GSI monitoring points pursuant to Section 20120e. From north to south, those wells include MW-13s, MW-29s, MW-29d, MW-30s, MW-30d, MW-10s, MW-17s, MW-31, and MW-14d. GSI monitoring points are labeled with red text on Figure 8.

A mean horizontal hydraulic gradient of 0.001 is consistently measured across the former TPC property. Data from *in situ* hydraulic conductivity tests performed on monitoring wells screened in the unconfined sand and gravel aquifer were used to calculate a geometric mean hydraulic conductivity. The geometric mean hydraulic conductivity is 9.5×10^{-3} cm/s with an upper 95-percent confidence limit of 2.2×10^{-1} cm/s and a lower 95-percent confidence limit of 4.2×10^{-4} cm/s. Assuming an effective porosity of 0.3, the resultant estimated groundwater flow velocity is 3.2×10^{-5} cm/s (33 feet per year). Hydraulic conductivity data are provided in Appendix B.

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The surface topography drops steeply downgradient of the site from an approximate elevation of 780 ft MSL to an approximate elevation of 750 ft MSL in the flood plain adjacent to the River Raisin. East of the site, in proximity to the change in surface elevation, the horizontal hydraulic gradient increases (Figure 8). East/southeast of the site, the prevalence of higher permeability materials (coarse sand and sand with gravel) facilitates the decrease in static water elevation. The relatively steep drop in groundwater elevation east of the southern portion of the site is illustrated on Cross Sections E-E', F-F' and G-G' (Figures 4 and 5). Data indicate that vertical groundwater movement is impeded by the continuous clay layer underlying the sand and gravel deposit.

Nature and Extent of Groundwater Contamination

Groundwater affected by VOCs originates in the vicinity of the former Tecumseh Products Company Site located at 100 East Patterson Street. On-site investigation has identified two areas with comparably higher soil and groundwater concentrations: the Northern Source Area and the Southern Source Area. The Northern Source Area is in the vicinity of soil borings NS-8, NS-9, and NS-10 (Figure 1) where the highest concentration of trichloroethene (TCE) was found in the soil, and up gradient of NS-1 where relatively higher concentrations of TCE were found in the groundwater. There is no single known source for TCE in the Northern Source Area and TCE is detected at varying concentrations throughout the area. The Southern Source Area is in the vicinity of soil borings SS-1 through SS-7 where high concentrations of TCE and 1,1,1-trichloroethane (TCA) were found in the groundwater. Both source areas are approximately 3,500 feet hydraulically up gradient of the River Raisin. Further details on these source areas can be found in the documents referenced in Appendix A.

Table 2 provides a summary of detected volatile organic compounds at groundwater monitoring locations (the table includes data from monitoring wells which are designated as MW-XX, where XX is the well number)¹. The concentrations of the detected compounds were compared to MDEQ Part 201 Cleanup Criteria (RRD Operational Memorandum No. 1, as amended September 28, 2012). Several chlorinated VOCs (CVOCs), specifically TCE, TCA and their breakdown products (cis-1,2-dichloroethene [cis-DCE], vinyl chloride, and 1,1-dichloroethane [1,1-DCA]) were detected above generic GSI criteria. The approximate extent of groundwater with CVOC concentrations above generic GSI criteria is illustrated on Figure 9. Of the designated sentinel monitoring points, only monitoring well MW-31, exhibits an exceedence of generic GSI criteria. TCE is present in monitoring well MW-31 at concentrations that fluctuate around the generic GSI criteria of 200 ug/L. Thirteen quarterly rounds of groundwater data have been collected from monitoring well MW-31 since its installation in June 2010, with TCE concentrations ranging from 130 and 340 ug/L. Monitoring well MW-31 is approximately 800 feet up gradient of the River Raisin.

¹ Tables summarizing groundwater chemistry data in grab samples collected at soil boring locations (designated as NS-XX, SS-XX or B-XX, where XX is the boring number) and at permeable reactive barrier performance monitoring wells (designated as PRB-XX, where XX is the well number) are included in the RI/EI Report.

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The area between monitoring well MW-31 and the River Raisin is occupied by a wooded flood plain. During low-flow conditions in the river, groundwater discharges to the River Raisin along the bank of the river. In addition to groundwater sampling, surface water concentrations are monitored at the two locations (WL-01 and SEEP) where surficial expression of groundwater has been observed. Surface water sample results are summarized in Table 3. No VOCs have been detected at either surface water sample location.

Response and Mitigation Measures

Response and mitigation measures conducted to date are documented in the 2011 EI Report, the 2012 RI/EI Report, and the February 2013 Full-Scale Soil Vapor Extraction System Construction Documentation Report for P-Building. These measures include:

- n A local groundwater use ordinance;
- n The decommissioning of private wells in the vicinity of affected groundwater;
- n A Declaration of Restrictive Covenant and License Agreement Regarding Environmental Work for the site;
- n Mitigation of on-site indoor air in S-Building (the office area for the site manager) through installation of a sub-slab depressurization/ventilation (SSDV) system;
- n Installation of a soil vapor extraction (SVE) system in P-Building for the following purposes:
 - To remove residual VOCs from northern source area soils which may be contributing to the off-site migration of contaminated groundwater;
 - To control the lateral off-site migration of affected soil gas from the northern source area; and
 - To mitigate on-site indoor air in the area (P-Building) that is expected to be occupied in the future;
- n Monitoring and mitigation of off-site indoor air including:
 - Installation of a SSDV system at one residential property east of the site; and
 - Completion of crawlspace sampling activities at four residential properties east of the site;
- n Installation of a permeable reactive barrier (PRB) downgradient of the southern source area, to address the potential off-site vapor intrusion pathway, by treating shallow CVOC-affected groundwater before the groundwater migrates off-site.²

² The primary purpose of the PRB is to address the potential off-site vapor intrusion pathway. However monitoring well MW-31 and the adjacent area of affected groundwater potentially venting to the River Raisin are located down gradient of the PRB treatment area. Ultimately the PRB is expected to reduce the concentration of TCE and other compounds which have the potential to vent to the River Raisin.

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Response and mitigation measures are ongoing, with areas posing the most risk/potential risk targeted first. Currently TPC is in the process of evaluating southern source area treatment options, and expects that southern source area treatment will begin in 2013 or 2014. These and other measures will be incorporated into the final corrective measures proposal (due to USEPA by January 31, 2016), and ultimately into the Final Remedy selected by USEPA.

Groundwater Discharge Rate

Although VOCs have not been detected in seeps or in surface water, the potential for discharge to the River Raisin was evaluated. The potential discharge rate of the venting groundwater contaminant plume was calculated to determine the groundwater-to-surface water mixing ratio.

Discharge Area (A)

The discharge area (A) is calculated as a function of the length (L) of the discharge area and the saturated thickness (t_{sat}), where:

$$A = L \times t_{sat}$$

The length of the discharge area was measured perpendicular to groundwater flow in the area downgradient of monitoring well MW-31. The measured length, **750 feet**, extends from monitoring well MW-17s in the north to monitoring well MW-14D in the south (Figure 8). No VOCs have been detected in either monitoring well MW-17S or monitoring well MW-14D.³

As illustrated on Cross Sections E-E' and F-F' (Figures 4 and 5), the saturated thickness is greatly reduced at GSI monitoring well MW-31 (approximately 5 feet) when compared to the saturated thickness along the eastern perimeter of the site. The groundwater discharge area was conservatively calculated using the saturated thickness along the downgradient (eastern) perimeter of the site, as illustrated in Cross Section H-H' on Figure 6. Using Cross Section H-H', an average saturated thickness of **29 feet** is observed between monitoring wells PRB-08s/d and monitoring wells MW-20s/d.

Using these values the groundwater discharge area was calculated to be **21,750 square feet**.

Horizontal Gradient (i)

Using groundwater elevation data collected during the April 2013 groundwater monitoring event (provided in Table 1), the unconfined groundwater hydraulic gradient (i) across the site is estimated to be approximately **0.001**. The groundwater horizontal gradient is also roughly depicted in the attached groundwater contour map (Figure 8).

³ The surface sample location SEEP, which is located between monitoring wells MW-31 and MW-14D, is sampled semi-annually. No VOCs have been detected, indicating that the measured length used to calculate the discharge area is conservative.

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Hydraulic Conductivity (k)

Data from *in situ* hydraulic conductivity tests performed on monitoring wells screened in the unconfined sand and gravel aquifer were used to calculate a geometric mean hydraulic conductivity of $9.5 \times 10^{-3} \text{ cm/s}$ ($3.1 \times 10^{-4} \text{ ft/s}$). Hydraulic conductivity data are provided in Appendix B.

The groundwater discharge rate (Q_{GW}) of the venting contaminant plume was estimated using Darcy's Law:

$$Q_{GW} = kiA$$

$$Q_{GW} = 3.1 \times 10^{-4} \text{ ft/s} \times 0.001 \times 21,750 \text{ ft}^2 = 6.7 \times 10^{-3} \text{ CFS}$$

The calculated groundwater discharge rate is 6.7×10^{-3} cubic feet per second (CFS).

River Raisin Surface Water Quantity

The River Raisin is a regional discharge feature draining an area of approximately 1,072 square miles (2,780 square kilometers) in the Michigan counties of Lenawee, Monroe, Washtenaw, Jackson, Hillsdale, and also a portion of Fulton County, Ohio. The river is approximately 150 miles long. Flow parameters for the River Raisin in the vicinity of venting groundwater were determined by the MDEQ Hydrologic Studies Unit (Appendix C). Key flow parameters are listed below:

- n Lowest monthly 95-percent exceedence low flow at the discharge location: 19 CFS
- n Harmonic mean flow at the discharge location: 92 CFS
- n 90dQ10 flow at the discharge location: 36 CFS

Calculated Mixing Ratio

The calculated groundwater discharge rate of 6.7×10^{-3} CFS is insignificant in comparison to flow parameters in the River Raisin. Even using the most conservative estimate of surface water flow (19 CFS), the calculated surface water-to-groundwater mixing ratio is **2800:1**. Given the large surface water-to-groundwater mixing ratio and the volatile nature of the contaminants with the potential to vent to surface water, neither the location of other contaminant plumes entering the River Raisin, nor the upstream surface water concentrations are considered necessary to this evaluation.

Determination of Site-Specific GSI Criteria

Groundwater data from groundwater monitoring points (Table 2) were used to determine the maximum concentration of each detected VOC, and the predicted worst case maximum GSI discharge concentration. Site-specific GSI criteria were calculated only for those compounds which have or have the potential to exceed generic GSI criteria at groundwater monitoring wells (including all MW-XX locations, where XX is the well number). The maximum detected groundwater concentration

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was compared to generic GSI criteria. A site-specific GSI criterion was calculated for all compounds exhibiting a maximum detected groundwater concentration exceeding 10-percent of the corresponding generic GSI criterion. Seven compounds met these criteria: 1,1-DCA, 1,1-dichloroethene (1,1-DCE), cis-DCE, tetrachloroethene (PCE), TCA, TCE and vinyl chloride.

Mixing zone-based GSI criteria were calculated based on mass flow rate and groundwater movement calculations, e.g. by using the surface water-to-groundwater mixing ratio to adjust the generic GSI criteria upward by a factor equivalent to that ratio. Due to the large surface water-to-groundwater mixing ratio, the calculated mixing zone-based GSI criteria were much higher than acute surface water quality criteria (MDEQ Rule 57 Final Acute Values [FAV] and Aquatic Max Values [AMV]). The lowest of the three values (mixing zone-based GSI criterion, FAV and AMV) was selected as the site-specific GSI criterion for each compound. Site-specific GSI criteria are presented in Table 4. As illustrated on Figure 9, the furthest extent of VOCs above site-specific GSI criteria is more than 2,000 feet up gradient of the River Raisin.

Summary and Conclusions

- n Extensive investigation activities have been conducted to define the nature and extent of groundwater contamination in the vicinity of the site.
- n On-site investigation has identified two areas with comparably higher soil and groundwater concentrations: the Northern Source Area and the Southern Source Area.
- n Response and mitigation measures are ongoing. Several of those mitigation efforts are ultimately expected to reduce the concentrations of groundwater venting to surface water:
 - In 2011, a PRB was installed downgradient of the southern source area, to reduce the concentrations of CVOCs in groundwater before the groundwater migrates off-site;
 - In 2012, an SVE system was installed to reduce soil concentrations and control lateral migration of soil gas from the northern source area; and
 - An evaluation of southern source area treatment options is underway, with implementation expected to begin in 2013 or 2014.
- n A series of nine cross sections were prepared to illustrate, in detail, the geology, hydrogeology and extent of contamination in the vicinity of the site.
- n Affected groundwater has the potential to vent to the River Raisin above generic GSI criteria.
- n TPC submitted a Request to MDEQ for Mixing Zone-Based GSI Criteria on June 19, 2012.
- n On October 29-30, 2012, following submitting of the RI/EI Report ,USEPA provided comments on ecological risk, groundwater stability, and the nature and extent of contamination. Based on USEPA feedback, MDEQ postponed determination of Mixing Zone-Based GSI Criteria until those comments had been addressed.

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- n Additional investigation activities were conducted in March 2013 to address USEPA comments. The findings of those investigation activities support the conceptual site model used to development the June 19, 2012 Request to MDEQ for Mixing Zone-Based GSI Criteria and the September 2012 RI/EI Report.
- n Effective June 20, 2012, the components of Part 201 which address groundwater venting to surface water were amended. This evaluation of the groundwater/surface water interface was prepared in accordance with the recently amended Part 201 statute.
- n Nine sentinel monitoring wells have been designated as GSI compliance monitoring points.
- n Of the designated sentinel GSI wells, only monitoring well MW-31, exhibits an exceedence of generic GSI criteria.
- n Surface water concentrations are monitored at the two locations (WL-01 and SEEP) where surficial expression of groundwater has been observed in the flood plain/wetland area. No VOCs have been detected at either surface water sample location.
- n The calculated groundwater discharge rate is insignificant in comparison to flow parameters in the River Raisin. Even using the most conservative estimate of surface water flow, the calculated surface water-to-groundwater mixing ratio is **2800:1**.
- n A site-specific GSI criterion was calculated for all compounds exhibiting a maximum detected groundwater concentration exceeding 10-percent of the corresponding generic GSI criterion.
- n The predicted worst case maximum GSI discharge concentrations are well below site-specific GSI criteria. Therefore, affected groundwater which originates in the vicinity of the former TPC site has no effect or at most a **de minimis** effect on the River Raisin, and no further response measures related to venting groundwater are required pursuant to Section 20120e(14) of NREPA.

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Tables

Table 1
Groundwater and Surface Water Elevations
Former Tecumseh Products Company Site
Tecumseh, Michigan

Well Location	Top of Well Casing (ft MSL)	Measurement Date	03/16/09	04/20/09	6/4/2009	12/7/2009	3/23/2010	5/10/2010	9/2/2010	12/10/2010	2/14/2011	4/25/2011	7/19/2011	10/3/2011	1/3/2012	4/2/2012	7/2/2012	10/2/2012	4/2/2013
Groundwater Monitoring Wells																			
MW-01s	796.53	Depth (ft BTOC)	16.13	15.95	16.14	17.34	17.58	17.40	17.55	18.13	18.45	17.53	16.89	17.30	16.70	16.46	17.08	18.27	18.90
		Elevation (ft MSL)	780.40	780.58	780.39	779.19	778.95	779.13	778.98	778.40	778.08	779.00	779.64	779.23	779.83	780.07	779.45	778.26	777.63
MW-02s	802.14	Depth (ft BTOC)	21.94	21.60	21.53	22.87	23.27	23.10	23.00	23.64	24.04	23.23	22.48	22.78	22.30	21.96	22.60	23.81	24.43
		Elevation (ft MSL)	780.20	780.54	780.61	779.27	778.87	779.04	779.14	778.50	778.10	778.91	779.66	779.36	779.84	780.18	779.54	778.33	777.71
MW-03s	787.00	Depth (ft BTOC)	7.63	7.45	7.63	8.57	8.79	8.60	8.70	9.20	9.58	8.71	8.26	8.51	8.09	7.85	8.38	9.43	9.87
		Elevation (ft MSL)	779.37	779.55	779.37	778.43	778.21	778.40	778.30	777.80	777.42	778.29	778.74	778.49	778.91	779.15	778.62	777.57	777.13
MW-04s	794.42	Depth (ft BTOC)	14.64	14.40	14.48	15.65	12.91*	15.80	15.80	16.40	16.75	15.90	15.26	15.54	15.09	14.80	15.38	16.50	17.11
		Elevation (ft MSL)	779.78	780.02	779.94	778.77	781.51*	778.62	778.62	778.02	777.67	778.52	779.16	778.88	779.33	779.62	779.04	777.92	777.31
MW-04i	794.29	Depth (ft BTOC)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	16.96
		Elevation (ft MSL)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	777.33
MW-05s	805.59	Depth (ft BTOC)	24.73	24.40	24.41	25.77	26.16	26.00	26.00	26.62	26.95	26.20	25.29	25.74	25.19	24.86	25.43	26.73	27.39
		Elevation (ft MSL)	780.86	781.19	781.18	779.82	779.43	779.59	779.59	778.97	778.64	779.39	780.30	779.85	780.40	780.73	780.16	778.86	778.20
MW-06s	803.73	Depth (ft BTOC)	23.26	22.85	22.72	24.18	24.65	24.58	24.35	24.99	25.40	24.64	23.80	24.05	23.61	23.23	23.95	25.18	25.83
		Elevation (ft MSL)	780.47	780.88	781.01	779.55	779.08	779.15	779.38	778.74	778.33	779.09	779.93	779.68	780.12	780.50	779.78	778.55	777.90
MW-07s	804.40	Depth (ft BTOC)	23.85	23.40	23.24	24.75	25.19	25.08	25.00	25.59	25.53	25.18	24.32	24.64	24.20	23.82	24.50	25.75	26.40
		Elevation (ft MSL)	780.55	781.00	781.16	779.65	779.21	779.32	779.40	778.81	778.87	779.22	780.08	779.76	780.20	780.58	779.90	778.65	778.00
MW-08s	804.39	Depth (ft BTOC)	23.61	23.30	23.24	24.61	25.00	25.06	24.80	25.47	25.79	25.00	24.18	24.59	24.06	23.73	24.31	25.59	26.25
		Elevation (ft MSL)	780.78	781.09	781.15	779.78	779.39	779.33	779.59	778.92	778.60	779.39	780.21	779.80	780.33	780.66	780.08	778.80	778.14
MW-08d	804.19	Depth (ft BTOC)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	26.15
		Elevation (ft MSL)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	778.04
MW-09s	783.97	Depth (ft BTOC)	4.46	4.30	4.63	5.65	5.78	5.60	5.85	6.98	6.04	5.48	Well Removed	Well Removed	Well Removed	Well Removed	Well Removed	Well Removed	Well Removed
		Elevation (ft MSL)	779.51	779.67	779.34	778.32	778.19	778.37	778.12	776.99	777.93	778.49							
MW-10s	788.65	Depth (ft BTOC)	NI	NI	10.46	11.57	11.55	11.20	11.85	12.15	12.46	11.09	11.34	11.54	10.76	10.60	11.40	12.18	12.57
		Elevation (ft MSL)	NI	NI	778.19	777.08	777.10	777.45	776.80	776.50	776.19	777.56	777.31	777.11	777.89	778.05	777.25	776.47	776.08
MW-10d	788.40	Depth (ft BTOC)	NI	NI	NI	12.10	11.98	11.60	12.41	12.68	12.99	11.48	12.05	12.30	11.50	11.57	12.56	14.25*	13.11
		Elevation (ft MSL)	NI	NI	NI	776.30	776.42	776.80	775.99	775.72	775.41	776.92	776.35	776.10	776.90	776.83	775.84	774.15*	775.29
MW-11s	809.64	Depth (ft BTOC)	NI	NI	28.09	29.69	30.29	30.20	29.90	30.49	30.95	30.21	29.43	29.50	29.15	28.75	29.50	30.74	31.41
		Elevation (ft MSL)	NI	NI	781.55	779.95	779.35	779.44	779.74	779.15	778.69	779.43	780.21	780.14	780.49	780.89	780.14	778.90	778.23
MW-12s	790.90	Depth (ft BTOC)	NI	NI	12.40	13.67	14.06	13.90	13.85	14.34	14.70	13.95	13.34	13.61	13.06	12.75	13.45	14.49	14.96
		Elevation (ft MSL)	NI	NI	778.50	777.23	776.84	777.00	777.05	776.56	776.20	776.95	777.56	777.29	777.84	778.15	777.45	776.41	775.94
MW-12d	790.48	Depth (ft BTOC)	NI	NI	NI	NI	13.93	13.81	12.70*	14.23	14.61	13.90	13.24	13.49	13.01	12.66	13.35	14.34	14.84
		Elevation (ft MSL)	NI	NI	NI	NI	776.55	776.67	777.78*	776.25	775.87	776.58	777.24	776.99	777.47	777.82	777.13	776.14	775.64
MW-13s	787.35	Depth (ft BTOC)	NI	NI	14.88	15.81	15.82	15.50	15.70	16.15	16.89	15.50	15.21	15.69	15.20	14.94	15.58	14.16*	16.43
		Elevation (ft MSL)	NI	NI	772.47	771.54	771.53	771.85	771.65	771.20	770.46	771.85	772.14	771.66	772.15	772.41	771.77	773.19*	770.92
MW-14s	780.67	Depth (ft BTOC)	NI	NI	5.12	6.20	3.62	3.60	7.05	6.80	6.36	2.43	5.88	6.29	2.90	4.11	6.85	8.10	4.22
		Elevation (ft MSL)	NI	NI	775.55	774.47	777.05	777.07	773.62	773.87	774.31	778.24	774.79	774.38	777.77	776.56	773.82	772.57	776.45
MW-14d	780.51	Depth (ft BTOC)	NI	NI	NI	NI	29.97	29.85	30.10	30.19	30.28	29.73	29.78	30.06	29.51	29.56	30.08	30.29	29.77
		Elevation (ft MSL)	NI	NI	NI	NI	750.54	750.66	750.41	750.32	750.23	750.78	750.73	750.45	751.00	750.95	750.43	750.22	750.74
MW-15s	811.72	Depth (ft BTOC)	NI	NI	29.59	31.09	31.48	31.50	31.25	32.03	32.33	31.63	30.61	31.10	30.61	30.21	30.72	32.12	32.83
		Elevation (ft MSL)	NI	NI	782.13	780.63	780.24	780.22	780.47	779.69	779.39	780.09	781.11	780.62	781.11	781.51	781.51	779.60	778.89

Notes:

- Survey conducted by Midwestern Consultants, Inc. (2009 - 2013)
- ft MSL - feet above mean sea level
- ft BTOC - feet below top of casing
- NI - Not installed at time of measurement
- Dry - Insufficient groundwater present for measurement
- NM - Not measured
- * Measured depth to water is anomalous. Datum was not used.

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Tecumseh, Michigan

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Groundwater Monitoring Wells																			
MW-16s	782.90	Depth (ft BTOC)	NI	NI	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
		Elevation (ft MSL)	NI	NI	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-17s	754.49	Depth (ft BTOC)	NI	NI	5.33	5.40	5.25	5.18	5.50	5.44	5.41	5.05	5.31	5.40	5.02	5.02	5.56	5.54	5.20
		Elevation (ft MSL)	NI	NI	749.16	749.09	749.24	749.31	748.99	749.05	749.08	749.44	749.18	749.09	749.47	749.47	748.93	748.95	749.29
MW-18s	805.49	Depth (ft BTOC)	NI	NI	NI	25.66	26.02	25.95	25.80	26.50	26.82	26.10	25.31	25.61	25.07	24.77	25.35	26.78	27.28
		Elevation (ft MSL)	NI	NI	NI	779.83	779.47	779.54	779.69	778.99	778.67	779.39	780.18	779.88	780.42	780.72	780.14	778.71	778.21
MW-19s	803.92	Depth (ft BTOC)	NI	NI	NI	24.05	24.26	24.25	24.25	24.91	25.20	24.38	23.58	24.08	23.43	23.16	23.72	25.02	25.60
		Elevation (ft MSL)	NI	NI	NI	779.87	779.66	779.67	779.67	779.01	778.72	779.54	780.34	779.84	780.49	780.76	780.20	778.90	778.32
MW-19d	804.04	Depth (ft BTOC)	NI	NI	NI	24.17	24.41	24.35	24.40	25.03	25.34	24.50	23.70	24.18	23.54	23.23	23.89	25.12	25.73
		Elevation (ft MSL)	NI	NI	NI	779.87	779.63	779.69	779.64	779.01	778.70	779.54	780.34	779.86	780.50	780.81	780.15	778.92	778.31
MW-20s	783.16	Depth (ft BTOC)	NI	NI	NI	4.85	4.97	4.80	5.00	5.53	5.81	4.86	4.38	4.73	4.11	3.96	4.60	7.66*	6.41
		Elevation (ft MSL)	NI	NI	NI	778.31	778.19	778.36	778.16	777.63	777.35	778.30	778.78	778.43	779.05	779.20	778.56	775.50*	776.75
MW-20d	783.29	Depth (ft BTOC)	NI	NI	NI	11.98	12.62	12.80	14.10	14.91	15.17	14.55	14.57	11.28	13.71	13.68	14.20	14.95	15.13
		Elevation (ft MSL)	NI	NI	NI	771.31	770.67	770.49	769.19	768.38	768.12	768.74	768.72	772.01	769.58	769.61	769.09	768.34	768.16
MW-21	780.85	Depth (ft BTOC)	NI	NI	NI	29.69	29.51	29.35	29.60	29.75	29.87	29.34	29.19	29.54	28.91	29.00	29.56	29.88	29.24
		Elevation (ft MSL)	NI	NI	NI	751.16	751.34	751.50	751.25	751.10	750.98	751.51	751.66	751.31	751.94	751.85	751.29	750.97	751.61
MW-22	782.62	Depth (ft BTOC)	NI	NI	NI	24.62	24.88	24.88	25.15	25.03	24.91	24.76	24.98	24.96	24.86	24.85	24.07	25.01	24.63
		Elevation (ft MSL)	NI	NI	NI	758.00	757.74	757.74	757.47	757.59	757.71	757.86	757.64	757.66	757.76	757.77	758.55	757.61	757.99
MW-23	787.10	Depth (ft BTOC)	NI	NI	NI	9.27	9.50	9.45	9.45	9.97	10.32	9.47	9.00	9.20	8.68	8.41	9.09	10.05	10.54
		Elevation (ft MSL)	NI	NI	NI	777.83	777.60	777.65	777.65	777.13	776.78	777.63	778.10	777.90	778.42	778.69	778.01	777.05	776.56
MW-24s	797.83	Depth (ft BTOC)	NI	NI	NI	19.10	19.49	19.37	19.30	19.83	20.24	19.43	18.73	19.04	18.45	18.03	18.84	19.99	20.53
		Elevation (ft MSL)	NI	NI	NI	778.73	778.34	778.46	778.53	778.00	777.59	778.40	779.10	778.79	779.38	779.80	778.99	777.84	777.30
MW-24d	797.93	Depth (ft BTOC)	NI	NI	NI	19.20	19.58	19.45	19.35	19.95	20.31	19.52	18.85	19.15	18.60	18.14	18.96	19.77*	20.64
		Elevation (ft MSL)	NI	NI	NI	778.73	778.35	778.48	778.58	777.98	777.62	778.41	779.08	778.78	779.33	779.79	778.97	778.16*	777.29
MW-25s	798.23	Depth (ft BTOC)	NI	NI	NI	18.77	18.97	18.80	19.00	19.60	19.90	18.96	18.31	18.76	18.11	17.87	18.50	19.71	20.29
		Elevation (ft MSL)	NI	NI	NI	779.46	779.26	779.43	779.23	778.63	778.33	779.27	779.92	779.47	780.12	780.36	779.73	778.52	777.94
MW-26s	805.73	Depth (ft BTOC)	NI	NI	NI	NI	26.10	26.00	26.00	26.68	26.95	26.11	25.31	25.80	25.15	24.92	25.47	26.75	27.31
		Elevation (ft MSL)	NI	NI	NI	NI	779.63	779.73	779.73	779.05	778.78	779.62	780.42	779.93	780.58	780.81	780.26	778.98	778.42
MW-27s	781.39	Depth (ft BTOC)	NI	NI	NI	NI	3.12	2.83	3.15	3.58	3.77	2.79	2.45	2.84	2.31	2.30	2.83	3.65	4.17
		Elevation (ft MSL)	NI	NI	NI	NI	778.27	778.56	778.24	777.81	777.62	778.60	778.94	778.55	779.08	779.09	778.56	777.74	777.22
MW-27d	781.40	Depth (ft BTOC)	NI	NI	NI	NI	23.63	23.50	23.65	23.94	24.08	23.40	23.22	23.55	23.11	23.13	23.50	23.85	23.41
		Elevation (ft MSL)	NI	NI	NI	NI	757.77	757.90	757.75	757.46	757.32	758.00	758.18	757.85	758.29	758.27	757.90	757.55	757.99
MW-28s	804.68	Depth (ft BTOC)	NI	NI	NI	NI	25.53	25.45	25.20	25.86	26.30	25.47	24.70	24.92	24.49	24.09	24.82	26.06	26.71
		Elevation (ft MSL)	NI	NI	NI	NI	779.15	779.23	779.48	778.82	778.38	779.21	779.98	779.76	780.19	780.59	779.86	778.62	777.97
MW-28d	804.92	Depth (ft BTOC)	NI	NI	NI	NI	25.81	25.70	25.50	26.10	26.54	25.75	24.95	25.16	24.71	24.33	25.08	26.30	26.97
		Elevation (ft MSL)	NI	NI	NI	NI	779.11	779.22	779.42	778.82	778.38	779.17	779.97	779.76	780.21	780.59	779.84	778.62	777.95
MW-29s	788.16	Depth (ft BTOC)	NI	NI	NI	NI	15.80	15.50	15.55	16.18	16.22	15.40	15.50	15.48	11.30*	14.92	15.40	15.91	16.37
		Elevation (ft MSL)	NI	NI	NI	NI	772.36	772.66	772.61	771.98	771.94	772.76	772.66	772.68	776.86*	773.24	772.76	772.25	771.79
MW-29d	788.16	Depth (ft BTOC)	NI	NI	NI	NI	18.74	18.60	18.55	18.28	18.95	18.90	18.28	18.23	18.16	17.75	18.43	19.14	19.29
		Elevation (ft MSL)	NI	NI	NI	NI	769.42	769.56	769.61	769.88	769.21	769.26	769.88	769.93	770.00	770.41	769.73	769.02	768.87
MW-30s	787.69	Depth (ft BTOC)	NI	NI	NI	NI	9.89	9.75	9.90	10.36	10.74	9.58	9.40	9.66	9.08	8.88	9.55	10.52	10.91
		Elevation (ft MSL)	NI	NI	NI	NI	777.80	777.94	777.79	777.33	776.95	778.11	778.29	778.03	778.61	778.81	778.14	777.17	776.78

Notes:

- Survey conducted to feet mean sea level by Midwestern Consultants, Inc. (2009 - 2013)
- ft MSL - feet above mean sea level
- ft BTOC - feet below top of casing
- NI - Not installed at time of measurement
- Dry - Insufficient groundwater present for measurement
- NM - Not measured
- * Measured depth to water is anomalous. Datum was not used.

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Groundwater Monitoring Wells																			
MW-30d	787.66	Depth (ft BTOC)	NI	NI	NI	NI	9.85	9.68	9.80	10.27	10.63	9.25	9.29	9.54	9.02	8.75	9.41	10.43	10.93
		Elevation (ft MSL)	NI	NI	NI	NI	777.81	777.98	777.86	777.39	777.03	778.41	778.37	778.12	778.64	778.91	778.25	777.23	776.73
MW-31	782.36	Depth (ft BTOC)	NI	NI	NI	NI	NI	32.60	33.00	33.03	33.03	31.62	32.76	32.91	32.51	32.57	32.97	33.13	32.68
		Elevation (ft MSL)	NI	NI	NI	NI	NI	749.76	749.36	749.33	749.33	750.74	749.60	749.45	749.85	749.79	749.39	749.23	749.68
MW-32s	802.59	Depth (ft BTOC)	NI	NI	NI	NI	NI	NI	23.45	23.96	24.35	23.54	22.81	23.15	21.59*	22.33	22.89	24.14	NM
		Elevation (ft MSL)	NI	NI	NI	NI	NI	NI	779.14	778.63	778.24	779.05	779.78	779.44	781.00*	780.26	779.70	778.45	NM
MW-33s	799.49	Depth (ft BTOC)	NI	NI	NI	NI	NI	NI	20.62	21.11	21.36	20.68	19.95	19.30*	19.77	19.50	20.08	21.28	NM
		Elevation (ft MSL)	NI	NI	NI	NI	NI	NI	778.87	778.38	778.13	778.81	779.54	780.19*	779.72	779.99	779.41	778.21	NM
MW-34s	802.78	Depth (ft BTOC)	NI	NI	NI	NI	NI	NI	23.60	24.15	24.49	23.63	22.89	23.35	22.70	22.43	23.04	24.29	NM
		Elevation (ft MSL)	NI	NI	NI	NI	NI	NI	779.18	778.63	778.29	779.15	779.89	779.43	780.08	780.35	779.74	778.49	NM
MW-35i	793.98	Depth (ft BTOC)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	16.58
		Elevation (ft MSL)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	777.40
MW-35d	793.99	Depth (ft BTOC)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	15.97
		Elevation (ft MSL)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	778.02
MW-36s	793.95	Depth (ft BTOC)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	16.53
		Elevation (ft MSL)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	777.42
MW-36d	793.72	Depth (ft BTOC)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	16.28
		Elevation (ft MSL)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	777.44
MW-37s	803.22	Depth (ft BTOC)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	25.19
		Elevation (ft MSL)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	778.03
MW-38s	783.69	Depth (ft BTOC)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	9.81
		Elevation (ft MSL)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	773.88
MW-38d	783.55	Depth (ft BTOC)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	31.14
		Elevation (ft MSL)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	752.41
MW-39s	792.84	Depth (ft BTOC)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	15.38
		Elevation (ft MSL)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	777.46
MW-39d	792.68	Depth (ft BTOC)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	15.21
		Elevation (ft MSL)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	777.47
MW-40s	776.49	Depth (ft BTOC)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	22.12
		Elevation (ft MSL)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	754.37
MW-40d	776.25	Depth (ft BTOC)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	21.87
		Elevation (ft MSL)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	754.38
PRB-01s	784.06	Depth (ft BTOC)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	5.49	5.85	5.20	5.10	5.81	6.84	7.73
		Elevation (ft MSL)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	778.57	778.21	778.86	778.96	778.25	777.22
PRB-02s	784.07	Depth (ft BTOC)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	5.52	5.82	5.20	5.06	5.84	6.85	7.71
		Elevation (ft MSL)	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	778.55	778.25	778.87	779.01	778.23	777.22
Surface Water Measurement Points (River Raisin)																			
E. Chicago Blvd	756.50	Depth (ft BTOC)	NI	NI	NI	14.00	13.32	13.42	14.90	13.89	14.46	11.50*	14.60	14.15	13.17	13.87	15.00	13.98	14.30
		Elevation (ft MSL)	NI	NI	NI	742.51	743.18	743.08	741.60	742.61	742.04	745.00	741.90	742.35	743.33	742.63	741.50	742.52	742.20
Russell Road	755.23	Depth (ft BTOC)	NI	NI	NI	19.36	18.50	18.65	20.40	22.04	19.99	19.50	22.65	21.70	20.75	18.96	23.18	19.05	22.10
		Elevation (ft MSL)	NI	NI	NI	735.87	736.73	736.58	734.83	733.19	735.24	735.73	732.58	733.53	734.48	736.27	732.05	736.18	733.13

Notes:

Survey conducted to feet mean sea level by Midwestern Consultants, Inc. (2009 - 2011)

ft MSL - feet above mean sea level

ft BTOC - feet below top of casing

NI - Not installed at time of measurement

Dry - Insufficient groundwater present for measurement

NM - Not measured

* Measured depth to water is anomalous. Datum was not used.

Table 2
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Former Tecumseh Products Company Site
Tecumseh, Michigan

Analyte	2-Butanone	Chloroethane	1,1-Dichloroethane	1,1-Dichloroethene ⁽²⁾	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichloro-fluoromethane	Vinyl Chloride
Residential DW Criteria	13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria	38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSI Criteria	2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion	4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	370	5.0
Non-Residential GWSLs for Vapor Intrusion	1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria	2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L

MW-01s (16-21') Depth to Groundwater Approx. 16 - 19'	3/13/2009	<100	<100	<20	<20	<20	<20	<20	750	<20	2,700	<20	<20
	4/20/2009	NA	<500	<100	<100	<100	<100	<100	1,100	<100	2,200	NA	<100
	12/9/2009	<100	<100	<20	<20	<20	<20	<20	1,000	<20	3,400	<20	<20
	3/17/2010	<100	<100	<20	<20	<20	<20	<20	1,400	<20	2,500	<20	<20
	5/18/2010	<100	<100	<20	<20	<20	<20	<20	1,000	<20	2,700	<20	<20
	9/10/2010	<100	<100	<20	<20	<20	<20	<20	750	<20	2,400	<20	<20
	12/28/2010	<100	<100	<20	<20	<20	<20	<20	1,100	<20	2,500	<20	<20
	2/25/2011	<50	<50	<10	<10	<10	<10	<10	560	<10	1,300	<10	<10
	5/11/2011 ⁽⁴⁾	<50	<50	<10	<10	<10	<10	<10	860	<10	1,900	<10	<10
	7/28/2011	<100	<100	<20	<20	<20	<20	<20	500	<20	1,900	<20	<20
	10/6/2011	<100	<100	<20	<20	<20	<20	<20	540	<20	2,000	<20	<20
	1/9/2012	<100	<100	<20	<20	31	<20	<20	530	<20	2,000	<20	<20
	4/4/2012	<100	<100	<20	<20	38	<20	<20	480	<20	1,900	<20	<20
	7/11/2012	<100	<100	<20	<20	<20	<20	<20	560	<20	2,100	<20	<20
	10/8/2012	<100	<100	<20	<20	<20	<20	<20	650	<20	2,000	<20	<20
	6/11/2013	<100	<100	<20	<20	<20	<20	<20	470	<20	1,400	<20	<20
DUP-01 (MW-01s)	3/13/2009	<20	<20	<20	<20	<20	<20	<20	720	<20	2,700	<20	<20
MW-02s (23-28') Depth to Groundwater Approx. 22 - 24'	3/13/2009	<10	<10	<2.0	<2.0	2.4	<2.0	2.2	2.5	<2.0	280	<2.0	<2.0
	4/20/2009	NA	<50	<10	<10	<10	<10	<10	<10	<10	130	NA	<10
	12/9/2009	<10	<10	<2.0	<2.0	3.7	<2.0	2.7	2.9	<2.0	250	<2.0	<2.0
	3/17/2010	13	<10	<2.0	<2.0	4.1	<2.0	2.3	3.1	<2.0	290	<2.0	<2.0
	5/18/2010	<10	<10	<2.0	<2.0	2.3	<2.0	2.4	2.6	<2.0	210	<2.0	<2.0
	9/10/2010	<10	<10	<2.0	<2.0	2.3	<2.0	2.3	2.3	<2.0	220	<2.0	<2.0
	12/22/2010	<10	<10	<2.0	<2.0	2.4	<2.0	2.3	3.1	<2.0	240	<2.0	<2.0
	2/24/2011	<10	<10	<2.0	<2.0	2.0	<2.0	<2.0	2.6	<2.0	240	<2.0	<2.0
	5/10/2011 ⁽⁴⁾	<10	<10	<2.0	<2.0	<2.0	<2.0	<2.0	2.3	<2.0	250	<2.0	<2.0
	7/28/2011 ⁽⁵⁾	<10	<10	<2.0	<2.0	2.0	<2.0	2.2	2.4	<2.0	280	<2.0	<2.0
	10/7/2011	<10	<10	<2.0	<2.0	<2.0	<2.0	2.5	2.5	<2.0	220	<2.0	<2.0
	1/10/2012	<10	<10	<2.0	<2.0	<2.0	<2.0	2.8	2.5	<2.0	190	<2.0	<2.0
	4/5/2012	<10	<10	<2.0	<2.0	2.7	<2.0	3.5	3.4	<2.0	210	<2.0	<2.0
	7/11/2012	<10	<10	<2.0	<2.0	2.2	<2.0	2.5	3.5	<2.0	330	<2.0	<2.0
	10/25/2012	<10	<10	<2.0	<2.0	<2.0	<2.0	<2.0	2.6	<2.0	270	<2.0	<2.0
	6/11/2013	<10	<10	<2.0	<2.0	<2.0	<2.0	<2.0	2.8	<2.0	300	<2.0	<2.0

Notes:
Health-Based Residential and Non-Residential Drinking Water (DW) Criteria, Groundwater/Surface Water Interface (GSI) Criteria and Groundwater Contact Criteria from MDEQ RRD Op Memo 1 Part 201 Generic Cleanup Criteria/Part 213 Risk Based Cleanup Levels, September 28, 2012. Groundwater Screening Levels (GWSLs) for Vapor Intrusion were calculated in accordance with the MDEQ Remediation and Redevelopment Division Program Redesign 2009 document titled Background Document: Draft Proposed Vapor Intrusion Indoor Air Criteria (IAC), Soil Gas Criteria (SGC), and Groundwater Screening Levels (GW_vSLs) for Vapor Intrusion using both residential and non-residential exposure scenarios and the most recent chemical specific toxicity values accepted and/or published by the United States Environmental Protection Agency (USEPA) as of February 1, 2012.

ug/L = micrograms per liter; NC = No criteria; NA = Not analyzed

Bold font denotes concentrations detected above laboratory reporting limits

Denotes concentrations above one or more criteria

* An asterisk indicates that the depth to groundwater intersects or may periodically intersect an overlying clay unit. The depth to the bottom of the upper clay unit is approximately 7.0 feet below ground surface (ft bgs) at MW-09s, 8.0 ft bgs at MW-20s (based on boring log for nearby soil boring B-29), 15.0 ft bgs at MW-23, 9.0 ft bgs at MW-27s, 20.5 ft bgs at MW-29d, and 14.0 ft bgs at MW-30s and MW-30d.

- 1) Criterion is not protective for surface water used as a drinking water source as described in footnote {X} of MDEQ Op Memo 1 Part 201, Attachment 1.
- 2) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21
- 3) At the request of USEPA, a site-specific groundwater contact criteria for trichloroethene (TCE) was recalculated to reflect revised TCE toxicity data which was published by USEPA on September 28, 2011.
- 4) The average temperature in this sample shipment exceeded the recommended temperature range. Sample results are approximate.
- 5) Quality control results for trichloroethene are outside the established control limits, the result is approximate.
- 6) Headspace present in the sample, results are approximate.

Table 2
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Former Tecumseh Products Company Site
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Analyte	2-Butanone	Chloroethane	1,1-Dichloroethane	1,1-Dichloroethene ⁽²⁾	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichloro-fluoromethane	Vinyl Chloride
Residential DW Criteria	13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria	38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSI Criteria	2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion	4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	370	5.0
Non-Residential GWSLs for Vapor Intrusion	1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria	2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-03s (9-14') Depth to Groundwater Approx. 8 - 10'	3/13/2009	<10	<10	9.1	<2.0	240	9.1	<2.0	<2.0	<2.0	<2.0	140
	4/20/2009	NA	<50	18	<10	490	18	<10	<10	<10	NA	210
	12/8/2009	<120	<120	46	<25	2,200	83	<25	<25	<25	<25	130
	3/17/2010	<25	<25	11	<5.0	460	17	<5.0	<5.0	<5.0	<5.0	42
	5/18/2010	<25	<25	14	<5.0	630	24	<5.0	<5.0	<5.0	<5.0	34
	9/10/2010	<50	<50	29	<10	1,600	63	<10	<10	<10	<10	83
	12/22/2010	<50	<50	32	<10	1,800	82	<10	<10	<10	<10	70
	2/25/2011	<100	<100	33	<20	2,200	110	<20	<20	<20	<20	75
	5/10/2011 ⁽⁴⁾	<100	<100	25	<20	1,600	77	<20	<20	<20	<20	52
	7/28/2011	<100	<100	23	<20	1,700	78	<20	<20	<20	<20	65
	10/6/2011	<100	<100	24	<20	2,100	100	<20	<20	<20	<20	91
	1/10/2012	<50	<50	22	<10	1,300	81	<10	<10	<10	<10	51
	4/4/2012	<100	<100	<20	<20	1,600	84	<20	<20	<20	20	170
	7/11/2012	<100	<100	23	<20	2,500	120	<20	<20	<20	25	210
	10/8/2012	<100	<100	<20	<20	1,700	93	<20	<20	<20	<20	100
DUP-01 (MW-03s)	6/3/2013	<100	<100	24	<20	2,000	120	<20	<20	<20	<20	220
MW-04s (15-20') Depth to Groundwater Approx. 15 - 17'	12/8/2009	<120	<120	42	<25	2,000	73	<25	<25	<25	<25	120
	3/13/2009	<120	<120	<25	<25	2,100	70	<25	<25	<25	5,000	460
	4/20/2009	NA	<500	<100	<100	1,700	<100	<100	<100	<100	4,000	520
	12/9/2009	<250	<250	<50	<50	2,500	90	<50	<50	<50	7,100	270
	3/17/2010	<250	<250	<50	<50	2,900	82	<50	<50	<50	7,500	520
	5/18/2010	<250	<250	<50	<50	2,100	58	<50	<50	<50	4,700	280
	9/17/2010	<250	<250	<50	<50	2,400	70	<50	<50	<50	5,200	200
	12/22/2010	<250	<250	<50	<50	2,700	91	<50	<50	<50	6,700	270
	2/25/2011	<250	<250	<50	<50	2,500	82	<50	<50	<50	5,900	280
	5/11/2011 ⁽⁴⁾	<250	<250	<50	<50	1,900	58	<50	<50	<50	4,600	270
	7/28/2011	<250	<250	<50	<50	1,700	50	<50	<50	<50	4,600	190
	10/6/2011	<250	<250	<50	<50	2,000	58	<50	<50	<50	4,600	190
	1/10/2012	<250	<250	<50	<50	1,800	72	<50	<50	<50	4,800	190
	4/4/2012	<250	<250	<50	<50	1,600	54	<50	<50	<50	4,300	170
	7/11/2012	<250	<250	<50	<50	2,100	65	<50	<50	<50	5,600	200
	10/8/2012	<250	<250	<50	<50	2,200	66	<50	<50	<50	6,700	200
	6/3/2013	<250	<250	<50	<50	1,900	63	<50	<50	<50	5,700	140

Notes:
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Residential DW Criteria		13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria		38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
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Non-Residential GWSLs for Vapor Intrusion		1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria		2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L

MW-04i (21.5-26.5') Depth to Groundwater Approx. 16-17'	4/3/2013	<250	<250	<50	<50	3,100	100	<50	<50	<50	5,000	<50	53
	6/3/2013	<250	<250	<50	<50	3,400	96	<50	<50	<50	4,900	<50	53
MW-05s (25-30') Depth to Groundwater Approx. 25 - 27'	3/13/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	3.5	<1.0	<1.0	120	<1.0	<1.0
	4/20/2009	NA	<25	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	140	NA	<5.0
	12/10/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	5.3	<1.0	<1.0	190	<1.0	<1.0
	3/17/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	6.3	<1.0	<1.0	160	<1.0	<1.0
	5/17/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	4.6	<1.0	<1.0	160	<1.0	<1.0
	9/9/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	4.6	<1.0	<1.0	140	<1.0	<1.0
	12/21/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	4.9	<1.0	<1.0	160	<1.0	<1.0
	2/24/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	4.4	<1.0	<1.0	130	<1.0	<1.0
	5/13/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	4.9	<1.0	<1.0	160	<1.0	<1.0
	7/27/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	4.8	<1.0	<1.0	150	<1.0	<1.0
	10/10/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	5.1	<1.0	<1.0	150	<1.0	<1.0
	1/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	5.8	<1.0	<1.0	150	<1.0	<1.0
	4/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	5.7	<1.0	<1.0	160	<1.0	<1.0
MW-06s (24-29') Depth to Groundwater Approx. 23 - 26'	7/10/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	5.8	<1.0	<1.0	160	<1.0	<1.0
	10/25/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	3.8	<1.0	<1.0	130	<1.0	<1.0
	3/16/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	21	<1.0	<1.0
	4/20/2009	NA	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	23	NA	<1.0
	12/9/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	37	<1.0	<1.0
	3/18/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	31	<1.0	<1.0
	5/17/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	33	<1.0	<1.0
	9/10/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	29	<1.0	<1.0
	12/21/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	34	<1.0	<1.0
	2/18/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	35	<1.0	<1.0
	5/10/2011 ⁽⁴⁾	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	27	<1.0	<1.0
	7/27/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	27	<1.0	<1.0
	10/5/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	30	<1.0	<1.0
	1/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	31	<1.0	<1.0
	4/3/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	32	<1.0	<1.0
	7/10/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	32	<1.0	<1.0
	10/4/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	28	<1.0	<1.0

Notes:
Health-Based Residential and Non-Residential Drinking Water (DW) Criteria, Groundwater/Surface Water Interface (GSI) Criteria and Groundwater Contact Criteria from MDEQ RRD Op Memo 1 Part 201 Generic Cleanup Criteria/Part 213 Risk Based Cleanup Levels, September 28, 2012. Groundwater Screening Levels (GWSLs) for Vapor Intrusion were calculated in accordance with the MDEQ Remediation and Redevelopment Division Program Redesign 2009 document titled Background Document: Draft Proposed Vapor Intrusion Indoor Air Criteria (IAC), Soil Gas Criteria (SGC), and Groundwater Screening Levels (GW_vSLs) for Vapor Intrusion using both residential and non-residential exposure scenarios and the most recent chemical specific toxicity values accepted and/or published by the United States Environmental Protection Agency (USEPA) as of February 1, 2012.

ug/L = micrograms per liter; NC = No criteria; NA = Not analyzed

Bold font denotes concentrations detected above laboratory reporting limits

Denotes concentrations above one or more criteria

* An asterisk indicates that the depth to groundwater intersects or may periodically intersect an overlying clay unit. The depth to the bottom of the upper clay unit is approximately 7.0 feet below ground surface (ft bgs) at MW-09s, 8.0 ft bgs at MW-20s (based on boring log for nearby soil boring B-29), 15.0 ft bgs at MW-23, 9.0 ft bgs at MW-27s, 20.5 ft bgs at MW-29d, and 14.0 ft bgs at MW-30s and MW-30d.

- 1) Criterion is not protective for surface water used as a drinking water source as described in footnote {X} of MDEQ Op Memo 1 Part 201, Attachment 1.
- 2) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21
- 3) At the request of USEPA, a site-specific groundwater contact criteria for trichloroethene (TCE) was recalculated to reflect revised TCE toxicity data which was published by USEPA on September 28, 2011.
- 4) The average temperature in this sample shipment exceeded the recommended temperature range. Sample results are approximate.
- 5) Quality control results for trichloroethene are outside the established control limits, the result is approximate.
- 6) Headspace present in the sample, results are approximate.

Table 2
Summary of Detected Volatile Organic Compounds at Groundwater Monitoring Locations
Former Tecumseh Products Company Site
Tecumseh, Michigan

Analyte		2-Butanone	Chloroethane	1,1-Dichloroethane	1,1-Dichloroethene ⁽²⁾	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichloro-fluoromethane	Vinyl Chloride
Residential DW Criteria		13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria		38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSI Criteria		2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion		4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	370	5.0
Non-Residential GWSLs for Vapor Intrusion		1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria		2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-07s (23.5-28.5') Depth to Groundwater Approx. 24 - 26'	3/16/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.1	<1.0	10	<1.0	<1.0
	4/20/2009	NA	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.6	<1.0	11	NA	<1.0
	12/10/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.8	<1.0	14	<1.0	<1.0
	3/17/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.9	<1.0	13	<1.0	<1.0
	5/17/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.9	<1.0	13	<1.0	<1.0
	9/10/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	12	<1.0	<1.0
	12/21/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.1	<1.0	16	<1.0	<1.0
	2/24/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.6	<1.0	12	<1.0	<1.0
	5/13/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5	<1.0	12	<1.0	<1.0
	7/27/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	11	<1.0	<1.0
	10/10/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	13	<1.0	<1.0
	1/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.6	<1.0	14	<1.0	<1.0
	4/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	12	<1.0	<1.0
	7/10/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	14	<1.0	<1.0
	10/19/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5	<1.0	14	<1.0	<1.0
MW-08s (23.5-28.5') Depth to Groundwater 23 - 26'	3/16/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	11	<1.0	<1.0
	4/20/2009	NA	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10	NA	<1.0
	12/10/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	11	<1.0	<1.0
DUP-01 (MW-08s)	4/20/2009	NA	NA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10	NA	<1.0
MW-08d (40-45') Depth to Groundwater Approx. 26 - 27'	4/2/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	6/11/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DUP-01 (MW-08d)	4/2/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-09s (7-12') Depth to Groundwater* Approx. 5 - 8'	3/16/2009	<100	<100	<20	<20	<20	<20	<20	160	<20	1,700	<20	<20
	4/20/2009	NA	<500	<100	<100	<100	<100	<100	220	<100	2,100	NA	<100
	12/9/2009	<100	<100	<20	<20	<20	<20	<20	150	<20	2,400	<20	<20
	3/18/2010	<100	<100	<20	<20	<20	<20	<20	120	<20	1,500	<20	<20
	5/18/2010	<100	<100	<20	<20	<20	<20	<20	120	<20	1,700	<20	<20
	9/17/2010	<100	<100	<20	<20	<20	<20	<20	120	<20	1,700	<20	<20
	2/25/2011	<50	<50	<10	<10	<10	<10	<10	84	<10	1,100	<10	<10
	5/11/2011 ⁽⁴⁾	<50	<50	<10	<10	<10	<10	<10	83	<10	1,200	<10	<10

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2) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21

3) At the request of USEPA, a site-specific groundwater contact criteria for trichloroethene (TCE) was recalculated to reflect revised TCE toxicity data which was published by USEPA on September 28, 2011.

4) The average temperature in this sample shipment exceeded the recommended temperature range. Sample results are approximate.

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Residential DW Criteria		13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria		38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSI Criteria		2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion		4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	370	5.0
Non-Residential GWSLs for Vapor Intrusion		1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria		2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-10s (8-13') Depth to Groundwater Approx. 7 - 9'	5/15/2009	NA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/9/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	3/16/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/12/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/3/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/16/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/15/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/9/2011 ⁽⁴⁾	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/20/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/4/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/4/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/2/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/3/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	6/12/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DUP-02 (MW-10s)	5/15/2009	NA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-10d (14-19') Depth to Groundwater Approx. 9 -10'	12/9/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-11s (29-34') Depth to Groundwater Approx. 29 - 32'	5/14/2009	NA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/13/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	3/15/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/14/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/3/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/17/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/17/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/12/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/22/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/7/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/4/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/6/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/12/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DUP-02 (MW-11s)	5/14/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DUP-01 (MW-11s)	9/3/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Notes:
Health-Based Residential and Non-Residential Drinking Water (DW) Criteria, Groundwater/Surface Water Interface (GSI) Criteria and Groundwater Contact Criteria from MDEQ RRD Op Memo 1 Part 201 Generic Cleanup Criteria/Part 213 Risk Based Cleanup Levels, September 28, 2012. Groundwater Screening Levels (GWSLs) for Vapor Intrusion were calculated in accordance with the MDEQ Remediation and Redevelopment Division Program Redesign 2009 document titled Background Document: Draft Proposed Vapor Intrusion Indoor Air Criteria (IAC), Soil Gas Criteria (SGC), and Groundwater Screening Levels (GW_vSLs) for Vapor Intrusion using both residential and non-residential exposure scenarios and the most recent chemical specific toxicity values accepted and/or published by the United States Environmental Protection Agency (USEPA) as of February 1, 2012.

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Bold font denotes concentrations detected above laboratory reporting limits

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* An asterisk indicates that the depth to groundwater intersects or may periodically intersect an overlying clay unit. The depth to the bottom of the upper clay unit is approximately 7.0 feet below ground surface (ft bgs) at MW-09s, 8.0 ft bgs at MW-20s (based on boring log for nearby soil boring B-29), 15.0 ft bgs at MW-23, 9.0 ft bgs at MW-27s, 20.5 ft bgs at MW-29d, and 14.0 ft bgs at MW-30s and MW-30d.

- 1) Criterion is not protective for surface water used as a drinking water source as described in footnote {X} of MDEQ Op Memo 1 Part 201, Attachment 1.
- 2) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21
- 3) At the request of USEPA, a site-specific groundwater contact criteria for trichloroethene (TCE) was recalculated to reflect revised TCE toxicity data which was published by USEPA on September 28, 2011.
- 4) The average temperature in this sample shipment exceeded the recommended temperature range. Sample results are approximate.
- 5) Quality control results for trichloroethene are outside the established control limits, the result is approximate.
- 6) Headspace present in the sample, results are approximate.

Table 2
Summary of Detected Volatile Organic Compounds at Groundwater Monitoring Locations
Former Tecumseh Products Company Site
Tecumseh, Michigan

Analyte	2-Butanone	Chloroethane	1,1-Dichloroethane	1,1-Dichloroethene ⁽²⁾	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichloro-fluoromethane	Vinyl Chloride
Residential DW Criteria	13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria	38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSI Criteria	2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion	4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	370	5.0
Non-Residential GWSLs for Vapor Intrusion	1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria	2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-12s (12-17') Depth to Groundwater Approx. 13 - 15'	5/15/2009	NA	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	<1.0	<1.0	<1.0
	12/30/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	<1.0	<1.0	<1.0
	3/15/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/14/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0
	9/3/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.6	<1.0	<1.0	<1.0	<1.0
	12/14/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/14/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/12/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.6	<1.0	<1.0	<1.0	<1.0
	7/20/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	<1.0	<1.0	<1.0
	10/7/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.9	<1.0	<1.0	<1.0	<1.0
	1/4/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	2.2	<1.0	<1.0	<1.0	<1.0
	4/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0
	7/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0
	10/12/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/30/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-12d (33-38') Depth to Groundwater Approx. 13 - 15'	3/18/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/14/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/3/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/14/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/14/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/12/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/20/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/7/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/4/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
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	10/12/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/31/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Notes:

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2) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21

3) At the request of USEPA, a site-specific groundwater contact criteria for trichloroethene (TCE) was recalculated to reflect revised TCE toxicity data which was published by USEPA on September 28, 2011.

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Residential DW Criteria	13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria	38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSI Criteria	2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion	4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	370	5.0
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Groundwater Contact Criteria	2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-13s (13-18') Depth to Groundwater Approx. 15 - 17'	5/15/2009	NA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/10/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	3/15/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/14/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/3/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/14/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/14/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/12/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/20/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/10/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/4/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/10/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/12/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/31/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-14s (4-9') Depth to Perched Groundwater Approx. 3 - 7'	5/14/2009	NA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/8/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	3/15/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/12/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/3/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/20/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/16/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/11/2011 ⁽⁴⁾	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/21/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/7/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/4/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/3/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

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Residential DW Criteria		13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria		38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
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Groundwater Contact Criteria		2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-14d (37.5-42.5') Depth to Groundwater Approx. 30 - 31'	3/23/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/14/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/3/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/16/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/16/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/9/2011 ⁽⁴⁾	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/21/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/5/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/4/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/2/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/3/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/4/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	6/12/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DUP-01 (MW-14d)	2/16/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/9/2011 ⁽⁴⁾	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/21/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/5/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/4/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/2/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/3/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DUP-02 (MW-14d)	10/4/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	6/12/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-15s (30-35') Depth to Groundwater Approx. 30 - 32'	5/15/2009	NA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/30/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	3/15/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/14/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/8/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/17/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/17/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/12/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/25/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/7/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/2/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Notes:
Health-Based Residential and Non-Residential Drinking Water (DW) Criteria, Groundwater/Surface Water Interface (GSI) Criteria and Groundwater Contact Criteria from MDEQ RRD Op Memo 1 Part 201 Generic Cleanup Criteria/Part 213 Risk Based Cleanup Levels, September 28, 2012. Groundwater Screening Levels (GWSLs) for Vapor Intrusion were calculated in accordance with the MDEQ Remediation and Redevelopment Division Program Redesign 2009 document titled Background Document: Draft Proposed Vapor Intrusion Indoor Air Criteria (IAC), Soil Gas Criteria (SGC), and Groundwater Screening Levels (GW_vSLs) for Vapor Intrusion using both residential and non-residential exposure scenarios and the most recent chemical specific toxicity values accepted and/or published by the United States Environmental Protection Agency (USEPA) as of February 1, 2012.
ug/L = micrograms per liter; NC = No criteria; NA = Not analyzed
Bold font denotes concentrations detected above laboratory reporting limits
Denotes concentrations above one or more criteria
* An asterisk indicates that the depth to groundwater intersects or may periodically intersect an overlying clay unit. The depth to the bottom of the upper clay unit is approximately 7.0 feet below ground surface (ft bgs) at MW-09s, 8.0 ft bgs at MW-20s (based on boring log for nearby soil boring B-29), 15.0 ft bgs at MW-23, 9.0 ft bgs at MW-27s, 20.5 ft bgs at MW-29d, and 14.0 ft bgs at MW-30s and MW-30d.
1) Criterion is not protective for surface water used as a drinking water source as described in footnote {X} of MDEQ Op Memo 1 Part 201, Attachment 1.
2) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21
3) At the request of USEPA, a site-specific groundwater contact criteria for trichloroethene (TCE) was recalculated to reflect revised TCE toxicity data which was published by USEPA on September 28, 2011.
4) The average temperature in this sample shipment exceeded the recommended temperature range. Sample results are approximate.
5) Quality control results for trichloroethene are outside the established control limits, the result is approximate.
6) Headspace present in the sample, results are approximate.

Table 2
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Former Tecumseh Products Company Site
Tecumseh, Michigan

Analyte	2-Butanone	Chloroethane	1,1-Dichloroethane	1,1-Dichloroethene ⁽²⁾	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichloro-fluoromethane	Vinyl Chloride
Residential DW Criteria	13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria	38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSI Criteria	2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion	4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	370	5.0
Non-Residential GWSLs for Vapor Intrusion	1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria	2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-17s (3-8') Depth to Groundwater Approx. 6'	7/23/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/7/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	3/18/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/12/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/8/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/16/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/15/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/11/2011 ⁽⁴⁾	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/21/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/4/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/2/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-18s (26-31') Depth to Groundwater Approx. 25 - 27'	7/3/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/3/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/8/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	3/16/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/12/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/8/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/20/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/17/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/9/2011 ⁽⁴⁾	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/22/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/5/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/3/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/6/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/4/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Notes:
Health-Based Residential and Non-Residential Drinking Water (DW) Criteria, Groundwater/Surface Water Interface (GSI) Criteria and Groundwater Contact Criteria from MDEQ RRD Op Memo 1 Part 201 Generic Cleanup Criteria/Part 213 Risk Based Cleanup Levels, September 28, 2012. Groundwater Screening Levels (GWSLs) for Vapor Intrusion were calculated in accordance with the MDEQ Remediation and Redevelopment Division Program Redesign 2009 document titled Background Document: Draft Proposed Vapor Intrusion Indoor Air Criteria (IAC), Soil Gas Criteria (SGC), and Groundwater Screening Levels (GW_vSLs) for Vapor Intrusion using both residential and non-residential exposure scenarios and the most recent chemical specific toxicity values accepted and/or published by the United States Environmental Protection Agency (USEPA) as of February 1, 2012.
ug/L = micrograms per liter; NC = No criteria; NA = Not analyzed
Bold font denotes concentrations detected above laboratory reporting limits
Denotes concentrations above one or more criteria

* An asterisk indicates that the depth to groundwater intersects or may periodically intersect an overlying clay unit. The depth to the bottom of the upper clay unit is approximately 7.0 feet below ground surface (ft bgs) at MW-09s, 8.0 ft bgs at MW-20s (based on boring log for nearby soil boring B-29), 15.0 ft bgs at MW-23, 9.0 ft bgs at MW-27s, 20.5 ft bgs at MW-29d, and 14.0 ft bgs at MW-30s and MW-30d.
1) Criterion is not protective for surface water used as a drinking water source as described in footnote {X} of MDEQ Op Memo 1 Part 201, Attachment 1.
2) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21
3) At the request of USEPA, a site-specific groundwater contact criteria for trichloroethene (TCE) was recalculated to reflect revised TCE toxicity data which was published by USEPA on September 28, 2011.
4) The average temperature in this sample shipment exceeded the recommended temperature range. Sample results are approximate.
5) Quality control results for trichloroethene are outside the established control limits, the result is approximate.
6) Headspace present in the sample, results are approximate.

Table 2
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Former Tecumseh Products Company Site
Tecumseh, Michigan

Analyte	2-Butanone	Chloroethane	1,1-Dichloroethane	1,1-Dichloroethene ⁽²⁾	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichloro-fluoromethane	Vinyl Chloride
Residential DW Criteria	13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria	38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSI Criteria	2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion	4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	370	5.0
Non-Residential GWSLs for Vapor Intrusion	1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria	2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L

MW-19s (25-30') Depth to Groundwater Approx. 24 - 26'	12/8/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.8	<1.0	31	<1.0	<1.0
	1/13/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.2	2.3	<1.0	36	<1.0	<1.0
	3/16/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.1	1.7	<1.0	36	<1.0	<1.0
	5/18/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.6	<1.0	32	<1.0	<1.0
	9/10/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.2	1.8	<1.0	33	<1.0	<1.0
	12/20/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.8	<1.0	37	<1.0	<1.0
	2/18/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.1	1.8	<1.0	41	<1.0	<1.0
	5/10/2011 ⁽⁴⁾	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5	<1.0	28	<1.0	<1.0
	7/25/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.0	1.4	<1.0	27	<1.0	<1.0
	10/5/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.1	1.7	<1.0	28	<1.0	<1.0
	1/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.2	1.9	<1.0	34	<1.0	<1.0
	4/3/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.1	1.5	<1.0	32	<1.0	<1.0
	7/10/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.6	2.3	<1.0	32	<1.0	<1.0
	10/4/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.6	<1.0	31	<1.0	<1.0
DUP-03 (MW-19s)	9/10/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.0	1.7	<1.0	32	<1.0	<1.0
DUP-02 (MW-19s)	2/18/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.1	1.8	<1.0	39	<1.0	<1.0
	5/10/2011 ⁽⁴⁾	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.6	<1.0	29	<1.0	<1.0
	7/25/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.1	1.4	<1.0	27	<1.0	<1.0
	10/5/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.1	1.6	<1.0	28	<1.0	<1.0
	1/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.2	1.8	<1.0	34	<1.0	<1.0
	4/3/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.1	1.6	<1.0	32	<1.0	<1.0
	7/10/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	1.6	2.3	<1.0	32	<1.0	<1.0
	10/4/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	27	<1.0	<1.0

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Tecumseh, Michigan

Analyte		2-Butanone	Chloroethane	1,1-Dichloroethane	1,1-Dichloroethene ⁽²⁾	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichloro-fluoromethane	Vinyl Chloride
Residential DW Criteria		13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria		38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSI Criteria		2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion		4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	370	5.0
Non-Residential GWSLs for Vapor Intrusion		1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria		2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-19d (40-45') Depth to Groundwater Approx. 24 - 26'	12/8/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	3/16/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/12/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/8/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/20/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/18/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/10/2011 ⁽⁴⁾	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/25/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/5/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/3/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/10/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
10/4/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
DUP-01 (MW-19d)	5/12/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
MW-20s (8-13') Depth to Groundwater* Approx. 4 - 6'	12/30/2009	<5.0	<5.0	48	4.0	9.6	<1.0	<1.0	150	<1.0	71	2.9	<1.0
	1/13/2010	<5.0	<5.0	50	3.5	9.0	<1.0	<1.0	170	<1.0	70	2.8	<1.0
	3/17/2010	<5.0	<5.0	51	3.8	9.4	<1.0	<1.0	160	<1.0	64	3.2	<1.0
	5/18/2010	<10	<10	58	5.1	12	<2.0	<2.0	210	<2.0	94	3.4	<2.0
	9/10/2010	<10	<10	34	4.2	9.7	<2.0	<2.0	230	<2.0	110	3.8	<2.0
	12/21/2010	<10	<10	24	3.6	6.1	<2.0	<2.0	200	<2.0	89	3.6	<2.0
	2/18/2011	<10	<10	19	3.3	5.5	<2.0	<2.0	190	<2.0	93	3.5	<2.0
	5/13/2011	<10	<10	14	2.8	4.1	<2.0	<2.0	190	<2.0	91	2.9	<2.0
	7/25/2011	<10	<10	6.5	<2.0	2.4	<2.0	<2.0	190	<2.0	100	2.3	<2.0
	10/10/2011	<10	<10	5.8	<2.0	<2.0	<2.0	<2.0	190	<2.0	110	3.1	<2.0
	1/9/2012	<5.0	<5.0	6.0	1.4	1.9	<1.0	<1.0	190	<1.0	100	3.2	<1.0
	4/9/2012	<5.0	<5.0	11	1.1	2.0	<1.0	<1.0	180	<1.0	100	2.6	<1.0
	7/10/2012	<10	<10	17	<2.0	2.5	<2.0	<2.0	190	<2.0	100	2.3	<2.0
	10/19/2012	<10	<10	24	<2.0	3.8	<2.0	<2.0	190	<2.0	98	2.0	<2.0
	5/31/2013	<10	<10	18	2.6	6.7	<2.0	<2.0	240	<2.0	120	<2.0	<2.0

Notes:

Health-Based Residential and Non-Residential Drinking Water (DW) Criteria, Groundwater/Surface Water Interface (GSI) Criteria and Groundwater Contact Criteria from MDEQ RRD Op Memo 1 Part 201 Generic Cleanup Criteria/Part 213 Risk Based Cleanup Levels, September 28, 2012. Groundwater Screening Levels (GWSLs) for Vapor Intrusion were calculated in accordance with the MDEQ Remediation and Redevelopment Division Program Redesign 2009 document titled Background Document: Draft Proposed Vapor Intrusion Indoor Air Criteria (IAC), Soil Gas Criteria (SGC), and Groundwater Screening Levels (GW_vSLs) for Vapor Intrusion using both residential and non-residential exposure scenarios and the most recent chemical specific toxicity values accepted and/or published by the United States Environmental Protection Agency (USEPA) as of February 1, 2012.

ug/L = micrograms per liter; NC = No criteria; NA = Not analyzed

Bold font denotes concentrations detected above laboratory reporting limits

Denotes concentrations above one or more criteria

* An asterisk indicates that the depth to groundwater intersects or may periodically intersect an overlying clay unit. The depth to the bottom of the upper clay unit is approximately 7.0 feet below ground surface (ft bgs) at MW-09s, 8.0 ft bgs at MW-20s (based on boring log for nearby soil boring B-29), 15.0 ft bgs at MW-23, 9.0 ft bgs at MW-27s, 20.5 ft bgs at MW-29d, and 14.0 ft bgs at MW-30s and MW-30d.

1) Criterion is not protective for surface water used as a drinking water source as described in footnote {X} of MDEQ Op Memo 1 Part 201, Attachment 1.

2) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21

3) At the request of USEPA, a site-specific groundwater contact criteria for trichloroethene (TCE) was recalculated to reflect revised TCE toxicity data which was published by USEPA on September 28, 2011.

4) The average temperature in this sample shipment exceeded the recommended temperature range. Sample results are approximate.

5) Quality control results for trichloroethene are outside the established control limits, the result is approximate.

6) Headspace present in the sample, results are approximate.

Table 2
Summary of Detected Volatile Organic Compounds at Groundwater Monitoring Locations
Former Tecumseh Products Company Site
Tecumseh, Michigan

Analyte		2-Butanone	Chloroethane	1,1-Dichloroethane	1,1-Dichloroethene ⁽²⁾	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichloro-fluoromethane	Vinyl Chloride
Residential DW Criteria		13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria		38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSI Criteria		2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion		4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	370	5.0
Non-Residential GWSLs for Vapor Intrusion		1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria		2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-20d (38.5-43.5') Depth to Groundwater Approx. 12 - 16'	12/30/2009	<5.0	<5.0	1.2	<1.0	86	<1.0	<1.0	1.9	<1.0	<1.0	<1.0	3.5
	1/13/2010	<5.0	<5.0	<1.0	<1.0	94	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.7
	3/17/2010	<5.0	<5.0	<1.0	<1.0	85	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	4.4
	5/18/2010	<5.0	<5.0	<1.0	<1.0	120	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.7
	9/10/2010	<5.0	<5.0	<1.0	<1.0	95	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/21/2010	<5.0	<5.0	<1.0	<1.0	200	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.5
	2/18/2011	<10	<10	<2.0	<2.0	190	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	3.2
	5/13/2011	<10	<10	<2.0	<2.0	170	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.6
	7/25/2011	<5.0	<5.0	<1.0	<1.0	170	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.6
	10/10/2011	<10	<10	<2.0	<2.0	200	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.5
	1/9/2012	<5.0	<5.0	<1.0	<1.0	140	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6.0
	4/9/2012	<5.0	<5.0	<1.0	<1.0	190	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	10
	7/10/2012	<10	<10	<2.0	<2.0	230	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	14
	10/19/2012	<10	<10	<2.0	<2.0	180	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	43
DUP-03 (MW-20d)	6/3/2013	<10	<10	<2.0	<2.0	250	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	67
MW-21 (28.5-33.5') Depth to Groundwater Approx. 29 - 30'	5/18/2010	<5.0	<5.0	<1.0	<1.0	120	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.7
	12/8/2009	<50	<50	31	<10	59	<10	<10	54	<10	840	<10	<10
	1/13/2010	<50	<50	28	<10	62	<10	<10	56	<10	730	<10	<10
	3/23/2010	<5.0	<5.0	33	2.2	81	7.5	<1.0	62	<1.0	850	<1.0	<1.0
	5/18/2010	<50	<50	35	<10	89	<10	<10	63	<10	830	<10	<10
	10/15/2010	<50	<50	26	<10	80	<10	<10	59	<10	810	<10	<10
	12/22/2010	<50	<50	25	<10	69	<10	<10	55	<10	730	<10	<10
	2/24/2011	<50	<50	25	<10	66	<10	<10	52	<10	730	<10	<10
	5/11/2011 ⁽⁴⁾	<50	<50	24	<10	65	<10	<10	49	<10	740	<10	<10
	7/28/2011	<50	<50	22	<10	77	<10	<10	54	<10	1,000	<10	<10
	10/6/2011	<50	<50	22	<10	74	<10	<10	55	<10	960	<10	<10
	1/10/2012	<50	<50	27	<10	79	<10	<10	64	<10	990	<10	<10
	4/4/2012	<50	<50	25	<10	81	<10	<10	55	<10	980	<10	<10
	7/11/2012	58	<50	25	<10	85	<10	<10	63	<10	1,000	<10	<10
	10/8/2012	<50	<50	22	<10	65	<10	<10	47	<10	850	<10	<10
DUP-02 (MW-21)	3/6/2013	<50	<50	26	<10	90	<10	<10	50	<10	760	<10	<10
	6/11/2013	<50	<50	26	<10	100	<10	<10	60	<10	1,100	<10	<10
DUP-02 (MW-21)	3/23/2010	<5.0	<5.0	33	2.2	79	7.8	<1.0	61	<1.0	810	<1.0	<1.0

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Bold font denotes concentrations detected above laboratory reporting limits

Denotes concentrations above one or more criteria

* An asterisk indicates that the depth to groundwater intersects or may periodically intersect an overlying clay unit. The depth to the bottom of the upper clay unit is approximately 7.0 feet below ground surface (ft bgs) at MW-09s, 8.0 ft bgs at MW-20s (based on boring log for nearby soil boring B-29), 15.0 ft bgs at MW-23, 9.0 ft bgs at MW-27s, 20.5 ft bgs at MW-29d, and 14.0 ft bgs at MW-30s and MW-30d.

- 1) Criterion is not protective for surface water used as a drinking water source as described in footnote {X} of MDEQ Op Memo 1 Part 201, Attachment 1.
- 2) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21
- 3) At the request of USEPA, a site-specific groundwater contact criteria for trichloroethene (TCE) was recalculated to reflect revised TCE toxicity data which was published by USEPA on September 28, 2011.
- 4) The average temperature in this sample shipment exceeded the recommended temperature range. Sample results are approximate.
- 5) Quality control results for trichloroethene are outside the established control limits, the result is approximate.
- 6) Headspace present in the sample, results are approximate.

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Former Tecumseh Products Company Site
Tecumseh, Michigan

Analyte	2-Butanone	Chloroethane	1,1-Dichloroethane	1,1-Dichloroethene ⁽²⁾	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichloro-fluoromethane	Vinyl Chloride
Residential DW Criteria	13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria	38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSI Criteria	2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion	4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	NC	5.0
Non-Residential GWSLs for Vapor Intrusion	1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria	2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L

DUP-03 (MW-21)	2/24/2011	<50	<50	24	<10	66	<10	<10	50	<10	740	<10	<10
	5/11/2011 ⁽⁴⁾	<50	<50	24	<10	66	<10	<10	49	<10	750	<10	<10
	7/28/2011	<50	<50	23	<10	78	<10	<10	57	<10	1,000	<10	<10
	10/6/2011	<50	<50	21	<10	73	<10	<10	52	<10	910	<10	<10
	1/10/2012	<50	<50	27	<10	85	<10	<10	66	<10	1,000	<10	<10
	4/4/2012	<50	<50	24	<10	81	<10	<10	61	<10	970	<10	<10
	7/11/2012	<50	<50	25	<10	80	<10	<10	59	<10	1,000	<10	<10
MW-22 (25-30') Depth to Groundwater Approx. 25 - 26'	6/11/2013	<50	<50	26	<10	110	<10	<10	76	<10	1,100	<10	<10
	12/7/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
	3/18/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	8.5
	5/18/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.0
	9/10/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	4.3
	12/22/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.0
	2/24/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.3
	5/11/2011 ⁽⁴⁾	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4
	7/21/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.8
	10/4/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6.2
	1/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	8.4
	4/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	12
	7/3/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	13
	10/3/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	18
	5/29/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	21

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Summary of Detected Volatile Organic Compounds at Groundwater Monitoring Locations
Former Tecumseh Products Company Site
Tecumseh, Michigan

Analyte	2-Butanone	Chloroethane	1,1-Dichloroethane	1,1-Dichloroethene ⁽²⁾	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichloro-fluoromethane	Vinyl Chloride
Residential DW Criteria	13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria	38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSI Criteria	2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion	4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	370	5.0
Non-Residential GWSLs for Vapor Intrusion	1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria	2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-23 (17-22') Depth to Groundwater* Approx. 8 - 10'	12/8/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.2
	1/13/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	7.6
	3/16/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	4.0
	5/18/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6.1
	9/10/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	9.0
	12/21/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	17
	2/18/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	18
	5/10/2011 ⁽⁴⁾	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	25
	7/25/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	23
	10/5/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	56
	11/4/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	11
	1/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	48
	4/3/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	85
	7/10/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	63
	10/8/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	47
	5/31/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	88
MW-24s (18.5'-23.5') Depth to Groundwater Approx. 19 - 21'	12/8/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	3/15/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/12/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/8/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/14/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/14/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/9/2011 ⁽⁴⁾	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/19/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/4/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/2/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/3/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/29/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Notes:
Health-Based Residential and Non-Residential Drinking Water (DW) Criteria, Groundwater/Surface Water Interface (GSI) Criteria and Groundwater Contact Criteria from MDEQ RRD Op Memo 1 Part 201 Generic Cleanup Criteria/Part 213 Risk Based Cleanup Levels, September 28, 2012. Groundwater Screening Levels (GWSLs) for Vapor Intrusion were calculated in accordance with the MDEQ Remediation and Redevelopment Division Program Redesign 2009 document titled Background Document: Draft Proposed Vapor Intrusion Indoor Air Criteria (IAC), Soil Gas Criteria (SGC), and Groundwater Screening Levels (GW_vSLs) for Vapor Intrusion using both residential and non-residential exposure scenarios and the most recent chemical specific toxicity values accepted and/or published by the United States Environmental Protection Agency (USEPA) as of February 1, 2012.

ug/L = micrograms per liter; NC = No criteria; NA = Not analyzed

Bold font denotes concentrations detected above laboratory reporting limits

Denotes concentrations above one or more criteria

* An asterisk indicates that the depth to groundwater intersects or may periodically intersect an overlaying clay unit. The depth to the bottom of the upper clay unit is approximately 7.0 feet below ground surface (ft bgs) at MW-09s, 8.0 ft bgs at MW-20s (based on boring log for nearby soil boring B-29), 15.0 ft bgs at MW-23, 9.0 ft bgs at MW-27s, 20.5 ft bgs at MW-29d, and 14.0 ft bgs at MW-30s and MW-30d.

- 1) Criterion is not protective for surface water used as a drinking water source as described in footnote {X} of MDEQ Op Memo 1 Part 201, Attachment 1.
- 2) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21
- 3) At the request of USEPA, a site-specific groundwater contact criteria for trichloroethene (TCE) was recalculated to reflect revised TCE toxicity data which was published by USEPA on September 28, 2011.
- 4) The average temperature in this sample shipment exceeded the recommended temperature range. Sample results are approximate.
- 5) Quality control results for trichloroethene are outside the established control limits, the result is approximate.
- 6) Headspace present in the sample, results are approximate.

Table 2
Summary of Detected Volatile Organic Compounds at Groundwater Monitoring Locations
Former Tecumseh Products Company Site
Tecumseh, Michigan

Analyte	2-Butanone	Chloroethane	1,1-Dichloroethane	1,1-Dichloroethene ⁽²⁾	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichloro-fluoromethane	Vinyl Chloride
Residential DW Criteria	13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria	38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSI Criteria	2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion	4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	370	5.0
Non-Residential GWSLs for Vapor Intrusion	1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria	2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-24d (39-44') Depth to Groundwater Approx. 19 - 21'	12/8/2009	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	3/15/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/12/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/8/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/14/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/14/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/9/2011 ⁽⁴⁾	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/19/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/4/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/2/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/3/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-25s (20-25') Depth to Groundwater Approx. 18 - 20'	5/30/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/10/2009	<5.0	<5.0	1.7	<1.0	8.8	<1.0	<1.0	4.8	<1.0	<1.0	<1.0
	3/16/2010	<5.0	<5.0	1.2	<1.0	<1.0	<1.0	<1.0	17	<1.0	1.1	<1.0
	5/14/2010	<5.0	<5.0	1.2	<1.0	<1.0	<1.0	<1.0	18	<1.0	1.0	<1.0
	9/8/2010	<5.0	<5.0	1.0	<1.0	<1.0	<1.0	<1.0	19	<1.0	1.4	<1.0
	12/22/2010	<5.0	<5.0	1.2	<1.0	<1.0	<1.0	<1.0	26	<1.0	2.4	<1.0
	2/24/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	19	<1.0	2.2	<1.0
	5/13/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	21	<1.0	2.2	<1.0
	7/28/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	19	<1.0	2.5	<1.0
	10/10/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	20	<1.0	2.8	<1.0
	1/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	20	<1.0	3.0	<1.0
	4/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	20	<1.0	3.6	<1.0
	7/11/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	21	<1.0	4.2	<1.0
DUP-01 (MW-25s)	10/25/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	19	<1.0	4.6	<1.0
	6/3/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	19	<1.0	6.1	<1.0
DUP-01 (MW-25s)	3/16/2010	<5.0	<5.0	1.3	<1.0	<1.0	<1.0	<1.0	18	<1.0	1.0	<1.0

Notes:

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2) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21

3) At the request of USEPA, a site-specific groundwater contact criteria for trichloroethene (TCE) was recalculated to reflect revised TCE toxicity data which was published by USEPA on September 28, 2011.

4) The average temperature in this sample shipment exceeded the recommended temperature range. Sample results are approximate.

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Residential DW Criteria	13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria	38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
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Groundwater Contact Criteria	2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-26s (28-33') Depth to Groundwater Approx. 26 - 28'	4/6/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/14/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/8/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/17/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/17/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/12/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/25/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/7/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/2/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-27s (7-12') Depth to Groundwater* Approx. 3 - 4'	3/23/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/17/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.0	<1.0
	9/9/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/20/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/16/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	<1.0
	5/9/2011 ⁽⁴⁾	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.0
	7/21/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/5/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/6/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/3/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/4/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	6/12/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DUP-02 (MW-27s)	9/9/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Notes:
Health-Based Residential and Non-Residential Drinking Water (DW) Criteria, Groundwater/Surface Water Interface (GSI) Criteria and Groundwater Contact Criteria from MDEQ RRD Op Memo 1 Part 201 Generic Cleanup Criteria/Part 213 Risk Based Cleanup Levels, September 28, 2012. Groundwater Screening Levels (GWSLs) for Vapor Intrusion were calculated in accordance with the MDEQ Remediation and Redevelopment Division Program Redesign 2009 document titled Background Document: Draft Proposed Vapor Intrusion Indoor Air Criteria (IAC), Soil Gas Criteria (SGC), and Groundwater Screening Levels (GW_vSLs) for Vapor Intrusion using both residential and non-residential exposure scenarios and the most recent chemical specific toxicity values accepted and/or published by the United States Environmental Protection Agency (USEPA) as of February 1, 2012.

ug/L = micrograms per liter; NC = No criteria; NA = Not analyzed

Bold font denotes concentrations detected above laboratory reporting limits

Denotes concentrations above one or more criteria

* An asterisk indicates that the depth to groundwater intersects or may periodically intersect an overlying clay unit. The depth to the bottom of the upper clay unit is approximately 7.0 feet below ground surface (ft bgs) at MW-09s, 8.0 ft bgs at MW-20s (based on boring log for nearby soil boring B-29), 15.0 ft bgs at MW-23, 9.0 ft bgs at MW-27s, 20.5 ft bgs at MW-29d, and 14.0 ft bgs at MW-30s and MW-30d.

- 1) Criterion is not protective for surface water used as a drinking water source as described in footnote {X} of MDEQ Op Memo 1 Part 201, Attachment 1.
- 2) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21
- 3) At the request of USEPA, a site-specific groundwater contact criteria for trichloroethene (TCE) was recalculated to reflect revised TCE toxicity data which was published by USEPA on September 28, 2011.
- 4) The average temperature in this sample shipment exceeded the recommended temperature range. Sample results are approximate.
- 5) Quality control results for trichloroethene are outside the established control limits, the result is approximate.
- 6) Headspace present in the sample, results are approximate.

Table 2
Summary of Detected Volatile Organic Compounds at Groundwater Monitoring Locations
Former Tecumseh Products Company Site
Tecumseh, Michigan

Analyte	2-Butanone	Chloroethane	1,1-Dichloroethane	1,1-Dichloroethene ⁽²⁾	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichloro-fluoromethane	Vinyl Chloride
Residential DW Criteria	13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria	38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSI Criteria	2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion	4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	370	5.0
Non-Residential GWSLs for Vapor Intrusion	1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria	2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-27d (37.5-42.5') Depth to Groundwater Approx. 24 - 25'	3/23/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/17/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/9/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/20/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/16/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/9/2011 ⁽⁴⁾	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/22/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/5/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/6/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/3/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-28s (25-30') Depth to Groundwater Approx. 25 - 27'	3/23/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/17/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/9/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/17/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/16/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/12/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/22/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/7/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/6/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0
	4/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/6/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/12/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Notes:
Health-Based Residential and Non-Residential Drinking Water (DW) Criteria, Groundwater/Surface Water Interface (GSI) Criteria and Groundwater Contact Criteria from MDEQ RRD Op Memo 1 Part 201 Generic Cleanup Criteria/Part 213 Risk Based Cleanup Levels, September 28, 2012. Groundwater Screening Levels (GWSLs) for Vapor Intrusion were calculated in accordance with the MDEQ Remediation and Redevelopment Division Program Redesign 2009 document titled Background Document: Draft Proposed Vapor Intrusion Indoor Air Criteria (IAC), Soil Gas Criteria (SGC), and Groundwater Screening Levels (GW_vSLs) for Vapor Intrusion using both residential and non-residential exposure scenarios and the most recent chemical specific toxicity values accepted and/or published by the United States Environmental Protection Agency (USEPA) as of February 1, 2012.

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- 1) Criterion is not protective for surface water used as a drinking water source as described in footnote {X} of MDEQ Op Memo 1 Part 201, Attachment 1.
- 2) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21
- 3) At the request of USEPA, a site-specific groundwater contact criteria for trichloroethene (TCE) was recalculated to reflect revised TCE toxicity data which was published by USEPA on September 28, 2011.
- 4) The average temperature in this sample shipment exceeded the recommended temperature range. Sample results are approximate.
- 5) Quality control results for trichloroethene are outside the established control limits, the result is approximate.
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Tecumseh, Michigan

Analyte	2-Butanone	Chloroethane	1,1-Dichloroethane	1,1-Dichloroethene ⁽²⁾	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichloro-fluoromethane	Vinyl Chloride
Residential DW Criteria	13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria	38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSI Criteria	2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion	4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	370	5.0
Non-Residential GWSLs for Vapor Intrusion	1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria	2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-28d (49-54') Depth to Groundwater Approx. 25 - 27'	3/23/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/17/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/9/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/17/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/16/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/12/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/22/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/7/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/6/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/6/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/19/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
DUP-03 (MW-28d)	10/19/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-29s (13-18') Depth to Groundwater Approx. 15 - 16'	3/18/2010	<5.0	<5.0	<1.0	<1.0	1.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/17/2010	<5.0	<5.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/9/2010	<5.0	<5.0	<1.0	<1.0	1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/15/2010	<5.0	<5.0	<1.0	<1.0	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/15/2011	<5.0	<5.0	<1.0	<1.0	1.7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/12/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/20/2011	<5.0	<5.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/10/2011	<5.0	<5.0	<1.0	<1.0	1.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/6/2012	<5.0	<5.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/5/2012	<5.0	<5.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/9/2012	<5.0	<5.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/12/2012	<5.0	<5.0	<1.0	<1.0	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/30/2013	<5.0	<5.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

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Residential DW Criteria	13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria	38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
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Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-29d (58.5-63.5') Depth to Groundwater* Approx. 18 - 19'	3/18/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/17/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/9/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/15/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/15/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/12/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/20/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/10/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/6/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/5/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/19/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-30s (11-16') Depth to Groundwater* Approx. 9 - 11'	3/23/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/17/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/9/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/16/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/15/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/13/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/20/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/10/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/6/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/19/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/30/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Notes:
Health-Based Residential and Non-Residential Drinking Water (DW) Criteria, Groundwater/Surface Water Interface (GSI) Criteria and Groundwater Contact Criteria from MDEQ RRD Op Memo 1 Part 201 Generic Cleanup Criteria/Part 213 Risk Based Cleanup Levels, September 28, 2012. Groundwater Screening Levels (GWSLs) for Vapor Intrusion were calculated in accordance with the MDEQ Remediation and Redevelopment Division Program Redesign 2009 document titled Background Document: Draft Proposed Vapor Intrusion Indoor Air Criteria (IAC), Soil Gas Criteria (SGC), and Groundwater Screening Levels (GW_vSLs) for Vapor Intrusion using both residential and non-residential exposure scenarios and the most recent chemical specific toxicity values accepted and/or published by the United States Environmental Protection Agency (USEPA) as of February 1, 2012.

ug/L = micrograms per liter; NC = No criteria; NA = Not analyzed

Bold font denotes concentrations detected above laboratory reporting limits

Denotes concentrations above one or more criteria

* An asterisk indicates that the depth to groundwater intersects or may periodically intersect an overlying clay unit. The depth to the bottom of the upper clay unit is approximately 7.0 feet below ground surface (ft bgs) at MW-09s, 8.0 ft bgs at MW-20s (based on boring log for nearby soil boring B-29), 15.0 ft bgs at MW-23, 9.0 ft bgs at MW-27s, 20.5 ft bgs at MW-29d, and 14.0 ft bgs at MW-30s and MW-30d.

- 1) Criterion is not protective for surface water used as a drinking water source as described in footnote {X} of MDEQ Op Memo 1 Part 201, Attachment 1.
- 2) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21
- 3) At the request of USEPA, a site-specific groundwater contact criteria for trichloroethene (TCE) was recalculated to reflect revised TCE toxicity data which was published by USEPA on September 28, 2011.
- 4) The average temperature in this sample shipment exceeded the recommended temperature range. Sample results are approximate.
- 5) Quality control results for trichloroethene are outside the established control limits, the result is approximate.
- 6) Headspace present in the sample, results are approximate.

Table 2
Summary of Detected Volatile Organic Compounds at Groundwater Monitoring Locations
Former Tecumseh Products Company Site
Tecumseh, Michigan

Analyte		2-Butanone	Chloroethane	1,1-Dichloroethane	1,1-Dichloroethene ⁽²⁾	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichloro-fluoromethane	Vinyl Chloride
Residential DW Criteria		13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria		38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSI Criteria		2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion		4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	370	5.0
Non-Residential GWSLs for Vapor Intrusion		1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria		2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-30d (25.5-30.5') Depth to Groundwater* Approx. 9 - 11'	3/23/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/17/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/9/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/16/2010	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2/15/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/13/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/20/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/10/2011	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/6/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/9/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/19/2012	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
5/30/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
MW-31 (33.3-38.3') Depth to Groundwater Approx. 32 - 33'	6/18/2010	<5.0	<5.0	14	<1.0	19	2.2	<1.0	20	<1.0	180	<1.0	<1.0
	9/17/2010	<10	<10	<2.0	<2.0	15	<2.0	<2.0	48	<2.0	220	<2.0	2.5
	12/22/2010 ⁽⁵⁾	<10	<10	16	<2.0	29	2.9	<2.0	27	<2.0	260	<2.0	<2.0
	2/24/2011	<10	<10	16	<2.0	31	3.1	<2.0	26	<2.0	300	<2.0	<2.0
	5/11/2011 ⁽⁴⁾	<10	<10	15	<2.0	24	3.0	<2.0	22	<2.0	250	<2.0	<2.0
	7/21/2011	<5.0	<5.0	7.4	<1.0	14	1.2	<1.0	11	<1.0	130	<1.0	<1.0
	10/4/2011	<5.0	<5.0	18	<1.0	40	3.4	<1.0	28	<1.0	340	<1.0	<1.0
	1/10/2012	<10	<10	17	<2.0	35	3.1	<2.0	24	<2.0	290	<2.0	<2.0
	4/5/2012	<10	<10	16	<2.0	36	3.1	<2.0	24	<2.0	290	<2.0	<2.0
	7/17/2012	<20	<20	16	<4.0	34	<4.0	<4.0	23	<4.0	310	<4.0	<4.0
	10/3/2012	16	<12	15	<2.5	40	3.4	<2.5	26	<2.5	340	<2.5	<2.5
	3/6/2013	<12	<12	13	<2.5	32	2.9	<2.5	23	<2.5	270	<2.5	<2.5
5/29/2013	<12	<12	15	<2.5	39	2.9	<2.5	23	<2.5	300	<2.5	<2.5	
DUP-01 (MW-31)	6/18/2010	<5.0	<5.0	12	<1.0	19	2.3	<1.0	21	<1.0	170	<1.0	<1.0

Notes:
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ug/L = micrograms per liter; NC = No criteria; NA = Not analyzed
Bold font denotes concentrations detected above laboratory reporting limits
Denotes concentrations above one or more criteria

* An asterisk indicates that the depth to groundwater intersects or may periodically intersect an overlying clay unit. The depth to the bottom of the upper clay unit is approximately 7.0 feet below ground surface (ft bgs) at MW-09s, 8.0 ft bgs at MW-20s (based on boring log for nearby soil boring B-29), 15.0 ft bgs at MW-23, 9.0 ft bgs at MW-27s, 20.5 ft bgs at MW-29d, and 14.0 ft bgs at MW-30s and MW-30d.
1) Criterion is not protective for surface water used as a drinking water source as described in footnote {X} of MDEQ Op Memo 1 Part 201, Attachment 1.
2) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21
3) At the request of USEPA, a site-specific groundwater contact criteria for trichloroethene (TCE) was recalculated to reflect revised TCE toxicity data which was published by USEPA on September 28, 2011.
4) The average temperature in this sample shipment exceeded the recommended temperature range. Sample results are approximate.
5) Quality control results for trichloroethene are outside the established control limits, the result is approximate.
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Former Tecumseh Products Company Site
Tecumseh, Michigan

Analyte		2-Butanone	Chloroethane	1,1-Dichloroethane	1,1-Dichloroethene ⁽²⁾	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichloro-fluoromethane	Vinyl Chloride
Residential DW Criteria		13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria		38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSI Criteria		2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion		4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	370	5.0
Non-Residential GWSLs for Vapor Intrusion		1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria		2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-32s (23-28') Depth to Groundwater Approx. 23 - 25'	9/17/2010	<100	<100	150	<20	270	26	<20	220	<20	2,400	<20	<20
	11/18/2010	<100	<100	<20	<20	190	<20	<20	560	<20	2,800	<20	<20
	12/28/2010	<100	<100	<20	<20	200	<20	<20	510	<20	2,300	<20	<20
	2/25/2011	<100	<100	<20	<20	190	<20	<20	420	<20	2,300	<20	<20
	5/10/2011 ⁽⁴⁾	<100	<100	<20	<20	170	<20	<20	380	<20	2,300	<20	31
	7/28/2011	<100	<100	<20	<20	140	<20	<20	380	<20	2,400	<20	<20
	10/6/2011	<100	<100	<20	<20	160	<20	<20	350	<20	2,200	<20	<20
	1/10/2012	<100	<100	<20	<20	170	<20	<20	400	<20	2,300	<20	<20
	4/4/2012	<100	<100	<20	<20	130	<20	<20	340	<20	2,200	<20	<20
	7/11/2012	<100	<100	<20	<20	85	<20	<20	370	<20	2,200	<20	<20
10/10/2012	<100	<100	<20	<20	89	<20	<20	280	<20	1,600	<20	<20	
5/20/2013	<100	<100	<20	<20	89	<20	<20	<20	220	<20	1,400	<20	<20
MW-32d (35-40') Depth to Groundwater Approx. 23 - 24'	5/20/2013	<5.0	<5.0	<1.0	<1.0	2.0	3.2	<1.0	<1.0	<1.0	53	<1.0	<1.0
MW-33s (21-26') Depth to Groundwater Approx. 20 - 22'	9/17/2010	<5.0	<5.0	12	<1.0	13	<1.0	<1.0	<1.0	<1.0	76	<1.0	64
	11/18/2010	<5.0	<5.0	14	<1.0	22	<1.0	<1.0	1.1	<1.0	150	<1.0	56
	12/22/2010	<5.0	<5.0	14	<1.0	22	1.2	<1.0	1.0	<1.0	130	<1.0	57
	2/24/2011	<5.0	<5.0	12	<1.0	20	1.0	<1.0	<1.0	<1.0	110	<1.0	60
	5/10/2011 ⁽⁴⁾	<10	<10	11	<2.0	21	<2.0	<2.0	<2.0	<2.0	220	<2.0	55
	7/28/2011	<10	<10	8.9	<2.0	18	<2.0	<2.0	<2.0	<2.0	260	<2.0	22
	10/6/2011	<10	<10	11	<2.0	19	<2.0	<2.0	<2.0	<2.0	220	<2.0	48
	1/9/2012 ⁽⁶⁾	<5.0	8.9	15	<1.0	20	1.0	<1.0	1.3	<1.0	170	<1.0	51
	4/4/2012	<5.0	5.6	17	<1.0	21	<1.0	<1.0	1.2	<1.0	170	<1.0	48
	7/11/2012	<5.0	13	25	<1.0	32	1.3	<1.0	<1.0	<1.0	130	<1.0	52
	10/10/2012	<5.0	12	23	<1.0	31	1.2	<1.0	<1.0	<1.0	120	<1.0	57
5/20/2013	<5.0	9.4	16	<1.0	23	<1.0	<1.0	<1.0	<1.0	98	<1.0	100	
DUP-01 (MW-33s)	11/18/2010	<5.0	<5.0	14	<1.0	23	<1.0	<1.0	1.2	<1.0	150	<1.0	55

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Residential DW Criteria		13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria		38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSi Criteria		2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion		4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	370	5.0
Non-Residential GWSLs for Vapor Intrusion		1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria		2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MW-34s (23-28') Depth to Groundwater Approx. 23 - 25'	9/17/2010	<100	<100	<20	<20	<20	<20	<20	1,600	<20	1,100	<20	<20
	11/18/2010	<100	<100	<20	<20	<20	<20	<20	1,600	<20	1,200	<20	<20
	12/28/2010	<50	<50	<10	13	<10	<10	<10	1,400	<10	1,000	<10	<10
	2/25/2011	<50	<50	<10	<10	<10	<10	<10	1,100	<10	900	<10	<10
	5/10/2011 ⁽⁴⁾	<50	<50	<10	<10	<10	<10	<10	1,200	<10	970	<10	<10
	7/28/2011	<50	<50	<10	<10	<10	<10	<10	1,300	<10	1,100	<10	<10
	10/6/2011	<50	<50	<10	<10	<10	<10	<10	1,200	<10	1,000	<10	<10
	1/10/2012	<50	<50	<10	14	<10	<10	<10	1,500	<10	1,100	<10	<10
	4/4/2012	<50	<50	<10	<10	<10	<10	<10	1,400	<10	1,200	<10	<10
	7/11/2012	<50	<50	<10	<10	<10	<10	<10	1,400	<10	1,100	<10	<10
	10/10/2012	<50	<50	<10	<10	<10	<10	<10	1,400	<10	1,100	<10	<10
DUP-01 (MW-34s)	5/20/2013	<50	<50	<10	<10	<10	<10	<10	720	<10	730	<10	<10
MW-34d (45-50') Depth to Groundwater Approx. 23 - 24'	5/20/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-35i (20.5-22.5') Depth to Groundwater Approx. 16 - 17'	10/29/2012	<250	<250	<50	94	<50	<50	<50	4,500	<50	3,000	<50	<50
	3/27/2013	<250	<250	<50	110	<50	<50	<50	4,500	<50	2,700	<50	<50
	6/5/2013	<250	<250	<50	160	<50	<50	<50	6,400	<50	4,300	<50	<50
MW-35d (42.5-44.5') Depth to Groundwater Approx. 15 - 16'	7/24/2012	<5.0	<5.0	<1.0	<1.0	180	53	<1.0	1.5	<1.0	20	<1.0	22
	10/25/2012	<5.0	<5.0	<1.0	<1.0	3.8	1.2	<1.0	<1.0	<1.0	2.2	<1.0	19
	3/6/2013	<5.0	<5.0	<1.0	<1.0	1.6	<1.0	<1.0	<1.0	<1.0	1.6	<1.0	24
	6/11/2013	<5.0	<5.0	<1.0	<1.0	2.3	<1.0	<1.0	<1.0	<1.0	1.7	<1.0	23
MW-36s (16.5-21.5') Depth to Groundwater Approx. 16 - 17'	4/3/2013	<12	19	15	2.7	140	18	<2.5	35	2.9	260	<2.5	12
	5/31/2013	<12	20	14	2.6	150	18	<2.5	29	<2.5	280	<2.5	11
MW-36d (31-36') Depth to Groundwater Approx. 16 - 17'	4/2/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	6/11/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-37s (25.5-30.5') Depth to Groundwater Approx. 25 - 26'	4/3/2013	<25	<25	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	570	<5.0	<5.0
	6/3/2013	<25	<25	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	580	<5.0	<5.0
MW-38s (9-14') Depth to Groundwater Approx. 9 - 10'	4/3/2013	<10	<10	13	<2.0	22	2.7	<2.0	18	<2.0	210	<2.0	16
	6/3/2013	<10	<10	15	<2.0	30	2.6	<2.0	18	<2.0	230	<2.0	16
MW-38d (29-34') Depth to Groundwater Approx. 30 - 32'	4/3/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	11	<1.0	<1.0
	6/12/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.8	<1.0	<1.0

Notes:

Health-Based Residential and Non-Residential Drinking Water (DW) Criteria, Groundwater/Surface Water Interface (GSi) Criteria and Groundwater Contact Criteria from MDEQ RRD Op Memo 1 Part 201 Generic Cleanup Criteria/Part 213 Risk Based Cleanup Levels, September 28, 2012. Groundwater Screening Levels (GWSLs) for Vapor Intrusion were calculated in accordance with the MDEQ Remediation and Redevelopment Division Program Redesign 2009 document titled Background Document: Draft Proposed Vapor Intrusion Indoor Air Criteria (IAC), Soil Gas Criteria (SGC), and Groundwater Screening Levels (GW_vSLs) for Vapor Intrusion using both residential and non-residential exposure scenarios and the most recent chemical specific toxicity values accepted and/or published by the United States Environmental Protection Agency (USEPA) as of February 1, 2012.

ug/L = micrograms per liter; NC = No criteria; NA = Not analyzed

Bold font denotes concentrations detected above laboratory reporting limits

Denotes concentrations above one or more criteria

* An asterisk indicates that the depth to groundwater intersects or may periodically intersect an overlying clay unit. The depth to the bottom of the upper clay unit is approximately 7.0 feet below ground surface (ft bgs) at MW-09s, 8.0 ft bgs at MW-20s (based on boring log for nearby soil boring B-29), 15.0 ft bgs at MW-23, 9.0 ft bgs at MW-27s, 20.5 ft bgs at MW-29d, and 14.0 ft bgs at MW-30s and MW-30d.

1) Criterion is not protective for surface water used as a drinking water source as described in footnote {X} of MDEQ Op Memo 1 Part 201, Attachment 1.

2) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21

3) At the request of USEPA, a site-specific groundwater contact criteria for trichloroethene (TCE) was recalculated to reflect revised TCE toxicity data which was published by USEPA on September 28, 2011.

4) The average temperature in this sample shipment exceeded the recommended temperature range. Sample results are approximate.

5) Quality control results for trichloroethene are outside the established control limits, the result is approximate.

6) Headspace present in the sample, results are approximate.

Table 2
Summary of Detected Volatile Organic Compounds at Groundwater Monitoring Locations
Former Tecumseh Products Company Site
Tecumseh, Michigan

Analyte		2-Butanone	Chloroethane	1,1-Dichloroethane	1,1-Dichloroethene ⁽²⁾	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichloro-fluoromethane	Vinyl Chloride
Residential DW Criteria		13,000	430	880	7.0	70	100	5.0	200	5.0	5.0	2,600	2.0
Non-Residential DW Criteria		38,000	1,700	2,500	7.0	70	100	5.0	200	5.0	5.0	7,300	2.0
GSI Criteria		2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Residential GWSLs for Vapor Intrusion		4.5E+06	NC	130	390	440	330	11	15,000	NC	9.9	370	5.0
Non-Residential GWSLs for Vapor Intrusion		1.9E+07	NC	670	1,600	1,800	1,400	55	63,000	NC	42	1,600	50
Groundwater Contact Criteria		2.4E+08	4.4E+05	2.4E+06	11,000	2.0E+05	2.2E+05	12,000	1.3E+06	21,000	13,000 ⁽³⁾	1.1E+06	1,000
Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L

MW-39s (15.5-20.5') Depth to Groundwater Approx. 15 - 16'	4/3/2013	<50	<50	86	17	56	<10	<10	86	<10	810	<10	<10
	6/3/2013	<50	<50	90	18	71	<10	<10	84	<10	870	<10	<10
MW-39d (34-39') Depth to Groundwater Approx. 15 - 16'	4/2/2013	<5.0	<5.0	<1.0	<1.0	2.6	2.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	6/11/2013	<5.0	<5.0	<1.0	<1.0	3.2	2.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-40s (20-25') Depth to Groundwater Approx. 22 - 23'	4/3/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	6/12/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-40d (37.5-42.5') Depth to Groundwater Approx. 21 - 22'	4/3/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	6/12/2013	<5.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Notes:
Health-Based Residential and Non-Residential Drinking Water (DW) Criteria, Groundwater/Surface Water Interface (GSI) Criteria and Groundwater Contact Criteria from MDEQ RRD Op Memo 1 Part 201 Generic Cleanup Criteria/Part 213 Risk Based Cleanup Levels, September 28, 2012. Groundwater Screening Levels (GWSLs) for Vapor Intrusion were calculated in accordance with the MDEQ Remediation and Redevelopment Division Program Redesign 2009 document titled Background Document: Draft Proposed Vapor Intrusion Indoor Air Criteria (IAC), Soil Gas Criteria (SGC), and Groundwater Screening Levels (GW_vSLs) for Vapor Intrusion using both residential and non-residential exposure scenarios and the most recent chemical specific toxicity values accepted and/or published by the United States Environmental Protection Agency (USEPA) as of February 1, 2012.

ug/L = micrograms per liter; NC = No criteria; NA = Not analyzed

Bold font denotes concentrations detected above laboratory reporting limits

Denotes concentrations above one or more criteria

* An asterisk indicates that the depth to groundwater intersects or may periodically intersect an overlying clay unit. The depth to the bottom of the upper clay unit is approximately 7.0 feet below ground surface (ft bgs) at MW-09s, 8.0 ft bgs at MW-20s (based on boring log for nearby soil boring B-29), 15.0 ft bgs at MW-23, 9.0 ft bgs at MW-27s, 20.5 ft bgs at MW-29d, and 14.0 ft bgs at MW-30s and MW-30d.

- 1) Criterion is not protective for surface water used as a drinking water source as described in footnote {X} of MDEQ Op Memo 1 Part 201, Attachment 1.
- 2) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21
- 3) At the request of USEPA, a site-specific groundwater contact criteria for trichloroethene (TCE) was recalculated to reflect revised TCE toxicity data which was published by USEPA on September 28, 2011.
- 4) The average temperature in this sample shipment exceeded the recommended temperature range. Sample results are approximate.
- 5) Quality control results for trichloroethene are outside the established control limits, the result is approximate.
- 6) Headspace present in the sample, results are approximate.

Table 3
Summary of Chlorinated Volatile Organic Compounds at Surface Water Sample Locations
Tecumseh Products Company
Tecumseh, Michigan

Analyte		1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene ⁽¹⁾	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	Trichloroethene	Vinyl Chloride
GSI Criteria		740	360 ⁽²⁾	130	620	1,500 ⁽²⁾	60 ⁽²⁾	89	200 ⁽²⁾	13 ⁽²⁾
Human Non-Cancer Value (Non-Drink)		400,000	420,000	33,000	36,000	19,000	1,800	1,300,000	550	4,400
Human Cancer Value (Non-Drink)		NC	360	NC	NC	NC	60	NC	370	13
Final Chronic Value		740	2,000	130	620	1,500	190	89	200	930
Aquatic Maximum Value		6,600	8,200	1,200	5,500	14,000	1,400	800	1,800	8,400
Final Acute Value		13,000	16,000	2,300	11,000	28,000	2,900	1,600	3,500	17,000
Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L

SEEP	4/3/2012	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/10/2012	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/4/2012	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	6/12/2013	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
WL-01	4/6/2010	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	6/18/2010	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	9/8/2010	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	12/10/2010 ⁽³⁾	--	--	--	--	--	--	--	--	--
	2/25/2011 ⁽³⁾	--	--	--	--	--	--	--	--	--
	5/11/2011	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	1/5/2012	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	4/2/2012	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	7/3/2012	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	10/3/2012	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	5/29/2013	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Notes:
Groundwater/Surface Water Interface (GSI) Criteria from MDEQ RRD Op Memo 1 Part 201 Generic Cleanup Criteria/Part 213 Risk Based Cleanup Levels, September 28, 2012. Human Non-Cancer Values (HNV), Human Cancer Values (HCV), Final Chronic Values (FCV), Aquatic Maximum Values (AMV) and Final Acute Values (FAV) from MDEQ Surface Water Assessment Rule 57 Water Quality Values, September 7, 2012.
ug/L = micrograms per liter
NC = No criteria
-- = No data

Bold font denotes concentrations detected above laboratory reporting limits
Denotes concentrations above one or more criteria

- 1) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21
2) Criterion is not protective for surface water used as a drinking water source as described in footnote {X} of MDEQ Op Memo 1 Part 201, Attachment 1.
3) Frozen, no sample collected.

Table 4
Evaluation and Determination of Site-Specific GSI Criteria
Former Tecumseh Products Company Site
Tecumseh, Michigan

Analyte	2-Butanone	Chloroethane	1,1-Dichloroethane	1,1-Dichloroethene ⁽²⁾	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichloro-fluoromethane	Vinyl Chloride
CAS Number	78-93-3	75-00-3	75-35-3	75-35-4	156-59-2	156-60-5	127-18-4	71-55-6	79-00-5	79-01-6	75-69-4	75-01-4
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
GSI Criteria	2,200	1,100	740	130	620	1,500 ⁽¹⁾	60 ⁽¹⁾	89	330 ⁽¹⁾	200 ⁽¹⁾	NC	13 ⁽¹⁾
Maximum Detected Groundwater Concentration and Location	58	20	150	160	3,400	120	6.3	6,400	2.9	7,500	3.8	520
	MW-21	MW-36s	MW-32s	MW-35i	MW-04i	MW-03s	MW-05s	MW-35i	MW-36s	MW-04s	MW-20s	MW-04s
Predicted Worst Case Maximum GSI Discharge Concentration and Location	16	<20	18	<2.5	40	3.4	<2.5	48	<2.5	340	<2.5	<2.5
	MW-31	MW-31	MW-31	MW-31	MW-31	MW-31	MW-31	MW-31	MW-31	MW-31	MW-31	MW-31
Calculate Site-Specific GSI? ⁽³⁾	No	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes
Calculated Mixing-Zone Based GSI ⁽⁴⁾	--	--	2.1E+06	3.6E+05	1.7E+06	--	1.7E+05	2.5E+05	--	5.6E+05	--	3.6E+04
Aquatic Maximum Value	--	--	6,600	1,200	5,500	--	1,400	800	--	1,800	--	8,400
Final Acute Value	--	--	13,000	2,300	11,000	--	2,900	1,600	--	3,500	--	17,000
Site-Specific GSI Criteria ⁽⁵⁾	NC	NC	6,600	1,200	5,500	NC	1,400	800	NC	1,800	NC	8,400
Does Max Conc. Exceed Site Specific GSI?	--	--	No	No	No	--	No	Yes	--	Yes	--	No
Discharge Conc. Exceed Site Specific GSI?	--	--	No	No	No	--	No	No	--	No	--	No

Notes:
Health-Based Residential and Non-Residential Drinking Water (DW) Criteria, Groundwater/Surface Water Interface (GSI) Criteria and Groundwater Contact Criteria from MDEQ RRD Op Memo 1 Part 201 Generic Cleanup Criteria/Part 213 Risk Based Cleanup Levels, September 28, 2012. Human Non-Cancer Values (HNV), Human Cancer Values (HCV), Final Chronic Values (FCV), Aquatic Maximum Values (AMV) and Final Acute Values (FAV) from MDEQ Surface Water Assessment Rule 57 Water Quality Values, September 7, 2012.
ug/L = micrograms per liter
NC = No criteria

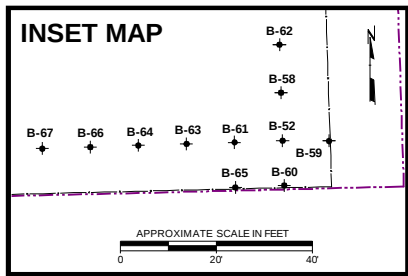
Bold font denotes concentrations detected above generic GSI criteria

Denotes concentrations above site specific GSI criteria

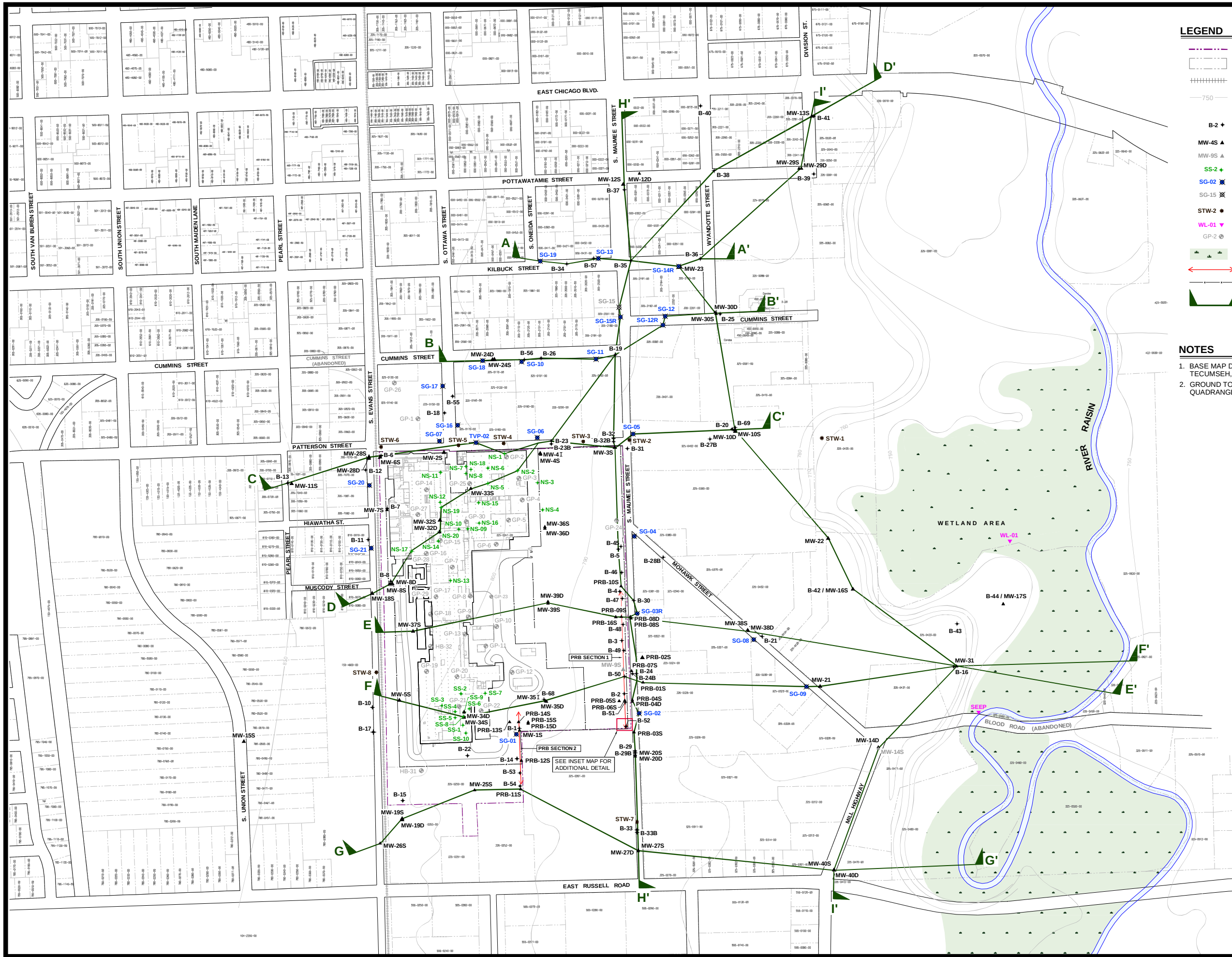
- 1) Criterion is not protective for surface water used as a drinking water source as described in footnote {X} of MDEQ Op Memo 1 Part 201, Attachment 1.
2) Compound may exhibit characteristic ignitability as defined in 40 C.F.R. § 261.21
3) A site-specific GSI criterion was calculated only for those compounds which have or have the potential to exceed generic GSI criteria at compliance monitoring wells. The maximum detected groundwater concentration was compared to generic GSI criteria, and a site-specific GSI criterion was calculated for all compounds exhibiting a maximum detected groundwater concentration exceeding 10-percent of the corresponding GSI criterion.
4) Mixing-zone based criteria are calculated based on mass flow rate and groundwater movement calculations, e.g. by multiplying the generic GSI criterion by the surface water to groundwater mixing ratio (2,800:1).
5) Both mixing zone-based GSI criteria and acute water quality values (FAV and AMV) were considered when determining site-specific GSI criteria. The site-specific GSI criterion for each compound is equal to the lowest of those values considered.

Technical Memorandum

Figures

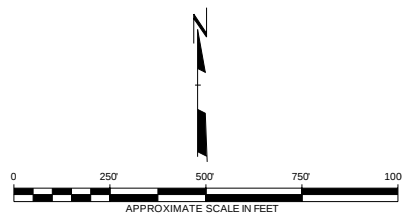
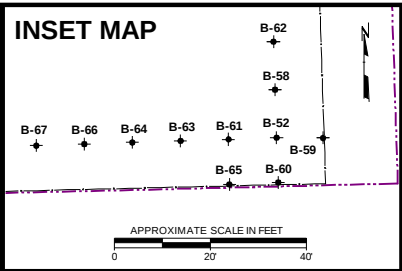


3					
2					
1	DGS	02/19/13	REVISED INVESTIGATION LOCATIONS		SEM
	NO.	BY	DATE	REVISION	APPD
PROJ1 FORMER TECUMSEH PRODUCTS SITE TECUMSEH, MICHIGAN					
TITLE: SITE LAYOUT AND SAMPLE LOCATIONS					
DRAWN BY:		DGS	SCALE:	PROJ. NO.	004311.0001.03
CHECKED BY:		SEM	AS INDICATED	FILE NO.	004311.0001.03.01.dwg
APPROVED BY:		QC	DATE PRINTED:	FIGURE 1	
DATE:		JULY 2013			



- LEGEND**
- FORMER TECUMSEH PRODUCTS SITE BOUNDARY
 - PARCEL BOUNDARY
 - RAILROAD TRACKS (APPROXIMATE LOCATION)
 - APPROXIMATE GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP
 - PERIMETER / OFF-SITE INVESTIGATION SOIL BORING LOCATION AND NUMBER
 - MONITORING WELL LOCATION AND NUMBER
 - DECOMMISSIONED MONITORING WELL LOCATION AND NUMBER
 - SOURCE AREA INVESTIGATION BORING LOCATION AND NUMBER
 - SOIL GAS SAMPLE LOCATION AND NUMBER
 - DECOMMISSIONED SOIL GAS SAMPLE LOCATION AND NUMBER
 - STORM WATER SEWER SAMPLE LOCATION AND NUMBER
 - APPROXIMATE SURFACE WATER SAMPLE LOCATION
 - ATC PHASE II ESA BORING LOCATION AND NUMBER
 - FLOODPLAIN / WOODED WETLAND AREA
 - PRB LOCATION
 - FENCE LINE
 - CROSS SECTION LOCATION

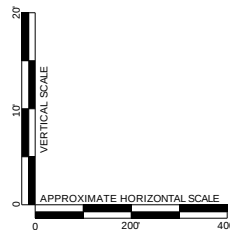
- NOTES**
- BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
 - GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S TOPOGRAPHIC QUADRANGLE MAP AND GROUND SURVEY DATA.

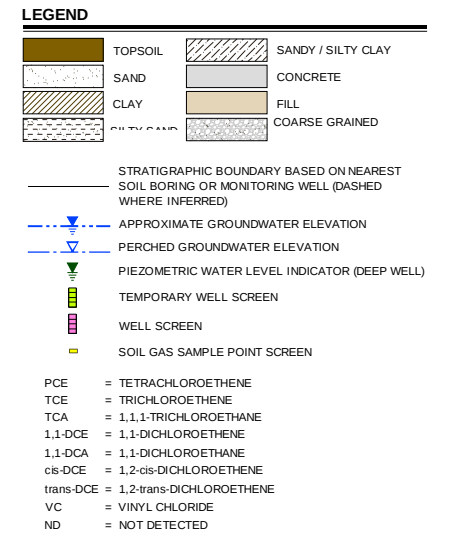


3					
2					
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NO.	BY	DATE	REVISION		APP
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TITLE: CROSS SECTION LOCATION MAP					
DRAWN BY: DGS		SCALE:		PROJ. NO. 004311.0001.03	
CHECKED BY: SEM		AS INDICATED		FILE NO. 004311.0001.03.02.dwg	
APPROVED BY: GC		DATE PRINTED:		FIGURE 2	
DATE: JULY 2013					

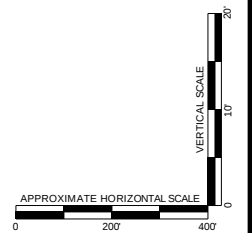


1540 Eisenhower Place
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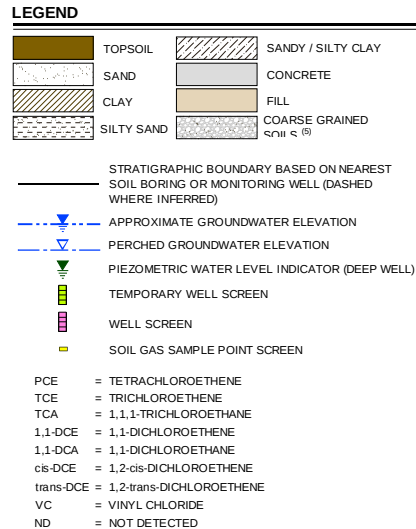




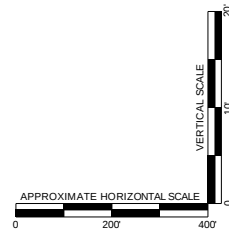
1. GROUND SURFACE AND STRATIGRAPHIC CONTACTS ARE APPROXIMATE AND EXTRAPOLATED FROM NEAREST SOIL BORING DATA.
2. SEE FIGURE 2 FOR LOCATION / ORIENTATION OF THIS GEOLOGIC CROSS SECTION.
3. GROUNDWATER ANALYTICAL DATA AND GROUNDWATER ELEVATIONS REFLECT THE MOST RECENT SAMPLE EVENT AS OF APRIL 2013.
4. DETECTED GROUNDWATER CONCENTRATIONS FOR CONSTITUENTS OF HIGHEST CONCERN ARE PROVIDED IN MICROGRAMS PER LITER.
5. COARSE GRAINED SOILS INCLUDE FINE GRAVEL, GRAVEL WITH SAND, SAND WITH GRAVEL, AND COARSE SAND.



3					
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1					
NO.	BY	DATE	REVISION		APP'D
PROJECT: FORMER TECUMSEH PRODUCTS SITE TECUMSEH, MICHIGAN					
TITLE: CROSS SECTIONS D - D' AND E - E'					
DRAWN BY: DGS		SCALE:		PROJ. NO. 004311.0001.03	
CHECKED BY: SM		AS INDICATED		FILE NO. 004311.0001.03-AA-II.dwg	
APPROVED BY: GC		DATE PRINTED:		FIGURE 4	
DATE: JULY 2013					



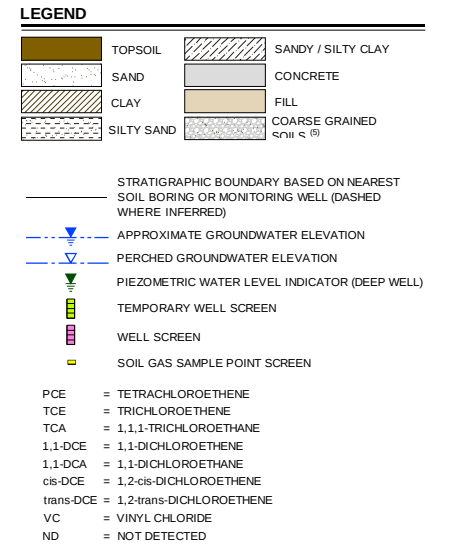
1. GROUND SURFACE AND STRATIGRAPHIC CONTACTS ARE APPROXIMATE AND EXTRAPOLATED FROM NEAREST SOIL BORING DATA.
2. SEE FIGURE 2 FOR LOCATION / ORIENTATION OF THIS GEOLOGIC CROSS SECTION.
3. GROUNDWATER ANALYTICAL DATA AND GROUNDWATER ELEVATIONS REFLECT THE MOST RECENT SAMPLE EVENT AS OF APRIL 2013.
4. DETECTED GROUNDWATER CONCENTRATIONS FOR CONSTITUENTS OF HIGHEST CONCERN ARE PROVIDED IN MICROGRAMS PER LITER.
5. COARSE GRAINED SOILS INCLUDE FINE GRAVEL, GRAVEL WITH SAND, SAND WITH GRAVEL, AND COARSE SAND.



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2					
1					
NO.	BY	DATE	REVISION		AP
PROJECT: FORMER TECUMSEH PRODUCTS SITE TECUMSEH, MICHIGAN					
TITLE: CROSS SECTIONS F - F' AND G - G'					
DRAWN BY:		DGS	SCALE	PROJ. NO.	004311.0001.0
CHECKED BY:		SM	AS INDICATED	FILE NO.	004311.0001.03.AA-H.d
APPROVED BY:		GC	DATE PRINTED:	FIGURE 5	
DATE:		JULY 2013			

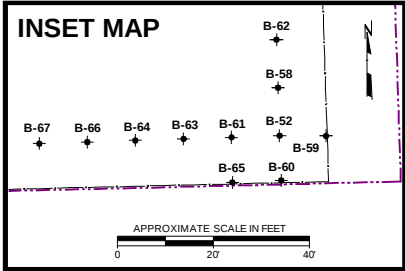


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1. GROUND SURFACE AND STRATIGRAPHIC CONTACTS ARE APPROXIMATE AND EXTRAPOLATED FROM NEAREST SOIL BORING DATA.
2. SEE FIGURE 2 FOR LOCATION / ORIENTATION OF THIS GEOLOGIC CROSS SECTION.
3. GROUNDWATER ANALYTICAL DATA AND GROUNDWATER ELEVATIONS REFLECT THE MOST RECENT SAMPLE EVENT AS OF APRIL 2013.
4. DETECTED GROUNDWATER CONCENTRATIONS FOR CONSTITUENTS OF HIGHEST CONCERN ARE PROVIDED IN MICROGRAMS PER LITER.
5. COARSE GRAINED SOILS INCLUDE FINE GRAVEL, GRAVEL WITH SAND, SAND WITH GRAVEL, AND COARSE SAND.





3				
2				
1	DGS	02/19/13	REVISED INVESTIGATION LOCATIONS	SEM
NO.	BY	DATE	REVISION	APPD

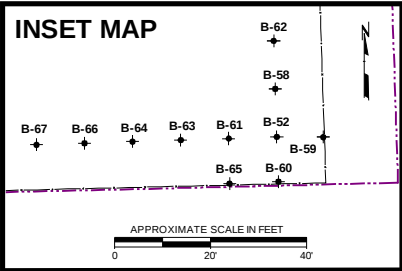
PROJ:2

**FORMER TECUMSEH PRODUCTS SITE
TECUMSEH, MICHIGAN**

TITLE:

ELEVATION OF THE TOP OF THE CLAY CONFINING UNIT

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CHECKED BY:	SEM	AS INDICATED	FILE NO.	004311.0001.03.07.dwg
APPROVED BY:	GC	DATE PRINTED:	FIGURE 7	
DATE:	JULY 2013			



3				
2				
1	DGS	02/19/13	REVISED INVESTIGATION LOCATIONS	SEM
NO.	BY	DATE	REVISION	APPD
PROJ2 FORMER TECUMSEH PRODUCTS SITE TECUMSEH, MICHIGAN				
TITLE: GROUNDWATER CONTOUR MAP APRIL 2013				
DRAWN BY: DGS		SCALE:		PROJ. NO. 004311.0001.03
CHECKED BY: SEM		AS INDICATED		FILE NO. 004311.0001.03.00.dwg
APPROVED BY: GC		DATE PRINTED:		FIGURE 8
DATE: JULY 2013				



Technical Memorandum

Appendix A References

Technical Memorandum

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The River Raisin Watershed Council. River Raisin Watershed Fact Sheet. Accessed online at <http://riverraisin.webplus.net/factsheet.html> on July 22, 2013.

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TRC Environmental Corporation. 2011. Current Human Exposures Under Control Environmental Indicator Report (RCRA-05-2010-0012); Tecumseh Products Company; Tecumseh, Michigan. September 2011.

TRC Environmental Corporation. 2012a. Former Tecumseh Products Company Site, Tecumseh, Michigan – Request to MDEQ for Mixing Zone-Based GSI Criteria. June 19, 2012.

TRC Environmental Corporation. 2012b. Remedial Investigation and Groundwater Environmental Indicator Report (RCRA-05-2010-0012); Former Tecumseh Products Company Site; Tecumseh, Michigan. September 2012.

TRC Environmental Corporation. 2012c. Technical Memorandum: Action Items from the October 2012 Project Meeting for Environmental Work Associated with the Former Tecumseh Products Company Site (RCRA-05-2010-0012). December 5, 2012; Revised December 19, 2012.

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Technical Memorandum

Appendix B **Hydraulic Conductivity Data**

US EPA ARCHIVE DOCUMENT

Table B1
 Summary of Single Well Response Test Results
 Former Tecumseh Products Company Site
 Tecumseh, Michigan

Monitoring Location	Test Date	Screened Interval Lithology	Test Type	Average	
				Hydraulic Conductivity (ft/day)	Hydraulic Conductivity (cm/sec)
MW-14s*	12/9/2009	Fine Sand with Silt	SLUG OUT	1.04	3.66E-04
MW-19s	12/9/2009	Well Graded Sand	SLUG IN	190	6.71E-02
			SLUG OUT		
MW-19d	12/9/2009	Fine Gravel with Sand	SLUG IN	131	4.62E-02
			SLUG OUT		
MW-20s	12/9/2009	Well Graded Sand	SLUG IN	196	6.93E-02
			SLUG OUT		
MW-20d	12/9/2009	Fine Gravel and Sand	SLUG IN	40.2	1.42E-02
			SLUG OUT		
MW-23	12/9/2009	Gravelly Sand	SLUG IN	218	7.67E-02
			SLUG OUT		
MW-24s	12/9/2009	Medium to Coarse Sand with Gravel	SLUG OUT	85.9	3.03E-02
MW-24d	12/9/2009	Coarse Sand and Gravel	SLUG IN	142	5.02E-02
			SLUG OUT		
MW-01s	3/1/2011	Well Graded Sand	SLUG IN	138	4.86E-02
			SLUG OUT		
MW-09s	3/1/2011	Poorly Graded Sand	SLUG IN	107	3.78E-02
			SLUG OUT		
MW-20s	3/1/2011	Well Graded Sand	SLUG IN	141	4.99E-02
			SLUG OUT		
PRB-01	3/1/2011	Well Graded Sand	SLUG IN	75.2	2.65E-02
			SLUG OUT		
PRB-03s	8/5/2011	Coarse Sand and Gravel	SLUG IN	6.87	2.42E-03
			SLUG OUT		
PRB-04d	8/5/2011	Coarse Sand and Gravel	SLUG IN	31.1	1.10E-02
			SLUG OUT		
PRB-04s	8/5/2011	Coarse Sand and Gravel	SLUG IN	12.1	4.27E-03
			SLUG OUT		
PRB-05s	8/5/2011	Coarse Sand and Gravel	SLUG IN	14.1	4.96E-03
			SLUG OUT		
PRB-06s**	8/5/2011	Blended PRB	SLUG IN	0.944	3.33E-04
			SLUG OUT		

Notes

Bouwer-Rice method used to calculate hydraulic conductivity values.

* MW-14s is screened in a different, perched water bearing unit than the other monitoring wells on-site. The hydraulic conductivity data measured at MW-14s was not used to determine minimum, maximum and average hydraulic conductivity in the water bearing unit connected to the site.

** PRB-06s, PRB-09s, and PRB-14s are screened in the permeable reactive barrier. The hydraulic conductivity data measured at these locations was not used to determine minimum, maximum and average hydraulic conductivity in the water bearing unit connected to the site.

Table B1
Summary of Single Well Response Test Results
Former Tecumseh Products Company Site
Tecumseh, Michigan

Monitoring Location	Test Date	Screened Interval Lithology	Test Type	Average	
				Hydraulic Conductivity (ft/day)	Hydraulic Conductivity (cm/sec)
PRB-07s	8/8/2011	Coarse Sand and Gravel	SLUG IN	5.80	2.04E-03
			SLUG OUT		
PRB-08d	8/8/2011	Coarse Sand and Gravel	SLUG IN	14.9	5.27E-03
			SLUG OUT		
PRB-08s	8/8/2011	Coarse Sand and Gravel	SLUG IN	6.32	2.23E-03
			SLUG OUT		
PRB-09s**	8/5/2011	Blended PRB	SLUG IN	0.715	2.52E-04
			SLUG OUT		
PRB-10s	8/5/2011	Coarse Sand and Gravel	SLUG IN	4.81	1.70E-03
			SLUG OUT		
PRB-11s	8/8/2011	Coarse Sand and Gravel	SLUG IN	2.80	9.89E-04
			SLUG OUT		
PRB-12s	8/8/2011	Coarse Sand and Gravel	SLUG IN	7.98	2.81E-03
			SLUG OUT		
PRB-13s	8/8/2011	Coarse Sand and Gravel	SLUG IN	1.40	4.94E-04
			SLUG OUT		
PRB-14s**	8/8/2011	Injected PRB	SLUG IN	4.33	1.53E-03
			SLUG OUT		
PRB-15d	8/8/2011	Coarse Sand and Gravel	SLUG IN	16.0	5.66E-03
			SLUG OUT		
PRB-15s	8/8/2011	Coarse Sand and Gravel	SLUG IN	5.86	2.07E-03
			SLUG OUT		
Minimum Hydraulic Conductivity				1.40	4.94E-04
Maximum Hydraulic Conductivity				218	7.67E-02
Geometric Mean Hydraulic Conductivity				27.0	9.53E-03

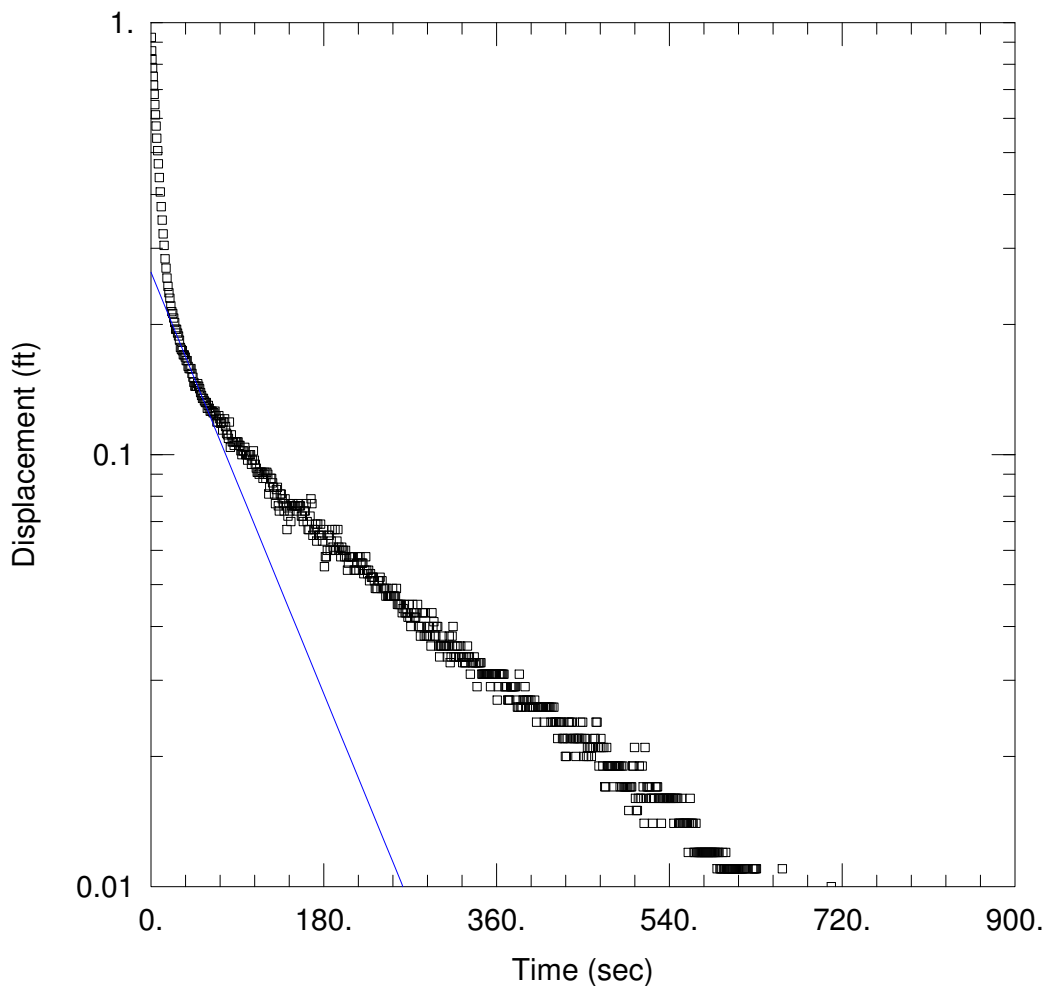
Notes

Bouwer-Rice method used to calculate hydraulic conductivity values.

* MW-14s is screened in a different, perched water bearing unit than the other monitoring wells on-site. The hydraulic conductivity data measured at MW-14s was not used to determine minimum, maximum and average hydraulic conductivity in the water bearing unit connected to the site.

** PRB-06s, PRB-09s, and PRB-14s are screened in the permeable reactive barrier. The hydraulic conductivity data measured at these locations was not used to determine minimum, maximum and average hydraulic conductivity in the water bearing unit connected to the site.

In Situ Hydraulic Conductivity Testing



MW-14S SLUGOUT

Data Set: P:\...\MW-14s_slugout_BR.aqt

Date: 07/08/10

Time: 12:36:44

PROJECT INFORMATION

Company: RMT

Client: TPC

Project: 02751.07.004 / 8070.07.004

Location: Tecumseh, MI

Test Date: 12/9/09

AQUIFER DATA

Saturated Thickness: 4. ft

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (MW-14s)

Initial Displacement: 1.08 ft

Static Water Column Height: 2.89 ft

Total Well Penetration Depth: 2.89 ft

Screen Length: 5. ft

Casing Radius: 0.08 ft

Wellbore Radius: 0.33 ft

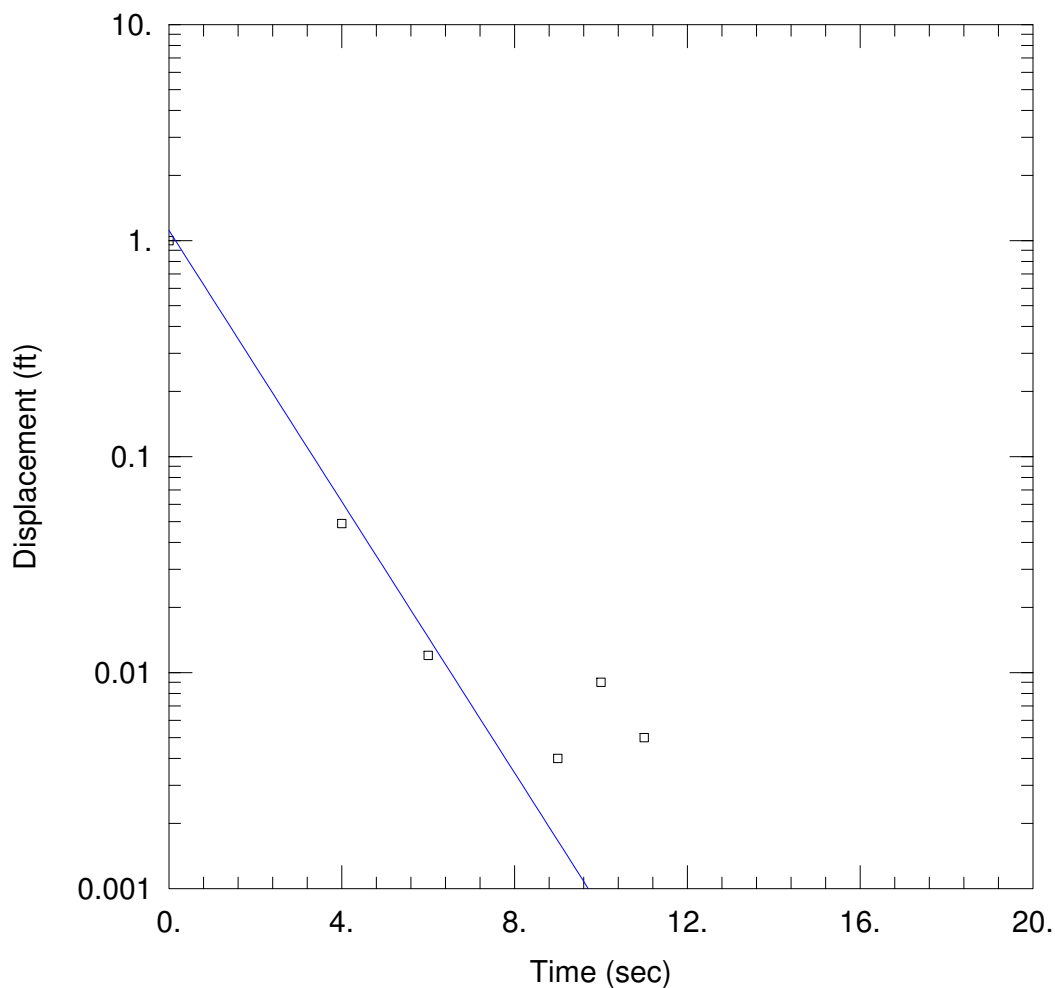
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 1.038$ ft/day

$y_0 = 0.2639$ ft



MW-19D SLUGIN

Data Set: P:\...\MW-19d_slugin_BR.aqt
Date: 07/08/10

Time: 16:51:49

PROJECT INFORMATION

Company: RMT
Client: TPC
Project: 02751.07.004 / 8070.07.004
Location: Tecumseh, MI
Test Date: 12/9/09

AQUIFER DATA

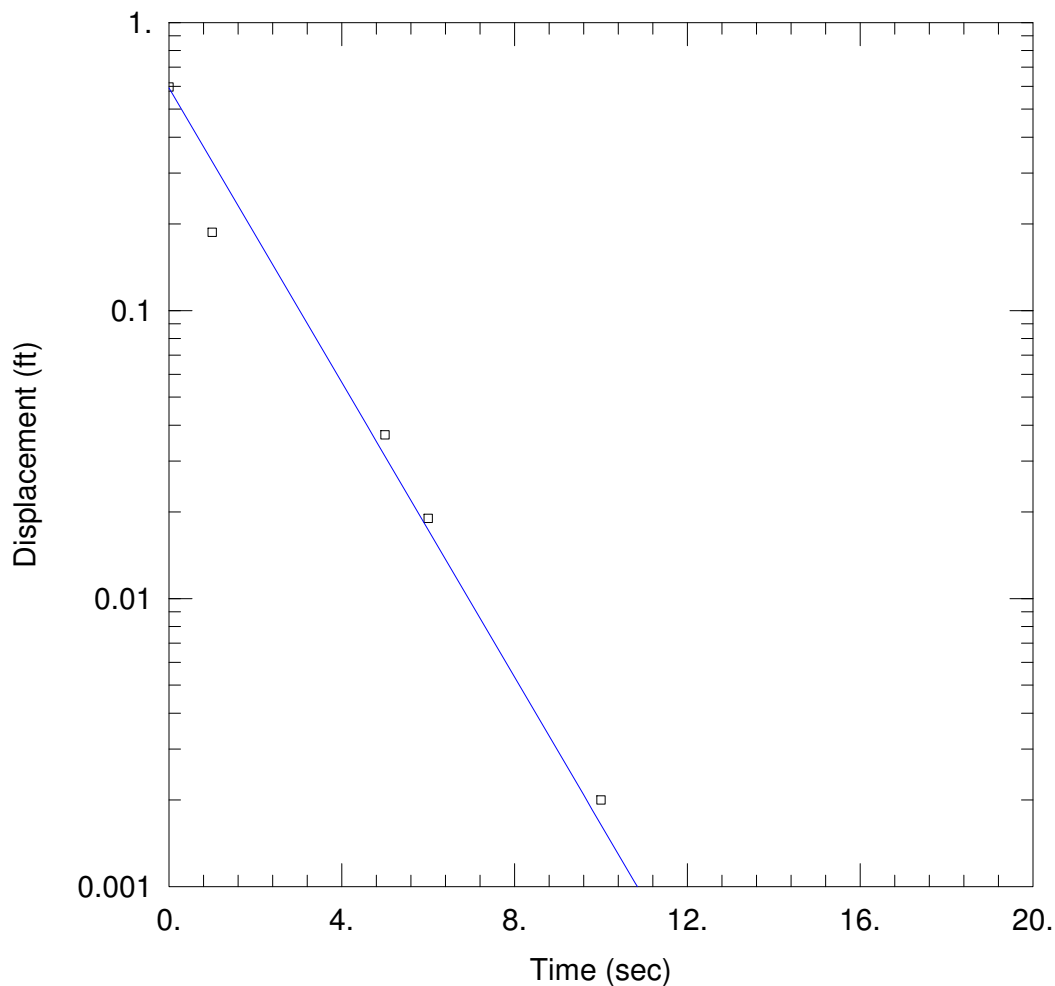
Saturated Thickness: 21. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-19d)

Initial Displacement: 1. ft Static Water Column Height: 20.81 ft
Total Well Penetration Depth: 20.81 ft Screen Length: 5. ft
Casing Radius: 0.08 ft Wellbore Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 144.5 ft/day y0 = 1.114 ft



MW-19D SLUGOUT

Data Set: P:\...\MW-19d_slugout_BR.aqt

Date: 07/08/10

Time: 16:54:11

PROJECT INFORMATION

Company: RMT

Client: TPC

Project: 02751.07.004 / 8070.07.004

Location: Tecumseh, MI

Test Date: 12/9/09

AQUIFER DATA

Saturated Thickness: 21. ft

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (MW-19d)

Initial Displacement: 0.597 ft

Static Water Column Height: 20.81 ft

Total Well Penetration Depth: 20.81 ft

Screen Length: 5. ft

Casing Radius: 0.08 ft

Wellbore Radius: 0.33 ft

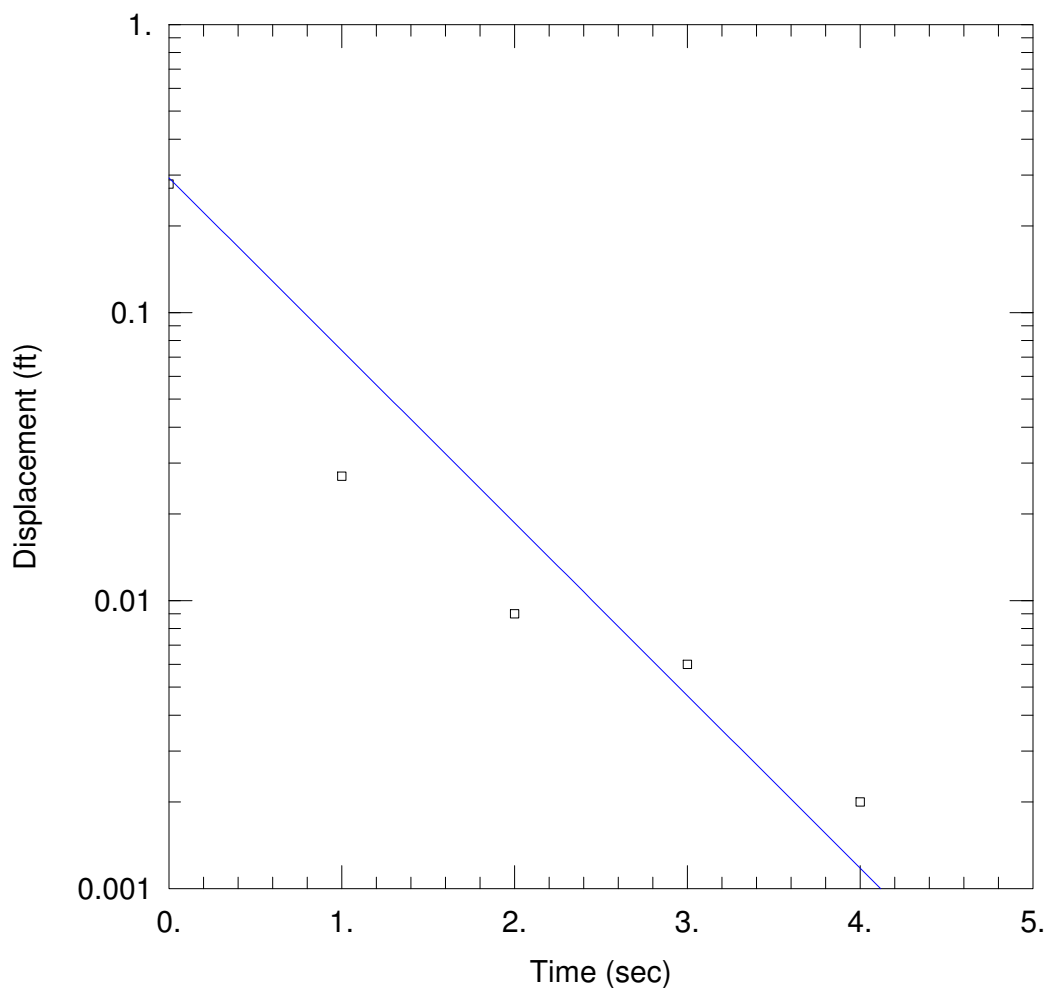
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 117.6 ft/day

y0 = 0.592 ft



MW-19S SLUGIN

Data Set: P:\...\MW-19s_slugin_BR.aqt

Date: 07/08/10

Time: 16:55:06

PROJECT INFORMATION

Company: RMT

Client: TCP

Project: 02751.07.004 \ 8070.07.004

Location: Tecumseh, MI

Test Date: 12/9/09

AQUIFER DATA

Saturated Thickness: 21. ft

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (MW-19s)

Initial Displacement: 0.279 ft

Static Water Column Height: 5.93 ft

Total Well Penetration Depth: 5.93 ft

Screen Length: 5. ft

Casing Radius: 0.08 ft

Wellbore Radius: 0.33 ft

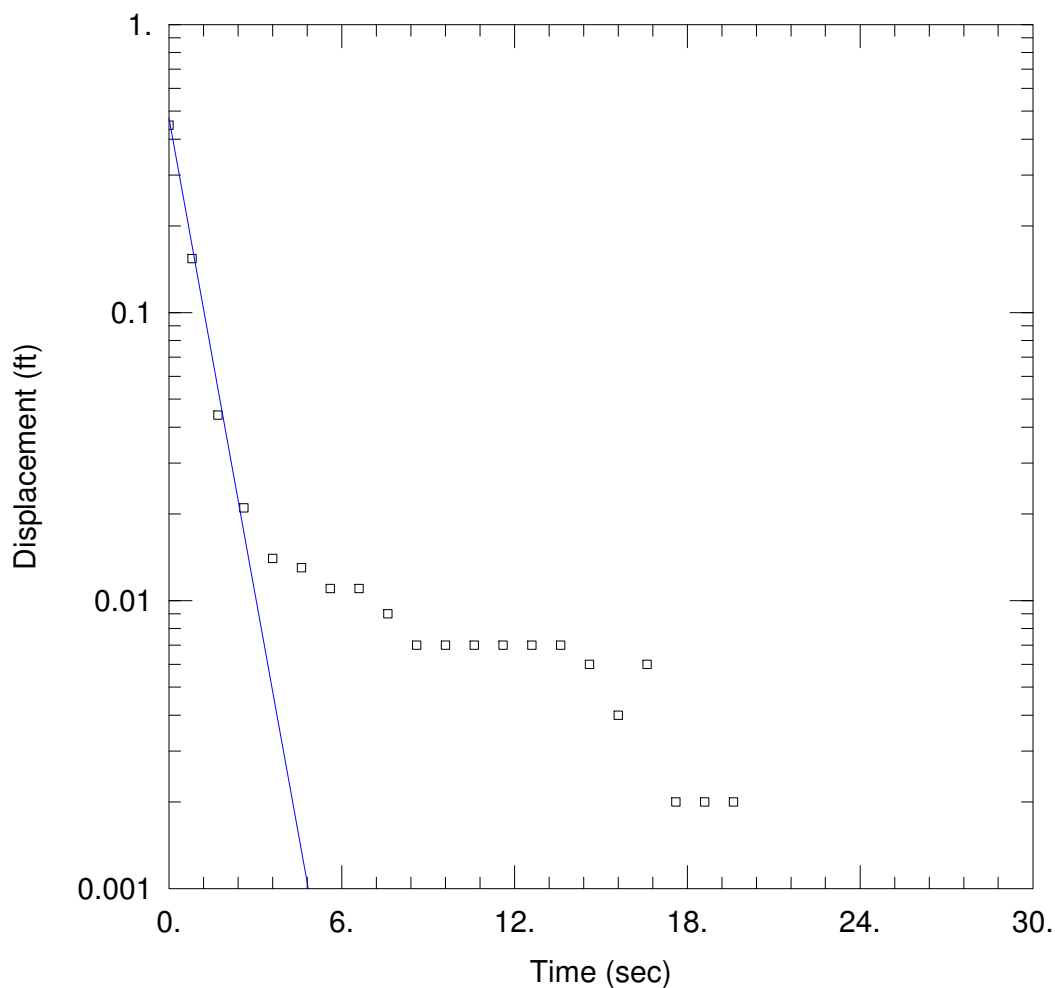
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 197.8$ ft/day

$y_0 = 0.2933$ ft



MW-19S SLUGOUT

Data Set: P:\...\MW-19s_slugout_BR.aqt

Date: 07/08/10

Time: 16:55:25

PROJECT INFORMATION

Company: RMT

Client: TPC

Project: 02751.07.004 / 8070.07.004

Location: Tecumseh, MI

Test Date: 12/9/09

AQUIFER DATA

Saturated Thickness: 21. ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-19s)

Initial Displacement: 0.447 ft

Static Water Column Height: 5.93 ft

Total Well Penetration Depth: 5.93 ft

Screen Length: 5. ft

Casing Radius: 0.08 ft

Wellbore Radius: 0.33 ft

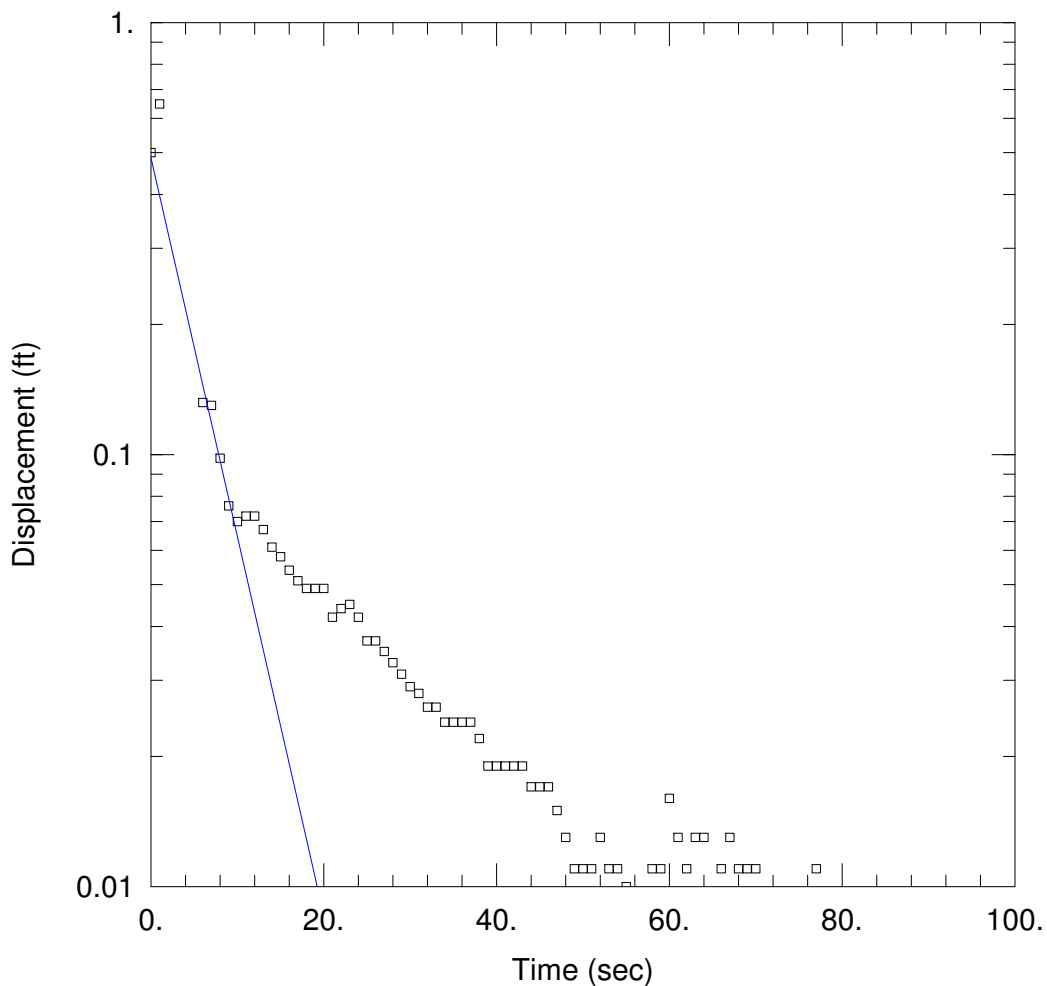
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 182.7 ft/day

y0 = 0.4734 ft



MW-20D SLUGIN

Data Set: P:\...\MW-20d_slugin_BR.aqt
Date: 07/08/10

Time: 16:55:49

PROJECT INFORMATION

Company: RMT
Client: TPC
Project: 02751.07.004 / 8070.07.004
Location: Tecumseh, MI
Test Date: 12/9/09

AQUIFER DATA

Saturated Thickness: 39. ft

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (MW-20d)

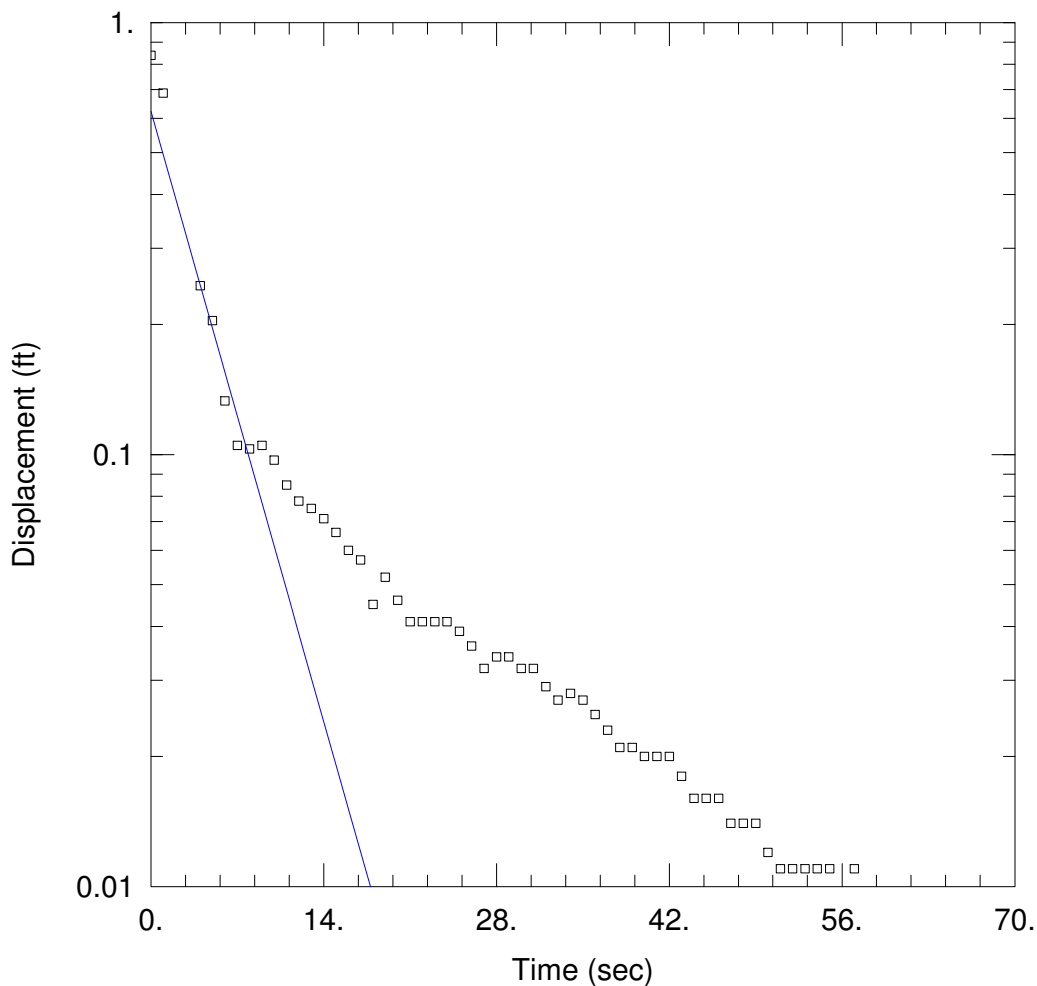
Initial Displacement: 0.5 ft
Total Well Penetration Depth: 31.48 ft
Casing Radius: 0.08 ft

Static Water Column Height: 31.48 ft
Screen Length: 5. ft
Wellbore Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
 $K =$ 37.35 ft/day

Solution Method: Bouwer-Rice
 $y_0 =$ 0.4857 ft



MW-20D SLUGOUT

Data Set: P:\...\MW-20d_slugout_BR.aqt

Date: 07/08/10

Time: 16:56:06

PROJECT INFORMATION

Company: RMT

Client: TPC

Project: 02751.07.004 / 8070.07.004

Location: Tecumseh, MI

Test Date: 12/9/09

AQUIFER DATA

Saturated Thickness: 39. ft

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (MW-20d)

Initial Displacement: 0.84 ft

Static Water Column Height: 31.48 ft

Total Well Penetration Depth: 31.48 ft

Screen Length: 5. ft

Casing Radius: 0.08 ft

Wellbore Radius: 0.33 ft

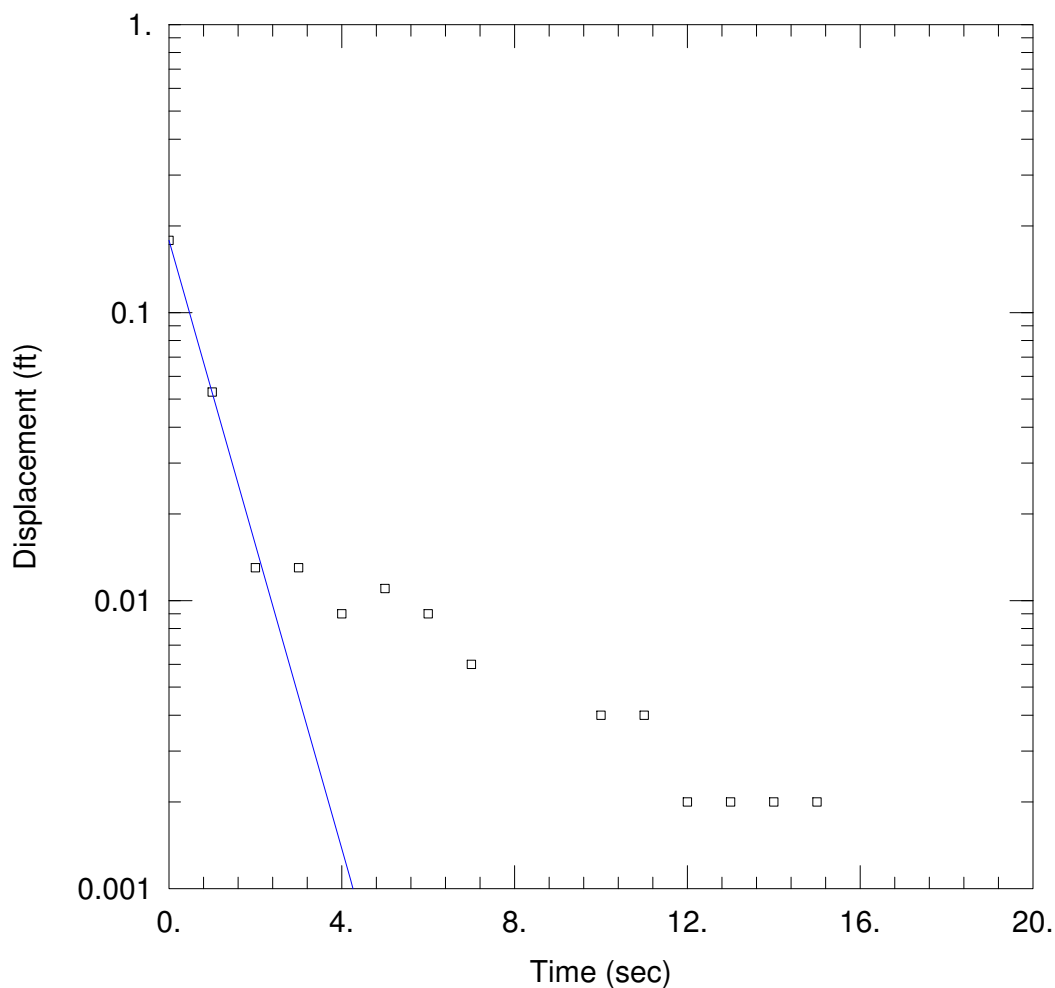
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K =$ 42.95 ft/day

$y_0 =$ 0.6224 ft



MW-20S SLUGIN

Data Set: P:\...\MW-20s_sluglin_BR.aqt

Date: 07/08/10

Time: 16:56:23

PROJECT INFORMATION

Company: RMT

Client: TPC

Project: 02751.07.004 / 8070.07.004

Location: Tecumseh, MI

Test Date: 12/9/09

AQUIFER DATA

Saturated Thickness: 39. ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-20s)

Initial Displacement: 0.178 ft

Static Water Column Height: 8.17 ft

Total Well Penetration Depth: 8.17 ft

Screen Length: 5. ft

Casing Radius: 0.08 ft

Wellbore Radius: 0.33 ft

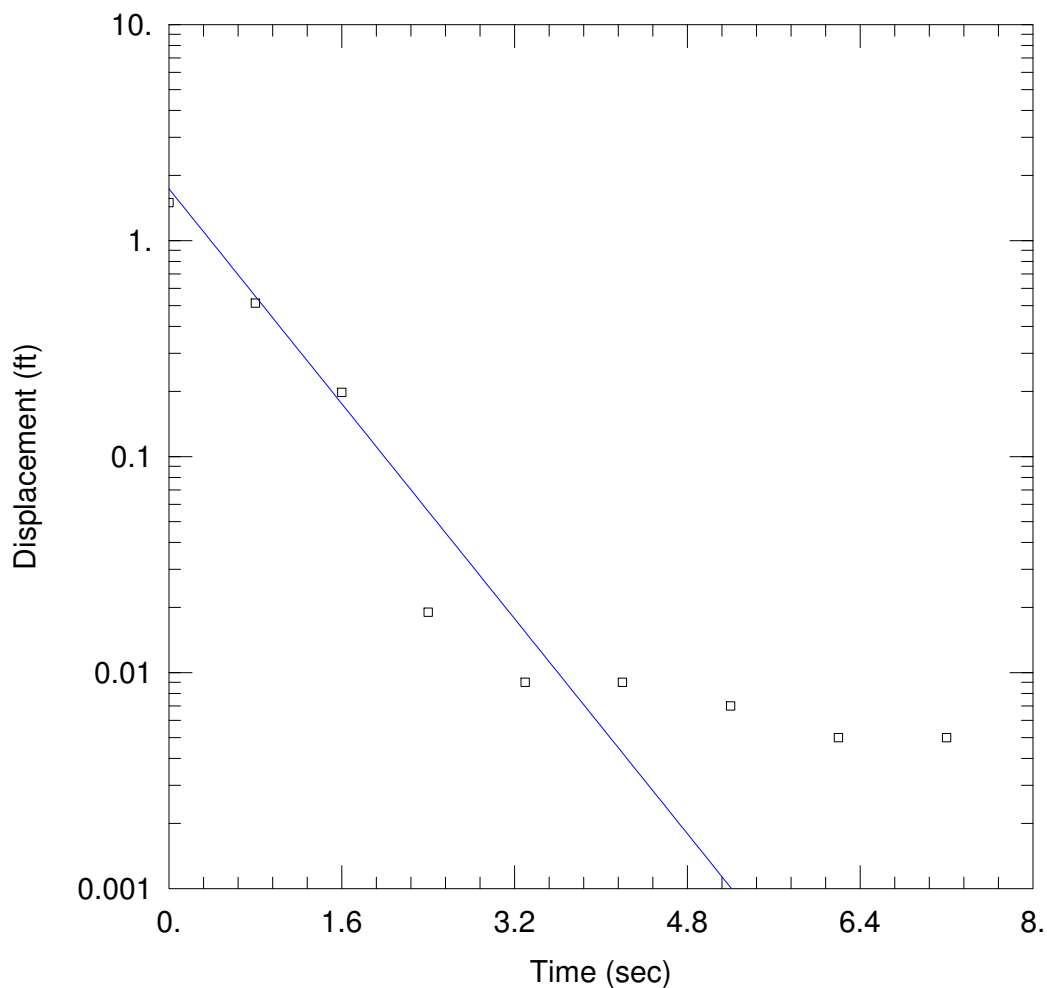
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 180.4 ft/day

y0 = 0.1779 ft



MW-20S SLUGOUT

Data Set: P:\...\MW-20s_slugout_BR.aqt

Date: 07/08/10

Time: 16:56:40

PROJECT INFORMATION

Company: RMT

Client: TPC

Project: 02751.07.004 / 8070.07.004

Location: Tecumseh, MI

Test Date: 12/9/09

AQUIFER DATA

Saturated Thickness: 39. ft

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (MW-20s)

Initial Displacement: 1.5 ft

Static Water Column Height: 8.17 ft

Total Well Penetration Depth: 8.17 ft

Screen Length: 5. ft

Casing Radius: 0.08 ft

Wellbore Radius: 0.33 ft

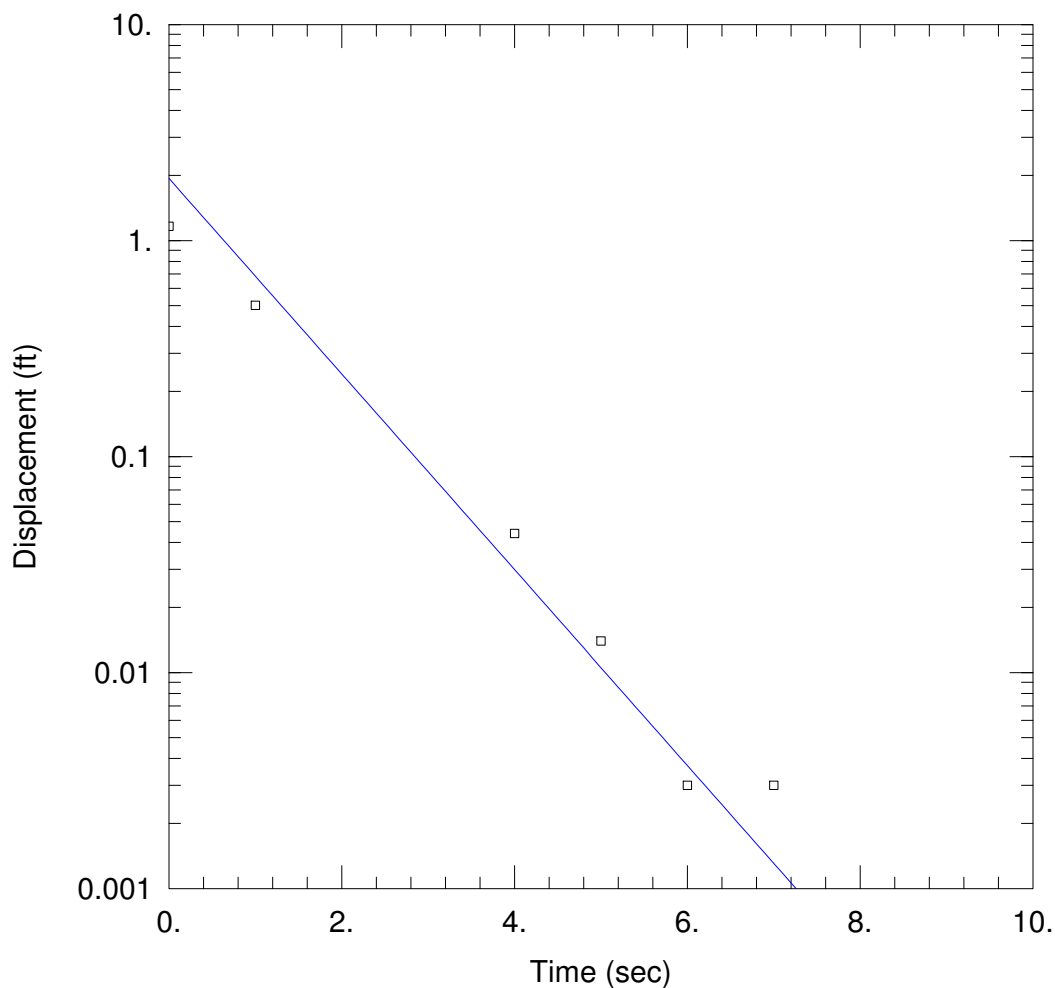
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 212.5$ ft/day

$y_0 = 1.735$ ft



MW-23 SLUGIN

Data Set: P:\...\MW-23_slugin_BR.aqt

Date: 07/08/10

Time: 16:56:56

PROJECT INFORMATION

Company: RMT

Client: TPC

Project: 02751.07.004 / 8070.07.004

Location: Tecumseh, MI

Test Date: 12/9/09

AQUIFER DATA

Saturated Thickness: 9. ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-23)

Initial Displacement: 1.162 ft

Static Water Column Height: 12.79 ft

Total Well Penetration Depth: 12.79 ft

Screen Length: 5. ft

Casing Radius: 0.08 ft

Wellbore Radius: 0.33 ft

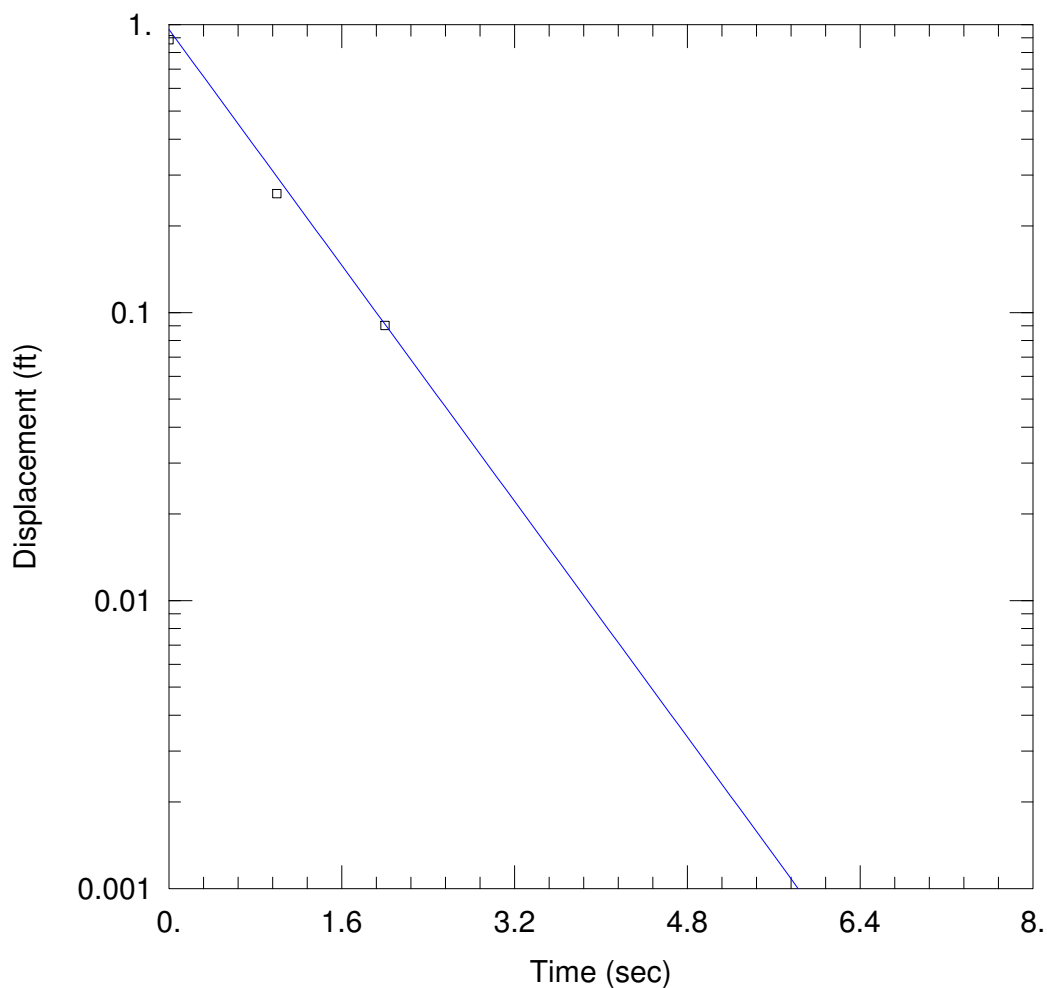
SOLUTION

Aquifer Model: Confined

Solution Method: Bouwer-Rice

K = 204.2 ft/day

y0 = 1.939 ft



MW-23 SLUGOUT

Data Set: P:\...\MW-23_slugout_BR.aqt

Date: 07/08/10

Time: 16:57:14

PROJECT INFORMATION

Company: RMT

Client: TPC

Project: 02751.07.004 / 8070.07.004

Location: Tecumseh, MI

Test Date: 12/9/09

AQUIFER DATA

Saturated Thickness: 9. ft

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (MW-23)

Initial Displacement: 0.886 ft

Static Water Column Height: 12.79 ft

Total Well Penetration Depth: 12.79 ft

Screen Length: 5. ft

Casing Radius: 0.08 ft

Wellbore Radius: 0.33 ft

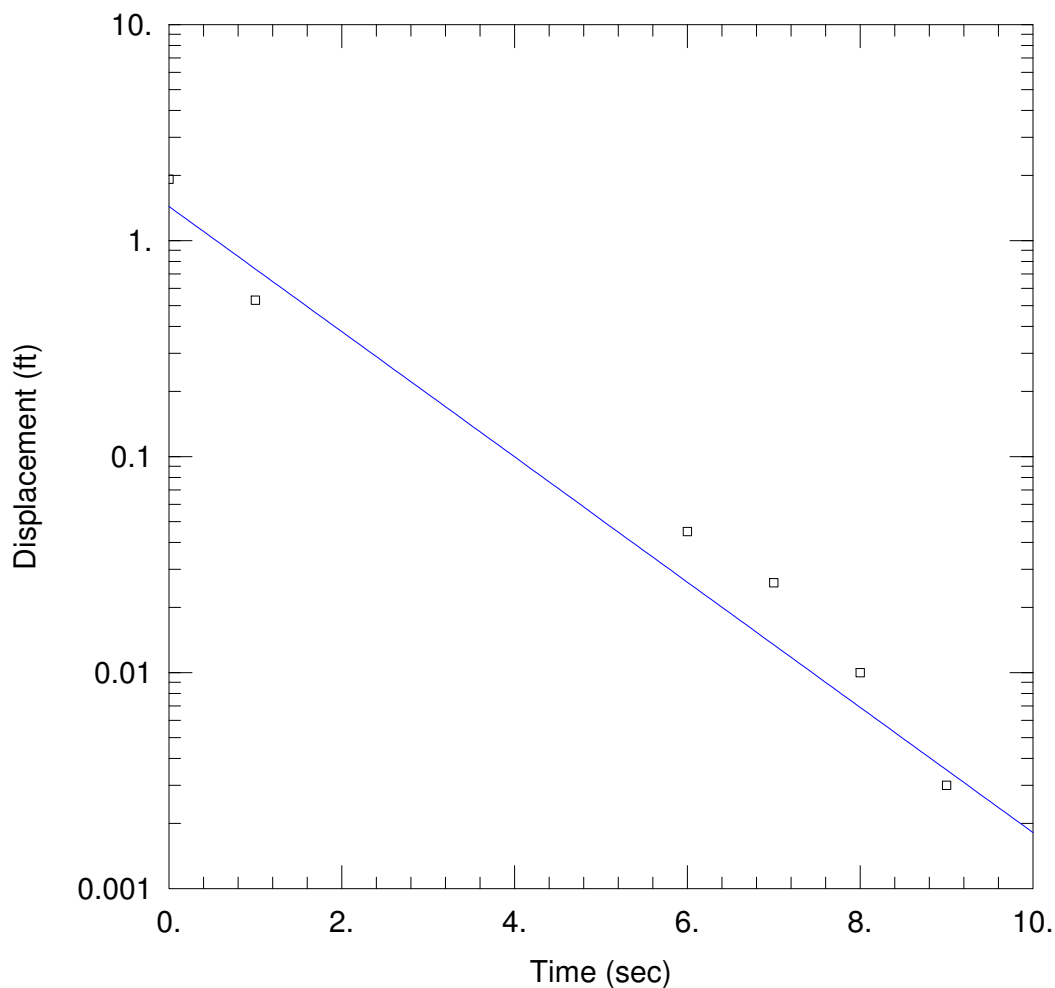
SOLUTION

Aquifer Model: Confined

Solution Method: Bouwer-Rice

$K = 230.8$ ft/day

$y_0 = 0.9609$ ft



MW-24D SLUGIN

Data Set: P:\...\MW-24d_slugin_BR.aqt

Date: 07/08/10

Time: 16:57:29

PROJECT INFORMATION

Company: RMT

Client: TPC

Project: 02751.07.004 / 8070.07.004

Location: Tecumseh, MI

Test Date: 12/9/09

AQUIFER DATA

Saturated Thickness: 25 ft

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (MW-24d)

Initial Displacement: 1.924 ft

Static Water Column Height: 24.93 ft

Total Well Penetration Depth: 24.93 ft

Screen Length: 5 ft

Casing Radius: 0.08 ft

Wellbore Radius: 0.33 ft

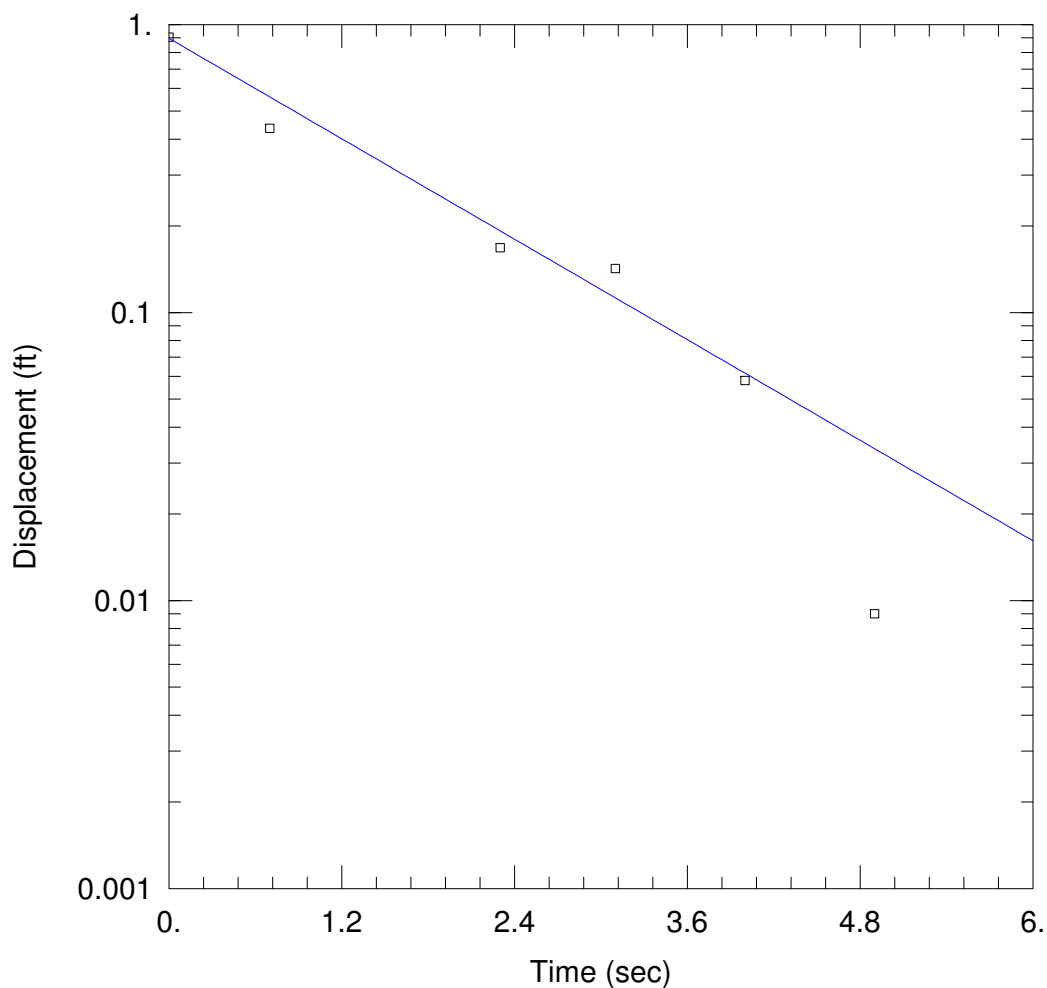
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 142.1$ ft/day

$y_0 = 1.438$ ft



MW-24D SLUGOUT

Data Set: P:\...\MW-24d_slugout_BR.aqt

Date: 07/08/10

Time: 16:57:43

PROJECT INFORMATION

Company: RMT

Client: TPC

Project: 02751.07.004 /8070.07.004

Location: Tecumseh, MI

Test Date: 12/9/09

AQUIFER DATA

Saturated Thickness: 25 ft

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (MW-24d)

Initial Displacement: 0.904 ft

Static Water Column Height: 24.93 ft

Total Well Penetration Depth: 24.93 ft

Screen Length: 5 ft

Casing Radius: 0.08 ft

Wellbore Radius: 0.33 ft

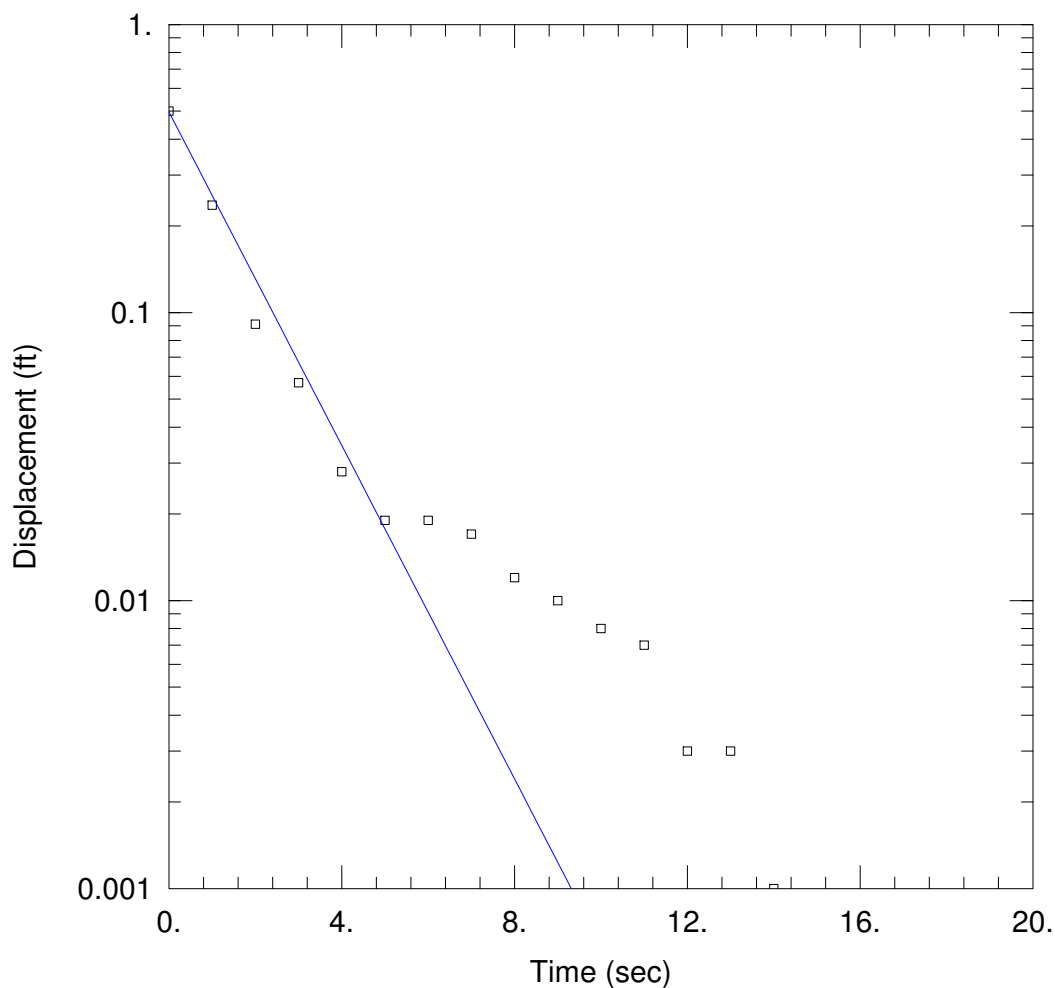
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 142.5$ ft/day

$y_0 = 0.8952$ ft



MW-24S SLUGOUT

Data Set: P:\...\MW-24s_slugout_BR.aqt

Date: 07/08/10

Time: 16:58:03

PROJECT INFORMATION

Company: RMT

Client: TPC

Project: 02751.07.004 / 8070.07.004

Location: Tecumseh, MI

Test Date: 12/9/09

AQUIFER DATA

Saturated Thickness: 25. ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (MW-24s)

Initial Displacement: 0.5 ft

Static Water Column Height: 3.52 ft

Total Well Penetration Depth: 3.52 ft

Screen Length: 5. ft

Casing Radius: 0.08 ft

Wellbore Radius: 0.33 ft

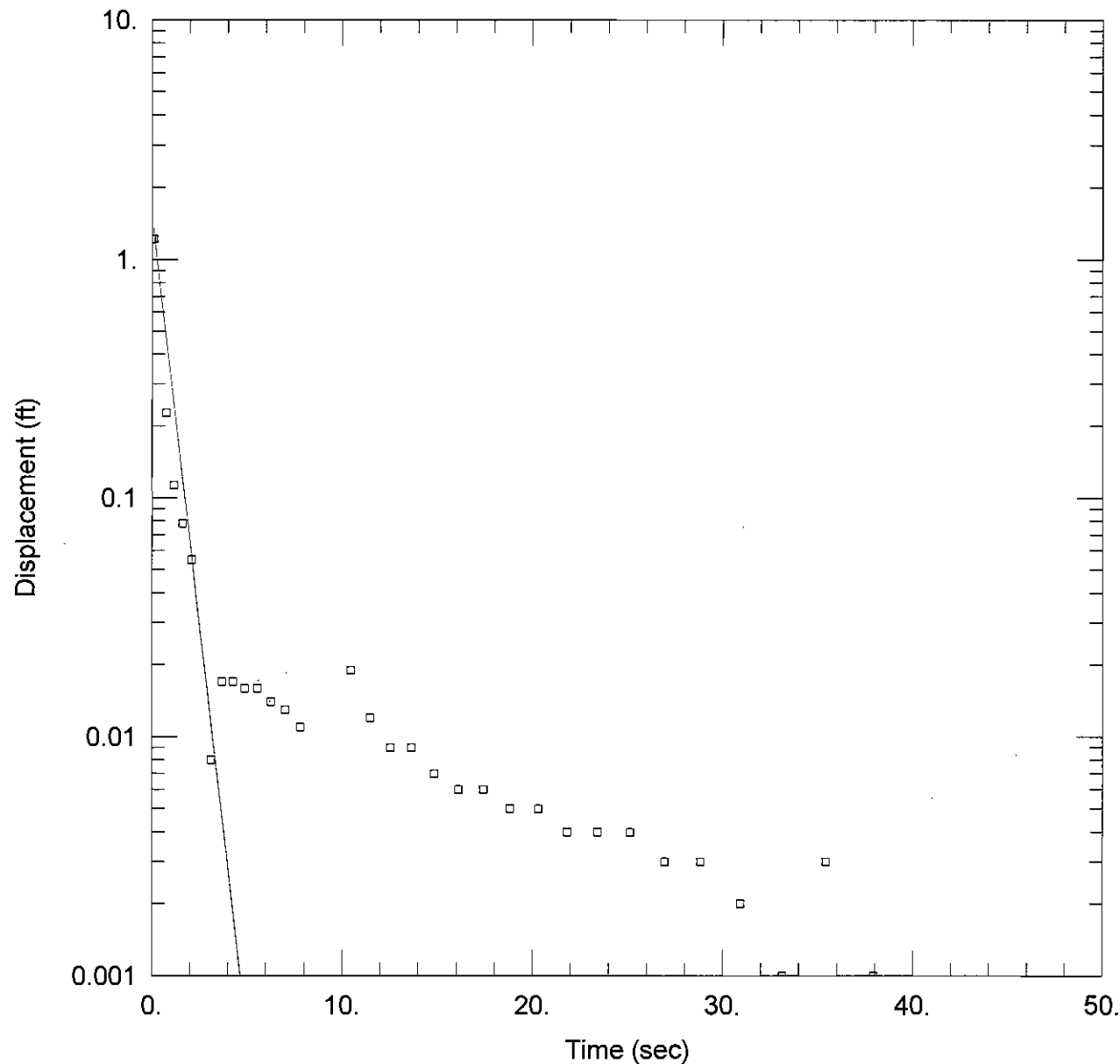
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 85.85 ft/day

y0 = 0.4966 ft



MW-1S FALLING HEAD

Data Set: P:\...MW-1 Falling Head_F
Date: 03/21/11 Time: 13:19:36

PROJECT INFORMATION

Company: RMT, Inc
Client: Tecumseh Products Company
Project: 02751.16.001
Location: Tecumseh, Michigan
Test Well: MW-1s
Test Date: 3/1/2011

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
 $K = 190.5$ ft/day
 $y_0 = 1.526$ ft

AQUIFER DATA

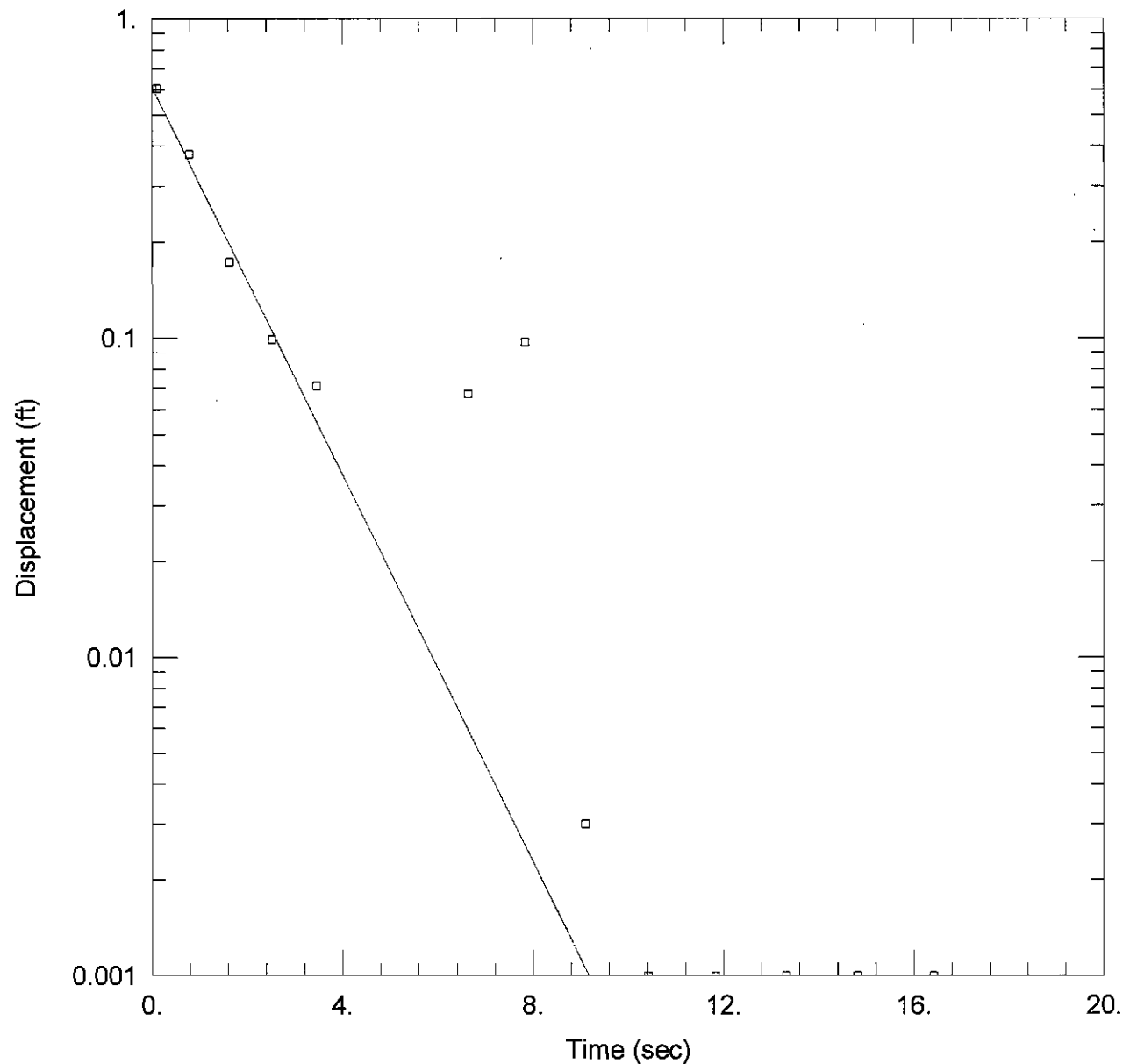
Saturated Thickness: 39. ft

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (MW-1s)

Initial Displacement: 1.221 ft
Total Well Penetration Depth: 2.81 ft
Casing Radius: 0.08 ft

Static Water Column Height: 2.81 ft
Screen Length: 5. ft
Wellbore Radius: 0.33 ft
Gravel Pack Porosity: 0



MW-1S RISING HEAD

Data Set: P:\...MW-1 Rising Head_Fi
Date: 03/21/11 Time: 13:19:59

PROJECT INFORMATION

Company: RMT, Inc
Client: Tecumseh Products Company
Project: 02751.16.001
Location: Tecumseh, Michigan
Test Well: MW-1s
Test Date: 3/1/2011

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
 $K = 84.8$ ft/day
 $y_0 = 0.6133$ ft

AQUIFER DATA

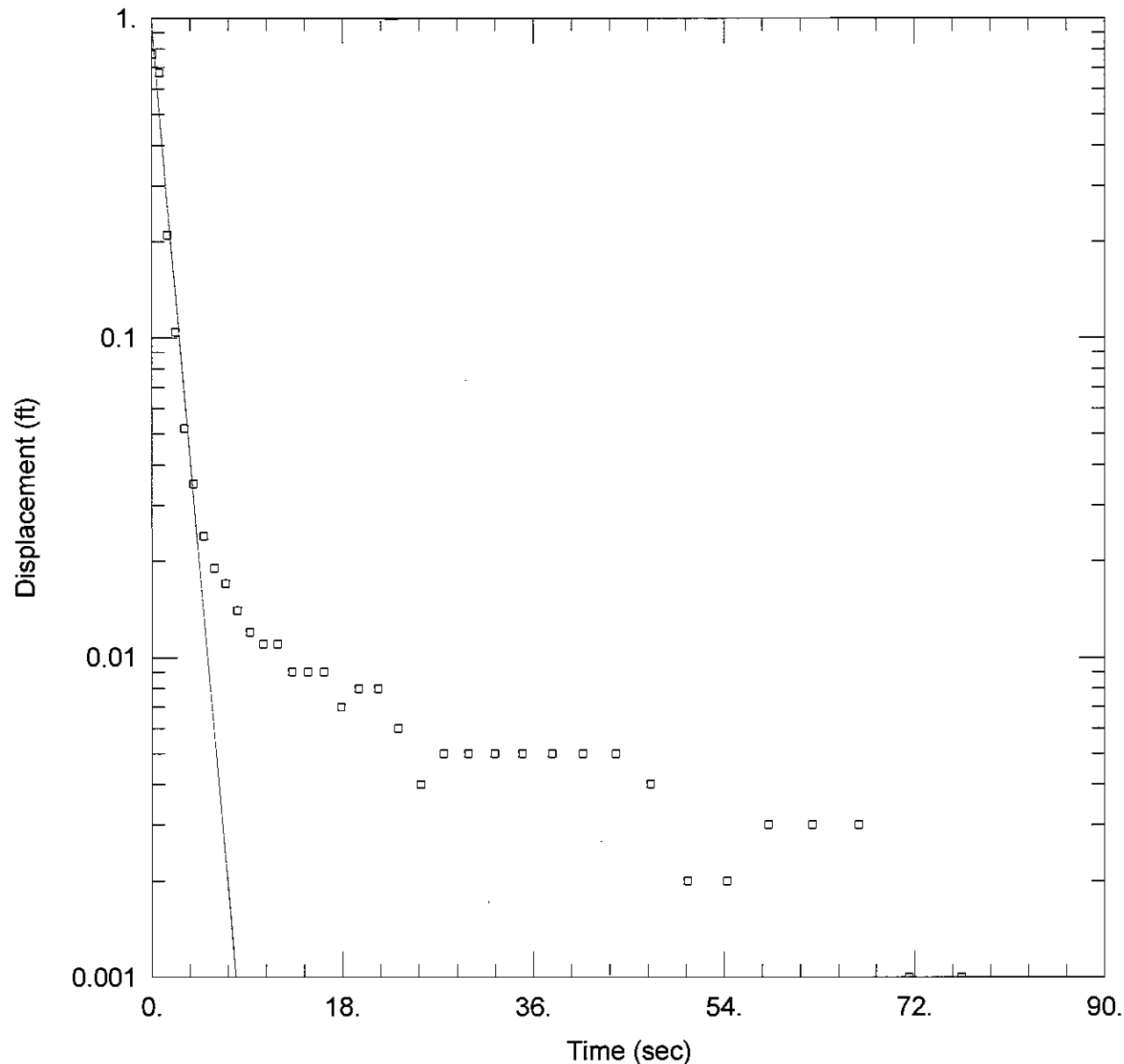
Saturated Thickness: 39. ft

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (MW-1s)

Initial Displacement: 0.605 ft
Total Well Penetration Depth: 2.81 ft
Casing Radius: 0.08 ft

Static Water Column Height: 2.81 ft
Screen Length: 5. ft
Wellbore Radius: 0.33 ft
Gravel Pack Porosity: 0



MW-9S FALLING HEAD

Data Set: P:\...MW-9 Falling Head_F
 Date: 03/21/11 Time: 13:20:19

PROJECT INFORMATION

Company: RMT, Inc
 Client: Tecumseh Products Company
 Project: 02751.16.001
 Location: Tecumseh, Michigan
 Test Well: MW-9s
 Test Date: 3/1/2011

SOLUTION

Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 $K = 120$ ft/day
 $y_0 = 0.9276$ ft

AQUIFER DATA

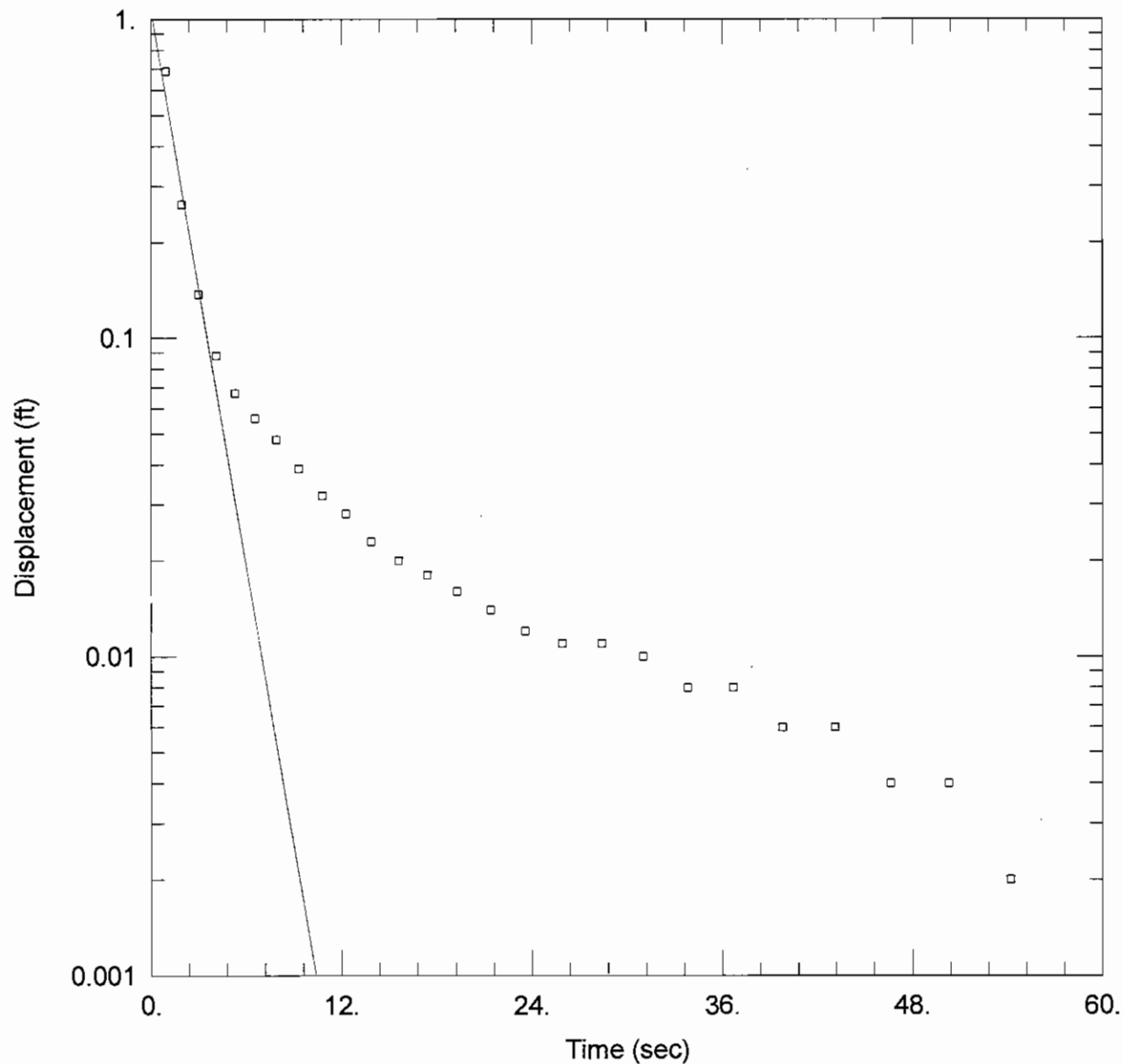
Saturated Thickness: 39. ft

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (MW-9s)

Initial Displacement: 0.769 ft
 Total Well Penetration Depth: 5.8 ft
 Casing Radius: 0.08 ft

Static Water Column Height: 5.8 ft
 Screen Length: 5. ft
 Wellbore Radius: 0.33 ft



MW-9S RISING HEAD

Data Set: P:\...MW-9 Rising Head_Fi
Date: 03/21/11 Time: 13:20:45

PROJECT INFORMATION

Company: RMT, Inc
Client: Tecumseh Products Company
Project: 02751.16.001
Location: Tecumseh, Michigan
Test Well: MW-9s
Test Date: 3/1/2011

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
 $K = 94.06$ ft/day
 $y_0 = 1.087$ ft

AQUIFER DATA

Saturated Thickness: 39. ft

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (MW-9s)

Initial Displacement: 1.649 ft

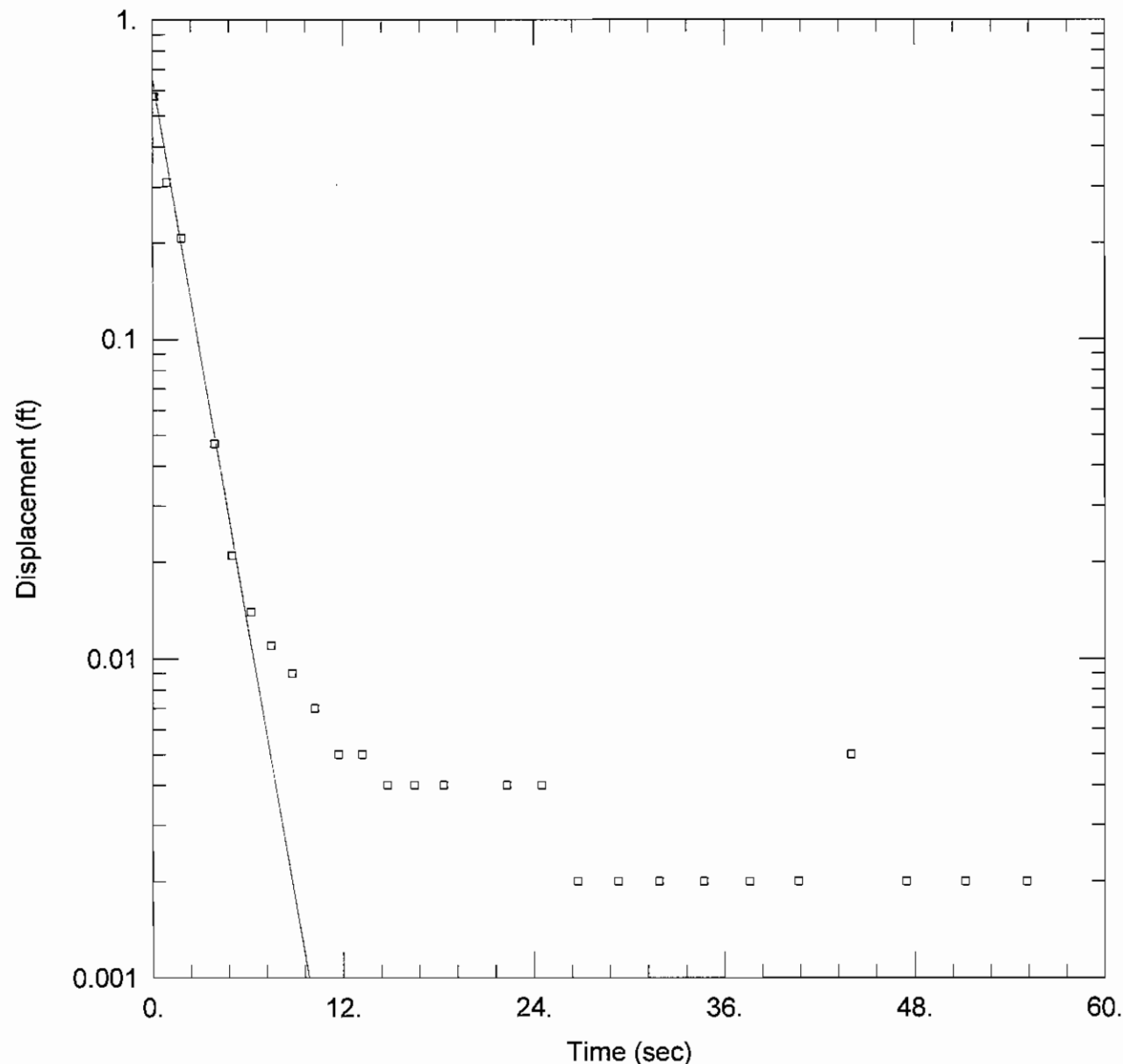
Static Water Column Height: 5.8 ft

Total Well Penetration Depth: 5.8 ft

Screen Length: 5. ft

Casing Radius: 0.08 ft

Wellbore Radius: 0.33 ft



MW-20S FALLING HEAD

Data Set: P:\...MW-20s Falling Head
Date: 03/21/11 Time: 13:16:23

PROJECT INFORMATION

Company: RMT, Inc
Client: Tecumseh Products Company
Project: 02751.16.001
Location: Tecumseh, MI
Test Well: MW-20s
Test Date: 3/1/2011

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
 $K = 96.32$ ft/day
 $y_0 = 0.652$ ft

AQUIFER DATA

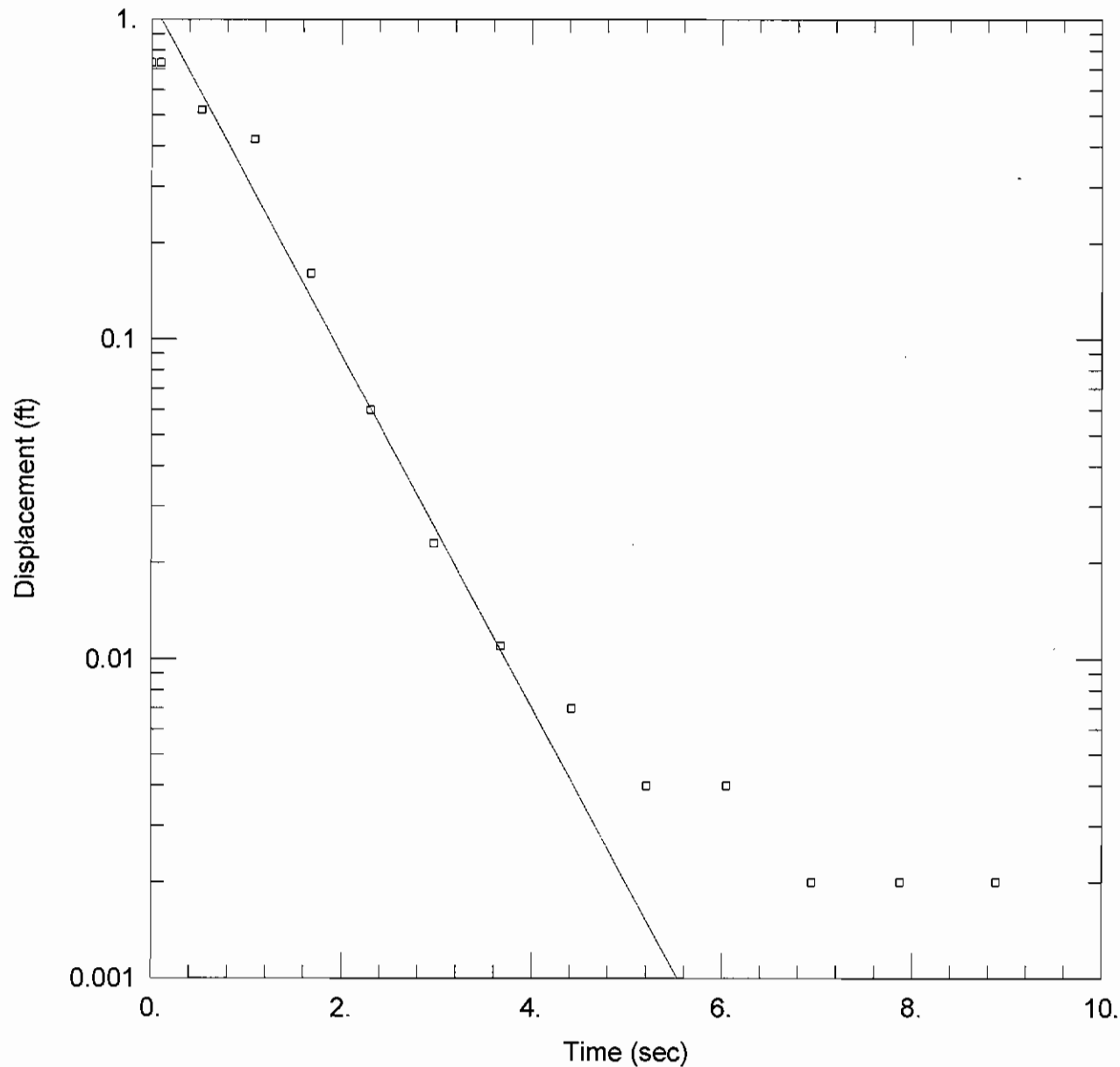
Saturated Thickness: 39. ft

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (MW-20s)

Initial Displacement: 0.576 ft
Total Well Penetration Depth: 7.53 ft
Casing Radius: 0.08 ft

Static Water Column Height: 7.53 ft
Screen Length: 5. ft
Wellbore Radius: 0.33 ft



MW-20S RISING HEAD

Data Set: P:\...\MW-20s Rising Head
 Date: 03/21/11 Time: 13:16:37

PROJECT INFORMATION

Company: RMT, Inc
 Client: Tecumseh Products Company
 Project: 02751.16.001
 Location: Tecumseh, Michigan
 Test Well: MW-20s
 Test Date: 3/1/2011

SOLUTION

Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 $K = 186.4$ ft/day
 $y_0 = 1.143$ ft

AQUIFER DATA

Saturated Thickness: 39. ft

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (MW-20s)

Initial Displacement: 0.732 ft

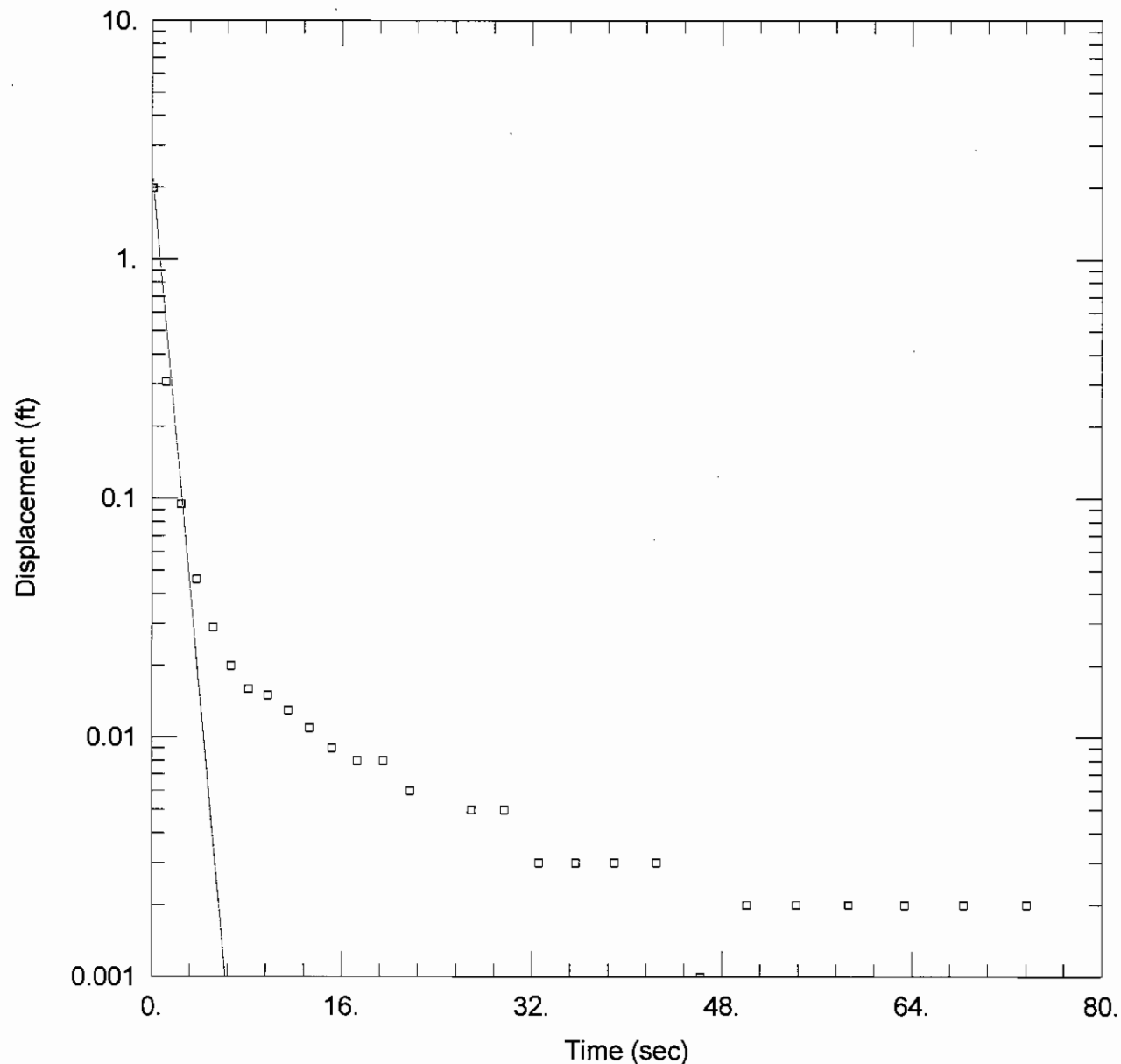
Static Water Column Height: 7.53 ft

Total Well Penetration Depth: 7.53 ft

Screen Length: 5. ft

Casing Radius: 0.08 ft

Wellbore Radius: 0.33 ft



PRB-1 FALLING HEAD

Data Set: P:\...\PRB-1 Falling Head_F
 Date: 03/21/11 Time: 13:16:48

PROJECT INFORMATION

Company: RMT, Inc
 Client: Tecumseh Products Company
 Project: 02751.16.001
 Location: Tecumseh, Michigan
 Test Well: PRB-1
 Test Date: 3/1/2011

SOLUTION

Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 $K = 88.94$ ft/day
 $y_0 = 2.417$ ft

AQUIFER DATA

Saturated Thickness: 39. ft

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (PRB-1)

Initial Displacement: 1.992 ft

Static Water Column Height: 0.56 ft

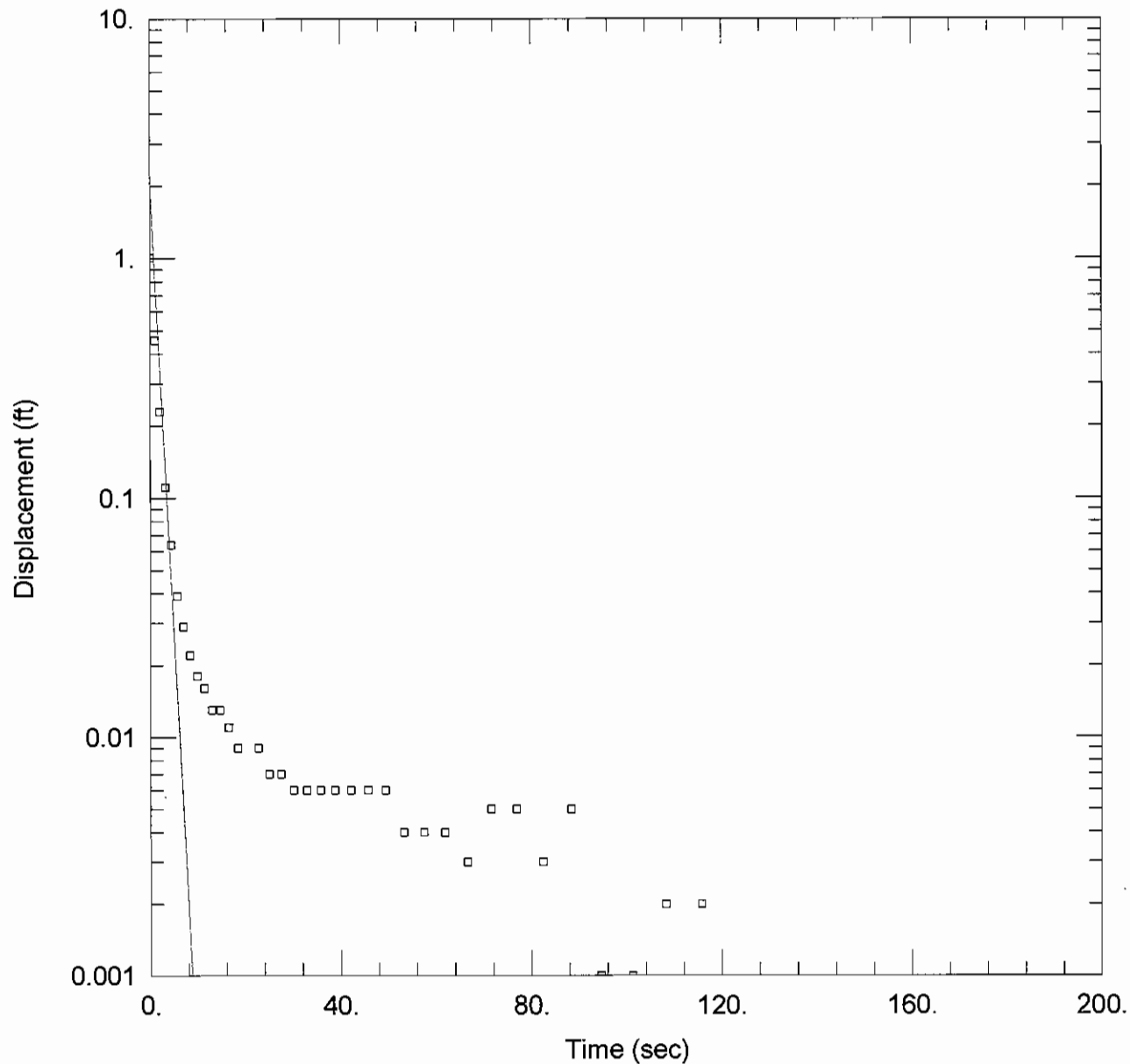
Total Well Penetration Depth: 0.56 ft

Screen Length: 5. ft

Casing Radius: 0.08 ft

Wellbore Radius: 0.33 ft

Gravel Pack Porosity: 0



PRB-1 RISING HEAD

Data Set: P:\...\PRB-1 Rising Head_F
Date: 03/21/11 Time: 13:16:58

PROJECT INFORMATION

Company: RMT, Inc
Client: Tecumseh Products Company
Project: 02751.16.001
Location: Tecumseh, Michigan
Test Well: PRB-1
Test Date: 3/1/2011

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 61.47 ft/day
y0 = 2.034 ft

AQUIFER DATA

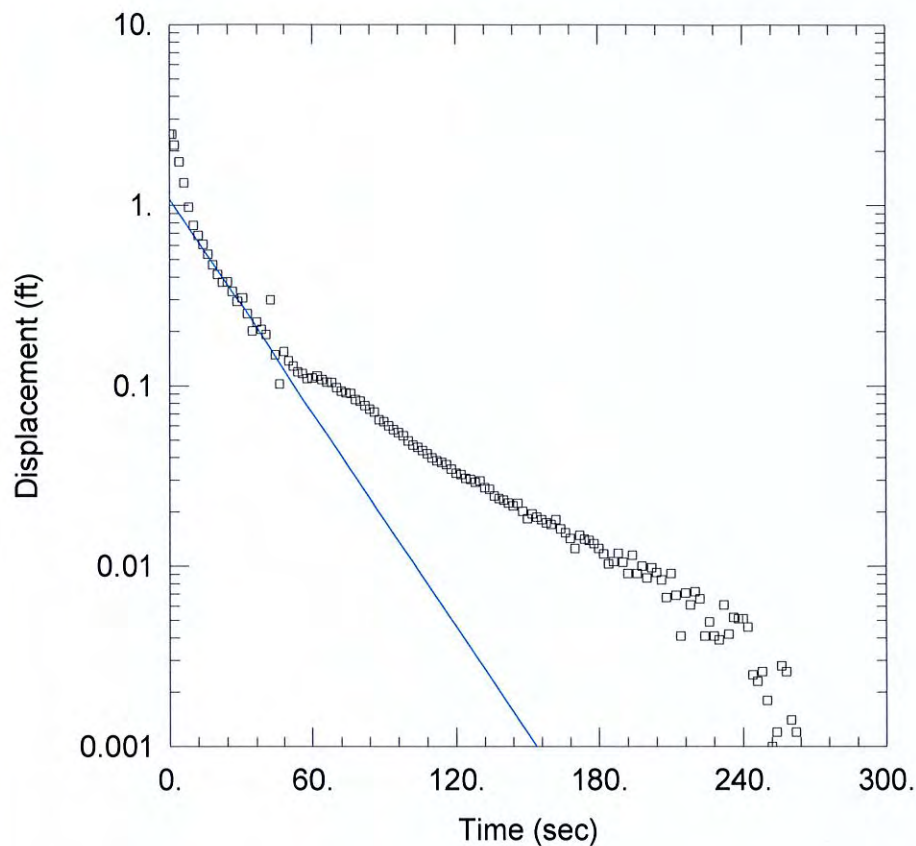
Saturated Thickness: 39. ft

Anisotropy Ratio (K_z/K_r): 0.1

WELL DATA (OW 1)

Initial Displacement: 1.009 ft
Total Well Penetration Depth: 0.56 ft
Casing Radius: 0.08 ft

Static Water Column Height: 0.56 ft
Screen Length: 5. ft
Wellbore Radius: 0.33 ft
Gravel Pack Porosity: 0



PRB-03S FALLING HEAD

Data Set: \...\PRB-03s Falling Head.aqt

Date: 05/10/12

Time: 13:28:59

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-03s

Test Date: 8/5/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 7.265$ ft/day

$y_0 = 1.08$ ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PRB-03s)

Initial Displacement: 2.475 ft

Total Well Penetration Depth: 5.51 ft

Casing Radius: 0.083 ft

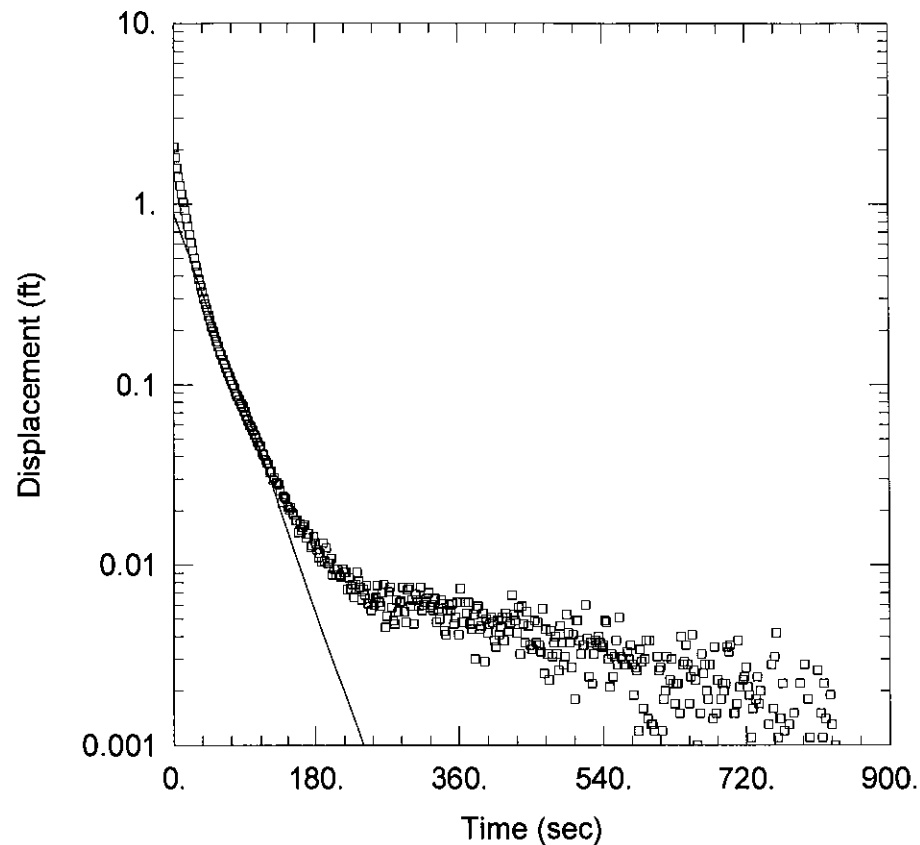
Static Water Column Height: 5.51 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Gravel Pack Porosity: 0.3

Screened Lithology: Native Coarse Sand and Gravel



PRB-03S RISING HEAD

Data Set: \...\PRB-03s Rising Head.aqt

Date: 05/10/12

Time: 13:29:12

PROJECT INFORMATION

Company: TRC, Inc.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-03s

Test Date: 8/5/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 4.421$ ft/day

$y_0 = 0.8913$ ft

AQUIFER DATA

Saturated Thickness: 40 ft

Anisotropy Ratio (K_z/K_r): 1

WELL DATA (PRB-03s)

Initial Displacement: 2.064 ft

Total Well Penetration Depth: 4.84 ft

Casing Radius: 0.083 ft

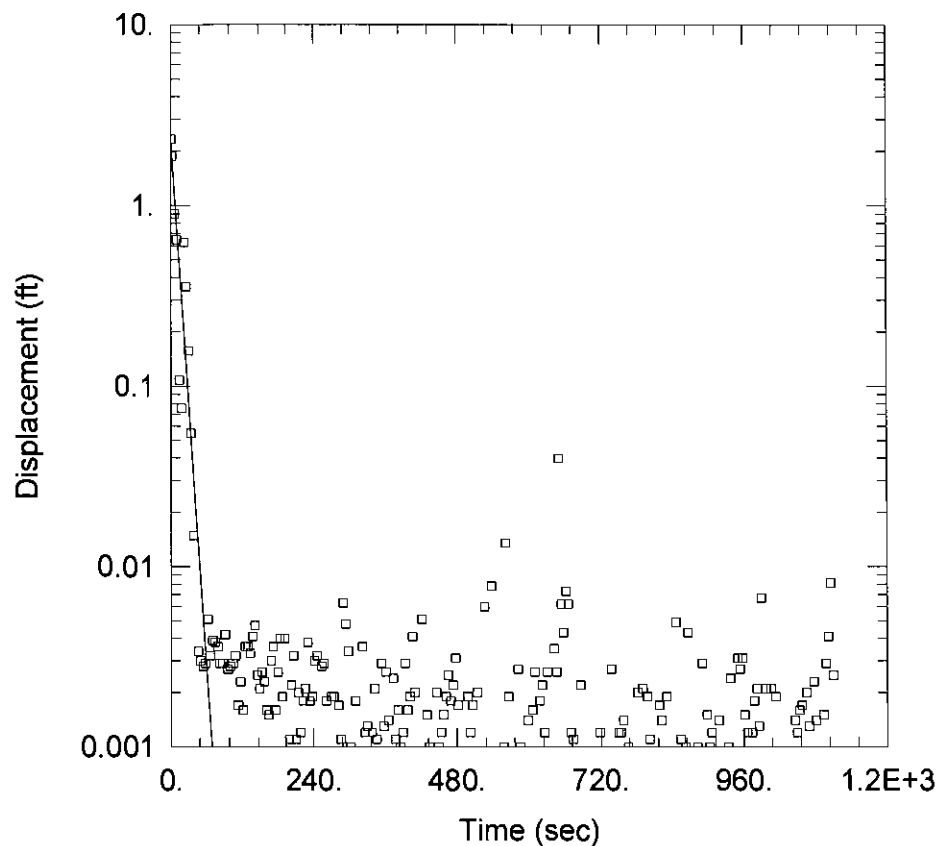
Static Water Column Height: 4.84 ft

Screen Length: 5 ft

Wellbore Radius: 0.083 ft

Gravel Pack Porosity: 0.3

Screened Lithology: Native Coarse Sand and Gravel



PRB-04D FALLING HEAD

Data Set: \...\PRB-04d Falling Head.aqt

Date: 05/10/12

Time: 13:29:19

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-04d

Test Date: 8/5/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 22.4 ft/day

y0 = 2.285 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-04d)

Initial Displacement: 2.335 ft

Total Well Penetration Depth: 23.78 ft

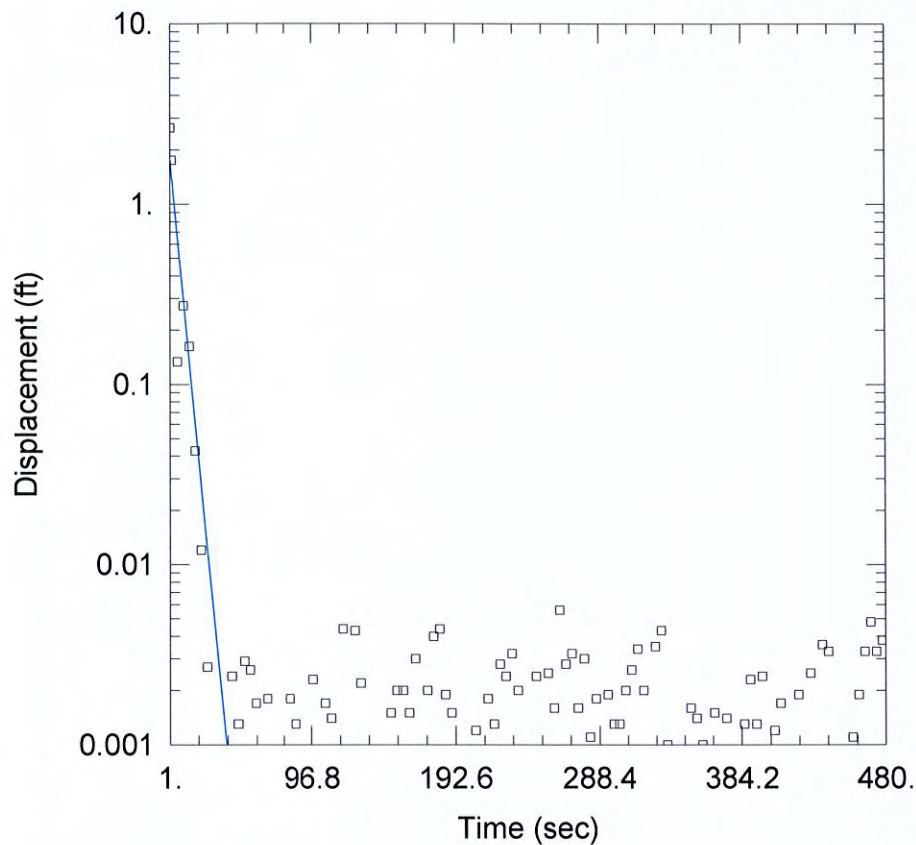
Casing Radius: 0.083 ft

Static Water Column Height: 23.78 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Screened Lithology: Native Coarse Sand and Gravel



PRB-04D RISING HEAD

Data Set: \...\PRB-04d Rising Head.aqt

Date: 05/10/12

Time: 13:29:26

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-04d

Test Date: 8/5/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 39.74 ft/day

y0 = 2.175 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-04d)

Initial Displacement: 2.654 ft

Total Well Penetration Depth: 23.78 ft

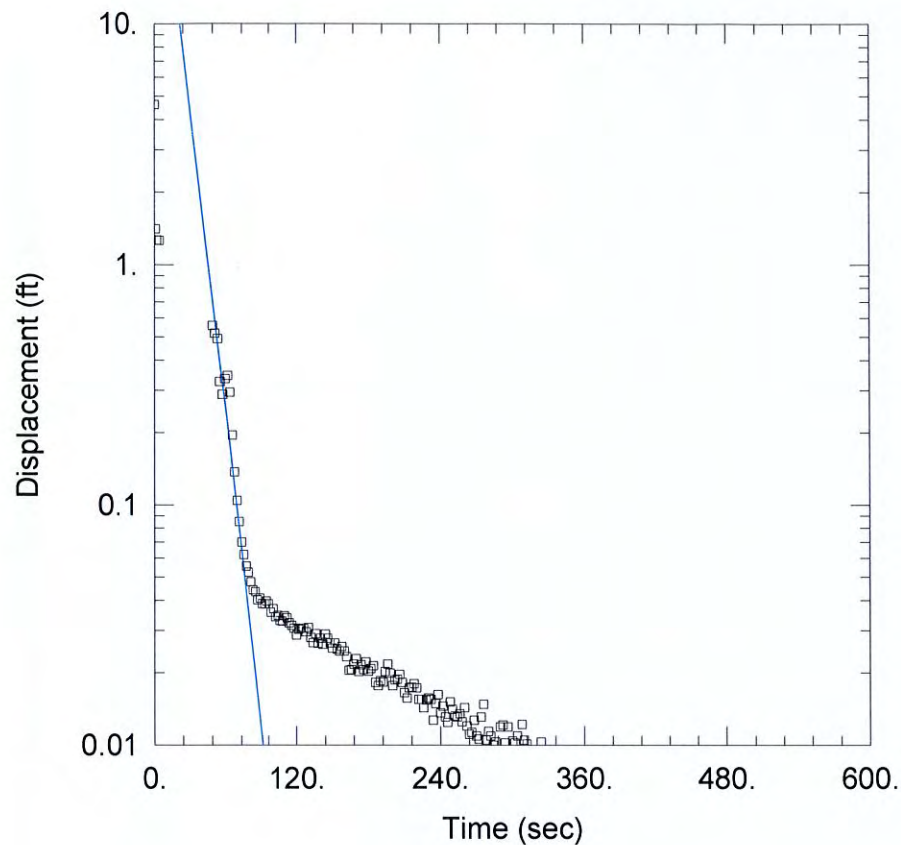
Casing Radius: 0.083 ft

Static Water Column Height: 23.78 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Screened Lithology: **Native Coarse Sand and Gravel**



PRB-04S FALLING HEAD

Data Set: \...\PRB-04s Falling Head.aqt

Date: 05/10/12

Time: 13:29:34

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-04s

Test Date: 8/5/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 15.4 ft/day

y0 = 83.56 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-04s)

Initial Displacement: 4.62 ft

Total Well Penetration Depth: 4.62 ft

Casing Radius: 0.083 ft

Static Water Column Height: 4.62 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Gravel Pack Porosity: 0.3

Screened Lithology: Native Coarse Sand and Gravel

PRB-04S RISING HEAD

Data Set: \...\PRB-04s Rising Head.aqt

Date: 05/10/12

Time: 13:29:40

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-04s

Test Date: 8/5/2011

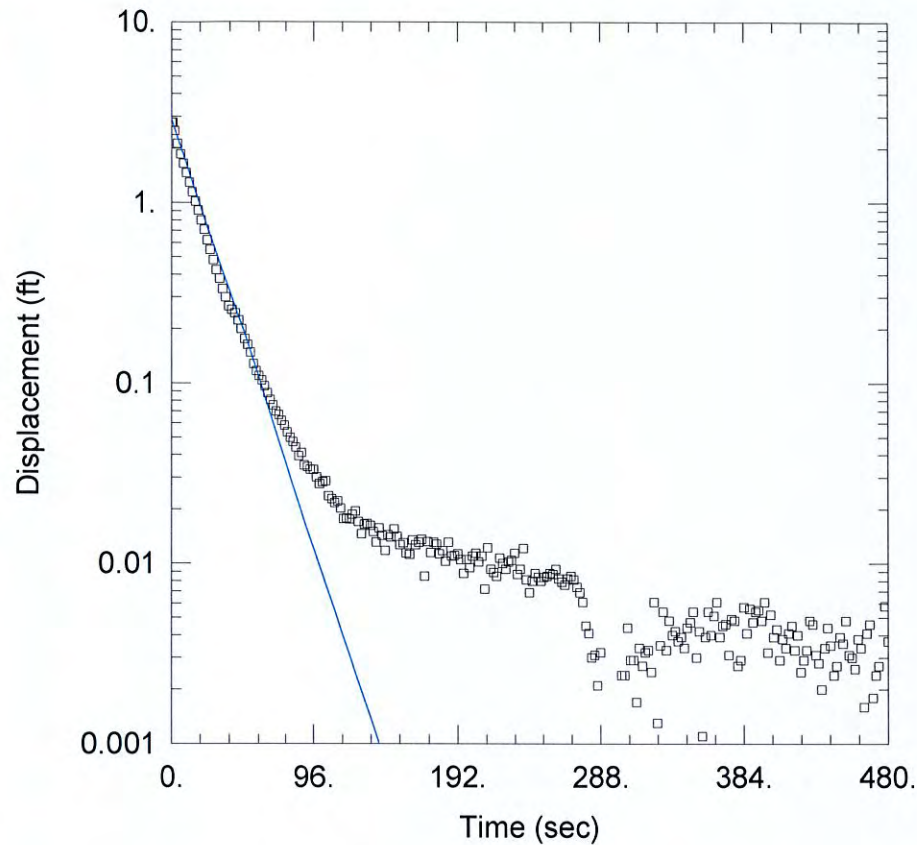
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 8.835 ft/day

y0 = 2.89 ft



AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-04s)

Initial Displacement: 2.777 ft

Total Well Penetration Depth: 4.62 ft

Casing Radius: 0.083 ft

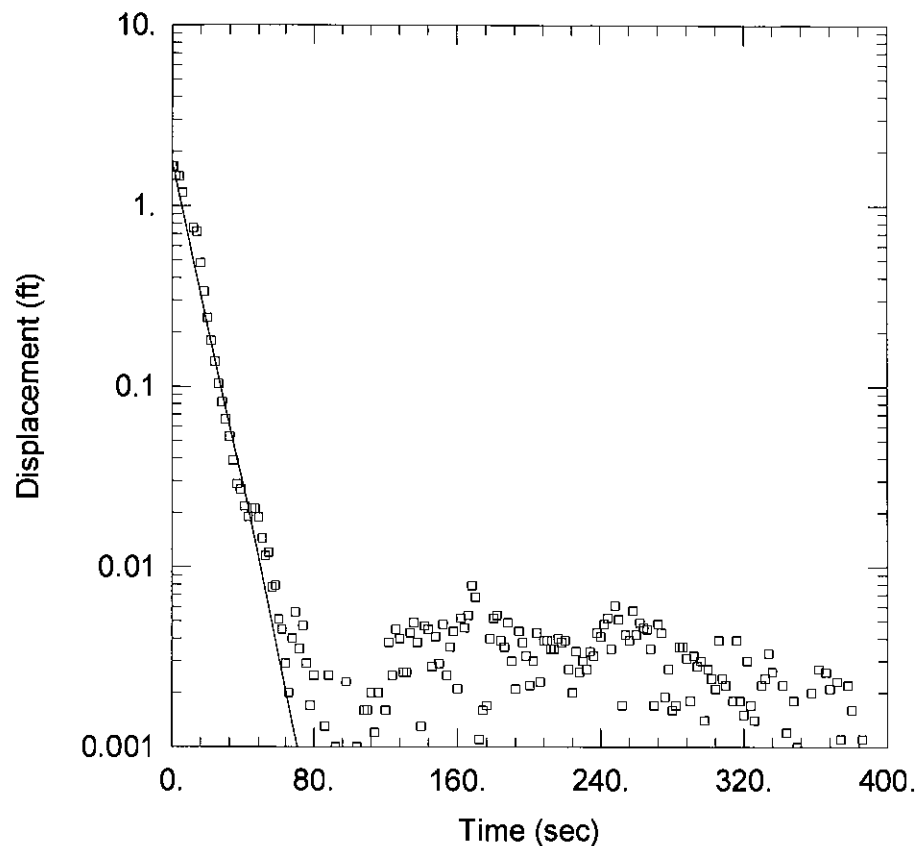
Static Water Column Height: 4.62 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Gravel Pack Porosity: 0.3

Screened Lithology: Native Coarse Sand and Gravel



PRB-05S FALLING HEAD

Data Set: \...\PRB-05s Falling Head.aqt

Date: 05/10/12

Time: 13:29:47

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, MI

Test Well: PRB-05s

Test Date: 8/5/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 16.46 ft/day

y0 = 1.756 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-05s)

Initial Displacement: 1.658 ft

Total Well Penetration Depth: 4.82 ft

Casing Radius: 0.083 ft

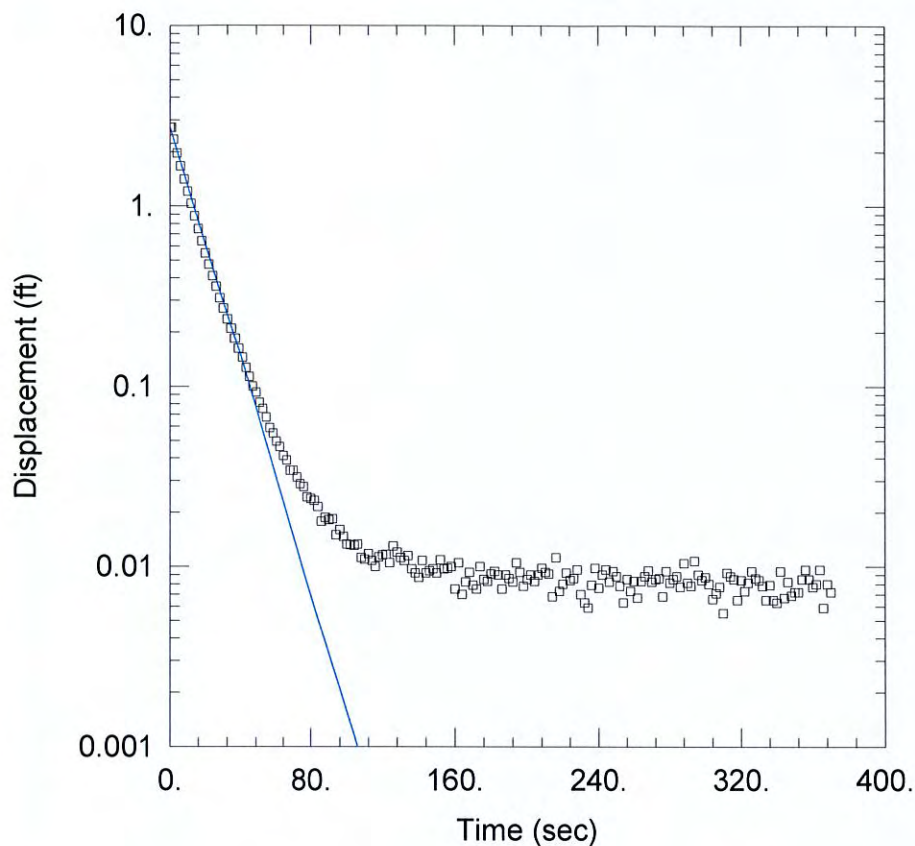
Static Water Column Height: 4.82 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Gravel Pack Porosity: 0.3

Screened Lithology: **Native Coarse Sand and Gravel**



PRB-05S RISING HEAD

Data Set: \\...\PRB-05s Rising Head.aqt

Date: 05/10/12

Time: 13:29:54

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Comapny

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-05s

Test Date: 8/5/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 11.68 ft/day

y0 = 2.737 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-05s)

Initial Displacement: 2.723 ft

Total Well Penetration Depth: 4.82 ft

Casing Radius: 0.083 ft

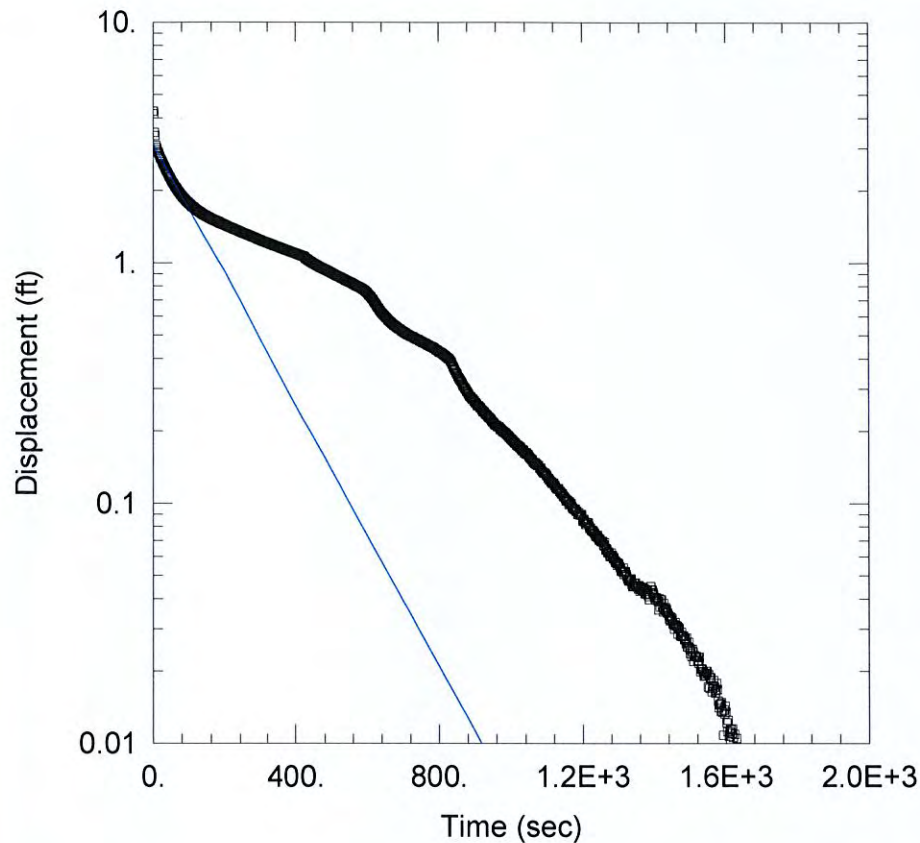
Static Water Column Height: 4.82 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Gravel Pack Porosity: 0.3

Screened Lithology: **Native Coarse Sand and Gravel**



PRB-06S FALLING HEAD

Data Set: \...\PRB-06s Falling Head.aqt

Date: 05/10/12

Time: 13:30:05

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-06s

Test Date: 8/5/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.9792 ft/day

y0 = 3.121 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-06s)

Initial Displacement: 4.268 ft

Total Well Penetration Depth: 4.89 ft

Casing Radius: 0.083 ft

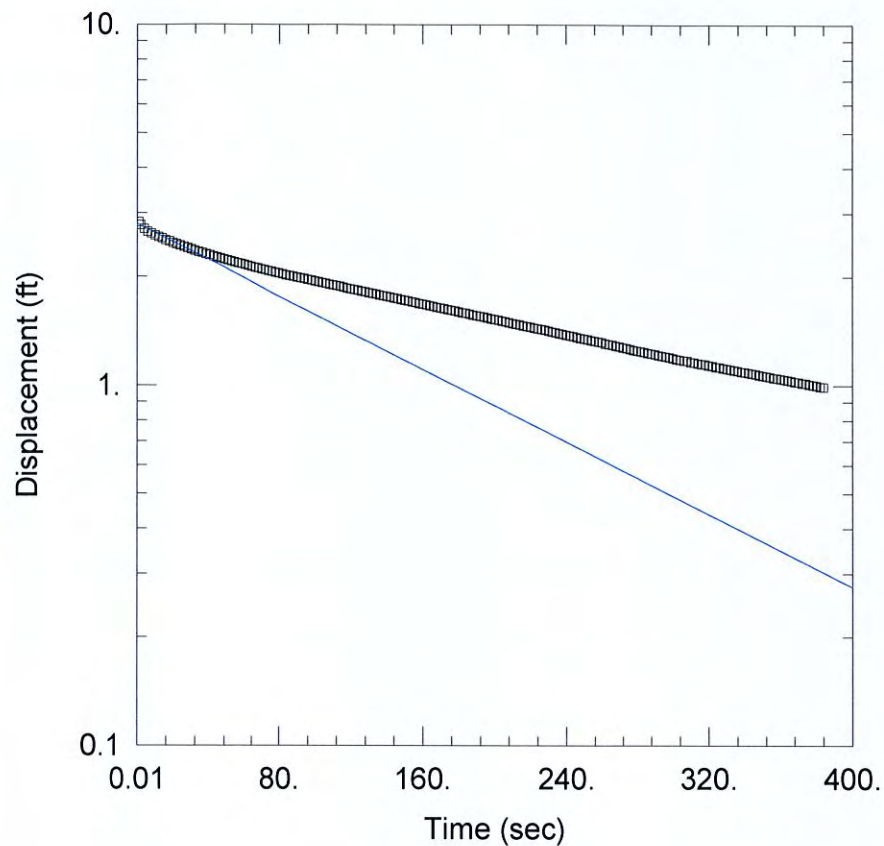
Static Water Column Height: 4.89 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Gravel Pack Porosity: 0.3

Screened Lithology: **Installed Permeable Reactive Barrier**



PRB-06S RISING HEAD

Data Set: \...\PRB-06s Rising Head.aqt

Date: 05/10/12

Time: 13:30:19

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-06s

Test Date: 8/5/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.9084 ft/day

y0 = 2.801 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-06s)

Initial Displacement: 2.831 ft

Total Well Penetration Depth: 4.89 ft

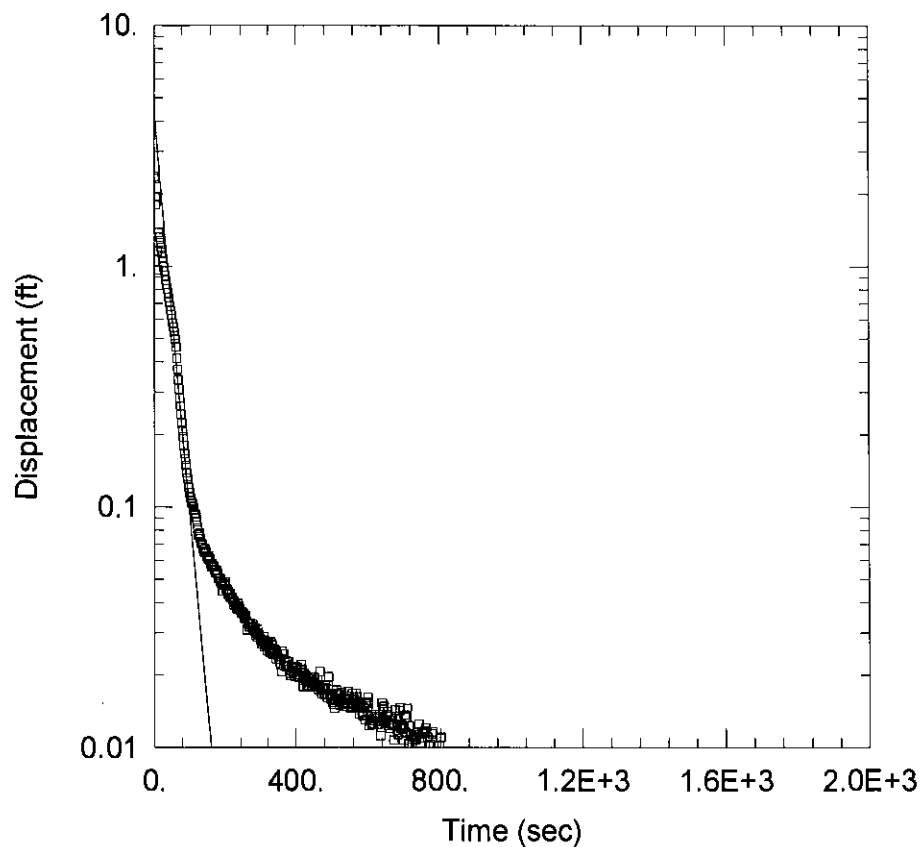
Casing Radius: 0.083 ft

Static Water Column Height: 4.89 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Gravel Pack Porosity: 0.3



PRB-07S FALLING HEAD

Data Set: \...\PRB-07s Falling Head.aqt

Date: 05/10/12

Time: 13:30:26

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-07s

Test Date: 8/8/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 6.146 ft/day

y0 = 4.331 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-07s)

Initial Displacement: 2.35 ft

Total Well Penetration Depth: 6.26 ft

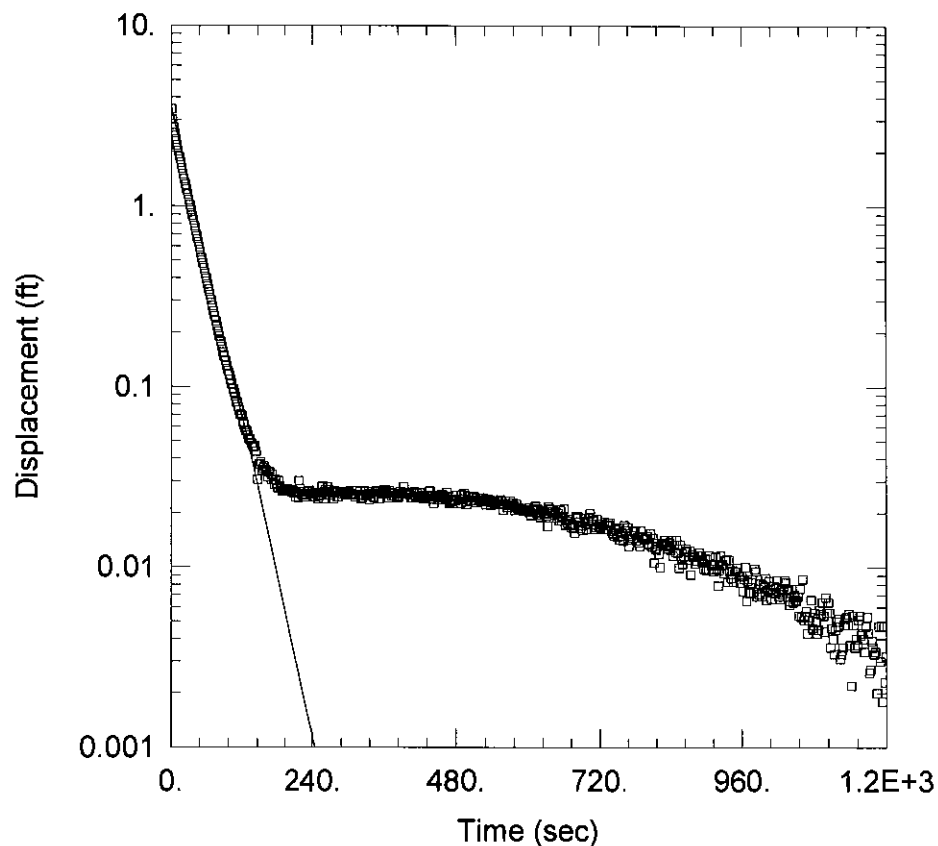
Casing Radius: 0.083 ft

Static Water Column Height: 6.26 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Screened Lithology: **Native Coarse Sand and Gravel**



PRB-07S RISING HEAD

Data Set: \...\PRB-07s Rising Head.aqt

Date: 05/10/12

Time: 13:30:33

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Comapny

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-07s

Test Date: 8/8/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 5.446 ft/day

y0 = 3.518 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-07s)

Initial Displacement: 3.442 ft

Total Well Penetration Depth: 6.26 ft

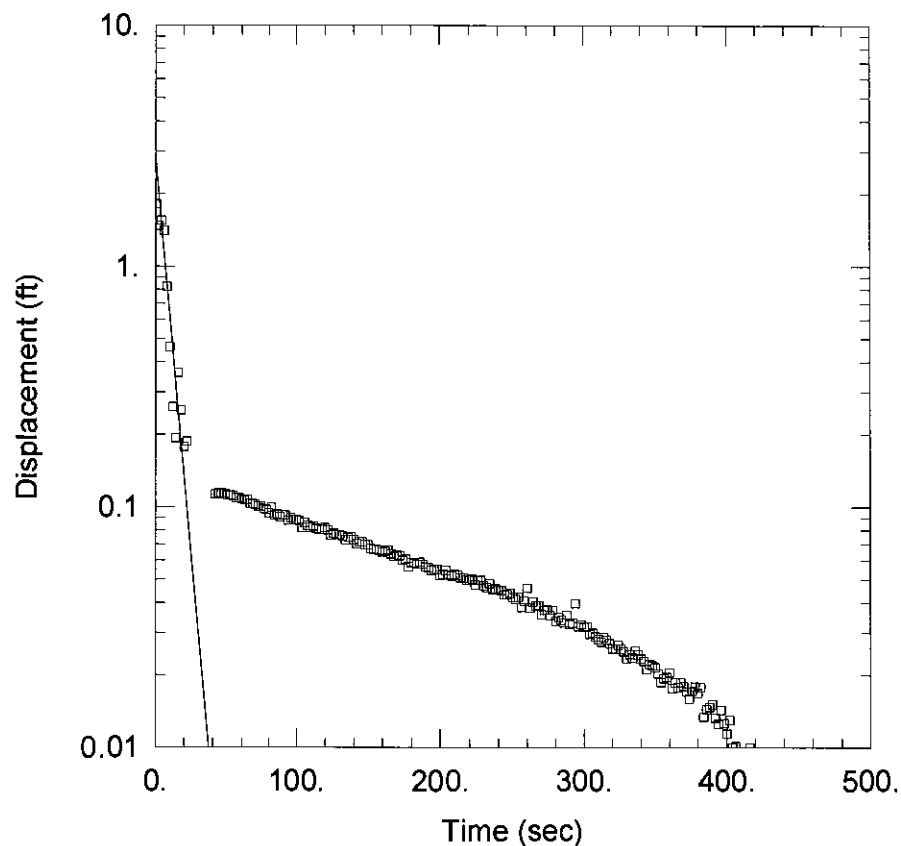
Casing Radius: 0.083 ft

Static Water Column Height: 6.26 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Screened Lithology: Native Coarse Sand and Gravel



PRB-08D FALLING HEAD

Data Set: \\...\PRB-08d Falling Head.aqt

Date: 05/10/12

Time: 13:30:40

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-08d

Test Date: 8/8/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 28.64$ ft/day

$y_0 = 2.815$ ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PRB-08d)

Initial Displacement: 1.809 ft

Total Well Penetration Depth: 16.67 ft

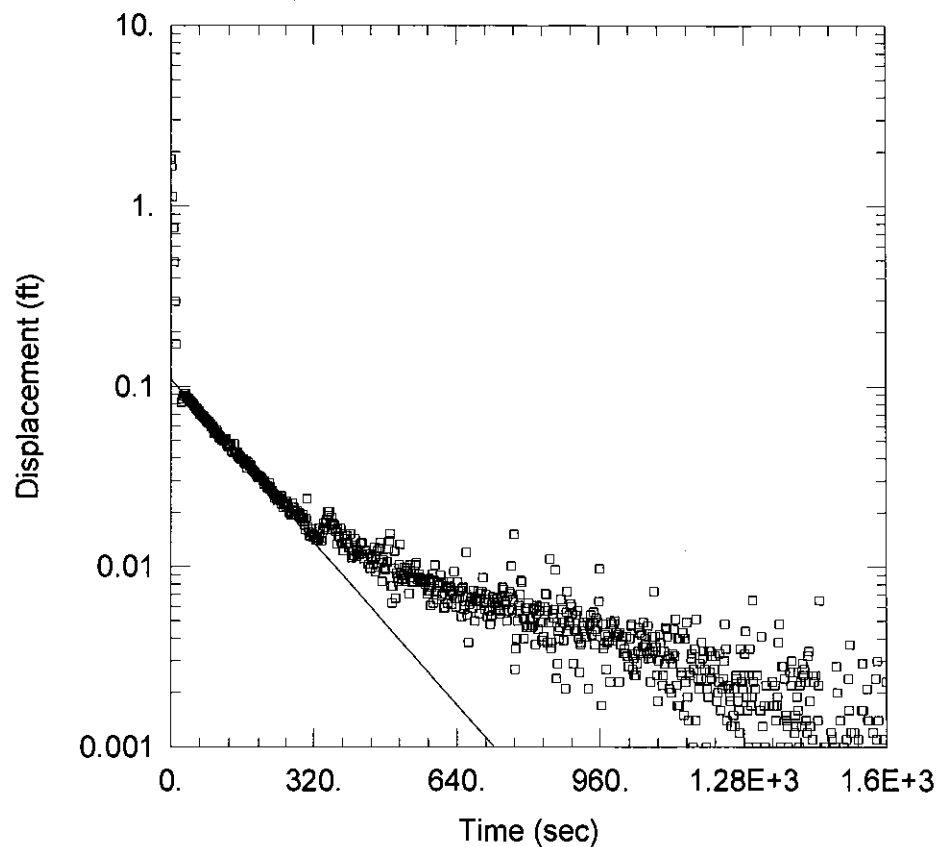
Casing Radius: 0.083 ft

Static Water Column Height: 16.67 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Screened Lithology: Native Coarse Sand and Gravel



PRB-08D RISING HEAD

Data Set: \...\PRB-08d Rising Head.aqt

Date: 05/10/12

Time: 13:30:47

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-08d

Test Date: 8/8/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 1.231 ft/day

y0 = 0.1097 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-08d)

Initial Displacement: 1.807 ft

Total Well Penetration Depth: 16.67 ft

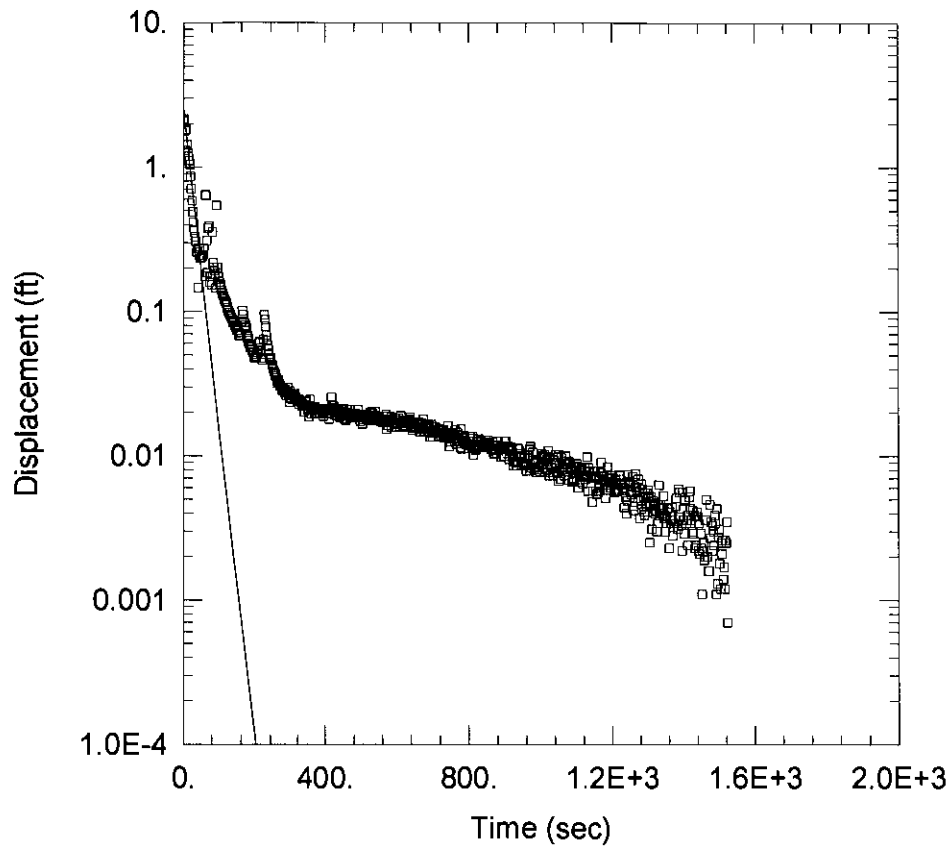
Casing Radius: 0.083 ft

Static Water Column Height: 16.67 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Screened Lithology: Native Coarse Sand and Gravel



PRB-08S FALLING HEAD

Data Set: \\.\PRB-08s Falling Head.aqt

Date: 05/10/12

Time: 13:30:55

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-08s

Test Date: 8/8/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 7.838$ ft/day

$y_0 = 2.48$ ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PRB-08s)

Initial Displacement: 2.152 ft

Total Well Penetration Depth: 4.58 ft

Casing Radius: 0.083 ft

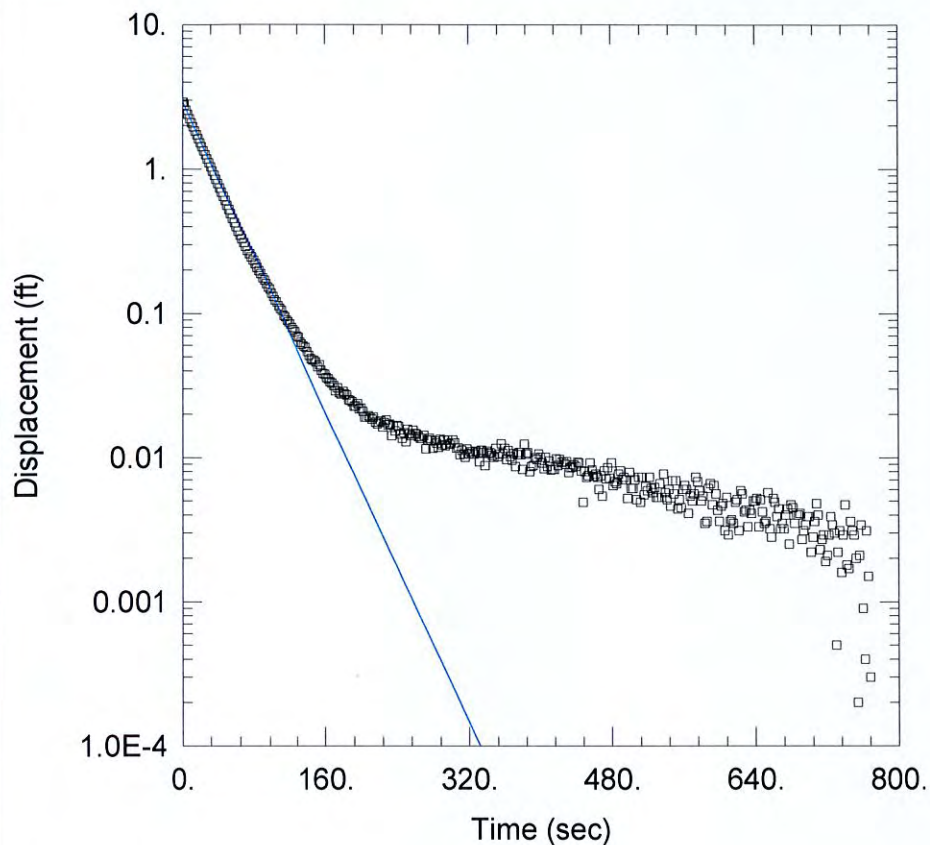
Static Water Column Height: 4.58 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Gravel Pack Porosity: 0.3

Screened Lithology: Native Coarse Sand and Gravel



PRB-08S RISING HEAD

Data Set: \\...\PRB-08s Rising Head.aqt

Date: 05/10/12

Time: 13:31:01

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-08s

Test Date: 8/8/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 4.794 ft/day

y0 = 2.926 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-08s)

Initial Displacement: 2.897 ft

Total Well Penetration Depth: 4.58 ft

Casing Radius: 0.083 ft

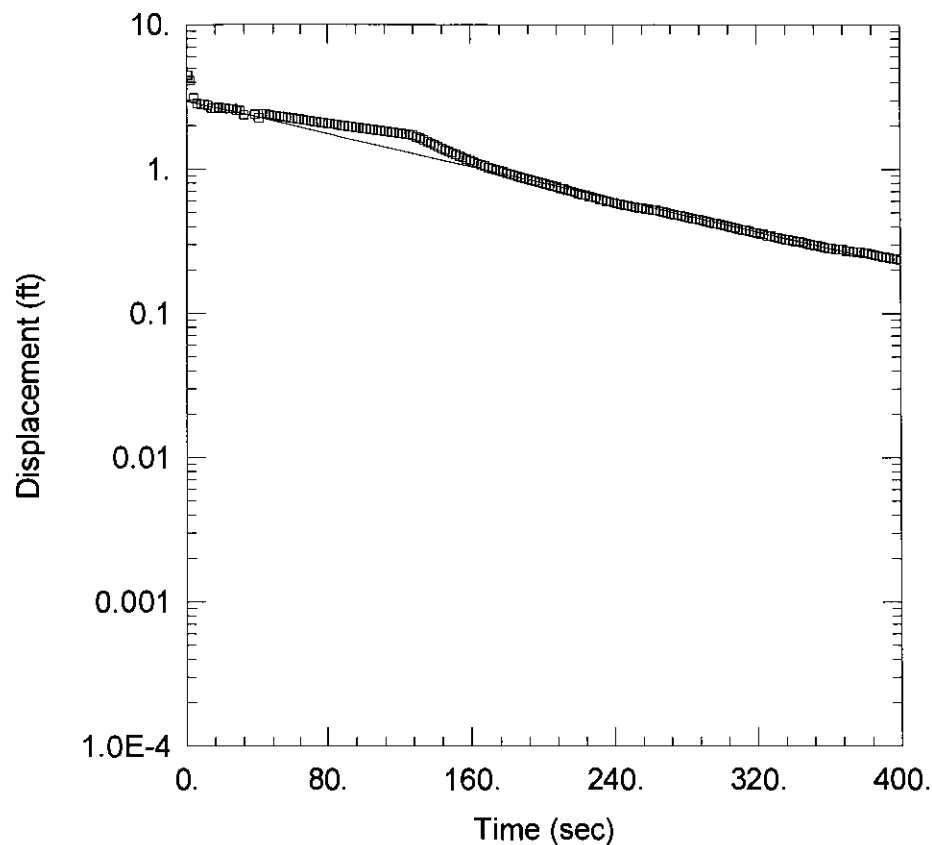
Static Water Column Height: 4.58 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Gravel Pack Porosity: 0.3

Screened Lithology: Native Coarse Sand and Gravel



PRB-09S FALLING HEAD

Data Set: \...\PRB-09s Falling Head.aqt

Date: 05/10/12

Time: 13:31:07

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Comapny

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-09s

Test Date: 8/5/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 1.016 ft/day

y0 = 2.94 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-09s)

Initial Displacement: 4.462 ft

Total Well Penetration Depth: 4.8 ft

Casing Radius: 0.083 ft

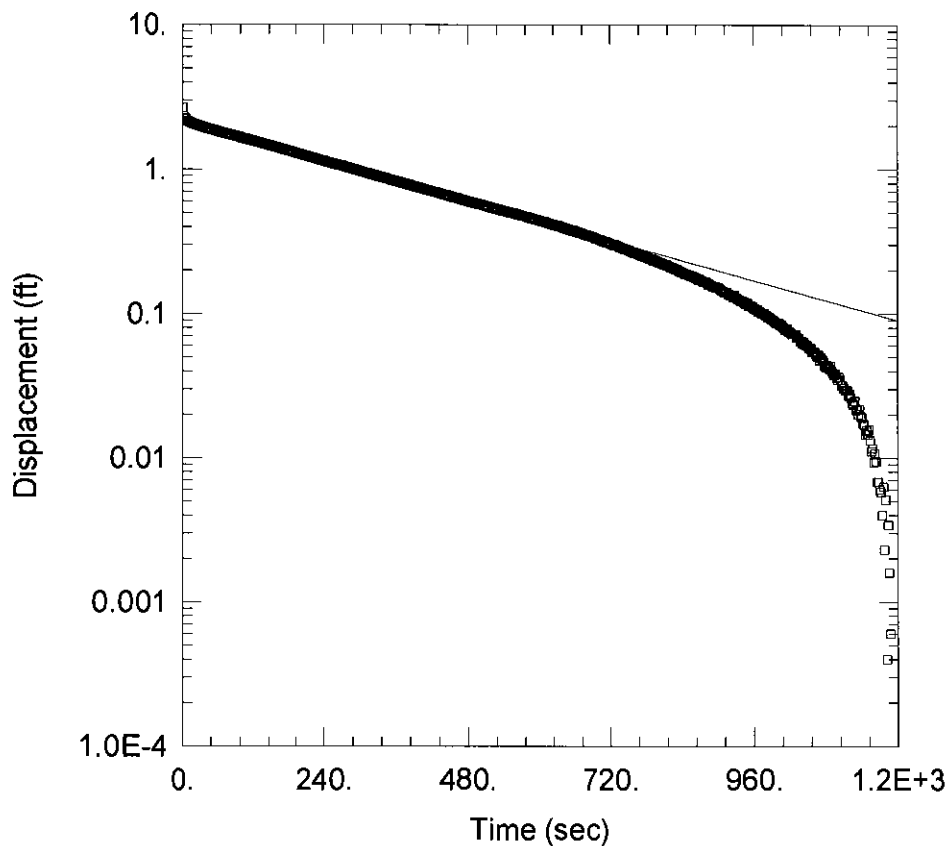
Static Water Column Height: 4.8 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Gravel Pack Porosity: 0.3

Screened Lithology: **Installed Permeable Reactive Barrier**



PRB-09S RISING HEAD

Data Set: \...\PRB-09s Rising Head.aqt

Date: 05/10/12

Time: 13:31:13

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 2751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-09s

Test Date: 8/5/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.414 ft/day

y0 = 2.154 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-09s)

Initial Displacement: 2.647 ft

Total Well Penetration Depth: 4.8 ft

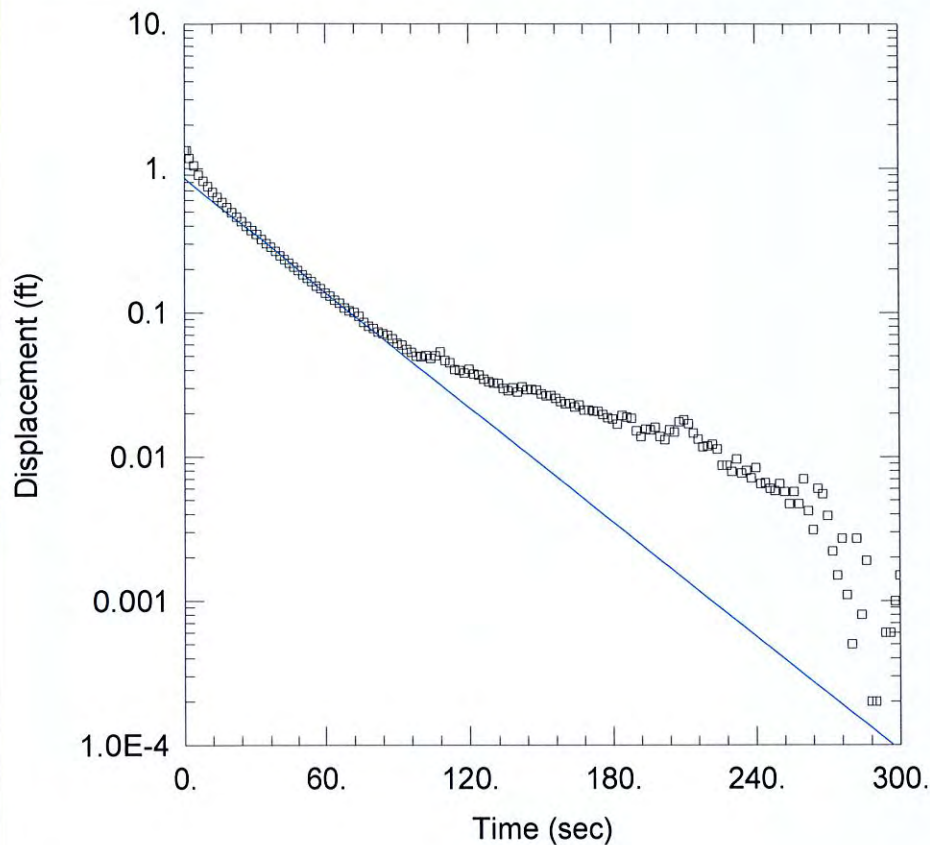
Casing Radius: 0.083 ft

Static Water Column Height: 4.8 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Screened Lithology: **Installed Permeable Reactive Barrier**



PRB-10S FALLING HEAD

Data Set: \...\PRB-10s Falling Head.aqt

Date: 05/10/12

Time: 13:31:20

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-10s

Test Date: 8/5/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 4.6 ft/day

y0 = 0.8494 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-10s)

Initial Displacement: 1.33 ft

Total Well Penetration Depth: 3.99 ft

Casing Radius: 0.083 ft

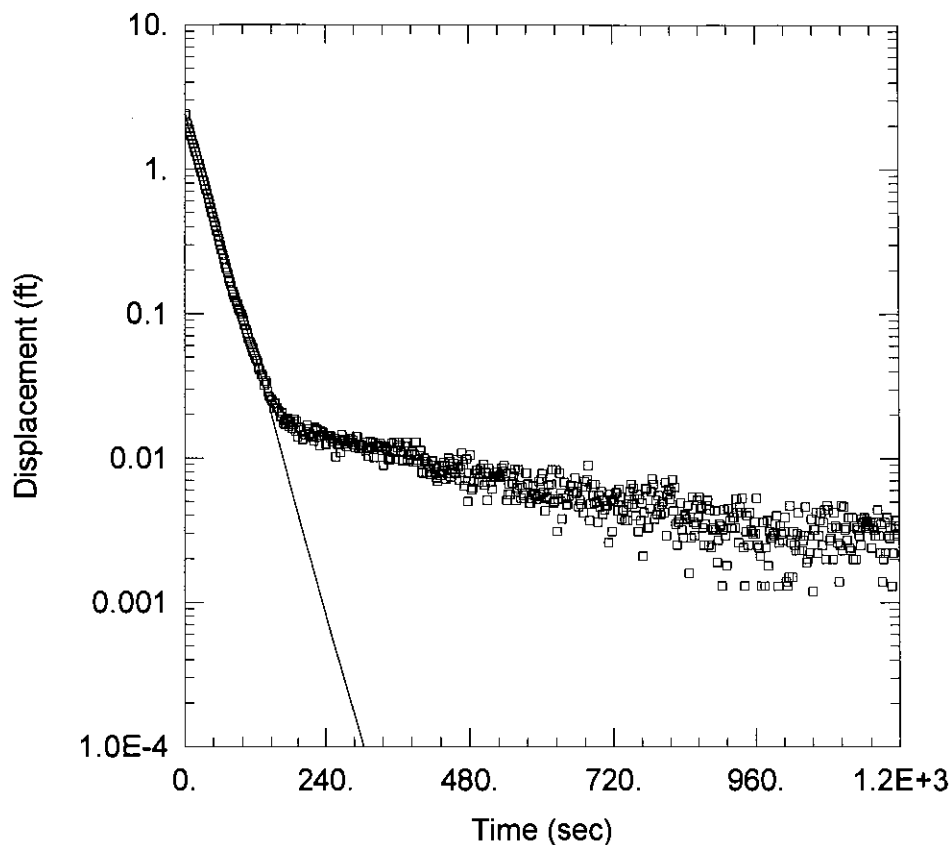
Static Water Column Height: 3.99 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Gravel Pack Porosity: 0.3

Screened Lithology: **Native Coarse Sand and Gravel**



PRB-10S RISING HEAD

Data Set: \...\PRB-10s Rising Head.aqt

Date: 05/10/12

Time: 13:31:27

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Comapny

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-10s

Test Date: 8/5/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 5.011 ft/day

y0 = 2.41 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-10s)

Initial Displacement: 2.422 ft

Total Well Penetration Depth: 3.99 ft

Casing Radius: 0.083 ft

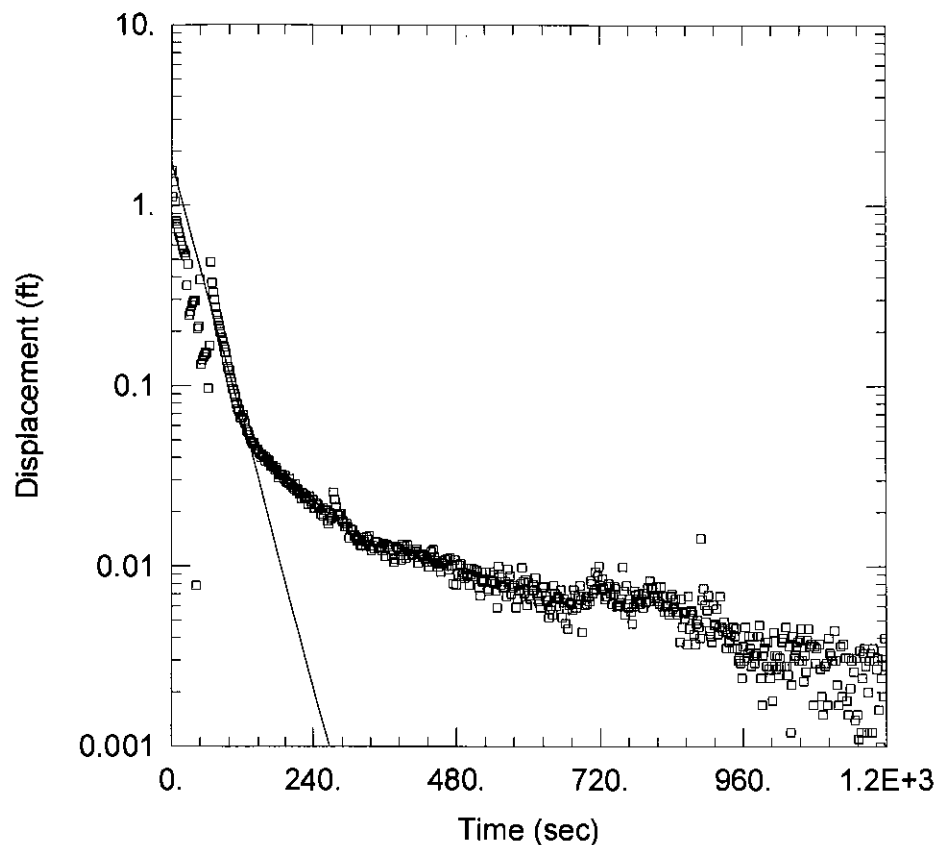
Static Water Column Height: 3.99 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Gravel Pack Porosity: 0.3

Screened Lithology: **Native Coarse Sand and Gravel**



PRB-11S FALLING HEAD

Data Set: \\...PRB-11s Falling Head.aqt

Date: 05/10/12

Time: 13:31:35

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-11s

Test Date: 8/8/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 4.248 ft/day

y0 = 1.731 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-11s)

Initial Displacement: 1.558 ft

Total Well Penetration Depth: 4.15 ft

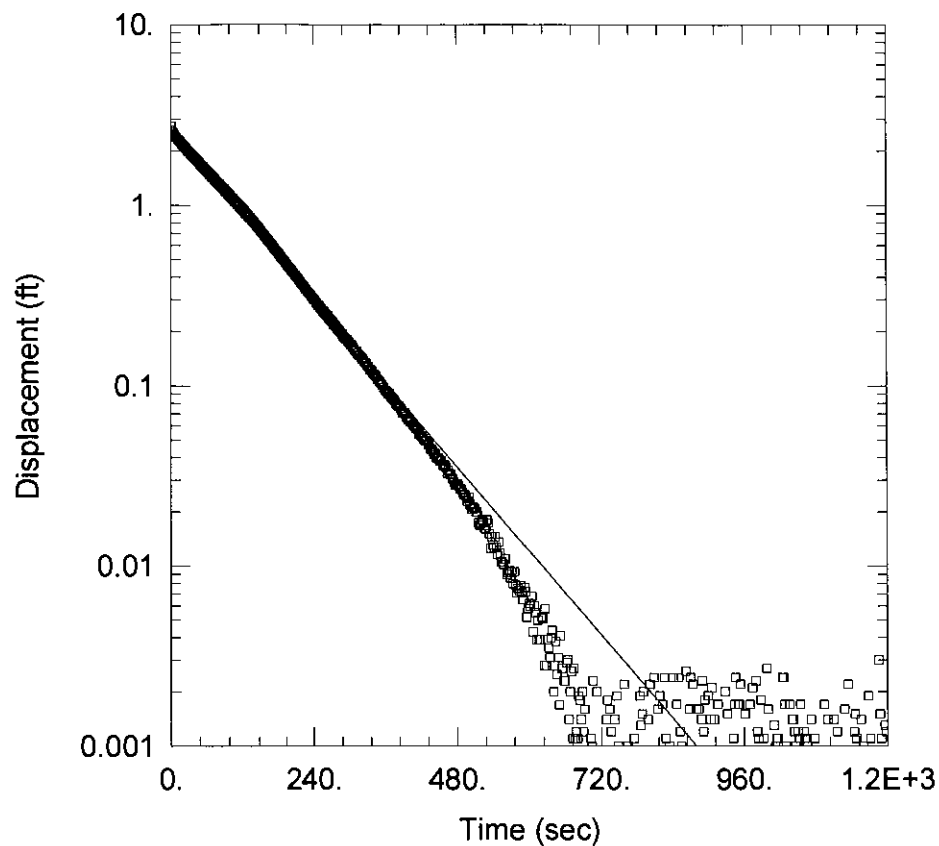
Casing Radius: 0.083 ft

Static Water Column Height: 4.15 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Screened Lithology: **Native Coarse Sand and Gravel**



PRB-11S RISING HEAD

Data Set: \...\PRB-11s Rising Head.aqt

Date: 05/10/12

Time: 13:31:42

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Comapny

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-11s

Test Date: 8/8/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 1.359 ft/day

y0 = 2.588 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-11s)

Initial Displacement: 2.738 ft

Total Well Penetration Depth: 4.15 ft

Casing Radius: 0.083 ft

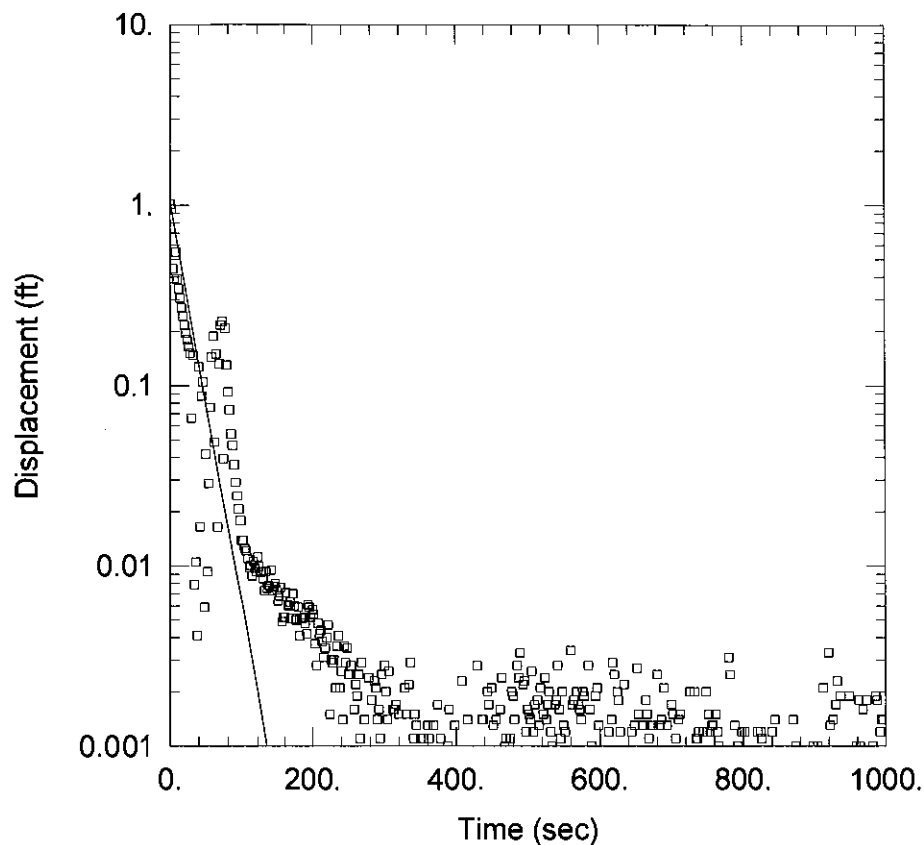
Static Water Column Height: 4.15 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Gravel Pack Porosity: 0.3

Screened Lithology: Native Coarse Sand and Gravel



PRB-12S FALLING HEAD

Data Set: \\\PRB-12s Falling Head.aqt

Date: 05/10/12

Time: 13:31:49

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-12s

Test Date: 8/8/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 7.822$ ft/day

$y_0 = 1.053$ ft

AQUIFER DATA

Saturated Thickness: 40 ft

Anisotropy Ratio (K_z/K_r): 1

WELL DATA (PRB-12s)

Initial Displacement: 1.013 ft

Total Well Penetration Depth: 3.86 ft

Casing Radius: 0.083 ft

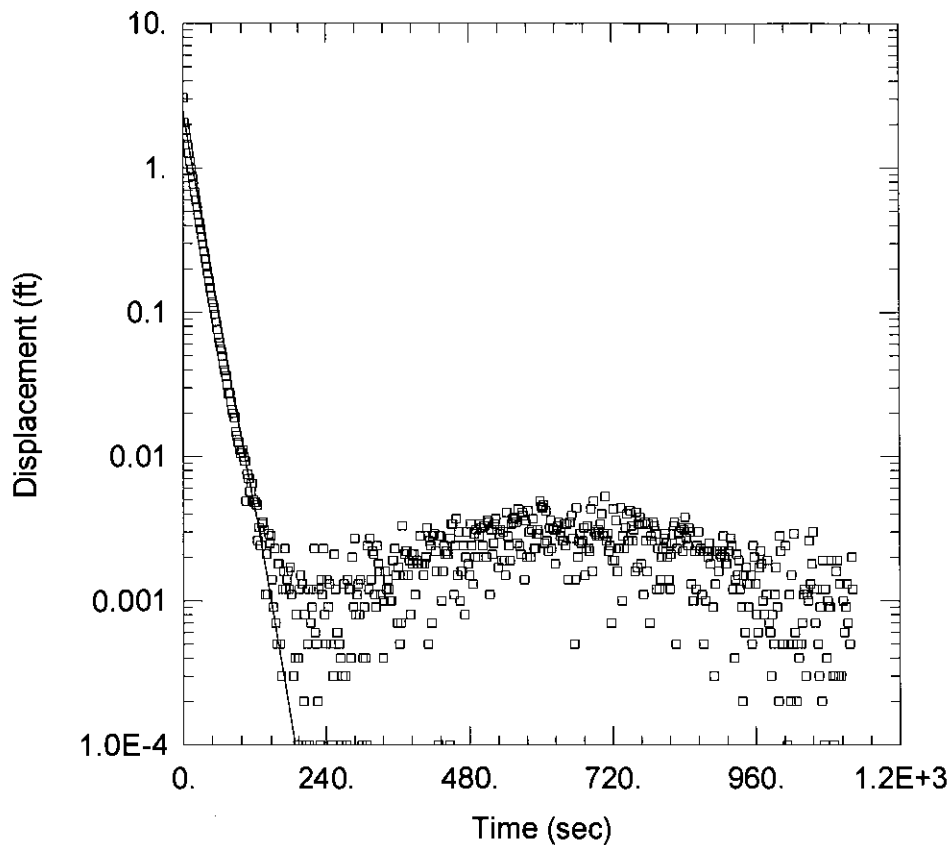
Static Water Column Height: 3.86 ft

Screen Length: 5 ft

Wellbore Radius: 0.083 ft

Gravel Pack Porosity: 0.3

Screened Lithology: Native Coarse Sand and Gravel



PRB-12S RISING HEAD

Data Set: \\\PRB-12s Rising Head.aqt

Date: 05/10/12

Time: 13:31:55

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Comapny

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-12s

Test Date: 8/8/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 8.132 ft/day

y0 = 2.448 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-12s)

Initial Displacement: 3.054 ft

Total Well Penetration Depth: 3.86 ft

Casing Radius: 0.083 ft

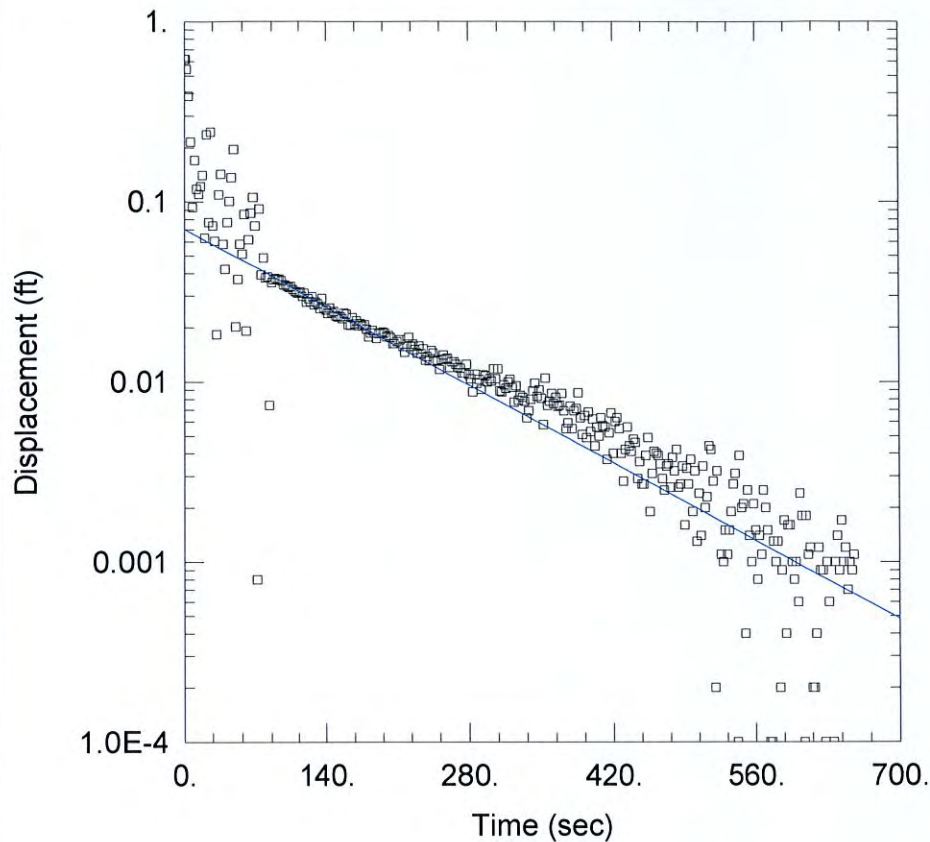
Static Water Column Height: 3.86 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Gravel Pack Porosity: 0.3

Screened Lithology: **Native Coarse Sand and Gravel**



PRB-13S FALLING HEAD

Data Set: \...\PRB-13s Falling Head.aqt

Date: 05/10/12

Time: 13:32:01

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Comapny

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-13s

Test Date: 8/8/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 1.17$ ft/day

$y_0 = 0.07045$ ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PRB-13s)

Initial Displacement: 0.6183 ft

Total Well Penetration Depth: 6.53 ft

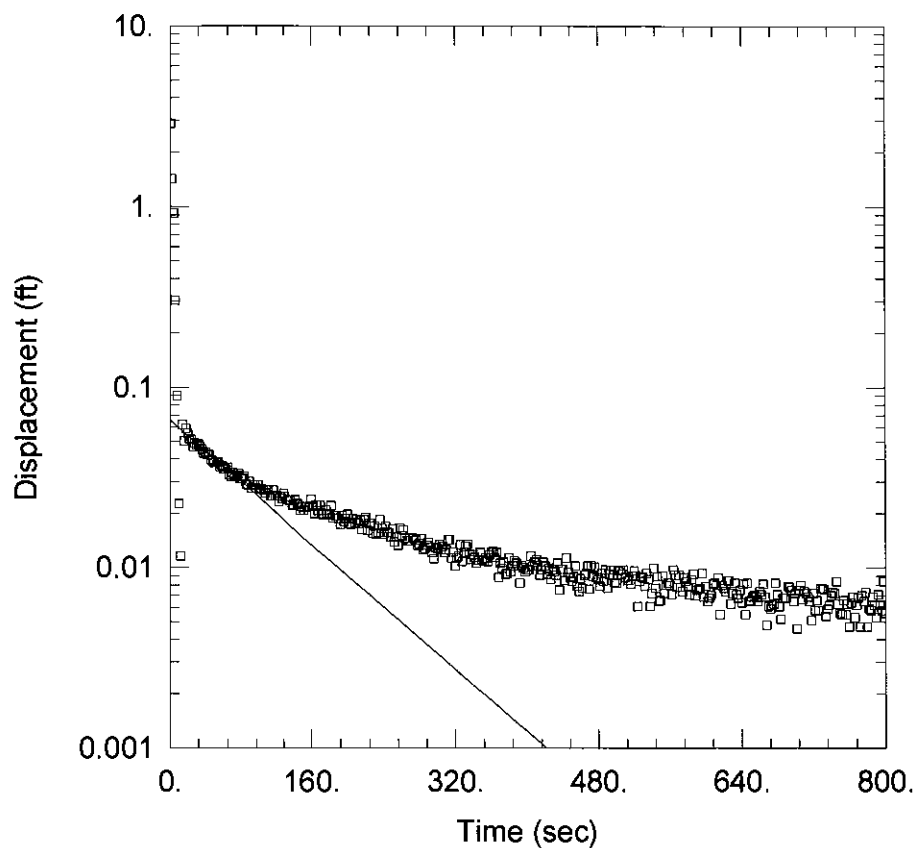
Casing Radius: 0.083 ft

Static Water Column Height: 6.53 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Screened Lithology: **Native Coarse Sand and Gravel**



PRB-13S RISING HEAD

Data Set: \...PRB-13s Rising Head.aqt

Date: 05/10/12

Time: 13:32:07

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-13s

Test Date: 8/8/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 1.633$ ft/day

$y_0 = 0.06544$ ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PRB-13s)

Initial Displacement: 2.888 ft

Total Well Penetration Depth: 6.53 ft

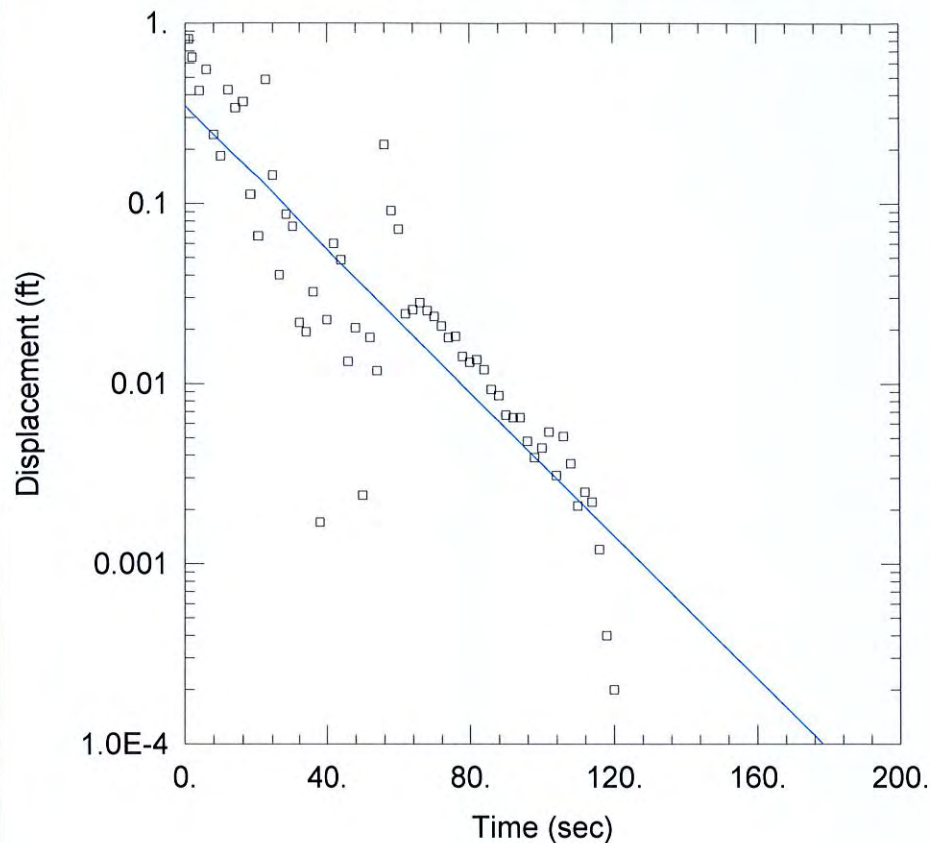
Casing Radius: 0.083 ft

Static Water Column Height: 6.53 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Screened Lithology: Native Coarse Sand and Gravel



PRB-14S FALLING HEAD

Data Set: \\...\PRB-14s Falling Head.aqt

Date: 05/10/12

Time: 13:32:13

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Comapny

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-14s

Test Date: 8/8/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 7.635 ft/day

y0 = 0.3464 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-14s)

Initial Displacement: 0.8159 ft

Total Well Penetration Depth: 7.18 ft

Casing Radius: 0.083 ft

Static Water Column Height: 7.18 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Screened Lithology: Installed Permeable Reactive Barrier

PRB-14S RISING HEAD

Data Set: \...\PRB-14s Rising Head.aqt

Date: 05/10/12

Time: 13:32:20

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-14s

Test Date: 8/8/2011

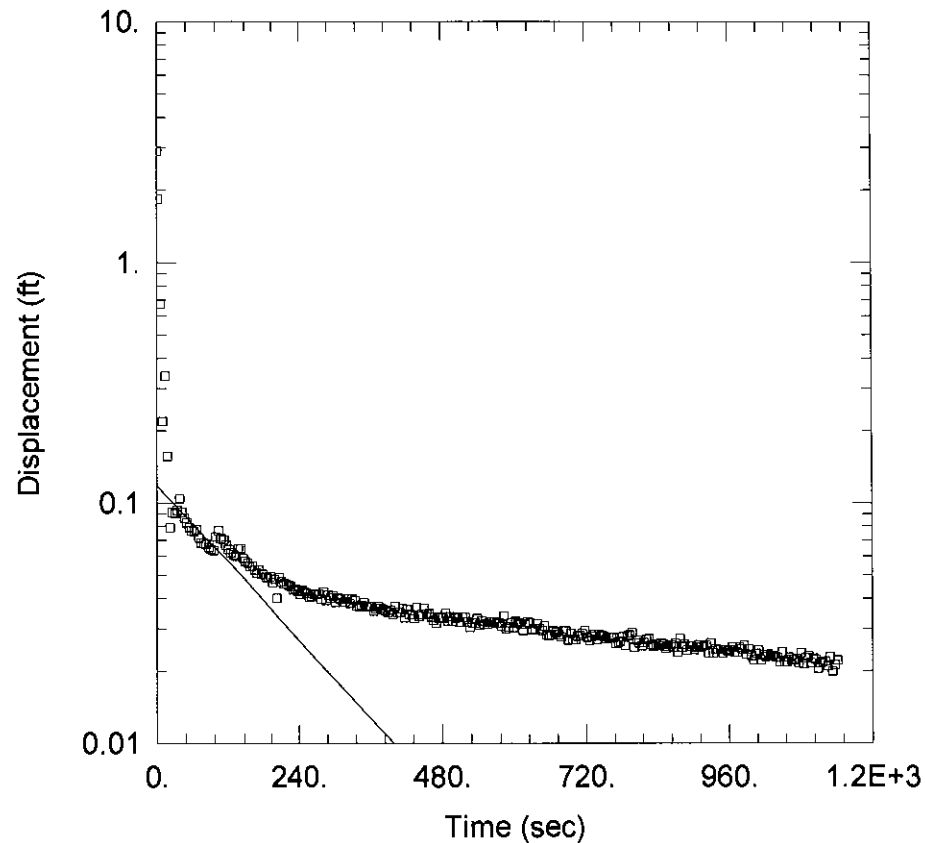
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 1.032$ ft/day

$y_0 = 0.118$ ft



AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PRB-14s)

Initial Displacement: 2.899 ft

Total Well Penetration Depth: 7.18 ft

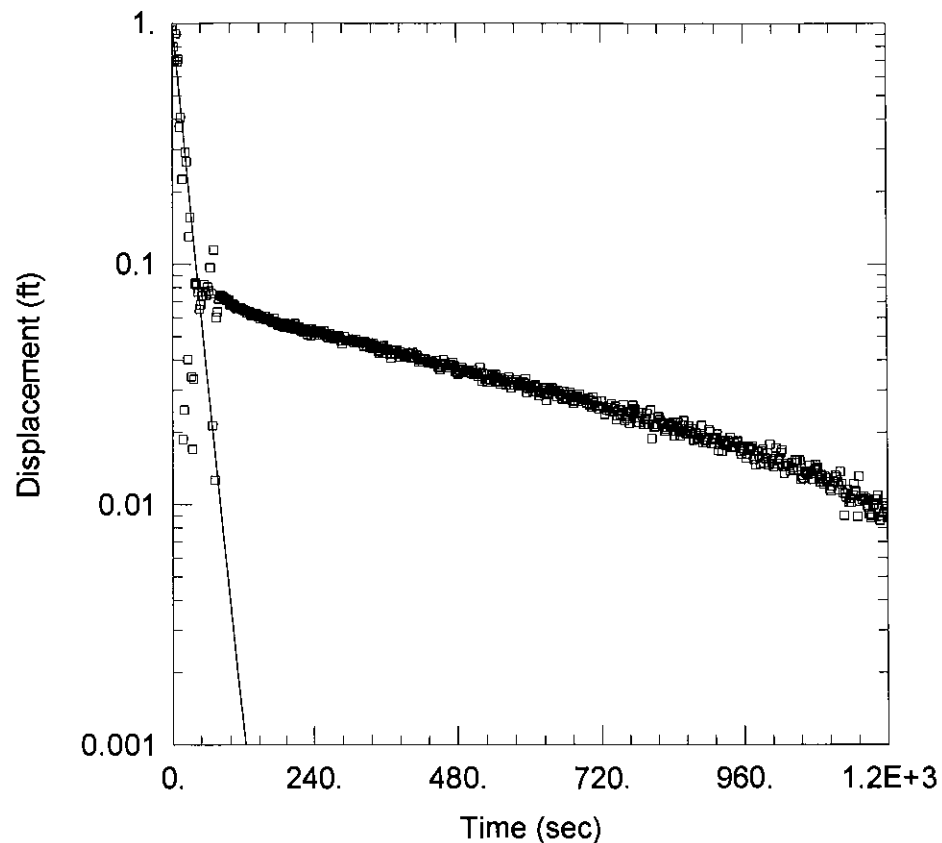
Casing Radius: 0.083 ft

Static Water Column Height: 7.18 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Screened Lithology: **Installed Permeable Reactive Barrier**



PRB-15D FALLING HEAD

Data Set: \\\PRB-15d Falling Head.aqt

Date: 05/10/12

Time: 13:32:26

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-15d

Test Date: 8/8/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 11.03 ft/day

y0 = 0.9895 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-15d)

Initial Displacement: 0.9735 ft

Total Well Penetration Depth: 18.46 ft

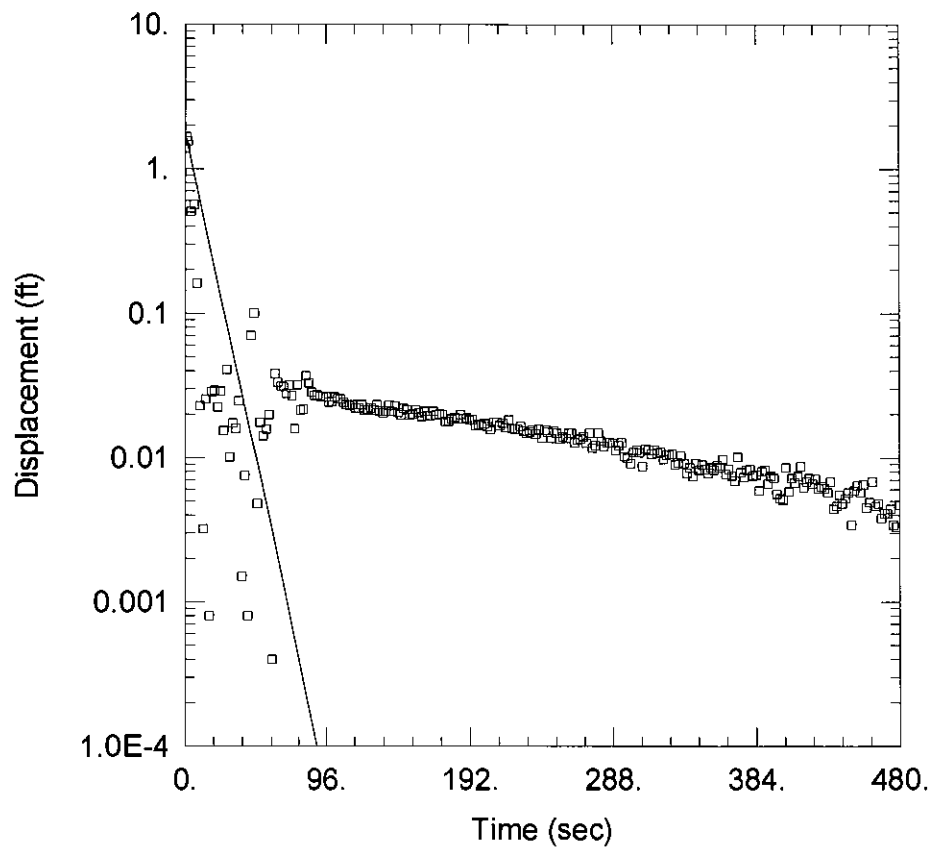
Casing Radius: 0.083 ft

Static Water Column Height: 18.46 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Screened Lithology: **Native Coarse Sand and Gravel**



PRB-15D RISING HEAD

Data Set: \\...\\PRB-15d Rising Head.aqt

Date: 05/10/12

Time: 13:32:32

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-15d

Test Date: 8/8/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 21.04 ft/day

y0 = 1.782 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-15d)

Initial Displacement: 1.394 ft

Total Well Penetration Depth: 18.46 ft

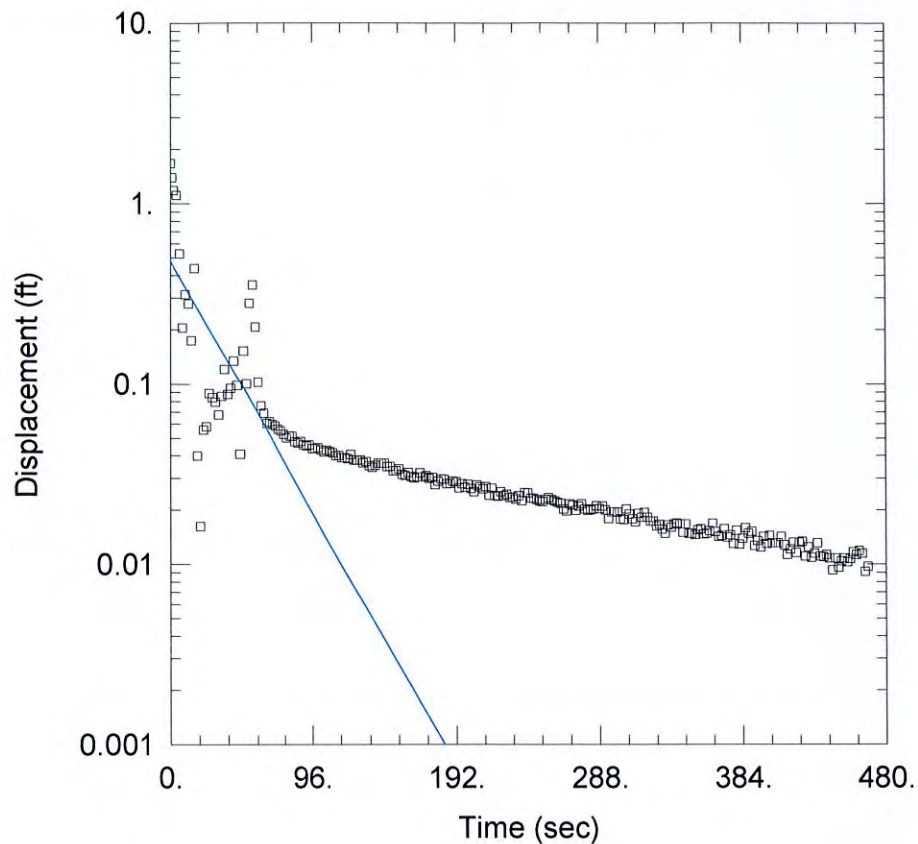
Casing Radius: 0.083 ft

Static Water Column Height: 18.46 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Screened Lithology: **Native Coarse Sand and Gravel**



PRB-15S FALLING HEAD

Data Set: \...\PRB-15s Falling Head.aqt

Date: 05/10/12

Time: 13:32:38

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Comapny

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-15s

Test Date: 8/8/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 5.097 ft/day

y0 = 0.4761 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-15s)

Initial Displacement: 1.666 ft

Total Well Penetration Depth: 4.14 ft

Casing Radius: 0.083 ft

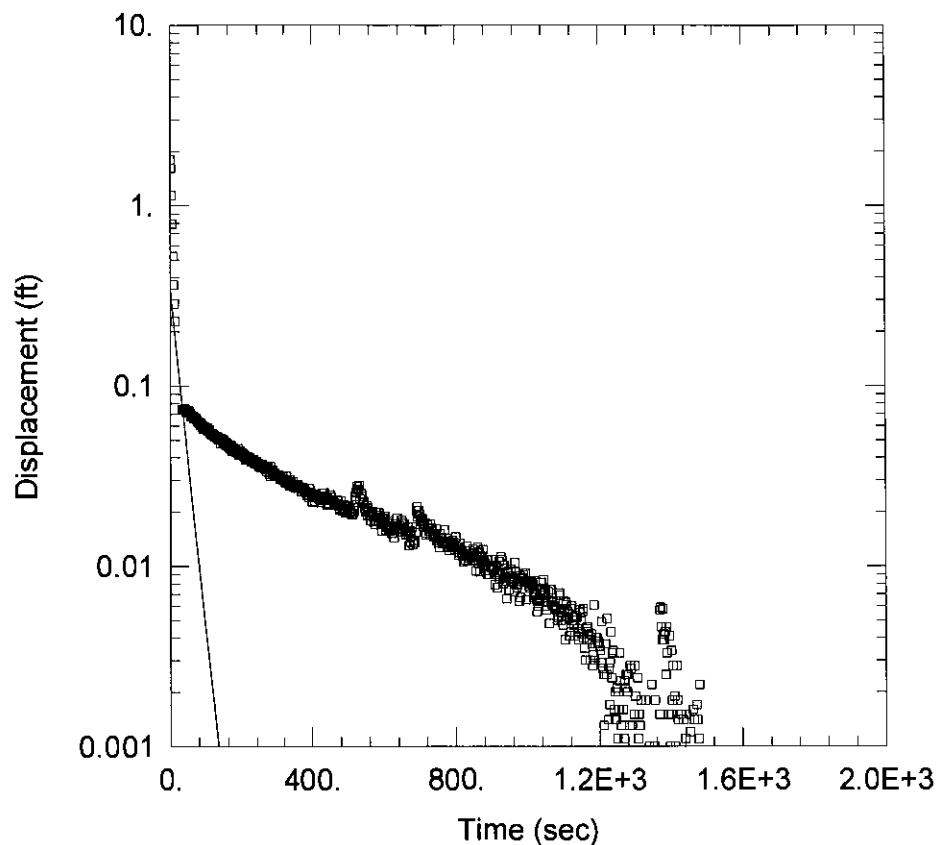
Static Water Column Height: 4.14 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Gravel Pack Porosity: 0.3

Screened Lithology: **Native Coarse Sand and Gravel**



PRB-15S RISING HEAD

Data Set: \...\PRB-15s Rising Head.aqt

Date: 05/10/12

Time: 13:32:44

PROJECT INFORMATION

Company: TRC Env. Corp.

Client: Tecumseh Products Company

Project: 02751.20.001

Location: Tecumseh, Michigan

Test Well: PRB-15s

Test Date: 8/8/2011

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 6.623 ft/day

y0 = 0.3387 ft

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PRB-15s)

Initial Displacement: 1.798 ft

Total Well Penetration Depth: 4.14 ft

Casing Radius: 0.083 ft

Static Water Column Height: 4.14 ft

Screen Length: 5. ft

Wellbore Radius: 0.083 ft

Gravel Pack Porosity: 0.3

Screened Lithology: Native Coarse Sand and Gravel

Laboratory Hydraulic Conductivity Testing

RMT, Inc.															QC: <i>AM</i>					
Falling Head Permeability Test (ASTM D5084)															QA: <i>AM</i>					
Project Name: Tecumseh Products										Cell #:					6					
Project #: 8070.07										USCS Description:					N/A					
Sample Name: MW-10D, 21-23'										USCS Classification:					N/A					
Visual Descript: Lean clay										Average Kv =					1.9E-08 cm/sec					
Sample Type: Undisturbed										Initial Values		Final Values								
Sample Dia. (in)										2.87		2.87		Permeant:		Water				
Sample Ht. (in)										2.30		2.30		Permeant Specific Gravity:		1.00				
Tare & Wet (g)										420.00		810.80		Sample Specific Gravity:		2.76 Est.				
Tare & Dry (g)										404.20		743.40		Confining Pressure (psi):		100.0				
Tare (g)										278.57		256.09		Burette Diameter (in):		0.250				
Sample Wt. (g)										552.50		554.71		Burette Zero (cm):		100.0				
Moisture (%)										12.6		13.8								
Wet Density (pcf)										141.5		142.0								
Dry Density (pcf)										125.7		124.8		Max. Effect. Stress (psi):		5.9				
Saturation (%)										93.7		100.4		Min. Effect. Stress (psi):		4.6				
														Ave. Effect. Stress (psi):		5.1				
1	Date			Time		Run Time	Temp C***	Pressure (psi)		Cham	Cham Dif.	Bot	Bot Dif.	Top	Top Dif.	Flow Dif. %	Kv *** cm/sec	Ave. * 0.1		
	Yr.	Mo.	Day	Hr.	Min.			Bot	Top											
1	2009	12	10	14	41.00		0.0	95	95	34.20		12.35		96.25						
2	2009	12	10	15	10.00	1740	19.0	95	95	34.80	0.60	12.45	0.10	95.85	0.40	-60.0	7.8E-08			
3	2009	12	10	16	10.00	3600	19.0	95	95	35.60	0.80	12.70	0.25	95.65	0.20	11.1	3.4E-08			
4	2009	12	11	7	52.00	56520	19.0	95	95	40.70	5.10	15.60	2.90	93.80	1.85	22.1	2.4E-08			
5	2009	12	11	9	51.00	7140	19.0	95	95	41.50	0.80	15.80	0.20	93.60	0.20	0.0	1.6E-08			
6	2009	12	11	11	48.00	7020	19.0	95	95	41.80	0.30	16.20	0.40	93.35	0.25	23.1	2.7E-08			
7	2009	12	11	13	48.00	7200	19.0	95	95	42.20	0.40	16.50	0.30	93.15	0.20	20.0	2.1E-08			
8	2009	12	11	15	8.00		0.0	95	95	41.80		17.00		92.95						
9	2009	12	11	16	16.00	4080	19.0	95	95	42.00	0.20	17.20	0.20	92.80	0.15	14.3	2.6E-08			
10	2009	12	14	5	56.00	222000	19.0	95	95	47.60	5.60	25.25	8.05	85.85	6.95	7.3	2.3E-08			
11	2009	12	14	8	37.00	9660	20.0	95	95	48.10	0.50	25.60	0.35	85.60	0.25	16.7	2.3E-08			
12	2009	12	14	10	38.00	7260	21.0	95	95	49.20	1.10	25.80	0.20	85.45	0.15	14.3	1.7E-08			
13	2009	12	14	12	34.00	6960	21.0	95	95	49.25	0.05	26.05	0.25	85.30	0.15	25.0	2.1E-08			
14	2009	12	14	14	34.00	7200	20.0	95	95	48.30	-0.95	26.20	0.15	85.05	0.25	-25.0	2.1E-08			
15	2009	12	15	5	32.00	53880	19.0	95	95	48.50	0.20	27.65	1.45	83.70	1.35	3.6	2.1E-08			
16	2009	12	15	7	36.00	7440	20.0	95	95	49.10	0.60	27.85	0.20	83.55	0.15	14.3	1.9E-08			
17	2009	12	15	9	44.00	7680	21.0	95	95	49.80	0.70	28.15	0.30	83.35	0.20	20.0	2.5E-08			
18	2009	12	15	11	34.00	6600	19.0	95	95	49.40	-0.40	28.25	0.10	83.20	0.15	-20.0	1.6E-08			
19	2009	12	15	13	33.00	7140	21.0	95	95	50.00	0.60	28.45	0.20	83.15	0.05	60.0	1.4E-08			
20	2009	12	15	15	34.00	7260	19.0	95	95	48.80	-1.20	28.60	0.15	82.90	0.25	-25.0	2.3E-08			
21	2009	12	16	5	56.00	51720	19.0	95	95	49.45	0.65	29.80	1.20	81.85	1.05	6.7	1.9E-08			
22	2009	12	16	7	48.00		0.0	95	95	49.50		30.40		82.20						
23	2009	12	16	9	58.00	7800	21.0	95	95	50.40	0.90	30.40	0.00	81.80	0.40	-100.0	2.1E-08			
24	2009	12	16	12	0.00	7320	19.0	95	95	49.30	-1.10	30.50	0.10	81.55	0.25	-42.9	2.1E-08			
25	2009	12	16	14	0.00	7200	21.0	95	95	50.70	1.40	30.65	0.15	81.40	0.15	0.0	1.8E-08			
26	2009	12	16	16	1.00	7260	19.0	95	95	49.50	-1.20	-30.80	-0.15	-81.25	-0.15	0.0	-1.9E-08			
**A zero in this column starts a series of measurements.															*Average Kv for those rows with a 1 in the Ave. column.					
(Termination determined by stable Kv and low flow differential.)															***Kv adjusted for temperature.					

RMT, Inc.															QC: <i>MM</i>		
Falling Head Permeability Test (ASTM D5084)															QA: <i>NN</i>		
Project Name: Tecumseh Products										Cell #: 6							
Project #: 8070.07										USCS Description: N/A							
Sample Name: MW-10D, 21-23'										USCS Classification: N/A							
Visual Descript: Lean clay																	
Sample Type: Undisturbed		Initial Values		Final Values													
Sample Dia. (in)		2.87		2.87		Permeant: Water											
Sample Ht. (in)		2.30		2.30		Permeant Specific Gravity: 1.00											
Tare & Wet (g)		420.00		810.80		Sample Specific Gravity: 2.76					Est.						
Tare & Dry (g)		404.20		743.40		Confining Pressure (psi): 100.0											
Tare (g)		278.57		256.09		Burette Diameter (in): 0.250											
Sample Wt. (g)		552.50		554.71		Burette Zero (cm): 100.0											
Moisture (%)		12.6		13.8		Maximum Gradient: 8.1											
Wet Density (pcf)		141.5		142.0		Average Gradient: 7.1											
Dry Density (pcf)		125.7		124.8		Max. Effect. Stress (psi): 5.5											
Saturation (%)		93.7		100.4		Min. Effect. Stress (psi): 4.7											
															Ave. Effect. Stress (psi): 5.0		
Yr.	Mo.	Day	Time		Run Time	Temp C°**	Pressure (psi)		Cham.	Cham. Dif.	Bot.	Bot. Dif.	Top	Top Dif.	Flow Dif. %	Kv *** cm/sec	Ave.* 0.1
			Bot	Top													
1	2009	12	16	16	1.00	0.0	95	95	49.50		30.80		81.25				
2	2009	12	17	7	39.00	56280	19.0	95	95	50.30	0.80	32.10	1.30	80.20	1.05	10.6	1.9E-08
3	2009	12	17	9	43.00	7440	19.0	95	95	50.60	0.30	32.25	0.15	80.05	0.15	0.0	1.9E-08
4	2009	12	17	11	41.00	7080	19.0	95	95	50.50	-0.10	32.35	0.10	79.90	0.15	-20.0	1.7E-08
5	2009	12	17	13	41.00	7200	19.0	95	95	50.60	0.10	32.50	0.15	79.80	0.10	20.0	1.7E-08
6	2009	12	17	15	41.00	7200	19.0	95	95	50.80	0.20	32.65	0.15	79.65	0.15	0.0	2.0E-08
7	2009	12	18	7	35.00	57240	19.0	95	95	51.30	0.50	33.80	1.15	78.60	1.05	4.5	1.9E-08
8	2009	12	18	9	35.00	7200	19.0	95	95	51.50	0.20	33.95	0.15	78.50	0.10	20.0	1.8E-08
9	2009	12	18	11	35.00	7200	19.0	95	95	51.60	0.10	34.10	0.15	78.35	0.15	0.0	2.1E-08
10	2009	12	18	13	35.00	7200	20.0	95	95	51.80	0.20	34.25	0.15	78.25	0.10	20.0	1.7E-08
11	2009	12	18	16	3.00	8880	20.0	95	95	51.80	0.00	34.40	0.15	78.10	0.15	0.0	1.7E-08
12	2009	12	21	6	6.00	223380	19.0	95	95	53.65	1.85	38.25	3.85	74.90	3.20	9.2	1.8E-08
13																	
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25																	
26																	
**A zero in this column starts a series of measurements.															*Average Kv for those rows with a 1 in the Ave. column.		1.9E-08 cm/sec
(Termination determined by stable Kv and low flow differential.)															***Kv adjusted for temperature.		

RMT, Inc.															QC: <i>gh</i>			
Falling Head Permeability Test (ASTM D5084)															QA: <i>gh</i>			
Project Name: Tecumseh Products										Cell #:					7			
Project #: 8070.07										USCS Description:					N/A			
Sample Name: MW-19D, 48-50'										USCS Classification:					N/A			
Visual Descript: Lean clay with sand										Average Kv =					1.5E-08 cm/sec			
Sample Type: Undisturbed										Initial Values		Final Values						
Sample Dia. (in)										2.86		2.86		Permeant: Water				
Sample Ht. (in)										2.28		2.28		Permeant Specific Gravity: 1.00				
Tare & Wet (g)										605.70		795.10		Sample Specific Gravity: 2.66 Est.				
Tare & Dry (g)										570.30		736.20		Confining Pressure (psi): 100.0				
Tare (g)										276.96		254.84		Burette Diameter (in): 0.250				
Sample Wt. (g)										541.70		540.26		Burette Zero (cm): 100.0				
Moisture (%)										12.1		12.2						
Wet Density (pcf)										140.5		140.5						
Dry Density (pcf)										125.4		125.2		Max. Effect. Stress (psi): 5.6				
Saturation (%)										99.3		100.1		Min. Effect. Stress (psi): 4.1				
														Ave. Effect. Stress (psi): 4.7				
Date	Time	Run	Temp	Pressure (psi)		Cham.		Bot.		Top	Flow	Kv ***	Ave.*					
Yr.	Mo.	Day	Hr.	Min.	Time	C***	Bot	Top	Cham	Dif.	Bot	Dif.	Top	Dif.	Dif. %	cm/sec	0.1	
1	2009	12	10	14	43.00	0.0	95	95	52.10		10.00		96.15					
2	2009	12	10	15	11.00	1680	19.0	95	95	53.20	1.10	10.15	0.15	95.55	0.60	-60.0	1.2E-07	
3	2009	12	10	16	11.00	3600	19.0	95	95	54.80	1.60	10.15	0.00	95.30	0.25	-100.0	1.8E-08	
4	2009	12	11	7	53.00	56520	19.0	95	95	62.80	8.00	11.90	1.75	94.00	1.30	14.8	1.5E-08	
5	2009	12	11	9	52.00	7140	19.0	95	95	63.70	0.90	12.15	0.25	93.75	0.25	0.0	1.9E-08	
6	2009	12	11	11	49.00	7020	19.0	95	95	64.30	0.60	12.40	0.25	93.60	0.15	25.0	1.6E-08	
7	2009	12	11	13	50.00	7260	19.0	95	95	64.60	0.30	12.65	0.25	93.40	0.20	11.1	1.7E-08	
8	2009	12	11	15	10.00	0.0	95	95	64.90		6.50		96.10					
9	2009	12	11	16	17.00	4020	19.0	95	95	65.20	0.30	6.65	0.15	95.95	0.15	0.0	1.9E-08	
10	2009	12	14	5	57.00	222000	19.0	95	95	72.90	7.70	13.85	7.20	89.55	6.40	5.9	1.7E-08	
11	2009	12	14	8	38.00	9660	20.0	95	95	73.80	0.90	14.15	0.30	89.30	0.25	9.1	1.7E-08	
12	2009	12	14	10	39.00	7260	21.0	95	95	74.80	1.00	14.35	0.20	89.15	0.15	14.3	1.4E-08	
13	2009	12	14	12	35.00	6960	21.0	95	95	75.05	0.25	14.50	0.15	89.00	0.15	0.0	1.2E-08	
14	2009	12	14	14	35.00	7200	20.0	95	95	74.00	-1.05	14.75	0.25	88.75	0.25	0.0	2.1E-08	
15	2009	12	15	5	33.00	53880	19.0	95	95	74.50	0.50	16.20	1.45	87.35	1.40	1.8	1.7E-08	
16	2009	12	15	7	37.00	7440	20.0	95	95	75.10	0.60	16.40	0.20	87.20	0.15	14.3	1.5E-08	
17	2009	12	15	9	46.00	7740	21.0	95	95	76.10	1.00	16.60	0.20	87.10	0.10	33.3	1.2E-08	
18	2009	12	15	11	35.00	6540	19.0	95	95	74.80	-1.30	16.75	0.15	86.90	0.20	-14.3	1.7E-08	
19	2009	12	15	13	33.00	7080	21.0	95	95	76.20	1.40	17.00	0.25	86.75	0.15	25.0	1.7E-08	
20	2009	12	15	15	43.00	7800	19.0	95	95	75.20	-1.00	17.15	0.15	86.60	0.15	0.0	1.3E-08	
21	2009	12	16	5	56.00	51180	19.0	95	95	75.70	0.50	18.40	1.25	85.35	1.25	0.0	1.6E-08	
22	2009	12	16	7	55.00	0.0	95	95	74.80		17.20		94.75					
23	2009	12	16	10	1.00	7560	21.0	95	95	77.30	2.50	16.40	-0.80	93.45	1.30	-120.0	1.8E-08	
24	2009	12	16	12	1.00	7200	19.0	95	95	76.50	-0.80	16.55	0.15	93.25	0.20	-14.3	1.4E-08	
25	2009	12	16	14	1.00	7200	21.0	95	95	77.80	1.30	16.75	0.20	93.10	0.15	14.3	1.4E-08	
26	2009	12	16	16	2.00	7260	19.0	95	95	76.50	-1.30	16.90	0.15	92.90	0.20	-14.3	1.4E-08	

**A zero in this column starts a series of measurements.
(Termination determined by stable Kv and low flow differential.)

*Average Kv for those rows with a 1 in the Ave. column.

***Kv adjusted for temperature.

RMT, Inc.														QC: <i>DN</i>																																																	
Falling Head Permeability Test (ASTM D5084)														QA: <i>DN</i>																																																	
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Visual Descript: Lean clay with sand																																																															
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	Date	Time	Run	Temp	Pressure (psi)			Cham.		Bot.		Top	Flow	Kv ***	Ave.*																																																
	Yr.	Mo.	Day	Hr.	Min.	Time	C°**	Bot	Top	Cham	Dif.	Bot	Dif.	Top	Dif.	Dif. %	cm/sec	0.1																																													
1	2009	12	16	16	2.00		0.0	95	95	76.50		16.90		92.90																																																	
2	2009	12	17	7	41.00	56340	19.0	95	95	77.60	1.10	18.40	1.50	91.45	1.45	1.7	1.6E-08																																														
3	2009	12	17	9	44.00	7380	19.0	95	95	77.90	0.30	18.65	0.25	91.30	0.15	25.0	1.7E-08																																														
4	2009	12	17	11	42.00	7080	19.0	95	95	77.90	0.00	18.80	0.15	91.20	0.10	20.0	1.1E-08																																														
5	2009	12	17	13	42.00	7200	19.0	95	95	78.10	0.20	19.05	0.25	91.00	0.20	11.1	2.0E-08																																														
6	2009	12	17	15	42.00	7200	19.0	95	95	78.20	0.10	19.20	0.15	90.80	0.20	-14.3	1.5E-08																																														
7	2009	12	18	7	36.00	57240	19.0	95	95	79.20	1.00	20.65	1.45	89.50	1.30	5.5	1.6E-08	1																																													
8	2009	12	18	9	36.00	7200	19.0	95	95	79.40	0.20	20.85	0.20	89.30	0.20	0.0	1.8E-08	1																																													
9	2009	12	18	11	36.00	7200	19.0	95	95	79.50	0.10	21.05	0.20	89.15	0.15	14.3	1.6E-08	1																																													
10	2009	12	18	13	37.00	7260	20.0	95	95	79.90	0.40	21.20	0.15	89.05	0.10	20.0	1.1E-08	1																																													
11	2009	12	18	16	4.00	8820	20.0	95	95	79.80	-0.10	21.40	0.20	88.85	0.20	0.0	1.5E-08	1																																													
12	2009	12	21	6	7.00	223380	19.0	95	95	82.80	3.00	26.35	4.95	84.30	4.55	4.2	1.5E-08	1																																													
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**A zero in this column starts a series of measurements.

*Average Kv for those rows with a 1 in the Ave. column.

1.5E-08 cm/sec

(Termination determined by stable Kv and low flow differential.)

***Kv adjusted for temperature.

Technical Memorandum

Appendix C

MDEQ Hydrologic Studies Unit Memo

US EPA ARCHIVE DOCUMENT

This reply is being sent via email only.

We have estimated the low flow discharges requested in your email of March 27, 2012 (Process No.7921), as follows:

River Raisin North Of Abandoned Blood Road, SW ¼ of the SE ¼ of Section 34, T5S, R4E, Tecumseh Township, Lenawee County, has a drainage area of 259 square miles. The lowest 95% and 50% exceedance, the Harmonic Mean and 90-day once in 10-year flow (90Q10) are estimated to be 19 cubic feet per second (cfs), 52 cfs, 92 cfs, and 36 cfs, respectively.

If you have any questions, please contact Mr. Marlio Lesmez, Water Resources Division, Hydrologic Studies Unit, at 517-335-3173, or by e-mail at: lesmezm@michigan.gov.

Sincerely,

Byron P. Lane, P.E., Chief
Hydrologic Studies Unit
Water Resources Division
517-241-9862

MWL

cc: , MDEQ (W-27-NW)

Attachment 3

First and Second Quarter 2013 Groundwater Investigation and Compliance Monitoring Activities

Attachment 4

Remedial Investigation and Groundwater Environmental Indicator Report