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December 18, 2012

Mr. John Feeney
Hydrogeologist
Wisconsin Department of Natural Resources
1155 Pilgrim Road
Plymouth, Wisconsin 53073

Subject: Closure Status Report
Tecumseh Products Company – Grafton, Wisconsin
BRRTS # 02-46-0000751

Dear Mr. Feeney:

TRC Environmental Corporation (TRC), on behalf of Tecumseh Products Company (Tecumseh), has enclosed a Closure Status Report for the Tecumseh site in Grafton, Wisconsin. In March 2010, Tecumseh requested closure for the site from the WDNR. The WDNR responded to this request with specific recommendations and requirements to achieve closure under NR 726. Tecumseh completed additional remediation and monitoring at the site, and has documented these activities in the enclosed report. **We request that you review the report, discuss the findings and conclusions with the Closure Committee, and respond with a letter of concurrence for each item listed in Section 5.4 of the report.**

Please feel free to contact me at 608-826-3661 if you have any questions.

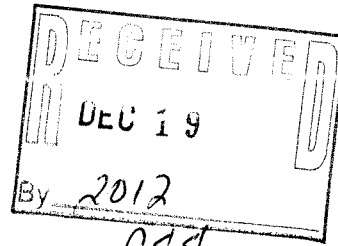
Sincerely,

TRC Environmental Corporation

Thomas Stolzenburg
Thomas R. Stolzenburg, PhD
Senior Project Manager

Enclosure Closure Status Report

cc: Jason Smith – Tecumseh Products Company
Alyssa Sellwood – TRC
John Rice – TRC
Sam Corson – Greenberg Traurig, LLC



*Sent email asking to
submit review fee to
Jacky JMF - 12/19/12*



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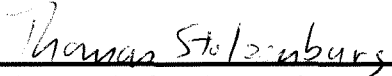
Closure Status Report

Tecumseh
Grafton, Wisconsin


BRRTS #02-46-0000751

December 2012


*Prepared For
Tecumseh Products Company*



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Section 1

Introduction

1.1 Background

Tecumseh Products Company (Tecumseh) formerly operated a manufacturing facility located at 900 North Street, in Grafton, Wisconsin (Figure 1). The facility has been vacant since 2009, except for a small portion of the northern warehouse that was leased to Maysteel starting December 2011 for dry warehousing. The facility is currently for sale.

In March 2010, Tecumseh requested closure from the Wisconsin Department of Natural Resources (WDNR) for the chlorinated volatile organic compound (CVOC) impacts to soil and groundwater associated with the facility. The WDNR replied with recommendations and requirements for the site in a letter dated September 27, 2010 (Appendix A).

Tecumseh addressed the WDNR's comments in a report dated October 2010. Further, in order to reduce regulatory uncertainty and better position the property for purchase by a new owner, Tecumseh proposed additional remediation and performance goals for the site, in exchange for the WDNR's commitment to no further action for the on-site groundwater if the performance goals were achieved (see WDNR's letter dated January 7, 2011, Appendix A).

The actions, goals/requirements, and commitments established for the site to achieve regulatory closure are summarized below. In each case the goals and commitments are consistent with the closure requirements set forth in NR 726.

■ On-Site Groundwater:

- Action: Complete additional remediation near MW-9, MW-9D, MW-12, and MW-25, and complete two years of performance groundwater monitoring.
- Goal: Achieve 50 percent reduction in the concentrations in groundwater in MW-9, MW-9D, and MW-12, and 25 percent reductions in concentrations in groundwater in MW-25 as compared to baseline concentrations measured in October 2010 prior to remediation.
- Commitment: WDNR to require no further action or monitoring for the on-site groundwater (except bedrock wells listed below).

■ On-Site Soil

- Requirement: Complete additional investigation, and remediation as needed, to address the residual impacts to soil below the foundation of the building if the foundation is removed.

- Action: Finalize a cap maintenance plan for the property, which will require that the foundation and pavement (“cap”) remain intact and that soil below the cap be sampled and properly managed if the cap is removed.
 - Commitment: WDNR to approve no further action for on-site soil based on the contingency that soils are investigated and properly managed if foundation is removed.
- Groundwater in Bedrock
 - Action: Complete groundwater monitoring for the bedrock wells MW-13BR2 and MW-13BR3, MW-18BR-1, MW-18BR-2 and MW-19BR-1.
 - Goal: Demonstrate stable to decreasing trends in the CVOC concentrations in these bedrock wells.
 - Commitment: WDNR to approve closure for the BRRTS # 02-46-000075 (assuming previous two goals for on-site soil and groundwater are met).

1.2 Purpose and Scope

Tecumseh has completed additional on-site remediation, on-site and off-site groundwater monitoring, and a draft cap maintenance plan for the property. The purpose of the report is to document these activities, request concurrence to our recommendations for the site.

This report contains the following:

- Documentation of the remedial actions and groundwater monitoring completed since 2010.
- Cap maintenance plan.
- Recommendations based on the current status of the on-site groundwater, on-site soil, and groundwater in bedrock.

Section 2

Remediation Documentation

2.1 Remedial Objectives and Approach

Between 2000 and 2007, Tecumseh completed remedial actions to address CVOC impacts in the three source areas at the site. *In situ* reductive dechlorination was completed in the West Dock and Recycling Dock Areas, and *ex situ* treatment was completed in the East Parking Lot Area. Both remedies were successful and significantly reduced the mass of CVOCs in the source areas. However, elevated concentrations of trichloroethene (TCE) remained in the shallow groundwater in several wells on the property (MW-9, MW-9D, MW-12, and MW-25) (Figure 2).

In order to approve the site for closure, WDNR required improvement in the groundwater quality in these shallow wells, and Tecumseh developed an action plan to remediate the shallow TCE impacts that remained on-site. As stated previously, the specific goals established with the WDNR include:

- Achieve 50 percent reduction in the concentration of TCE in groundwater in MW-9, MW-9D, and MW-12 as compared to baseline concentrations (October 2010).
- Achieve 25 percent reduction in concentration of TCE in groundwater in MW-25 as compared to baseline concentrations (October 2010).

Tecumseh selected to implement *in situ* enhanced reductive dechlorination to achieve the targeted remediation goals for the shallow groundwater, based on the successful application of this treatment technology previously completed at the site.

2.2 Groundwater Injections – MW-9/9D, MW-12, and MW-25

2.2.1 Summary of ABC+®

Anaerobic Biochem Plus (ABC+®) is patented by Redox Tech, LLC (Redox Tech), and contains a mixture of soluble lactic acids, fatty acids, a phosphate buffer, and zero valent iron (ZVI). The ZVI provides immediate reduction in the oxidation reduction potential in the injection zone, and the other components support bacterial growth and anaerobic bioremediation of CVOCs. The ABC+ is injected into the subsurface in suspension/solution.

2.2.2 January 2011 Field Summary

Between January 24 and 31, 2011 TRC Environmental Corporation (TRC) was on-site to oversee Redox Tech inject ABC+® into the subsurface in the three target treatment areas shown on Figure 3 (MW-9/9D, MW-12, and MW-25). The ABC+® was injected via temporary points through Geoprobe drill rods, and each point was abandoned following the injection.

1/2011
A summary of the injection is included in Appendix B, and photographs of the injection are included in Appendix C. In general, the injection included 33 injection points southwest of MW-9/9D, seven injection points southwest of MW-12, and ten injection points south and west of MW-25. The ABC+® was injected into the unconsolidated saturated zone in each point, and into the capillary fringe zone in the points associated with MW-9/9D and MW-12.

2.2.3 August 2011 Field Summary

Performance groundwater monitoring was completed following the January injection, and the results indicated that the ABC+® did not reach MW-12. TRC concluded that an intervening storm sewer corridor may have caused the ABC+® to be redirected around the treatment zone. As a result, Tecumseh elected to install additional injections on the northwest side of MW-12 to complete the remediation in this area.

Between August 15 and 17, 2011, TRC was on site to oversee Redox Tech inject ABC+® into the subsurface to the northwest of MW-12 as shown on Figure 3. A summary of this injection is included in Appendix B. In general, the injection included 15 injection points. The ABC+® was injected into the unconsolidated saturated zone in each point, and into the vadose zone in four points near MW-12.

2.3 MW-9 Polishing Step and Sewer Repair

2.3.1 Basis for Polishing Step

Performance monitoring completed following the January injection indicated that surface water had flushed through the area near MW-9. A storm sewer runs east/west approximately 10 to 15 feet south of MW-9/9D, and evaluation of the groundwater geochemistry led TRC to conclude that surface water was affecting the groundwater quality in MW-9 and had potentially flushed a portion of the ABC+® out of the shallow groundwater in this area (flushing had not affected the deeper groundwater near MW-9D, and was assumed to have had minimal effect on groundwater within the injection field to the south of the sewer). Based on this evaluation, Tecumseh elected to

complete an additional remediation polishing step in the shallow groundwater near MW-9 and to locate and replace the leaking storm sewer to mitigate a potential flushing event in the future in this area.

2.3.2 Summary of Daramend®

The polishing step included placement of the treatment chemical Daramend® into the shallow groundwater zone to provide additional treatment. Daramend® is a proprietary technology available through Adventus Remediation Technologies. Daramend® integrates controlled-release carbon (organic amendment particles) and ZVI to create a reducing environment and to promote bacterial growth supporting reductive dechlorination of CVOCs. Daramend® is mixed as a solid *in situ* into the targeted treatment area.

Daramend® was chosen for the polishing step because it is placed into the subsurface in the solid phase, and has lower potential to be removed by a flushing event if one were to occur in the future. In addition, the Daramend® can be placed to provide direct remediation of the shallow groundwater. As stated above, the deeper groundwater (25 to 30 feet below ground surface) was not affected by potential flushing, and did not require additional treatment in the polishing step.

2.3.3 March 2012 Field Summary

Between March 12 and 15, 2012 TRC was on site to oversee Veolia Environmental Services, Inc. (Veolia) complete the *in situ* mixing of Daramend® into the subsurface and implement storm sewer repair by constructing a seepage collar and installing a new storm sewer pipe adjacent to MW-9 to mitigate potential for flushing of surface water in this area in the future. Photographs of the *in situ* mixing are included in Appendix C, and the location of the mixing and sewer repair are shown on Figure 3.

Veolia mixed 4 tons of Daramend® using a backhoe into the top 5 feet of saturated material (depth of 11 to 16 feet bgs) along a trench constructed approximately 15 feet to the west of MW-9 and extending approximately 25 feet to the north and 25 feet to the south of MW-9. The placement of the solid material at this location was designed to provide direct treatment to the shallow groundwater, and act as a reactive zone to promote reductive dechlorination for future groundwater flow through the area.

Veolia also removed a 60-foot section of the storm sewer and replaced it with a new 60-foot section of 8-inch-diameter sewer pipe. The new sewer pipe was attached to the original clay pipe to the west near the building and the clay pipe connection to the

manhole to the east of MW-9. In addition, Veolia constructed a low-permeability seepage collar approximately 50 feet to the west of MW-9. The seepage collar consisted of a 1.5-foot box of granular bentonite placed around the sewer pipe to limit flow of water through the backfill in this area.

The material temporarily removed during construction of the sewer and trench was replaced by Veolia on March 15, 2012 to bring the excavations to grade, and the asphalt pavement in the disturbed areas was restored at a later date by Merit Asphalt.

Section 3

Groundwater Monitoring

Tecumseh has continued with the semi-annual groundwater monitoring program at the site following the March 2010 closure request.

3.1 Groundwater Monitoring Program

The groundwater monitoring program consists of the following wells shown on Figure 4:

- Eight On-site Shallow Wells: MW-3, -3D, -9, -9D, -12, -24R, -25, and -26
- One Off-site Shallow Well: MW-27
- Seven On-site Bedrock Wells: MW-3BR1, -3BR2, -3BR3, -12BR, -13BR2, -13BR3, and -22BR
- Seven Off-site Bedrock Wells: MW-14BR, -18BR1, -18BR2, -19BR1, -19BR2, -20BR1, -20BR2

TRC collected groundwater samples from these wells each spring and fall between 2010 and 2012 (six total rounds). The samples were collected using low-flow sampling and the groundwater samples were analyzed in the field for pH, dissolved oxygen (DO), oxidation reduction potential (ORP), temperature, and specific conductance. Samples were submitted to Pace Analytical (Pace) for laboratory analysis for VOCs, dissolved nitrate, dissolved manganese, dissolved iron, dissolved sulfate, chloride, and total organic carbon (TOC). The laboratory reports from the six semi-annual sampling events are included in Appendix D.

3.2 Groundwater Monitoring Results

The results from the groundwater monitoring are summarized in Tables 1 and 2, and trend plots for the CVOC concentrations are included in Appendix E. In addition, the extent of the TCE plume is shown on Figure 4.

The results of the monitoring are broken into three sections based on the criteria for closure that was established for the site: on-site performance monitoring; bedrock plume monitoring; and all other wells. The discussions presented below focus primarily on TCE. The CVOC 1,1,1-trichloroethane (TCA) is also present in the groundwater, but it attenuates rapidly and there are currently no NR 140 ES exceedences for 1,1,1-TCA on site or in the downgradient bedrock.

3.2.1 On-Site Performance Monitoring

The groundwater samples collected from four shallow on-site wells MW-9, MW-9D, MW-12, and MW-25 have been evaluated with respect to the remediation goals established for the site. The concentrations detected in the samples collected in October 2010, prior to the *in situ* treatment, are used as the baseline concentrations from which to calculate the percent reduction in concentration. A summary of the percent reductions in concentration in each well as compared to the baseline concentrations is listed in the table below.

WELL	PERFORMANCE GOAL % REDUCTION	TCE CONCENTRATION (µg/L)		PERCENT REDUCTION	
		OCTOBER 2010	OCTOBER 2012	AVERAGE	LAST ROUND (OCT 2012)
MW-9	50%	881	96.9	83%	89%
MW-9D	50%	766	1.6	96%	99.8%
MW-12	50%	354	2.1	84%	99%
MW-25	25%	4,380	3.7	99%	99.9%

The targeted reductions in concentration were achieved (and significantly exceeded) in each well. In each case, reducing conditions were enhanced in the groundwater following treatment, and a decrease in the concentration of TCE was matched by increases in the concentration of daughter products (cis-1,2-dichloroethene [DCE] and vinyl chloride). These patterns show that the mass of TCE was reduced by reductive dechlorination in response to the remedial actions completed at the site. The reduction in mass is also shown on Figure 4 (i.e. the shallow groundwater with concentrations of TCE over 1,000 µg/L has been eliminated in the on-site groundwater following the additional remediation).

3.2.2 Bedrock Plume Monitoring

In general, the plume of CVOCs in bedrock has been stable to decreasing in extent. However, of the fourteen bedrock wells monitored for the site, five individual wells had fluctuating concentrations of TCE at the time of the closure request (MW-13BR2, MW-13BR3, MW-18BR1, MW-18BR2 and MW-19BR1). We have evaluated the bedrock plume using all fourteen sampled bedrock wells in order to maintain an understanding of the overall plume dynamics, but attention is focused on the five specific wells listed above that were of concern to the WDNR with respect to closure.

As shown on Figure 4, the TCE plume within the bedrock is stable in extent. Sentinel wells MW-20BR1 and MW-20BR2, which are east of the Milwaukee River, continue to have no detectable concentrations of CVOCs. In addition, downgradient well MW-14BR

which is on the north edge of the plume, continues to have stable concentrations below the NR 140 ESs.

The upgradient bedrock wells on the property (MW-3BR1, MW-3BR2, MW-3BR3, MW-12, MW-13BR2, MW-13BR3, and MW-22) have had stable to decreasing concentrations of TCE between 2010 and 2012, and indicators supporting reductive dechlorination were apparent in the wells MW-3BR2, MW-3BR3, and MW-12BR (strong reducing environment with decrease in TCE and increase in daughter products). These trends may be reflective of the source area remediation efforts that have been completed on the property.

The downgradient bedrock wells off the property (MW-18BR1, MW-18BR2, MW-19BR1, and MW-19BR2), which are within the center of the plume, have shown consistent patterns in concentrations of TCE since 2007 when TRC took over the groundwater monitoring for the site and initiated low-flow sampling. Please note that abrupt changes in measured concentrations for these wells occurred in 2007. These changes are likely an artifact of the change in consultants and sampling method, and are not representative of a change in the groundwater quality in these wells. Therefore, our evaluation in trends for these wells focuses on the time period starting in 2007.

Wells MW-18BR1, MW-18BR2, and MW-19BR1 continue to show elevated concentrations of TCE, with the highest concentration present in MW-19BR1 (333 µg/L). The concentration of TCE in these three wells has fluctuated since 2007, but no significant increases in concentration have been observed. The deeper downgradient well MW-19BR2 continues to have low to non-detectable concentrations of TCE and its daughter products, and the concentration of all constituents in MW-19BR2 are currently below NR 140 ESs.

The conceptual model previously presented for the site is supported by the current data. The extent of the groundwater plume is controlled and intercepted by the Milwaukee River. The impacts become shallower closure to the Milwaukee River and no impacts are detected downgradient from the River.

To reiterate the discussion for the five bedrock wells of interest to the WDNR (MW-13BR2, MW-13BR3, MW-18BR1, MW-18BR2, and MW-19BR1), the downgradient wells (MW-18BR1, MW-18BR2, and MW-19BR1) continue to show elevated concentrations of TCE. Because of the lateral and vertical distance from the former source area to these off-site wells, the measured concentrations of CVOCs are not expected to change significantly in the near future and they will continue to fluctuate

around historical levels as they have since 2007. The on-site wells MW-13R2 and MW-13BR3 have stable to decreasing concentrations. These trends are reflective of the fact that these well are closer to the former source area that has been remediated, and the stable to decreasing trends are expected to continue as a result of the remedial actions that have been completed on-site.

3.2.3 Other Well Monitoring

The groundwater samples from the four remaining wells on the property (MW-3, -3D, -24R, and -26) and shallow downgradient well M-27 have historically had stable to decreasing concentrations and were not of concern to the WDNR with respect to satisfying closure.

The on-site shallow wells MW-3, MW-3D, MW-24R, and MW-26 maintained stable and low concentrations for CVOCs in the samples collected between 2010 and 2012. With the exception of MW-26, concentrations of detected CVOCs were below their respective NR 140 Enforcement Standards in each of the wells. In addition, no CVOCs were detected in the shallow off-site well MW-27, which is downgradient from MW-9. These results are consistent with the concentrations and trends presented in the initial closure request in 2010, and continue to satisfy the requirements need to achieve closure.

Section 4

Cap Maintenance Plan

As discussed in Section 1, the WDNR requires as a condition for approval of closure of the site that soil below the foundation of the building be investigated and properly managed if and when the foundation is removed. Therefore, we have prepared a cap maintenance plan for the site to ensure that Tecumseh and future property owners(s) maintain the existing foundation and pavement to prevent direct contact and minimize water infiltration, and that they properly investigate and manage the subgrade soil if and when the pavement and/or foundation of the building are removed.

The draft cap maintenance plan is included in Appendix F. Tecumseh is requesting that the WDNR review the cap maintenance plan and provide written concurrence for the plan, such that an approved plan is in place for property prior to final closure, and be available for future property transactions, should they occur.

Section 5

Conclusions and Recommendations

Tecumseh has completed additional remediation and monitoring at the site to prepare the site for closure. A summary of the conclusions and recommendations for the three main closure criteria established by the WDNR for this site are presented below.

5.1 On-Site Groundwater

5.1.1 Conclusions

Tecumseh completed *in situ* enhanced bioremediation to provide additional treatment to the shallow groundwater on-site and address the elevated concentrations of TCE that persisted near MW-9/9D, MW-12, and MW-25. The remediation was successful in reducing the mass of TCE in the shallow on-site groundwater, and the remediation goals were met (and significantly exceeded) in each of the wells. The achieved average reductions in the concentration of TCE ranged between 83 and 99 percent in each of the wells following the remediation, as compared to the goal of 25 percent reduction in MW-25 and 50 percent reduction in MW-9/9D and MW-12.

5.1.2 Recommendations

Because the remediation goals for the shallow on-site groundwater have been achieved, we recommend that no further action or monitoring be required for the shallow groundwater on-site.

In addition, we recommend that all the shallow groundwater monitoring wells be abandoned. The abandonment would include the list of wells presented in Table 3. The property is being positioned for purchase by a new owner. Because control will be given to a new owner and operations will occur in the facility under new ownership, it is desirable to remove the existing wells to minimize potential for damage to the wells and to allow unrestricted use of the facility above grade.

Table 1
 Summary of Chlorinated VOCs Detected in Groundwater (µg/L)
 Tecumseh Products Company - Grafton, Wisconsin

WELL I.D.	SAMPLE DATE	TCE	CIS-1,2-DCE	TRANS-1,2-DCE	VINYL CHLORIDE	1,1,1-TCA	1,1-DCA	1,1-DCE	CHLOROETHANE	
On-Site Monitoring Wells										
NR 140 Enforcement Standard		5	70	100	0.2	200	850	7	400	
NR 140 Preventive Action Limit		0.5	7	20	0.02	40	85	0.7	80	
On-Site Monitoring Wells - West Dock Area										
MW-25	4/30/2008	354	4.7 J	<4.4	<0.9	<4.5	<3.8	<2.8	<4.8	
	10/8/2008	3,770	534	<22.2	48.3	<22.5	<18.8	<14.2	<24.2	
	4/20/2009	324	5.1	<1.8	<0.36	<1.8	<1.5	<1.1	<1.9	
	10/5/2009	4460	618	41.1	<4.5	<22.5	<18.8	<14.2	<24.2	
	5/19/2010	284	3.9	<1.8	<0.36	<1.8	<1.5	<1.1	<1.9	
	10/21/2010	4380	612	<44.5	54.3	<45	<37.5	<28.5	<48.5	
	4/12/2011	125	587	<4.4	17.3	<4.5	<3.8	<2.8	<4.8	
	10/13/2011	5.3	205	<4.4	224	<4.5	<3.8	<2.8	<4.8	
	5/22/2012	15.5	341	5.5	272	<1.8	<1.5	<1.1	<1.9	
10/25/2012	3.7 J	429	4.9 J	412	<4.5	<3.8	3.2 J	<4.8		
MW-26	4/30/2008	39.5	345	2.8 J	210	<2.2	7.3	3.3 J	10	
	10/8/2008	44.3	721	39	148	4.9 J	25.2	<2.8	13.6 J	
	4/20/2009	33.5	597	13.3	183	4.7 J	21.1	5.6	10.1	
	10/5/2009	34.0	868	19.7	238	6.1	29.2	<2.8	<4.8	
	5/19/2010	17.7	517	17.0	189	<4.5	14.4	4.1 J	5.8	
	10/21/2010	32.8	756	12.5	144	6.4	24.3	5.3	<4.8	
	4/12/2011	5.1	1130	25.3	401	<4.5	24.7	7.4	43.0	
	10/13/2011	27.9	702	21.8 L1	180	5.4	23.9	4.9 J	11.2	
	5/22/2012	18.0	744	15.2	190	<4.5	16.0	5.6	11.4	
10/25/2012	59.6	967	12.4	233	<9	24.6	7.3 J	28.5		
Eastern Property Line Wells - Recycling Dock Area										
MW-24R	4/28/2008	1.2 J	<0.83	<0.89	0.52 J	<0.9	12.7	<0.57	75.8	
	10/7/2008	1.8	1.5 J	<0.89	0.63	<0.9	1.1 J	<0.57	7.7	
	4/22/2009	0.61 J	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97	
	10/7/2009	1.0	<0.83	1.3	0.41 J	<0.9	9.0	<0.57	70.5	
	5/18/2010	0.60 J	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97	
	10/20/2010	<0.48	<0.83	<0.89	0.71 J	<0.9	3.0	<0.57	22.1	
	4/11/2011	5.4	<0.83	0.99 J	<0.18	<0.9	12.7	<0.57	72.4	
	10/12/2011	0.71 J	1.5	<0.89	1.0	<0.9	0.83 J	<0.57	2.1	
	5/21/2012	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97	
10/24/2012	0.63 J	1.5	<0.89	2.5	<0.9	3.6	<0.57	6.4		
MW-3	4/28/2008	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97	
	10/8/2008	Dry								
	4/20/2009	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97	
	10/5/2009	Dry								
	5/18/2010	0.87 J	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97	
	10/20/2010	Dry								
	4/11/2011	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97	
	10/11/2011	Not Sampled								
	5/21/2012	1.7	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97	
10/25/2012	Not Sampled									
MW-3D	4/28/2008	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97	
	10/8/2008	<0.48	<0.83	<0.89	<0.18	<0.9	4.5	<0.57	<0.97	
	4/20/2009	<0.48	<0.83	<0.89	0.32 J	<0.9	<0.75	<0.57	15.8	
	10/7/2009	<0.48	<0.83	<0.89	<0.18	<0.9	1.6	<0.57	<0.97	
	5/18/2010	<0.48	<0.83	<0.89	0.52 J	<0.9	<0.75	<0.57	24.5	
	10/20/2010	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97	
	4/11/2011	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97	
	10/11/2011	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97	
	5/21/2012	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97	
10/24/2012	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97		

Table 1
 Summary of Chlorinated VOCs Detected in Groundwater (µg/L)
 Tecumseh Products Company - Grafton, Wisconsin

WELL I.D.	SAMPLE DATE	TCE	CIS-1,2-DCE	TRANS-1,2-DCE	VINYL CHLORIDE	1,1,1-TCA	1,1-DCA	1,1-DCE	CHLORO-ETHANE	
On-Site Monitoring Wells										
NR 140 Enforcement Standard		5	70	100	0.2	200	850	7	400	
NR 140 Preventive Action Limit		0.5	7	20	0.02	40	85	0.7	80	
Eastern Property Line Wells - Recycling Dock Area										
MW-3BR1	4/29/2008	102	18.5	<0.89	1.2	36.4	27.1	10.7	<0.97	
	10/7/2008	104	18	<0.89	1.3	51	28.1	11.1	<0.97	
	4/21/2009	133	19.8	<0.89	1.5	44.5	26	11.7	<0.97	
	10/6/2009	96.3	18.9	<0.89	1.5	37.3	24.3	9.5	<0.97	
	5/19/2010	124	19.8	<0.89	1.8	24.9	23.5	11.2	<0.97	
	10/22/2010	97.9	16.7	<0.89	1.5	49.5	22.2	12.3	<0.97	
	4/12/2011	117	19.1	<0.89	1.7	37.1	21.7	11.8	<0.97	
	10/13/2011	115	20.4	<0.89	1.8	71.5	26.4	13.6	<0.97	
	5/22/2012	122	16.7	<0.89	1.6	60.9	20.4	12.4	<0.97	
10/24/2012	Not Sampled									
MW-3BR2	4/29/2008	170	47.7	<0.89	2	3.9	12.6	1.6 J	<0.97	
	10/7/2008	216	45.3	1.9 J	2.1	5.7	17.9	2.4	<0.97	
	4/21/2009	172	36.3	<0.89	2.2	6.6	18.8	2.6	<0.97	
	10/6/2009	111	27.8	<1.8	2.1	5.7	21.2	1.7 J	<1.9	
	5/19/2010	105	31.4	2.5	2.3	4.8	17.4	<1.1	<1.9	
	10/22/2010	153	35.4	<0.89	2.2	7.4	18.6	2.8	<0.97	
	4/12/2011	117	33.8	<0.89	2.5	5.0	13.0	2.5	<0.97	
	10/13/2011	38.3	118	1.4 L1	2.2	2.2	16.3	2.1	<0.97	
	5/22/2012	16.0	61.8	<0.89	13.4	1.0	7.3	0.82 J	<0.97	
10/25/2012	5.1	14.4	<0.89	22.0	1.2	17.8	<0.57	<0.97		
MW-3BR3	4/28/2008	Not Sampled								
	10/7/2008	222	61	8.3	3.9	7.1 J	28	2.5 J	<2.4	
	4/21/2009	247	65.7	2	5.1	6.7	29.5	5.6	<1.9	
	10/6/2009	195	56.3	2.6	3.4	4.9	24.1	2.9	<1.9	
	5/19/2010	225	55.2	<1.8	4.3	3.6	25.6	5.2	<1.9	
	10/22/2010	216	45.8	2.8	3.2	3.9	23.9	2.1	<1.9	
	4/12/2011	197	49.2	<1.8	4.1	3.1	25.1	3.9	<1.9	
	10/13/2011	211	50.8	5.9 L1	3.4	3.1	31.7	1.4 J	<1.9	
	10/25/2012	173	74.4	<0.89	15.3	2.2	28.6	4.6	<0.97	
Eastern Property Line Wells										
MW-9	4/28/2008	992	1,010	<0.89	<1.8	211	94.8	16.1 J	<9.7	
	10/9/2008	1,200	819	9.8 J	<1.8	225	45.3	21.1	<9.7	
	4/21/2009	429	310	7.5	<0.45	85.4	27.4	4.2	<2.4	
	10/5/2009	1090	573	12.3	<1.8	153	46.9	<5.7	<9.7	
	5/18/2010	687	510	13.7	<1.8	74.0	36.2	5.7 J	<9.7	
	10/20/2010	881	370	10.3	<1.8	82.2	19.7	<5.7	<9.7	
	4/11/2011	31.0	2.4	<0.89	<0.18	14.3	2.0	<0.57	<0.97	
	10/11/2011	470	550	<8.9	5.1 J	57.1	46.7	9.0 J	<9.7	
	1/10/2012	871	941	21.0	14.7	73.0	53.0	<5.7	<9.7	
	5/21/2012	9.3	4.2	<0.89	2.4	21.9	1.1	<0.57	<0.97	
10/24/2012	96.9	83.1	7.0	29.7	68.8	42.3	0.95 J	31.6		
MW-9D	4/28/2008	519	89.2	<4.4	<0.9	78.9	111	11.4	<4.8	
	10/9/2008	522	149	<8.9	10.6	59.1	130	6.3 J	<9.7	
	4/21/2009	801	191	6.3	10.8	55.2	159	15.3	<4.8	
	10/5/2009	1680	374	27.7	16.7	68.5	73.9	6.4	<4.8	
	5/18/2010	837	127	<4.4	6.4	69.4	146	21.0	<4.8	
	10/20/2010	766	137	16.2	10.3	93.9	116	5.9	<4.8	
	4/11/2011	76.1	430	<4.4	4.5 J	29.4	90.0	7.7	<4.8	
	10/11/2011	16.6	376	4.8 J	56.7	33.0	133	6.4	<4.8	
	1/10/2012	44.8	319	5.3	45.2	29.8	93.0	11.4	<4.8	
	5/21/2012	30.0	51.6	<4.4	27.6	227	646	27.7	<4.8	
10/24/2012	1.6	1.1	<0.89	1.7	8.1	80.0	<0.57	44.7		

Table 1
 Summary of Chlorinated VOCs Detected in Groundwater (µg/L)
 Tecumseh Products Company - Grafton, Wisconsin

WELL I.D.	SAMPLE DATE	TCE	CIS-1,2-DCE	TRANS-1,2-DCE	VINYL CHLORIDE	1,1,1-TCA	1,1-DCA	1,1-DCE	CHLORO-ETHANE
On-Site Monitoring Wells									
NR 140 Enforcement Standard		5	70	100	0.2	200	850	7	400
NR 140 Preventive Action Limit		0.5	7	20	0.02	40	85	0.7	80
Eastern Property Line Wells									
MW-12	4/28/2008	303	4.2 J	<4.4	<0.9	<4.5	<3.8	<2.8	<4.8
	10/9/2008	778	8.3 J	<8.9	<1.8	24.6 J	<7.5	<0.57	<9.7
	4/21/2009	618	<0.83	<0.89	<1.8	22.5	<7.5	<0.57	<9.7
	10/5/2009	618	15.9	<2.2	<0.45	23.6	5.9	<1.4	<2.4
	5/18/2010	215	3.1	<2.2	<0.45	6.0	<1.9	<1.4	<2.4
	10/20/2010	354	6.5	<2.2	1.5 J	16.6	2.4 J	<1.4	<2.4
	4/11/2011	186	4.2	<2.2	<0.45	5.7	<1.9	<1.4	<2.4
	7/22/2011	503	7.7	<1.8	<0.36	7.0	1.8 J	<1.1	<1.9
	10/11/2011	35.9	447	2.3 J	2.5	8.3	3.8	1.7 J	<2.4
	5/22/2012	0.70 J	0.86 J	<0.89	18.7	3.0	5.1	<0.57	2.1
10/25/2012	2.1	107	<0.89	187	5.4	9.0	2.0	<0.97	
MW-12BR	4/30/2008	24.6	91.8	<0.89	<0.18	24.9	38.9	4.2	<9.7
	10/8/2008	11.6	86.6	<0.89	<0.18	15	31.1	2.8	<9.7
	4/21/2009	76.8	45.9	<0.89	0.43 J	50.3	82.4	7.8	<9.7
	10/5/2009	36.6	78.0	<0.89	0.74 J	35.8	73.5	7.3	<9.7
	5/18/2010	99.8	96.1	<0.89	2.1	55.1	78.7	9.0	<0.97
	10/20/2010	10.8	168	<0.89	2.2	62.2	66.2	7.5	<0.97
	4/11/2011	0.61 J	171	1.0	<0.18	46.6	61.8	5.8	<0.97
	10/11/2012	2.2	131	<0.89	0.96 J	28.5	44.6	4.2	<0.97
	5/22/2012	2.8	10.8	<0.89	16.1	18	47.7	0.92J	<0.97
	10/24/2012	2.3	3.2	<0.89	28.7	80.6	143	2.1	<0.97
MW-13BR2	4/29/2008	311	25.5	<2.2	1.8	185	191	7.5	<2.4
	10/8/2008	265	29	<0.89	2.7	155	158	34.8	<0.97
	4/21/2009	314	28.1	<1.8	2.9	164	162	27.5	<1.9
	10/5/2009	279	28.8	<1.8	3.6	129	160	25.8	<1.9
	5/18/2010	284	24.6	<1.8	2.7	106	146	14.2	<1.9
	10/20/2010	269	21.8	2.3	1.8 J	105	128	7.2	<1.9
	4/11/2011	258	29.1	<1.8	2.3	105	177	21.4	<1.9
	10/11/2011	237	19.1	1.9 J	1.3 J	83.1	103	5.0	<1.9
	5/24/2012	286	23.0	2.3	1.8 J	80.4	140	7.4	<1.9
	10/24/2012	288	35.4	<2.2	2.6	87.2	148	23.7	<2.4
MW-13BR3	4/29/2008	149	13.4	<0.89	0.45 J	58.8	64.2	14.5	<0.97
	10/8/2008	115	13.9	<0.89	0.44 J	43.3	51.1	11.3	<0.97
	4/21/2009	149	13.8	<0.89	0.66 J	47.8	49.6	12.7	<0.97
	10/5/2009	115	12.8	<0.89	<0.18	32.4	42.6	10.2	<0.97
	5/18/2010	128	13.9	<0.89	0.74 J	29.1	42.4	11.6	<0.97
	10/20/2010	124	13.4	<0.89	0.64 J	30.7	39.2	9.4	<0.97
	4/11/2011	121	14.7	<0.89	0.71 J	27.9	41.4	9.7	<0.97
	10/11/2011	110	15.0	<0.89	0.73 J	24.1	42.3	8.2	<0.97
	5/22/2012	111	12.9	<0.89	0.67 J	20.1	37.8	9.2	<0.97
	10/24/2012	93.7	14.6	<0.89	<0.18	19.7	36.2	7.5	<0.97
MW-22BR	4/29/2008	53.2	8.8	<0.89	<0.18	<0.9	1.4 J	<0.57	<0.97
	10/8/2008	18.1	3.7	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	4/22/2009	39.5	5.4	<0.89	<0.18	<0.9	1.0	<0.57	<0.97 L
	10/7/2009	14.8	4.4	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	5/17/2010	40.6	5.8	<0.89	<0.18	<0.9	1.0	<0.57	<0.97
	10/20/2010	14.7	3.5	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	4/11/2011	51.0	7.7	<0.89	<0.18	<0.9	1.6	<0.57	<0.97
	10/12/2011	14.9	4.6	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	5/21/2012	30.6	4.5	<0.89	<0.18	<0.9	0.84 J	<0.57	<0.97
	10/24/2012	11.9	4.8	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97

Table 1
 Summary of Chlorinated VOCs Detected in Groundwater (µg/L)
 Tecumseh Products Company - Grafton, Wisconsin

WELL I.D.	SAMPLE DATE	TCE	CIS-1,2-DCE	TRANS-1,2-DCE	VINYL CHLORIDE	1,1,1-TCA	1,1-DCA	1,1-DCE	CHLORO-ETHANE
On-Site Monitoring Wells									
NR 140 Enforcement Standard		5	70	100	0.2	200	850	7	400
NR 140 Preventive Action Limit		0.5	7	20	0.02	40	85	0.7	80
Off-Site Downgradient Wells									
PW-30 (Heiser) ⁽¹⁾	4/29/2008	1.2 J	< 0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
MW-27 ⁽²⁾	7/22/2008	0.98 J	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	10/8/2008	0.53 J	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	4/22/2009	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97 L
	10/5/2009	0.55 J	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	5/17/2010	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	10/21/2010	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	4/13/2011	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	10/12/2011	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	5/21/2012	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
10/24/2012	0.59 J	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97	
MW-18BR1	4/29/2008	48	19	<0.89	<0.18	5.7	28.2	3.3	<0.97
	10/7/2008	48.6	16.9	<0.89	<0.18	5.3	25.8	3.1	<0.97
	4/22/2009	41.1	12.7	<0.89	<0.18	4.0	19.8	3.3	<0.97 L
	10/6/2009	20.4	7.4	<0.89	<0.18	2.2	11.0	1.2	<0.97
	5/17/2010	33.0	10.1	<0.89	<0.18	2.5	14.4	2.4	<0.97
	10/21/2010	35.0	11.5	<0.89	<0.18	2.6	17.4	3.0	<0.97
	4/12/2011	32.8	9.9	<0.89	<0.18	2.4	14.3	2.6	<0.97
	10/12/2011	37.7	11.5	<0.89	<0.18	2.4	16.3	2.1	<0.97
	5/22/2012	40.2	9.8	<0.89	<0.18	2.2	15.0	2.4	<0.97
10/24/2012	39.2	12.4	<0.89	<0.18	2.3	17.8	2.6	<0.97	
MW-18BR2	4/29/2008	129	63.9	1.4 J	<0.18	19.5	96.4	12.8	<0.97
	10/7/2008	146	63.4	2.8 J	<0.18	20.1	96.2	12.3	<0.97
	4/22/2009	150	60.7	1.2	<0.18	16.2	90.3	16.3	<0.97 L
	10/6/2009	124	58.4	1.4	<0.18	14.5	86.9	11.1	<0.97
	5/17/2010	168	59.6	1.3	<0.18	12.9	79.7	14.5	<0.97
	10/21/2010	154	61.3	1.2	<0.18	12.6	93.7	15.2	<0.97
	4/12/2011	151	54.1	1.0	<0.18	11.6	76.2	12.9	<0.97
	10/12/2011	159	61.2	1.1	<0.18	11.6	88.4	11.2	<0.97
	5/22/2012	167	56.2	1.5	<0.18	10.4	78.8	12.9	<0.97
10/24/2012	147	59.6	<1.8	<0.36	9.9	86.9	12.0	<1.9	
MW-14BR	4/29/2008	0.49 J	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	10/8/2008	0.48 J	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	4/22/2009	0.70 J	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97 L
	10/5/2009	0.95 J	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	5/17/2010	1.0	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	10/21/2010	0.91 J	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	4/13/2011	1.5	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	10/12/2011	1.3	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	5/21/2012	1.2	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
10/24/2012	1.3	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97	
MW-19BR1	4/29/2008	18.3	2.6 J	<0.89	<0.18	<0.9	4.2	0.093 J	<0.97
	10/7/2008	227	125	2.6 J	7.8	<0.9	120	30.5	<0.97
	4/22/2009	251	69.1	5.4	2.7 J	<4.5	95.6	5.5	<4.8 L
	10/6/2009	255	86.0	1.3	2.8	<0.9	96.5	13.7	<0.97
	5/18/2010	309	72.7	<2.2	3.1	<2.2	103	16.5	<2.4
	10/21/2010	304	75.8	2.9	2.9	<2.2	110	11.4	<2.4
	4/12/2011	302	64.8	2.7	2.9	<2.2	97.0	11.2	<2.4
	10/12/2011	279	62.9	3.9	2.3 J	<2.2	93.5	6.3	<2.4
	5/22/2012	302	59.7	3.0	2.7	<2.2	91.3	10.4	<2.4
10/24/2012	333	83.2	5.1	2.7	<2.2	110	6.7	<2.4	

Table 1
Summary of Chlorinated VOCs Detected in Groundwater (µg/L)
Tecumseh Products Company - Grafton, Wisconsin

WELL ID.	SAMPLE DATE	TCE	CIS-1,2-DCE	TRANS-1,2-DCE	VINYL CHLORIDE	1,1,1-TCA	1,1-DCA	1,1-DCE	CHLOROETHANE
On-Site Monitoring Wells									
NR 140 Enforcement Standard		5	70	100	0.2	200	850	7	400
NR 140 Preventive Action Limit		0.5	7	20	0.02	40	85	0.7	80
Off-Site Downgradient Wells									
MW-19BR2	4/28/2008	Not Sampled							
	10/7/2008	<0.48	<0.83	<0.89	0.87	<0.9	<0.75	<0.57	<0.97
	4/22/2009	2.0	<0.83	<0.89	2.1	<0.9	0.83 J	<0.57	<0.97 L
	10/6/2009	1.1	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	5/18/2010	1.3	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	10/21/2010	1.5	<0.83	<0.89	0.24 J	<0.9	<0.75	<0.57	<0.97
	4/12/2011	1.1	<0.83	<0.89	0.24 J	<0.9	<0.75	<0.57	<0.97
	10/12/2011	2.0	<0.83	<0.89	0.38 J	<0.9	<0.75	<0.57	<0.97
	5/22/2012	0.90 J	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
10/24/2012	1.1	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97	
MW-20BR1	4/29/2008	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	10/7/2008	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	4/22/2009	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97 L
	10/6/2009	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	5/17/2010	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	10/21/2010	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	4/12/2011	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	10/12/2011	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	5/22/2012	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
10/24/2012	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97	
MW-20BR2	4/29/2008	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	10/7/2008	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	4/22/2009	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97 L
	10/6/2009	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	5/17/2010	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	10/21/2010	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	4/12/2011	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	10/12/2011	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
	5/22/2012	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97
10/24/2012	<0.48	<0.83	<0.89	<0.18	<0.9	<0.75	<0.57	<0.97	

Notes:

(1) PW-30 (Heiser) was abandoned on 9/3/08.

(2) MW-27 was installed on 7/22/08.

Italicized values = constituents that exceed NR 140 Preventive Action Limits

Bolded values = constituents that exceed NR 140 Enforcement Standards.

J = concentration detected equal to or greater than the method detection limit but less than the reporting limit.

DCE = dichloroethene.

DCA = dichloroethane.

TCA = trichloroethane.

TCE = trichloroethene.

Table 2
Summary of Groundwater Field and Degradation Evaluation Parameters
Tecumseh Products Company - Grafton, Wisconsin

SAMPLE LOCATION	SAMPLE DATE	WATER LEVEL	pH	SPECIFIC CONDUCTANCE	TEMPERATURE	ORP	DISSOLVED OXYGEN	DISSOLVED NITRATE	DISSOLVED MANGANESE	DISSOLVED IRON	DISSOLVED SULFATE	CHLORIDE	TOC
UNITS		ft (MSL)		µmhos/cm	°C	mV	mg/L	mg/L	ug/L	ug/L	mg/L	mg/L	mg/L
On-Site Monitoring Wells													
MW-25	4/30/08	757.86	7.18	820	11.7	-62	0.22	< 0.085 H	60.7	< 26 H	92.4	28.2 B	< 1.4
	7/21/08	755.98											
	10/8/08	753.01	7.20	875	14.9	-80	0.57	<0.085	66.6	<26	85.6	28.4	<1.4
	4/20/09	755.59	7.26	845	10.9	39	1.36	0.18 J	61.2	0.4	91	20.2	2.6
	10/5/09	752.09	7.24	895	14.9	-34	0	<0.25	62.1	97.9	36.3		1.9 J
	5/19/10	756.92	7.20	830	12.4	-105	0.48	<0.10	67.3	0.4	82.6	24.1	1.2 J
	10/21/10	752.39	7.31	861	16.0	-76	0.82	<0.2	61.5	NM	91.0	29.6	<1
	4/12/11	NM	7.01	798	12.15	-204.1	NM	<0.2	164	2.5	56.4	35.3	10.7
	10/13/11	752.76	7.17	807	15.06	-94.3	1.61	<0.2	94.9	2.0	77.4	28.0	1.3
5/22/12	755.42	7.16	951	12.71	-99.5	0.13	<0.12 ⁽⁵⁾	96.4	NM	81.6	56.1	0.39 J	
10/25/12	751.69	7.26	873	15.87	-174.3	0.40	<0.12 ^(5,6)	76.1 ⁽⁶⁾	1.0 ⁽⁷⁾	83.2 ⁽⁶⁾	29.4 ⁽⁶⁾ MO	0.64	
MW-26	4/30/08	753.61	7.09	970	15.0	-164	0.18	< 0.085 H	83.8	< 26 H	89.8	72.6	< 1.4
	10/8/08	747.98	6.98	1,452	16.0	-183	0.96	<0.085	206	<26	92	186	3.3
	4/20/09	750.87	6.98	1,345	14.6	-58	0.35	< 0.085	203	0.1	91.1	161	3.7
	10/5/09	747.10	7.03	1414	15.4	-167	0	<0.25	238	88.1	199	NM	3.9
	5/19/10	752.49	7.02	1123	14.4	-230	3.3	<0.10	185	1	74.6	137	2.3
	10/21/10	747.56	7.09	1399	15.7	-151	1.07	<0.2	212	0.9	76.0	173	1.9 J
	4/12/11	NM	6.84	11.58	14.2	-92.7	NM	<0.2	179	0.6	32.4	148	3.2
	10/13/11	748.08	6.98	1192	15.19	-24.5	1.04	<0.2	175	0.8	56.2	134	0.62
	5/22/12	750.78	6.94	1426	14.11	-54.3	0.30	<0.12 ⁽⁵⁾	179	NM	58.0	153	0.37 J
10/25/12	747.10	7.09	1229	15.1	-129.8	0.73	<0.12 ^(5,6)	164 ⁽⁶⁾	1.0 ⁽⁷⁾	56.6 ⁽⁶⁾	117 ⁽⁶⁾	1.6	
Eastern Property Line Wells - Recycling Dock Area													
MW-24R	4/28/08	753.95	7.08	1,735	10.3	-182	0.18	< 0.085 H	189	130 H	20.5	402	6.4
	7/21/08	751.19											
	10/7/08	747.87	7.10	1,080	16.5	-165	1.48 J	<0.085	140	<26	17.6	103	6.3
	4/21/09	750.82	7.07	1,116	9.2	-54	0.43	0.17 J	148	0.8	16.8	157	3
	10/7/09	746.90	6.94	1121	15.9	-89	0.4	<0.25	151	16.3	115	NM	13.9
	5/18/10	752.62	7.23	730	12.8	-245	4.65	NM	85.3	0.8	12.8	24.4	2.8
	10/20/10	747.34	6.97	829	17.6	-200	2.52	<0.2	110	2.0	9.1	41.2	13.0
	4/11/11	NM	7.04	850	11.60	-22.9	2.59	0.26 J	97.4	1.5	9.4	68.7	18.5
	10/12/11	747.76	6.94	732	17.1	-35.9	2.31	<0.2	75.6	0.8	10.7	8.3	3.1
	5/21/12	750.70	7.22	663	13.28	-66.4	0.24	<0.12 ⁽⁵⁾	49.0	NM	8.8	21.9	2.4
10/24/12	746.92	6.87	735	16.40	-187.6	0.28	<0.12 ^(5,6)	72.2 ⁽⁶⁾	1.5 ⁽⁷⁾	11.3 ⁽⁶⁾	43.3 ⁽⁶⁾	2.8	
MW-3	4/28/08	755.21	7.25	1,343	8.1	176	4.51	3.6 H	8	< 26 H	21.4	241	1.9
	10/8/08												
	4/20/09	752.68	7.23	1,165	6.4	133	6.91	0.6	6.9	0.1	19	188	3.4
	10/5/09												
	5/18/10	753.44	7.22	967	11.9	-142	6.78	NM	1.9 J	0.1	19.7	57.8	3.0
	10/20/10												
	4/11/11	NM	7.28	618	6.91	20.3	10.68	<0.2	0.86 J	0.0	13.1	16.1	3.5
	10/11/11												
	5/21/12	751.15	7.06	1500	12.87	44.6	2.73	0.13 J ⁽⁵⁾	1.9 J	NM	17.4	208	0.25 J
10/24/12													

Table 2
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Tecumseh Products Company - Grafton, Wisconsin

SAMPLE LOCATION	SAMPLE DATE	WATER LEVEL	pH	SPECIFIC CONDUCTANCE	TEMPERATURE	ORP	DISSOLVED OXYGEN	DISSOLVED NITRATE	DISSOLVED MANGANESE	DISSOLVED IRON	DISSOLVED SULFATE	CHLORIDE	TOC
UNITS		ft (MSL)		$\mu\text{mhos/cm}$	$^{\circ}\text{C}$	mV	mg/L	mg/L	ug/L	ug/L	mg/L	mg/L	mg/L
Eastern Property Line Wells - Recycling Dock Area													
MW-3D	4/28/08	752.86	6.94	1,136	12.5	-172	0.17	< 0.085 H	115	150 H	74.8	111	< 1.4
	10/8/08	746.81	7.12	1,189	15.0	-167	0.35	0.28 JH	73.2	<26	48.8	135	<1.4
	4/20/09	NM	6.90	1,238	12.5	-42	0.27	0.26 J	190	1.5	58.9 M	134	3.9
	10/7/09	745.97	7.20	1125	14.4	-102	0.3	0.38 J	63.6	60.6	108	NM	<1.4
	5/18/10	751.60	7.14	1305	13.8	-153	5.06	NM	332	2	73.7	148	2.5
	10/20/10	746.40	7.19	1120	16.1	-137	0.42	0.56	67.8	2.0	67.6	106	<1
	4/11/11	NM	7.13	1102	12.98	-15.6	2.70	<0.2	180	0.8	85.8	113	1.1 J
	10/11/11	746.68	7.15	1268	15.39	-82.4	0.48	0.59	215	1.5	59.5	154	0.13 J
	5/21/12	749.70	7.09	1168	14.25	1.4	0.20	0.27 ⁽⁵⁾	204	NM	90.8	79.6	0.22 J
10/24/12	745.88	6.95	1200	14.51	-119	0.34	2.8 ^(5,6)	221 ⁽⁶⁾	0.4 ⁽⁷⁾	75.6 ⁽⁶⁾	106 ⁽⁶⁾	0.31 J	
MW-3BR1	4/29/08	NM	7.08	768	13.0	-237	0.33	< 0.085	59	< 26 H	68.6	35.9 B	2.1
	10/7/08	NM	7.13	790	16.1	-281	0.2	<0.085	59.5	<26	60.7	32.5	1.8 J
	4/21/09	NM	7.05	798	12.0	-141	2.65	0.16 J	62.7	1	61.6	33.2	1.5 J
	10/6/09	NM	7.03	795	15.8		0.5	<0.25	58.9	65.7	36.2	NM	<1.4
	5/19/10	NM	6.96	776	14.3	-251	0.35	NM	62.0	1	58.4	36.1	1.7 J
	10/22/10	NM	7.06	807	14.6	-235	1.20	0.42 HM	64.7	0.4	60.7 M1	35.3	2.2
	4/12/11	NM	6.64	718	11.2	-115.3	2.59	<0.2	58.6	0.8	60.3	34.9	1.7 J
	10/13/11	NM	6.78	785	15.99	-177.5	0.96	<0.2	61.8	0.8	59.6	36.8	0.82
	5/22/12	NM	6.90	828	14.35	-212.3	0.29	<0.12 ⁽⁵⁾	55.4	NM	59.1	36.4	0.69
10/24/12						Not sampled							
MW-3BR2	4/29/08	NM	7.20	1,117	14.0	-221	0.15	< 0.085	46	< 26 H	83.4	102	< 1.4
	10/7/08	NM	7.26	1,119	15.2	-169 R	0.5 R	<0.085	43.4	<26	82.8	99.8	1.4 J
	4/21/09	NM	7.12	1,113	11.5	-85	0.7	< 0.085	50.2	0.6	84	99.7	< 1.4
	10/6/09	NM	7.12	1088	15.1	NM	NM	<0.25	39.7	92.8	90.4	NM	<1.4
	5/19/10	NM	6.98	1054	14.2	-227	0.34	<0.10	44.2	0.6	79.7	78.3	1.4 J
	10/22/10	NM	7.23	1074	15.0	-181	1.05	<0.2	42.6	0.8	89.9	81.4	1.1 J
	4/12/11	NM	6.84	943	13.13	-58.5	2.41	<0.2	41.2	0.6	91.0	73.4	1.1 J
	10/13/11	NM	7.13	979	14.91	-117.8	1.01	<0.2	314	2.5	36.1	77.3	0.83
	5/22/12	NM	7.03	1025	14.14	-207.5	0.33	<0.12 ⁽⁵⁾	50.9	NM	50.8	67.4	0.19 J
10/25/12	NM	7.16	1061	14.43	-189.3	0.75	<0.12 ^(5,6)	32.6 ⁽⁶⁾	3.0 ⁽⁷⁾	76.0 ⁽⁶⁾	79.8 ⁽⁶⁾	0.35 J	
MW-3BR3	4/29/08						Not sampled						
	10/7/08	NM	7.18	1,012	14.9	-231	0.2	<0.085	50.7	<26	83.3	73.4	1.6 J
	4/21/09	NM	7.03	1,024	13.0	-86	1.33	0.17 J	51.2	1	84.5	79	1.4 J
	10/6/09	NM	7.08	1030	15.4	NM	0.2	<0.25	48.6	91.2	86.4	NM	<1.4
	5/19/10	NM	7.02	1012	14.4	-219	0.22	<0.10	51.7	0.8	77.0	75.3	1.7 J
	10/22/10	NM	7.14	1048	15.0	-193	3.65	0.34 JH3	52.5	NM	84.5	82.3	1.3 J
	4/12/11	NM	6.72	940	12.78	-63.4	2.39	<0.2	49.3	1.5	84.0	82.0	1.3 J
	10/13/11	NM	7.00	1009	14.9	-49.6	0.53	<0.2	49.0	1.0	75.5	73.6	<0.072
	5/23/12	NM	6.95	1081	14.19	-84.7	0.33	<0.12 ⁽⁵⁾	46.2	NM	78.7	75.6	0.10 J
10/25/12	NM	7.10	1015	14.47	-181.7	0.55	<0.12 ^(5,6)	44.0 ⁽⁶⁾	1.5 ⁽⁷⁾	74.2 ⁽⁶⁾	73.4 ⁽⁶⁾	0.44 J	

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UNITS		ft (MSL)		µmhos/cm	°C	mV	mg/L	mg/L	ug/L	ug/L	mg/L	mg/L	mg/L
Eastern Property Line Wells													
MW-9	4/28/08	752.98	6.97	2,170	9.0	220	3.95	4.8 H, M	1.1 J	< 26 H	27.9 M	437 M	2.7
	10/9/08	746.73	6.87	1,371	17.6	56	1.19	3.3	17.9	<26	23.0 B	200	1.9 J
	4/21/09	749.86	7.09	2,390	8.3	161	6.06	< 0.085	5	0.05	25	482	4
	10/5/09	745.76	7.04	1088	17.4	67	1.5	3.6	10.2	16.5	124		3.2
	5/18/10	751.65	6.97	1964	12.8	59	6.38	NM	0.28 J	0.1	24.5	361	<1
	10/20/10	746.27	6.93	1365	18.2	30	0.78	1.5	8.4	0.0	19.3	218	1.4 J
	4/11/11	NM	7.13	4391	9.21	-54.8	3.41	<0.2	277	4.5	51.0	1140	5.2
	10/11/11	746.65	7.18	1395	18.75	-184.8	0.26	<0.2	492	> 10 E	16.0	219	0.50
	1/10/12	747.30	6.97	1982	12.06	-77.0	NM	NM	NM	NM	NM	490	NM
	5/21/12	749.78	7.19	2305	12.92	-63.05	0.14	<0.12 ⁽⁵⁾	48.2	NM	28.5	369	0.64
10/24/12	NM	6.55	887	15.61	-129.7	0.31	<0.12 ^(5,6)	356 ⁽⁶⁾	2.0 ⁽⁷⁾	18.3 ⁽⁶⁾	66.7 ⁽⁶⁾	2.8	
MW-9D	4/28/08	752.92	7.18	1,183	11.8	-88	0.39	< 0.085 H	130	< 26 H	86.8	119	< 1.4
	10/9/08	746.72	7.08	1,160	15.0	-98	0.15	<0.085	100	<26	87.2	117	<1.4
	4/21/09	749.86	7.2	1,139	11.5	58	2.35	0.19 JM	79.2	0.8	75.4	158 M	< 1.4
	10/5/09	745.78	7.22	1108	15.5	-62	0.2	<0.25	122	86.7	106		35.3
	5/18/10	751.67	7.19	1081	13.6	-101	5.92	NM	75.7	1	78.6	92.0	<1
	10/20/10	746.30	7.17	1020	16.7	-35	0.42	<0.2	92.0	1.5	87.4	107	1.1 J
	4/11/11	NM	7.16	1164	12.95	-133.4	2.79	0.20 J	342		71.0	98.2	26.8
	10/11/11	744.70	7.29	1151	16.25	-181.2	0.29	<0.2	183	3.5	62.6	104	0.38 J
	1/10/12	747.34	7.18	1215	14.10	-87.6	NM	NM	NM	NM	NM	166	NM
	5/21/12	749.74	7.12	1383	14.11	-111.5	0.22	<0.12 ⁽⁵⁾	148	NM	132	127	0.45 J
10/24/12	745.91	6.60	3190	15.45	-190.7	0.21	<0.12 ^(5,6)	338 ⁽⁶⁾	> 10 ⁽⁷⁾	<2 ⁽⁵⁾	391 ⁽⁶⁾	821	
MW-12	4/28/08	753.01	7.17	769	9.0	250	2.39	0.18 H	9.1	< 26 H, R1	25.1 M	73.8 M	< 1.4
	10/9/08	746.74	6.81	770	NA	124	0.85	0.20 J	28.1	<26	26.9 B	57.2	<1.4
	4/21/09	749.92	6.79	981	9.2	246	0.48	0.19 J	26.8	0.2	20.6	106	1.5 J
	10/5/09	745.77	7.16	1237	15.2	142	1.0	<0.25	46.9	21.5	220		<1.4
	5/18/10	751.73	7.08	739	10.5	152	10.01	NM	9.4	0	18.4	80.7	1.3 J
	10/20/10	746.29	7.15	1025	15.5	178	0.49	<0.2	31.4	0.05	79.4	110	1.8 J
	4/11/11	NM	7.12	1188	9.48	89.0	4.51	<0.2	42.2	0.0	65.6	238	<1
	7/22/11	747.16	7.08	1669	13.81	-12.4	0.28	NM	NM	NM	NM	NM	NM
	10/11/11	746.71	7.06	1581	16.90	-44.8	0.16	<0.2	1130	4	10.4	210	93.3
	5/22/12	751.71	6.78	1163	11.02	-76.4	0.23	<0.12 ⁽⁵⁾	116	NM	7.7	125	2.5
10/25/12	745.98	7.21	1163	15.77	-194.5	0.37	<0.12 ^(5,6)	92.0 ⁽⁶⁾	3.5 ⁽⁷⁾	36.3 ⁽⁶⁾	141 ⁽⁶⁾	1.7	
MW-12BR	4/30/08	752.61	7.18	1,031	11.2	-235	0.16	< 0.085 H	48.6	< 26 H	90.8	91.5	< 1.4
	10/8/08	746.59	7.35	1,087	15.2	-323	0.49	<0.085	66.1	<26	60.2	87.3	<1.4
	4/21/09	749.77	7.23	1,041	9.8	-11	0.36	0.25 J	48.1	1.5	82.1	88.8	1.9 J
	10/5/09	745.59	7.51	1054	14.6	-276	0.05	<0.25	34.3	63.9	94.1	NM	<1.4
	5/18/10	751.63	7.15	1046	11.7	-268	8.81	NM	68.1	1.5	78.6	76.8	1.2 J
	10/20/10	746.14	7.30	1112	14.6	-294	0.42	<0.2	75.8	0.1	67.5	89.7	1.5 J
	4/11/11	NM	7.36	1019	10.9	-114.3	3.09	<0.2	76.6	0.1	59.0 M0	91.3	12.8
	10/11/11	746.55	7.45	1070	15.41	-300.1	0.09	<0.2	16.9	0.3	3.0 J	91.0	1.2
	5/22/12	750.09	7.30	1108	12.00	-169.8	0.15	<0.12 ⁽⁵⁾	43.6	NM	40.5	84.7	0.30 J
10/24/12	745.61	7.72	1091	14.46	-352.1	0.17	<0.12 ^(5,6)	49.9 ⁽⁶⁾	0.1 ⁽⁷⁾	13.7 ⁽⁶⁾	93.4 ⁽⁶⁾	0.48 J	

Table 2
 Summary of Groundwater Field and Degradation Evaluation Parameters
 Tecumseh Products Company - Grafton, Wisconsin

SAMPLE LOCATION	SAMPLE DATE	WATER LEVEL	pH	SPECIFIC CONDUCTANCE	TEMPERATURE	ORP	DISSOLVED OXYGEN	DISSOLVED NITRATE	DISSOLVED MANGANESE	DISSOLVED IRON	DISSOLVED SULFATE	CHLORIDE	TOC
UNITS		ft (MSL)		µmhos/cm	°C	mV	mg/L	mg/L	ug/L	ug/L	mg/L	mg/L	mg/L
Eastern Property Line Wells													
MW-13BR2	4/29/08	NM	7.18	1,093	11.7	-201	0.29	< 0.085	73.4	< 26 H	87.6	108	< 1.4
	10/8/08	NM	6.98	1,105	16.3	-215	0.42	0.58	73.5	<26	78	102	<1.4
	4/21/09	NM	7.07	1,124	10.5	-80	1.46	0.52	76.4	0.8	86.9	103	1.8 J
	10/5/09	NM	7.12	1134	14.9	-186	0.6	<0.25	71.5	93.9	112	NM	<1.4
	5/18/10	NM	7.04	1112	13.3	-200	0.49	NM	79.6	1	78.8	105	1.0 J
	10/20/10	NM	7.06	1133	14.6	-186	0.54	<0.2	72.5	1.0	86.8	106	1.1 J
	4/11/11	NM	7.06	1031	12.50	-54.9	2.91	<0.2	69.3	0.90	84.8	107	<1
	10/11/11	NM	7.18	1111	17.0	-208.3	0.36	<0.2	70.6	1.5	77.5	104	0.24 J
	5/22/12	NM	7.02	1195	12.52	-98.80	0.35	<0.12 ⁽⁵⁾	72.2	NM	82.9	109	<0.072
	10/24/12	NM	7.05	1151	14.27	-149.6	0.43	<0.12 ^(5,6)	72.8 ⁽⁶⁾	0.2 ⁽⁷⁾	82.2 ⁽⁶⁾	107 ⁽⁶⁾	0.24 J
MW-13BR3	4/29/08	NM	7.21	917	12.0	-192	0.3	< 0.085	213	< 26 H	79.8	68.6	< 1.4
	10/8/08	NM	7.05	943	16.5	-184	0.5	<0.085	212	<26	77.3	61.5	<1.4
	4/21/09	NM	7.10	940	11.2	-70	1.65	0.17 J	204	0.3	77.6	60.6	< 1.4
	10/5/09	NM	7.16	928	14.4	-173	0.3	<0.25	212	82.2	61.2	NM	<1.4
	5/18/10	NM	6.89	925	12.9	-187	0.43	NM	232	0.2	72.0	57.6	<1
	10/20/10	NM	7.11	958	14.5	-145	0.49	<0.2	218	0.30	78.7	62.4	1.0 J
	4/11/11	NM	7.10	857	12.13	-67.4	3.06	<0.2	208	0.2	76.4	61.1	<1
	10/11/11	NM	7.23	928	15.79	-176.1	0.25	<0.2	216	0.4	73.9	60.0	0.34 J
	5/22/12	NM	7.12	997	12.32	-129.4	0.27	<0.12 ⁽⁵⁾	211	NM	76.0	58.8	0.18 J
	10/24/12	NM	7.11	950	14.08	-168.2	0.42	<0.12 ^(5,6)	210 ⁽⁶⁾	0.4 ⁽⁷⁾	75.8 ⁽⁶⁾	57.0 ⁽⁶⁾	0.41 J
MW-22BR	4/29/08	749.78	7.38	732	12.0	-6	1.4	0.32 J	73.3	< 26 H	49.2	42.1 B	< 1.4
	10/8/08	743.91	7.18	760	14.0	180	0.5	0.17 JH	81.8	<26	41.5	52.5	<1.4
	4/22/09	746.88	7.00	880	11.5	250	0.7	< 0.085	103	0.05	44.2	68.4	< 1.4
	10/7/09	742.82	7.27	824	13.7	24	0.2	<0.25	112	44.2 M	58.9 M		<1.4
	5/17/10	748.83	7.10	872	13.8	-43	6.45	NM	110	0.1	47.1	65.3	<1
	10/20/10	743.63	7.30	806	14.6	45	0.40	0.20 J	77.3	0.0	41.7	54.7	<1
	4/11/11	NM	7.29	728	13.87	39	3.24	<0.2	83.4	0.1	44.5	46.5	<1
	10/12/11	743.93	7.18	799	14.61	20.2	1.93	<0.2	102	0.1	41.6	53.2	<0.072
	5/22/12	747.06	7.16	1,005	14.2	40.9	0.38	<0.12 ⁽⁵⁾	113	NM	50.4	78.9	<0.072
	10/24/12	743.06	6.86	858	13.61	-76.4	0.48	<0.12 ^(5,6)	113 ⁽⁶⁾	0.2 ⁽⁷⁾	45.7 ⁽⁶⁾	60.3 ⁽⁶⁾	0.16 J
Off-Site Downgradient Wells													
MW-27 ⁽²⁾	7/22/08	750.34	7.27	626	13.4	134	3.39	0.18 JM	52.7	<26	14.1 B	4 JM	4 JM
	10/8/08	746.89	7.09	512	15.1	62	2.61	<0.085	34	<26	15	3.1 J	<1.4
	4/22/09	750.11	7.01	638	8.1	348	6.19	0.18 JM	1.6 J	0.1	13.5	2.6 JM	1.8 J
	10/5/09	746.97	7.21	551	14.5	104	0.8	<0.25	7.7	14.5	3.2 J	NM	27.8
	5/17/10	752.1	6.91	631	10.2	183	9.20	NM	2.6 JB	0.3	13.8	3.3 J	1.4 J
	10/21/10	746.51	7.26	532	15.1	-83	4.10	<0.2	1.7 J	0.05	15.4	3.3 J	1.1 J
	4/13/11	NM	6.94	567	7.62	17.4	9.23	<0.2	5.1	0.0	17.7	3.8 J	1.8 J
	10/12/11	746.86	7.11	571	14.9	35.5	3.74	<0.2	9.7	0.1	18.4	3.5 J	0.91
	5/21/12	749.99	7.02	709	11.27	43.4	8.02	<0.12 ⁽⁵⁾	0.58 J	NM	14.3	2.3 J	1.4
	10/24/12	745.94	7.24	584	14.49	-76.7	1.37	<0.12 ^(5,6)	9.3 ⁽⁶⁾	0.1 ⁽⁷⁾	26.3 ⁽⁶⁾	3.5 ⁽⁶⁾ J	1.1
PW-30 (Heiser) ⁽¹⁾	4/29/08	NM	7.78	NA	10.2	-10	6.85	9.2 H	0.63 J	< 26 H	34.2	38.8 B	< 1.4

Table 2
Summary of Groundwater Field and Degradation Evaluation Parameters
Tecumseh Products Company - Grafton, Wisconsin

SAMPLE LOCATION	SAMPLE DATE	WATER LEVEL	pH	SPECIFIC CONDUCTANCE	TEMPERATURE	ORP	DISSOLVED OXYGEN	DISSOLVED NITRATE	DISSOLVED MANGANESE	DISSOLVED IRON	DISSOLVED SULFATE	CHLORIDE	TOC
UNITS		ft (MSL)		µmhos/cm	°C	mV	mg/L	mg/L	ug/L	ug/L	mg/L	mg/L	mg/L
Off-Site Downgradient Wells													
MW-18BR1	4/29/08	NM	7.28	1,135	10.8	-68	4.48	7.8	0.67 J	< 26 H	36.9	136	< 1.4
	10/7/08	NM	7.17	1,166	13.5	-136	2.5	6.3	2.5 J	<26	34.7	134	1.6 J
	4/22/09	NM	7.07	1,110	10.3	235	6.14	5.9	3.2 J	0.1	31.8	118	< 1.4
	10/6/09	NM	7.06	1011	13.5	69	5.20	6.1 M	<0.12	37.4 M	93.7 M	NM	<1.4
	5/17/10	NM	6.94	1073	11.3	29	3.73	NM	0.84 JB	0	34.9	117	1.3 J
	10/21/10	NM	7.10	1123	14.1	0	7.77	5.6	1.1 J	0.1	30.6	109	<1
	4/12/11	NM	6.82	977	10.27	-0.1	5.83	5.2	1.9 J	0.0	25.8	116	<1
	10/12/11	NM	7.03	1,126	13.65	-6.4	6.45	5.9	0.26 J	0.0	29.3	125	0.11 J
	5/22/12	NM	7.00	1238	12.24	-33.9	6.26	5.6 ⁽⁵⁾	0.31 JB	NM	28.9	131	<0.072
10/24/12	NM	7.09	1148	13.30	-70.4	5.32	5.5 ^(5,6)	<1.3 ⁽⁶⁾	0.2 ⁽⁷⁾	30.9 ⁽⁶⁾	122 ⁽⁶⁾	0.13 J	
MW-18BR2	4/29/08	NM	7.15	1,616	11.0	-251	1.08	3	102	< 26 H	43	243	19.4
	10/7/08	NM	7.10	1,496	13.4	-244	0.5	3.1	39.1	<26	44.6	242	1.8 J
	4/22/09	NM	6.99	1,644	10.6	-78	1.05	< 0.085	171	0.8	38.7	258	6.7
	10/6/09	NM	7.01	1545	13.9	-198	0.9	3.8	55.9	43.5	265	NM	2.6
	5/17/10	NM	6.93	1957	11.1	-214	1.41	NM	39.5	0.1	43.6	405	3.2
	10/21/10	NM	7.13	1821	13.6	-206	3.08	3.6	14.0	0.05	40.6	298	1.5 J
	4/12/11	NM	6.67	1668	11.13	-100.3	2.96	2.5	27.5	0.7	36.2	323	<1
	10/12/11	NM	7.00	1792	14.14	-51.2	2.37	3.5	1.8 J	0.1	43.7	335	<0.072
	5/22/12	NM	6.97	2120	12.09	-129.5	2.38	3.9 ⁽⁵⁾	1.6 JB	NM	44.0	373	<0.072
10/24/12	NM	7.11	1732	13.24	-168.4	2.14	4.1 ^(5,6)	<1.3 ⁽⁶⁾	0.1 ⁽⁷⁾	42.3 ⁽⁶⁾	301 ⁽⁶⁾	<0.072	
MW-14BR	4/29/08	743.37	7.33	859	9.8	32	7.32	11.4 H	0.8 J	< 26 H	32.5	63.1	< 1.4
	10/8/08	736.08	7.13	856	15.9	208	8.06	10.0 H	1.5 J	<26	28.8	55.6	<1.4
	4/22/09	740.61	7.08	858	9.5	354	8.15	8.2	2.0 J	0	27.3	62.3	< 1.4
	10/5/09	734.63	7.22	857	14.2	173	6.68	9.4 M	<0.12	29.8	63.1 M	NM	<1.4
	5/17/10	742.33	7.08	841	11.1	44	10.40	NM	1.1 JB	0.1	26.4	61.3	<1
	10/21/10	735.66	7.21	855	13.8	42	8.53	7.7	0.22 J	0.0	25.5	56.9	<1
	4/13/11	NM	6.89	807	9.70	22.0	NM	7.9 H3	0.19 J	0.0	26.7	72.2	<1
	10/12/11	736.52	7.21	886	15.03	8.9	6.38	8.1 1q	<0.098	0.1	26.8	73.7	<0.072
	5/21/12	740.92	6.78	920	12.05	42	7.17	7.5 ⁽⁵⁾	<0.14	NM	26.6	66.4	<0.072
10/24/12	735.96	7.26	879	14.69	-65.0	5.14	8.2 ^(5,6)	<1.3 ⁽⁶⁾	0.1 ⁽⁷⁾	25.4 ⁽⁶⁾	62.9 ⁽⁶⁾	0.21 J	
MW-19BR1	4/29/08	NM	7.35	298	10.4	-180	0.3	0.31 J	10.2	< 26 H	5.5	6.7 B	9
	10/7/08	NM	7.08	1,024	12.2	-268	2.51	<0.085	101	<26	52.3	96	2.5
	4/22/09	NM	7.15	1,049	10.2	-212	0.29	< 0.085	40.2	0.5	53.9	98	< 1.4
	10/6/09	NM	7.11	1078	12.6	-138	0.2	<0.25	33.6	58.9	110	NM	<1.4
	5/18/10	NM	7.10	1025	11.1	-185	0.26	NM	32.0	0.4	55.2	97.0	<1
	10/21/10	NM	7.22	1064	12.2	-153	0.79	<0.2	28.4	0.3	54.7	97.8	<1
	4/12/11	NM	6.86	967	10.51	-46.3	2.02	<0.2	27.2	0.7	54.4 M0	98.2	<1
	10/12/11	NM	7.08	1056	12.87	-46.7	1.04	<0.2	26.3	0.6	53.0	104	0.30 J
	5/22/12	NM	7.03	1130	11.63	-61.5	0.19	<0.12 ⁽⁵⁾	26.5	NM	55.4	105	<0.072
10/24/12	NM	7.14	1128	12.29	-219.6	0.36	<0.12 ^(5,6)	24.1 ⁽⁶⁾	0.6 ⁽⁷⁾	56.4 ⁽⁶⁾	115 ⁽⁶⁾	0.21 J	

Table 2
Summary of Groundwater Field and Degradation Evaluation Parameters
Tecumseh Products Company - Grafton, Wisconsin

SAMPLE LOCATION	SAMPLE DATE	WATER LEVEL	pH	SPECIFIC CONDUCTANCE	TEMPERATURE	ORP	DISSOLVED OXYGEN	DISSOLVED NITRATE	DISSOLVED MANGANESE	DISSOLVED IRON	DISSOLVED SULFATE	CHLORIDE	TOC
UNITS		ft (MSL)		µmhos/cm	°C	mV	mg/L	mg/L	ug/L	ug/L	mg/L	mg/L	mg/L
Off-Site Downgradient Wells													
MW-19BR2	4/29/08						Not sampled						
	10/7/08	NM	7.01	539	12.7	-299	2.19	2	204	<26	6.4	3.1 J	2.3
	4/22/09	NM	7.01	533	10.1	-226	0.29	< 0.085	186	1	5.2	2.0 J	< 1.4
	10/6/09	NM	7.17	556	12.7	-261	0.1	<0.25	172	7.4	2.6 J	NM	<1.4
	5/18/10	NM	7.20	541	11.8	-298	0.18	NM	152	0.8	7.2	2.3 J	<1
	10/21/10	NM	7.24	567	13.2	-271	1.01	<0.2	127	1.0	7.4	2.3 J	<1
	4/12/11	NM	6.75	513	10.51	-211.4	1.98	<0.2	98.4	1.0	7.2	2.1 J	<1
	10/12/11	NM	6.74	611	16.99	-269.8	1.04	<0.2	82.6	0.8	7.1	2.0 J	0.76
	5/22/12	NM	7.06	597	13.22	-286.6	0.13	<0.12 ⁽⁵⁾	65.6	NM	7.5	2.1 J	0.64
10/24/12	NM	7.11	586	12.56	-312.7	0.31	<0.12 ^(5,6)	65.0 ⁽⁶⁾	1.5 ⁽⁷⁾	8.3 ⁽⁶⁾	2.0 ⁽⁶⁾ J	0.62	
MW-20BR1	4/29/08	NM	8.13	987	9.0	-134	1.8	0.14 J	74.3	< 26 H	14.8	751	8.3
	10/7/08	NM	7.69	778	12.9	-274	1.62	0.16 J	93.2	<26	4.5	142	14.7
	4/22/09	NM	8.00	4,280	11.2	-168	0.64	0.19 J	380	0.6	15.8	1210	11.7
	10/6/09	NM	8.19	1888	12.3	-172	0.6	<0.25	142	10.4	495	NM	8.2
	5/17/10	NM	8.18	986	11.4	-208	0.39	NM	64.9	0.1	15.5	232	9.3
	10/21/10	NM	8.15	1195	11.5	-208	1.53	<0.2	86.2	0.2	8.6	248	7.4
	4/12/11	NM	7.47	6944	11.35	-106.1	3.11	<0.2	606	0.8	36.9	2310	1.6 J
	10/12/11	NM	7.68	947	11.86	-52.6	2.95	<0.2	83.0	0.6	12.0	228	9.5
	5/22/12	NM	7.44	4546	11.78	-120.6	0.84	<0.12 ⁽⁵⁾	454	NM	14.1	1360	0.99
10/24/12	NM	7.41	530	13.19	-248.7	0.43	<0.12 ^(5,6)	140 ⁽⁶⁾	0.6 ⁽⁷⁾	3.3 ⁽⁶⁾ J	81.2 ⁽⁶⁾ M0	44.9	
MW-20BR2	4/29/08	NM	6.93	1,554	10.4	-270	0.34	0.15 J	193	38 J, H	2.2 J	361	15.5
	10/7/08	NM	6.52	1,865	12.9	-290	0.31	0.16 J	189	<26	3.1 J	419	14.5
	4/22/09	NM	7.00	2,480	10.7	-216	0.29	0.20 J	195	3	3.9 J	605	11.7
	10/6/09	NM	6.95	2830	12.2	-247	0.1	<0.25	176	3.8 J	761	NM	10.3
	5/17/10	NM	6.76	2840	11.5	-267	0.28	NM	158	0.3	3.2 J	754	3.9
	10/21/10	NM	7.13	1661	11.5	-237	1.25	0.22 J	114	2.5	6.1	293	6.3
	4/12/11	NM	6.76	2150	11.42	-126	2.49	0.21 J	133	1.0	9.2	541	4.4
	10/12/11	NM	6.95	3568	13.86	-251	0.95	<0.2	174	2.0	3.8 J	911	1.6
	5/22/12	NM	6.86	3675	11.78	-28.1	0.26	0.20 J ⁽⁵⁾	233	NM	3.8 J	886	1.5 M0
10/24/12	NM	7.05	2350	12.48	-279.1	0.42	0.14 ^(5,6) J	141 ⁽⁶⁾	1.5 ⁽⁷⁾	10.3 ⁽⁶⁾	458 ⁽⁶⁾	3.4	
Terminal Electron Accepting Process ⁽³⁾			--	--	--	--	Aerobic respiration	Denitrification	Manganese reduction	Iron (III) reduction	Sulfate reduction	--	--
Trend During Biodegradation ⁽³⁾⁽⁴⁾			Optimal range: 5 to 9	Increase over background	--	< 50 mV suggests reductive dechlorination possible	Reductive dechlorination can occur in groundwater microcosms at < 1 to 2 mg/L	< 1 mg/L in source area	Increase over background	Increase over background	Decrease compared to background	Increase over background	> 20 mg/L preferred

Notes:

NM = not measured. Water levels cannot be measured in the multi-level water 100 wells.
 NS = not sampled.
 B = analyte present in the method blank.
 H = preservation, extraction, or analysis performed past holding time.
 J = estimated value.
 M = matrix spike recovery was outside laboratory control limits.
 R1 = relative percent difference (RPD) value was outside control limits.
 -- = injection date not applicable as injections not performed in close proximity to well.

Footnotes

(1) PW-30 (Heiser) was abandoned on 9/3/08.
 (2) MW-27 was installed on 7/22/08.
 (3) Wiedemier, 1998.
 (4) WDNR quick reference guide to natural biodegradation of chlorinated solvents, May 2007.
 (5) Nitrate plus Nitrite Nitrogen.
 (6) Total, not dissolved.
 (7) Total iron, field measurement.

Table 3
Proposed Monitoring Well Abandonment for Shallow Wells
Tecumseh - Grafton, Wisconsin

WELL I.D.	DATE INSTALLED	WELL INTAKE ELEVATION INCLUDING FILTER PACK (feet, NGVD)		SCREEN LENGTH
		TOP	BOTTOM	
MW-1	5/4/1993	755.9	743.9	10
MW-2	5/6/1993	756.8	744.3	10
MW-3	5/10/1993	755	744	10
MW-3D	8/17/1994	734	726	5
MW-4	6/30/1993	754.9	744.9	10
MW-5	7/22/1993	754.3	743.5	10
MW-6	10/15/1993	755.4	744.4	10
MW-7	10/15/1993	755.8	743.8	10
MW-8	10/18/1993	754.3	744.3	10
MW-8D	8/19/1994	732.2	725.9	5
MW-9	8/19/1994	753.3	741.8	10
MW-9D	8/18/1994	734.7	728.7	5
MW-10	8/19/1994	765.8	754.8	10
MW-11	11/14/1994	757.1	743.1	10
MW-12	11/14/1994	747.1	734.1	10
MW-16	8/15/1995	754	741	10
MW-23	10/30/2002	750.9	738.4	10
MW-24R	11/11/2003	751.5	739	10
MW-25	10/31/2002	749.4	736.4	5
MW-26	10/31/2002	747.9	738.9	5
MW-27 ⁽¹⁾	7/22/2008			

Notes:

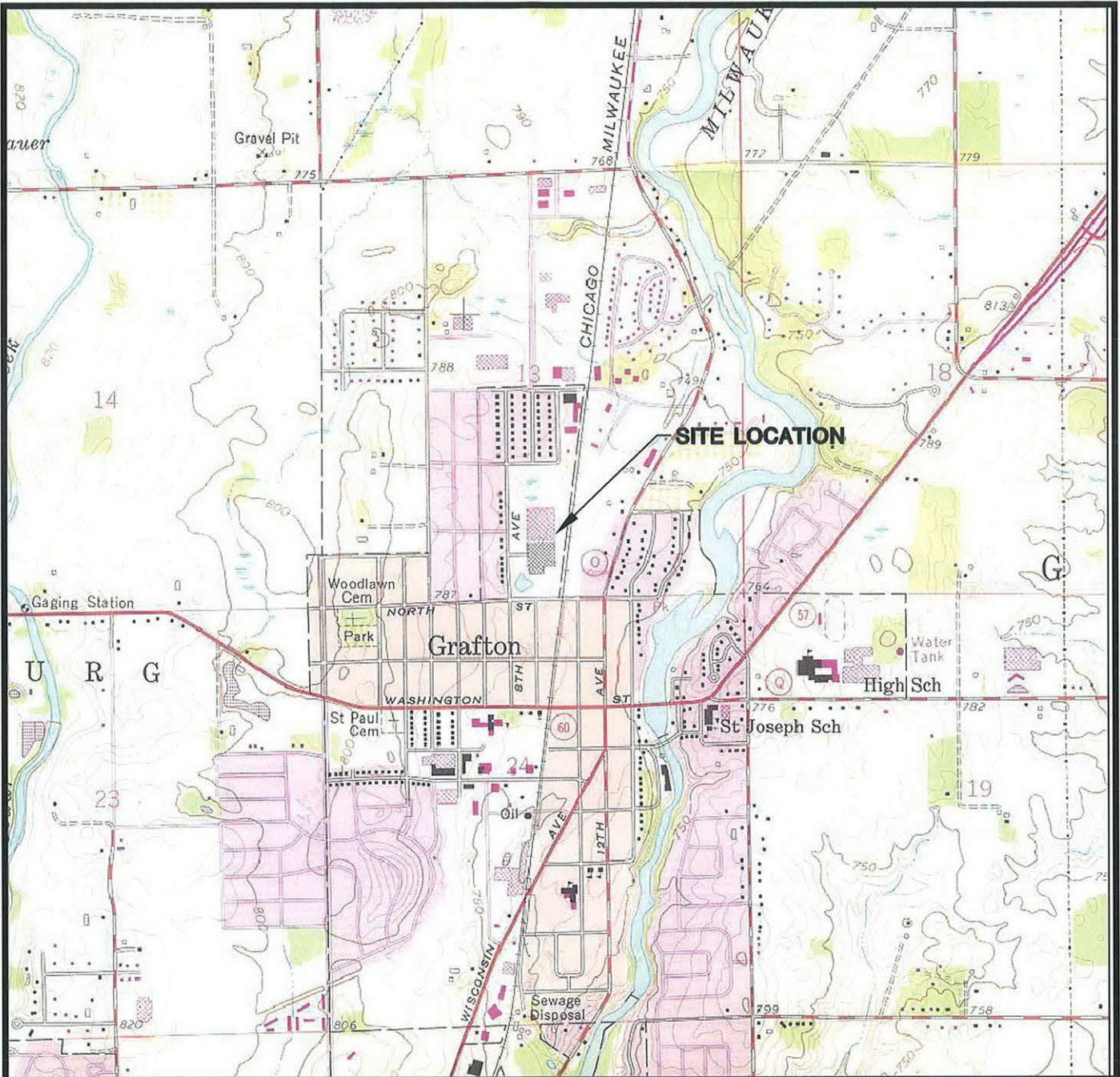
1. MW-27 is the only shallow off-site well. It is included in the proposed abandonment program because it has maintained concentrations below the NR 140 ES since installation and will no longer be sampled if the shallow groundwater on-site is approved for no further action.

Attached Xrefs: grafonr, Model
 Attached Images: Layout

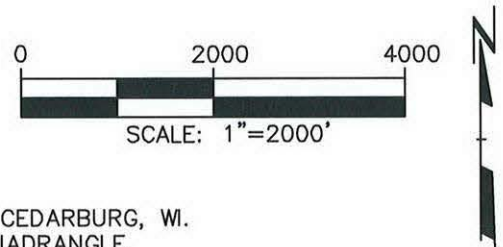
Dwg Size: 0.11 Mb
 Plot Date: December 17, 2012
 Plot Time: 9:02 AM

J:\Tecumseh\00-04169\0000\000001\004169.00000.001.03.dwg
 SIEWERT, DENNIS
 0.386863

PLOT DATA
 Drawing Name:
 Operator Name:
 Drawing Plot Scale:



STATE LOCATION



SOURCE: BASE MAP FROM CEDARBURG, WI.
 7.5 MIN. USGS QUADRANGLE.

LOCATION: SW1/4, SE1/4 SEC 13, T10N, R21E



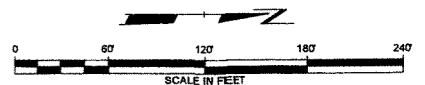
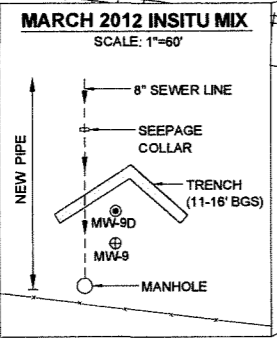
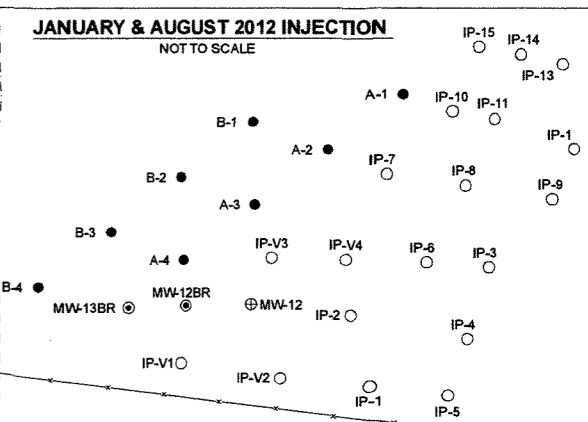
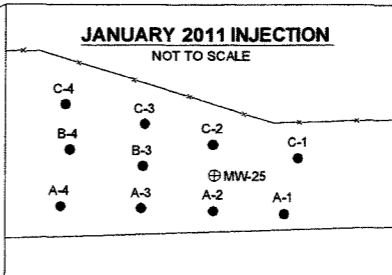
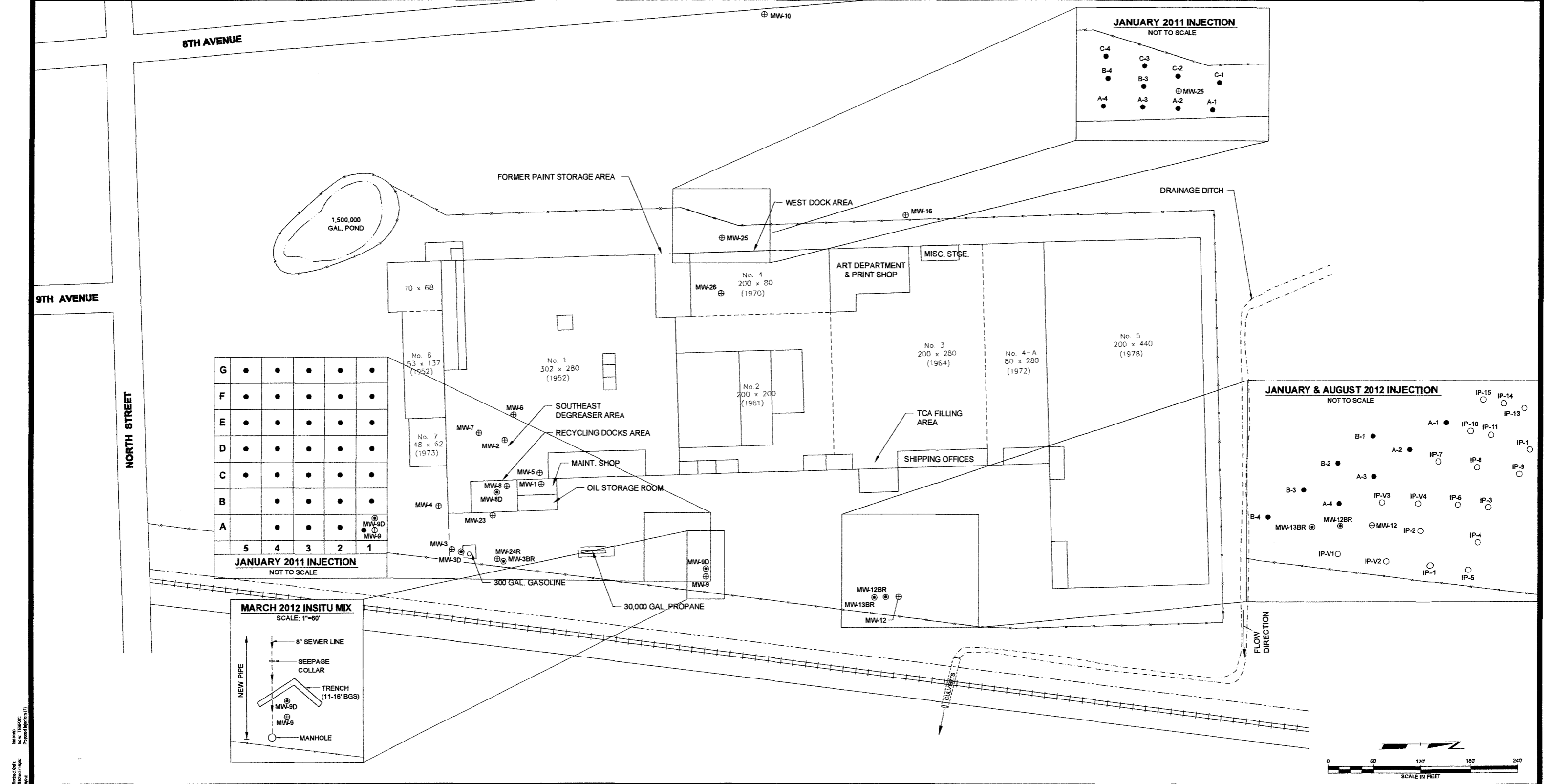
708 Heartland Trail
 Suite 3000
 Madison, WI 53717
 Phone: 608.826.3600

PROJECT: **TECUMSEH PRODUCTS COMPANY
 GRAFTON, WISCONSIN**

SHEET TITLE: **SITE LOCATION MAP**

DRAWN BY:	SIEWERTD
APPROVED BY:	STOLZENBURGT
PROJ. NO.	004169.0000
FILE NO.	004169.0000.001.03.dwg
DATE:	DECEMBER 2012

FIGURE 1



- LEGEND**
- PROPERTY LINE
 - AISLEWAY
 - FENCE LINE
 - ==== RAILROAD
 - MW-24R ⊕ WATER TABLE WELL
 - MW-3BR ⊙ PIEZOMETER
 - B-4 ● TEMPORARY INJECTION POINT - JANUARY 2011
 - IP-1 ○ TEMPORARY INJECTION POINT - AUGUST 2011 (SEE NOTE 3)

- NOTES**
1. FACILITY LAYOUT ADAPTED FROM DRAWINGS PROVIDED BY TECUMSEH PRODUCTS COMPANY.
 2. MONITORING WELL LOCATIONS AND ELEVATIONS WERE SURVEYED BY RMT INC. ON 12/5/94.
 3. POINTS WITH "V" IN NAME REPRESENT INJECTION IN THE VADOSE ZONE.

5.					
4.					
3.					
2.					
1.					
NO.	BY	DATE	REVISION	APPD.	

TECUMSEH PRODUCTS COMPANY GRAFTON, WISCONSIN

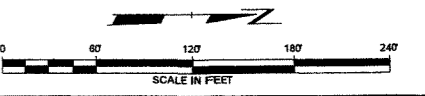
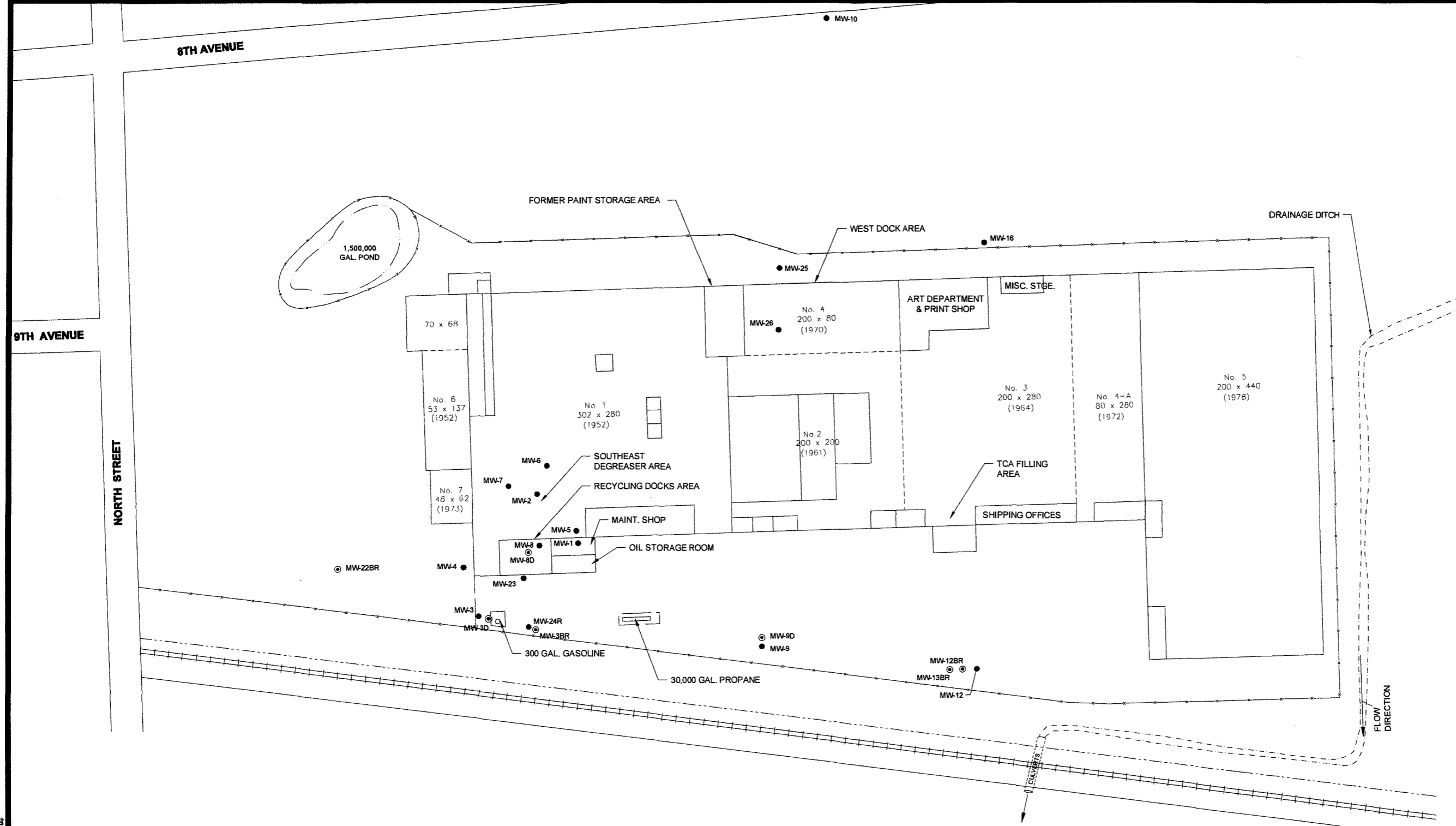
SOURCE AREA REMEDIATION LAYOUT

DRAWN BY: DSS	DRAWING SCALE: AS INDICATED	PROJECT NO: 04169.0000.001.01
CHECKED BY: AAS	DATE PRINTED: DEC 18 2012	FILE NO: 04169.0000.001.01.dwg
APPROVED BY: TS	DATE: NOVEMBER 2012	FIGURE 3

TRC
744 Heartland Trail
Madison, WI 53717-1934
P.O. Box 8923 53708-8923
Phone: 608-831-4444 • Fax: 608-956-7778

J:\11\remediation\04169\0000\001\101\101\04169.0000.001.01.dwg 12/11/12 10:51 AM
 Drawing Name: SOURCE AREA REMEDIATION LAYOUT
 Drawing Path: J:\11\remediation\04169\0000\001\101\101\04169.0000.001.01.dwg
 Date Plotted: 11/27/12 10:51 AM
 Plot Style: RMT.ctb
 User: TS

12/12 closure Status Report



LEGEND

- - - - - PROPERTY LINE
- - - - - AISLEWAY
- — — FENCE LINE
- || || || || RAILROAD
- MW-24R ● WATER TABLE WELL
- MW-3BR ⊙ PIEZOMETER

NOTES

1. FACILITY LAYOUT ADAPTED FROM DRAWINGS PROVIDED BY TECUMSEH PRODUCTS COMPANY.
2. MONITORING WELL LOCATIONS AND ELEVATIONS WERE SURVEYED BY RMT INC. ON 12/5/94.

NO.	BY	DATE	REVISION	APP'D.

TECUMSEH PRODUCTS COMPANY GRAFTON, WISCONSIN

SITE MAP

DRAWN BY: DSS	DRAWING SCALE: AS INDICATED	PROJECT: N004169,0000,001,02
CHECKED BY: AAS	DATE PRINTED: NOVEMBER 2012	FILE: N004169,0000,001,02.dwg
APPROVED BY: TS	DATE: NOVEMBER 2012	FIGURE 2

744 Heartland Trail
Madison, WI 53717-1934
P.O. Box 8923 53708-8923
Phone: 608-831-4444 • Fax: 608-956-7778

PLT: NDL
 Date: 11/27/2012 10:40 AM
 Operator: Name
 Drawing: PDI Color
 PLOT DATE: 11/27/2012 10:40 AM
 PLOT TIME: 11:00 AM
 PLOT BY: NAME
 PLOT FROM: 11/27/2012 10:40 AM
 PLOT TO: 11/27/2012 10:40 AM
 PLOT STATUS: OK
 PLOT COMMENTS:

my copy

RMT

Technical Memorandum

Date: May 27, 2010

To: John Feeney

cc: Jason Smith

From: John Rice and Tom Stolzenburg

Project No.: 02268.07.001

Subject: Additional information to address Tecumseh Grafton closure request

BAKTS#
0246000751

This memo has been prepared to address comments and questions from the WDNR Closure Committee. The issues that are addressed below were communicated to RMT by John Feeney.

1. MW-21BR1 and MW-21BR2 are not presented on plume maps because they do not provide additional data on the plume extent. MW-21BR1 and MW-21BR2 were sampled 19 times between June 1996 and May 2007. During this time period only 2 low level detections of vinyl chloride were reported in MW-21BR2. No other chlorinated volatile organic compound (CVOC) detections were reported in either well during this time period. Because MW-21BR1 and MW-21BR2 are located down gradient from MW-20BR1 and MW-20BR2, which are approximately 1,200 feet closer to the site and have had no detections, **we do not believe that the two detections of vinyl chloride in MW-21BR2 are related to the Tecumseh site.**
2. Private wells PW-36, PW-101, and PW-102 were last sampled in December 1994. PW-36 had a reported concentration of 1,1,1-TCA of 0.3 ug/L between the LOD and the LOQ. Low levels of several other VOCs were not confirmed by resampling. (The private well sampling data table is attached.) These wells were subsequently abandoned and the residences placed on municipal water supply.
3. We understand that there was some question about concentration trends at specific monitoring well points. Trend plots of chlorinated ethenes and chlorinated ethanes for MW-9, MW-9D, MW-25, and MW-26 are attached to this memo.

While CVOC concentrations in MW-25 show considerable variability, the concentrations and the relatively higher concentration of breakdown products in MW-26, which is less than 100 feet down gradient of MW-25, show that reductive dechlorination is continuing at a high rate and is effectively degrading the parent products. This demonstrates that natural attenuation is working.

The trends shown in the graphs for both chlorinated ethenes and chlorinated ethanes are declining for MW-9. Trends of chlorinated ethanes have also declined and are currently stable in MW-9D. However concentrations of chlorinated ethenes are not stable and have increased over the last two sampling rounds in MW-9D. We agree that this bears watching. However, this individual point does not negate the plume-wide demonstration of decreasing size and mass.

Technical Memorandum

4. We do not believe that the data currently supports the need for additional enhancement of reductive dechlorination. The effectiveness of any electron donor is directly related to the dose and the delivery. As for different chemical types of hydrogen-generating substrates, refer to He et.al. *Environ. Sci. Technol.*, 2002, 36 (18), pp 3945-3952. Given the heterogeneous bacterial populations in the subsurface, ~~no one hydrogen source has proven to be the best in all cases.~~ In this case, there is no evidence of inhibitive competition by methanogens or sulfate reducers. In fact, the ratio of daughter product to parent (cis-1,2-DCE to TCE) remains high, indicating a healthy and on-going bio-based reductive dechlorination within the plume.
5. Figures showing the plume of the parent compounds have shown a marked decrease in size over the last 11 years of monitoring. The extent of the cis 1,2-DCE occurrences have increased over this time period. As Tecumseh has claimed reductive dechlorination as one of the natural attenuation mechanisms at this site, the increase in cis 1,2-DCE, as a breakdown product of TCE, was expected and hoped for. Concentrations of cis 1,2-DCE are expected to begin to decline as the source is depleted of TCE.
6. The entire area of the plume is currently served by municipal water supply. The private wells that were in the area have been abandoned and the residences placed on municipal water supply.
7. We understand that the Closure Committee will review each site individually, to determine whether closure is warranted. However, to the extent the Committee can clarify conditions that would lead to closure at this site, Tecumseh is asking for the Committee's thoughts:

- Tecumseh agrees that the concentration trends at MW-9D bear watching. However, are we correct in assuming that the Committee does not make a judgment based on one well, but rather on the trend of the whole plume? - *source area not clear - not clear*
- The healthy ratio of breakdown product (cis-1,2-DCE) to parent product has been viewed as a positive sign by Tecumseh from two perspectives. First, observed increases in cis-1,2-DCE indicate that reductive dechlorination, as one of the mechanisms of natural attenuation, is proceeding as desired. Secondly, as those ratios remain high, additional injections are currently not warranted, as there is no indication of declining substrate for the microorganisms. ~~_____~~

If Tecumseh continues to monitor for two more years, and the plume is stable to declining for (then) a total of four years, can we assume that the Closure Committee will generally look more favorably on closure at that point in time?

Tecumseh's questions for Committee
C/3/10 Closure meeting
1/6/05

Why Committee believe size of plume is same, exactly, as pre-injection?

9D, 25 must go down
25 weeks no pre-treatment data
far BR wells are not good argument due to slow response etc.
Source area is most important

Source area not clear - not clear
important is most not showing
not work pre + post
supposed to be down tr. source!

2 more years should help, but if 25 + 9D keep increasing actions should be taken

FID # 246009170

Well Abandonment - on site bedrock wells -

Feeney, John M - DNR

From: Stolzenburg, Thomas <TStolzenburg@trcsolutions.com>
Sent: Friday, March 15, 2013 10:22 AM
To: Feeney, John M - DNR
Subject: RE: Tecumseh-Grafton request

Issues with Waterloo Wells

Thank you much.

From: Feeney, John M - DNR [mailto:JohnM.Feeney@Wisconsin.gov]
Sent: Friday, March 15, 2013 10:10 AM
To: Stolzenburg, Thomas
Subject: RE: Tecumseh-Grafton request

Okay. Thanks Tom. Please proceed with your plan to abandon those wells.

John M Feeney, Wisconsin PG #750
Wisconsin Department of Natural Resources
Remediation and Redevelopment Program
Plymouth Service Center
920-892-8756 extension 3023
johnmfeeney@wisconsin.gov

From: Stolzenburg, Thomas [mailto:TStolzenburg@trcsolutions.com]
Sent: Thursday, March 14, 2013 3:09 PM
To: Feeney, John M - DNR
Cc: Rice, John
Subject: RE: Tecumseh-Grafton request

John,

We talked to the vendor again. It is not possible to surgically remove the packers (and other gear) without overdrilling the whole well. Others have tried without success. As far as the lifetime of the packers...so far none have failed going back to the first installation in 1983. The reason? Although there may be rubber components, the guts of the packer is simply bentonite grout. As these packers will remain below the water table they cannot dry out and fail or crack, and as the vendor put it "they are no different than a bentonite seal around a monitoring well". The wells would still be overdrilled to bedrock and abandoned with bentonite to ground surface eliminating any concern regarding surface water infiltration or contamination.

Please pass this information along.

Regards,

Tom

From: Feeney, John M - DNR [mailto:JohnM.Feeney@Wisconsin.gov]
Sent: Wednesday, March 13, 2013 9:29 AM
To: Stolzenburg, Thomas
Subject: RE: Tecumseh-Grafton request

Tom, the only feedback I got statewide on this is a concern that the rubber in the packers will eventually fail and cause slumping of material into the well and create a conduit for contaminants in the open borehole. Is there a way to estimate how long those will last?

John M Feeney, Wisconsin PG #750
Wisconsin Department of Natural Resources
Remediation and Redevelopment Program
Plymouth Service Center
920-892-8756 extension 3023
johnmfeeney@wisconsin.gov

From: Stolzenburg, Thomas [<mailto:TStolzenburg@trcsolutions.com>]
Sent: Monday, March 11, 2013 1:32 PM
To: Feeney, John M - DNR
Subject: RE: Tecumseh-Grafton request

Thank you

From: Feeney, John M - DNR [<mailto:JohnM.Feeney@Wisconsin.gov>]
Sent: Monday, March 11, 2013 11:17 AM
To: Stolzenburg, Thomas
Subject: RE: Tecumseh-Grafton request

Oh Sorry Tom, I will try to get back to you on this today or tomorrow.

John M Feeney, Wisconsin PG #750
Wisconsin Department of Natural Resources
Remediation and Redevelopment Program
Plymouth Service Center
920-892-8756 extension 3023
johnmfeeney@wisconsin.gov

From: Stolzenburg, Thomas [<mailto:TStolzenburg@trcsolutions.com>]
Sent: Monday, March 11, 2013 11:11 AM
To: Feeney, John M - DNR
Subject: FW: Tecumseh-Grafton request

Good morning John,

Can you let me know how soon we may hear on this?

Thanks,

Tom

From: Stolzenburg, Thomas
Sent: Thursday, February 28, 2013 9:28 AM
To: 'Feeney, John M - DNR'
Cc: Smith, Jason; Rice, John
Subject: RE: Tecumseh-Grafton request

John

Yes. We talked to the vendor for the Waterloo multi-level sampling system, Solinst®. In fact, the person that we talked to was the manufacturer's representative who was in Grafton for the installation of the Waterloo multi-level sampling systems that were installed in 1994. He said that there are two basic methods to abandon. The first is to try to over drill the entire well and

grout the borehole. However, in situations where the bedrock is softer, like the dolomite at Grafton, there is a risk of veering off and making a new hole. Because of this, he suggested a potential alternative, which was specified in the previous e-mail.

Hope this helps.

Tom

From: Feeney, John M - DNR [<mailto:JohnM.Feeney@Wisconsin.gov>]
Sent: Thursday, February 28, 2013 8:12 AM
To: Stolzenburg, Thomas
Subject: RE: Tecumseh-Grafton request

Good morning Tom. Is that the manufacturers recommendation? We had some correspondence on this a few months ago. I will review that.

John M Feeney, Wisconsin PG #750
Wisconsin Department of Natural Resources
Remediation and Redevelopment Program
Plymouth Service Center
920-892-8756 extension 3023
johnmfeeney@wisconsin.gov

From: Stolzenburg, Thomas [<mailto:TStolzenburg@trcsolutions.com>]
Sent: Wednesday, February 27, 2013 4:01 PM
To: Feeney, John M - DNR
Cc: Rice, John; Sellwood, Alyssa; Smith, Jason
Subject: Tecumseh-Grafton request

John:

In planning to abandon the on-site wells we noted that two of the deep bedrock monitoring well nests (i.e. MW-3BR and MW-13BR) were constructed using the Waterloo multi-level groundwater monitoring systemTM. This system is constructed of modular pumps and transducers, separated by a permanent packer system that allows groundwater samples to be collected at multiple levels in the bedrock aquifer in a single borehole. Permanent packers separate each of the monitored intervals and ensure long term integrity of seals in the bedrock boreholes. The permanent packers consist of a water activated expansion sleeve fitted over the perforated packer body; with a rubber/Kevlar/rubber sheath surrounding the expansion material. The Kevlar provides strength to bridge across large fissures in the bedrock, and the rubber forms an effective seal against the borehole wall. These components permanently form an engineered seal against the borehole wall.

Because these wells have been constructed with a packer system that is permanent and that should not need to be removed, standard well abandonment procedures are not necessarily optimal for these wells. Therefore, we propose to abandon the Waterloo wells by 1) removing the protective casing, 2) cutting off the surface casing at least 3 feet below the ground surface, 3) overdrilling the well until the top of the bedrock, 4) tremie grouting the borehole from the top of the bedrock to the ground surface, and 5) restoring the ground surface. We are not proposing to

overdrill the entire borehole, because the permanent packers should maintain permanent seals in each borehole as constructed, and because of potential for the stainless steel pumps and pipes of the Waterloo system to redirect the drill bit away from the borehole into the native rock, which would create a second borehole.

John, we are looking for approval of this method of well abandonment. Thank you.

Tom

Tom Stolzenburg
Client Service Manager



708 Heartland Trail, Madison, WI 53717
T: 608-826-3661 | F: 608-826-3941 | C: 608-358-5213

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Feeney, John M - DNR

From: Mylotta, Pamela A - DNR
Sent: Tuesday, September 21, 2010 11:03 AM
To: Feeney, John M - DNR
Subject: Crestwood Injection Program

John,

I don't remember what you said about the injection at Tecumseh, but for Crestwood, they injected about 70,000 gallons of dilute molasses solution into a variable number of injection points (up to about 200 points on 20-25 foot centres) over about a 2 year period (almost monthly). The contamination was mainly PCE/TCE from a PCE source, in a relatively shallow area (down to around 15 to 20 feet). Soil and groundwater impacts were high level, and they also did a lengthy SVE over the source area. The property size was about 5 acres. They went back in to an off-site area later and did additional injection because the 1,2-DCE and Vinyl Chloride in that area were not dropping off after the original treatment, and they wanted to get done sooner than later. The plume PCE/TCE concentrations went from around 14,000-50,000 ug/l down to below ES.

I worked on another project (part of the Tower Automotive complex) where lactate was injected through infiltration trenching, and maybe also points, to treat a high level TCE plume in shallow groundwater. It worked ok, but they also did a large excavation to remove the worst soil source. I could look at that one as well if you want. Let me know.

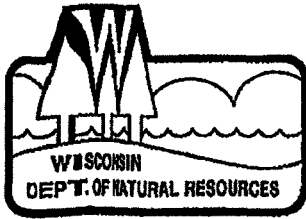
Pamela A. Mylotta

Hydrogeologist, WDNR Remediation & Redevelopment Program
Southeast Region, Milwaukee Service Center

Phone: (414) 263-8758
Fax: (414) 263-8716
E-mail: Pamela.Mylotta@wisconsin.gov

Appendix A

WDNR Correspondence



State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
Matthew J. Frank, Secretary
Gloria L. McCutcheon, Regional Director

Plymouth Service Center
1155 Pilgrim Rd.
P.O. Box 408
Plymouth, Wisconsin 53073-0408
Telephone 920-892-8756
FAX 920-892-6638

September 27, 2010

Jason Smith
Tecumseh Products Company
1604 Michigan Avenue
New Holstein, WI 53061-1175

Dear Mr. Smith:

Subject: Closure request for groundwater, Tecumseh Power Co, 900 North Street, Grafton, file reference FID #246009170, BRRTS #0246000751.

Thank you for submitting a closure request regarding the status of groundwater remediation at the site. The Wisconsin Department of Natural Resources appreciates all your efforts and work that you have put into restoring the environment at your property and beyond. The department has reviewed your submittals and is not able to close the groundwater portion of your case at this time:

Concerns

- Concentrations in source area wells have not decreased sufficiently to demonstrate effectiveness of the remedial actions taken. Contaminant concentrations must decrease significantly from where they are at present, including concentrations in the source area wells.
- Although TCE concentrations in MW-25 have shown fluctuations, a significant and consistent reduction has not been demonstrated. The soil sampling results within the treatment zone have indicated some reduction of TCE in the soil samples, but high levels remain (10,000 ug/kg) which could still contribute to groundwater contamination. Also, as no piezometers were ever placed in this area, and only one nearby monitor well is being used to evaluate affects in the estimated downgradient direction, it is difficult to clearly establish how successful the treatment has been.
- Monitoring well MW9 and MW-9D have not shown enough reduction in TCE concentration to reflect the success of the remedy there (excavation and thermal treatment). Extremely high concentrations of TCE were measured in some of the soil samples collected from the remedial excavations conducted in this area (1,000 to 22,000 mg/kg), which indicate that a significant soil source for groundwater contamination may remain in this area. There are no other monitor wells, besides MW-9 and MW-9D in this area to help define the plume from this source, and so it is difficult to judge whether the soil excavation has had a significant impact on groundwater quality.
- Overall, the limited number of monitoring wells makes a detailed analysis of the contaminant plume difficult.

- TCA concentrations in MW-12BR, MW-13BR1 and MW-13BR2 have decreased since the soil excavations were conducted, and TCE concentrations in MW-12BR and MW-13BR1 have also declined somewhat, but TCE concentrations in MW-13BR2 and MW-13BR3 have shown increases since 2007 and approach pre-remedial levels.
- Bedrock well MW-18BR1 and 18BR2 had a increase in TCE contaminant concentration for the past two years, such that TCE levels in 18BR2 are actually higher now than they were prior to remediation efforts. Similarly, TCE levels in bedrock well MW-19BR1 appear to have rebounded, approaching pre-remedial levels, although TCE concentrations in MW-19BR2 remain low.

Recommendations

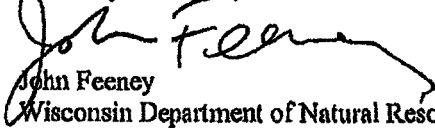
- Continue to monitor until relevant wells show significant reductions in concentrations.
- Consider additional wells close to and downgradient from the three major source areas on site to better show the effects of the remedial actions. Including a bedrock well close to and downgradient from MW-25 may also help to show the effectiveness of the remedial action in that location.
- Consider additional remedial actions

Requirements

- If the building and especially the floor slab are removed, additional investigation and remedial action should be done. You may want to consider whether to conduct investigation prior to building removal to better define the residual contamination and identify any other source areas that could be continuing to contribute to groundwater quality degradation.
- Continue with the groundwater sampling program. The department can't make a guarantee on how long this could take or if additional remedy is needed.
- Calculate flux of contaminants into the river for all substances over PAL concentrations.
- Please contact the local water utility to provide a service area map for the municipal wells closest to your contaminant plume.

If you have any questions about this letter, please call me at 920-892-8756 extension 3023.

Sincerely



John Feeney

Wisconsin Department of Natural Resources

Cc: RMT
SBR File

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
Plymouth Service Center
1155 Pilgrim Rd.
P.O. Box 408
Plymouth WI 53073-0408

Scott Walker, Governor
Cathy Stepp, Secretary
Gloria L. McCutcheon, Regional Director
Telephone 920-892-8756
FAX 920-892-6638



January 7, 2011

Jason Smith
Corporate Environmental Director
Tecumseh Products Company
2700 West Wood Street
Paris, TN 38242

Dear Mr. Smith:

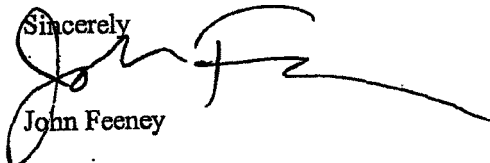
Subject: Response to your consultant's email requesting that the department give you "written commitment" regarding specific groundwater remedial action goals at Tecumseh Grafton, file reference FID #246009170, BRRTS #0246000751.

The department has reviewed your request regarding specific groundwater remedial action goals at Tecumseh Grafton. As specified by your consultant's email to the department, the purpose of these goals is to determine an end-point for remedial action at the site; the end point for remedial actions is reached upon meeting certain percent reductions of TCE in groundwater in monitoring wells MW-9, MW-9D, MW-12, and MW-25.

The department finds these reductions in concentrations outlined by your consultant to be consistent with closure requirements set forth in ch. NR726. Therefore, the department is committed to close the groundwater remediation requirements at this property when these reductions happen after a minimum of two years groundwater monitoring, with the following caveats:

- The baseline for your stated reduction goals is 2010 groundwater chemistry data.
- Site investigation and hot-spot soil remediation must occur under the present building footprint when the building is taken down. The department considers that the soil under the building footprint (especially in the West Dock area that still had high concentrations of TCE in soil last time sampled, to be a potential groundwater contaminant source, not just a potential direct-contact risk.
- The down-gradient bedrock wells MW-13BR, MW-18BR-1, MW-18BR-2, MW19BR-1 must continue to be sampled (beyond the proposed two years if necessary) until they establish stable to decreasing contaminant trends. Additional off-site investigation may be necessary if the down-gradient bedrock wells indicate a substantial increase of current levels.

If you have any questions about this letter, please call me at 920-892-8756 extension 3023, or email me at johnm.feeney@wisconsin.gov.

Sincerely

John Feeney

Wisconsin Department of Natural Resources

Cc: RMT, SER File

From: Stolzenburg, Tom
Sent: Wednesday, January 05, 2011 11:22 AM
To: 'Delwiche, Jim C - DNR'
Cc: 'Smith, Jason'; Sellwood, Alyssa; Rice, John
Subject: Tecumseh - Grafton

Jim:

You left me a voice mail asking for a reiteration of the Tecumseh's proposal at the Grafton site. Here you go:

On December 12th I sent you an e-mail that summarized the proposal from Tecumseh Products (TPC), which was imbedded in the report dated October 22, 2010 to John Feeney. The gist is straightforward. TPC is attempting to make the Grafton property economically productive again by selling it for commercial use, but buyers are averse to regulatory uncertainty, especially regarding groundwater. To address this uncertainty TPC is willing to commit to quantitative performance objectives for on-site monitoring wells that concern the Department in exchange for a written commitment from the Department that further injections or other source control measures to address groundwater would not be required if the performance objectives were met. We believe that such a mutual commitment can address the environmental concerns of the Department, and at the same time hasten the return of the property to commercial use. TPC understands that further monitoring may be warranted in selected off-site wells following the two years of performance monitoring, depending on future concentration trends. TPC further understands that on-site residual soil impacts may also need to be addressed if and when the building foundation is removed potentially posing a direct contact exposure risk.

Specifically TPC is willing to commit to the following performance targets: a 50% reduction in groundwater TCE concentrations at MW-9, MW9D and MW-12. Over and above that, TPC is also willing to offer a 25% reduction in groundwater concentrations at MW-25 (despite the fact that TPC has already met the Department's specified source control goals at this location). In return TPC is seeking a written commitment from the Department today that states no further source control action will be required to address groundwater impact when these targets are met. And, after two years of post-treatment performance monitoring showing these targets continue to met, there would no longer be on-site groundwater monitoring requirements. The plan would be to make a series of injections of a mixture of ZVI and organic substrate to enhance both direct chemical and biological reductive dechlorination this winter, and then to continue semi-annual monitoring on the same historic schedule (April, October). It is expected that the above-stated numerical goals would be achieved within 2 years.

In order to meet this schedule, we have asked for a response from the Department in the very near future. Please let me know the status of this plan as soon as you can after the meeting on Thursday.

Appendix B

Redox Tech Injection Summary

REDOX TECH, LLC



"Providing Innovative In Situ Soil and Groundwater Treatment"

Field Summary Report for the Tecumseh Products Company, 900 North Street Grafton, WI

Prepared by Michael Miles on February 17, 2011

Field Contractor	Redox Tech, LLC	Client	RMT, Inc.
Project Lead	Greg Powers	Project Lead	Alyssa Sellwood
Phone Number	803-644-7106	Phone Number	608-662-5480
Email Address	powers@redox-tech.com	Email Address	alyssa.sellwood@rmtinc.com
Start Date	1/24/11	End Date	1/31/11
Chemical	ABC +	Total Gallons	22,205
Concentration	MW-9 – 13 gal ABC and 450 lbs ZVI per 510 gal of solution MW-12 – 11.25 gal ABC and 375 lbs ZVI per 425 gal of solution MW-25 – 4.7 gal ABC and 200 lbs ZVI per 240 gal of solution (No ABC was used in the 12.5' interval in this area.)		
Injection Points	50		
Injection Intervals	MW-9 – 30, 26, 22, 18, 14, and 10 feet bgs. MW-12 – 25, 21, 17, 13, and 10 feet bgs. MW-25 – 22, 19, 16, and 12.5 feet bgs.		

Brief Narrative:

ABC+ solution was used to treat the presence of volatile organic compounds (VOCs), primarily trichloroethene (TCE) and trichloroethane (TCA), via an enhanced reductive dechlorination approach at the Tecumseh Products Company, located at 900 North Street Grafton, Wisconsin. Redox Tech performed injections under contract to RMT, Inc. from January 24, 2011 through January 31, 2011.

The total volume of ABC+ injected was approximately 22,205 gallons which contained 19,475 lbs of ZVI and 5,450 lbs of ABC. The Geoprobe drill rods were advanced in three different areas, MW-9 consisting of 33 injection locations, MW-12 consisting of 7 injection locations, and MW-25 consisting of 10 injection locations. In area MW-9, injections were conducted in 4' interval depths at 30, 26, 22, 18, 14, and 10 ft bgs. Area MW-12 injections were conducted in four individual 4' intervals and one individual 3' interval at 25, 21, 17, 13, and 10 ft bgs. Area MW-25 injections were conducted in 3 individual 3' intervals and one individual 3.5' interval at 22, 19, 16, and 12.5 ft bgs. An injection summary table and the injection logs are included in Appendix A.

A total of 50 injection points were advanced in the areas of concern. The injection points were spaced according to the client's specific field markings and the injection location map provided by the client.

REDOX TECH, LLC



"Providing Innovative In Situ Soil and Groundwater Treatment"

Tecumseh - Grafton, Wisconsin						
Injection Point	Date	Total Number of Intervals	Gallons Injected per Interval	Solution Injected (gal.)	ABC Injected (gal)	ZVI Injected (lbs)
MW-9						
G-2	1/25/2011	6	85	510	13	450
G-3	1/25/2011	6	85	510	13	450
G-1	1/25/2011	6	85	510	13	450
F-2	1/25/2011	6	85	510	13	450
F-3	1/26/2011	6	85	510	13	450
E-2	1/26/2011	6	85	510	13	450
E-1	1/26/2011	6	85	510	13	450
F-1	1/26/2011	6	85	510	13	450
A-4	1/27/2011	6	85	510	13	450
C-5	1/27/2011	6	85	510	13	450
D-4	1/27/2011	6	85	510	13	450
C-4	1/27/2011	6	85	510	13	450
B-4	1/28/2011	6	85	510	13	450
E-4	1/28/2011	6	85	510	13	450
G-4	1/28/2011	6	85	510	13	450
F-4	1/28/2011	6	85	510	13	450
E-3	1/28/2011	6	85	510	13	450
D-3	1/28/2011	6	85	510	13	450
A-3	1/29/2011	6	85	510	13	450
D-2	1/29/2011	6	85	510	13	450
C-3	1/29/2011	6	85	510	13	450
C-2	1/29/2011	6	85	510	13	450
B-3	1/29/2011	6	85	510	13	450
B-2	1/29/2011	6	85	510	13	450
A-1	1/30/2011	6	85	510	13	450
B-1	1/30/2011	6	85	510	13	450
A-2	1/30/2011	6	85	510	13	450
F-5	1/29/2011	6	85	510	13	450
G-5	1/29/2011	6	85	510	13	450
E-5	1/29/2011	6	85	510	13	450
D-5	1/30/2011	6	85	510	13	450
D-1	1/30/2011	6	85	510	13	450
C-1	1/30/2011	6	85	510	13	450

REDOX TECH, LLC



"Providing Innovative In Situ Soil and Groundwater Treatment"

Field Summary Report for the Tecumseh Products Company, 900 North Street Grafton, WI

Prepared by Michael Miles on August 29, 2011

Field Contractor	Redox Tech, LLC	Client	RMT, Inc.
Project Lead	Greg Powers	Project Lead	Alyssa Sellwood
Phone Number	803-644-7106	Phone Number	608-662-5480
Email Address	powers@redox-tech.com	Email Address	alyssa.sellwood@rmtinc.com
Start Date	8/15/11	End Date	8/17/11
Chemical	ABC +	Total Gallons	5,190
Concentration	Saturated Zone - 11 gal ABC and 375 lbs ZVI per 375 gal of solution Saturated Zone - 11 gal ABC and 375 lbs ZVI per 250 gals of solution Vadose Zone - 5.5 gal ABC and 50 lbs ZVI per 60 gal of solution		
Injection Points	19		
Injection Intervals	Saturated Zone - 25, 21, 17, 13, and 10 feet bgs. Vadose Zone - 9, 7, and 5 feet bgs.		

Brief Narrative:

ABC+ solution was used to treat the presence of volatile organic compounds (VOCs), primarily trichloroethene (TCE) and trichloroethane (TCA), via an enhanced reductive dechlorination approach at the Tecumseh Products Company, located at 900 North Street Grafton, Wisconsin. Redox Tech performed injections under contract to RMT, Inc. from August 15, 2011 through August 17, 2011.

The total volume of ABC+ injected was approximately 5,190 gallons, which contained 5,825 lbs of ZVI and 188 gals of ABC. The Geoprobe rods were advanced in the saturated and vadose target areas. The saturated zone consisted of 15 locations with injection depths of 25, 21, 17, 13, and 10 ft bgs. The vadose zone consisted of 4 locations surrounding MW-12, with injections depths of 9, 7, and 5 ft bgs.

Back pressure occurred at IP-2, IP-3, IP-4, IP-8, IP-9, and IP-10. IP-1, IP-6, and IP-7 produced substantial back pressure and daylighting through cracks in the asphalt. To reduce daylighting, the concentration of ABC+ was increased, reducing the amount of water used from 75 gals per interval to 50 gals. A detailed account of these instances can be found in the injection summary table and the injection logs included in Appendix A.

A total of 19 injection points were advanced in the areas of concern. The injection points were spaced according to the client's specific field markings.

REDOX TECH, LLC



"Providing Innovative In Situ Soil and Groundwater Treatment"

Tecumseh - Grafton, Wisconsin						
Injection Point	Date	Total Number of Intervals	Gallons Injected per Interval	Solution Injected (gal.)	ABC Injected (gal)	ZVI Injected (lbs)
MW-12						
A-4	1/27/2011	5	85	425	11.25	375
A-3	1/27/2011	5	85	425	11.25	375
A-2	1/27/2011	5	85	425	11.25	375
A-1	1/28/2011	5	85	425	11.25	375
B-3	1/28/2011	5	85	425	11.25	375
B-1	1/28/2011	5	85	425	11.25	375
B-2	1/28/2011	5	85	425	11.25	375
MW-25						
A-3	1/25/2011	4	60	240	4.7	200
B-3	1/25/2011	4	60	240	4.7	200
C-3	1/25/2011	4	60	240	4.7	200
A-1	1/25/2011	4	60	240	4.7	200
C-2	1/25/2011	4	60	240	4.7	200
C-1	1/25/2011	4	60	240	4.7	200
B-4	1/26/2011	4	60	240	4.7	200
A-4	1/26/2011	4	60	240	4.7	200
A-2	1/26/2011	4	60	240	4.7	200
C-4	1/26/2011	4	60	240	4.7	200
			Totals:	22,205	554.75	19,475

REDOX TECH, LLC





"Providing Innovative In Situ Soil and Groundwater Treatment"

Tecumseh - Grafton, Wisconsin						
Injection Point	Date	Total Number of Intervals	Gallons Injected per Interval	Solution Injected (gal.)	ABC Injected (gal)	ZVI Injected (lbs)
MW-12						
IP-1	8/16-17/2011	5	50+	375	15.5	375
IP-2	8/17/2011	5	50	250	11	375
IP-3	8/17/2011	5	50	250	11	375
IP-4	8/17/2011	5	50	250	11	375
IP-5	8/17/2011	5	50	250	11	375
IP-6	8/16/2011	5	75+	210	7.5	375
IP-7	8/16/2011	5	75+	365	11	375
IP-8	8/16/2011	5	75	375	11	375
IP-9	8/16/2011	5	75	375	11	375
IP-10	8/15/2011	5	75	375	11	375
IP-11	8/15/2011	5	75	375	11	375
IP-12	8/15/2011	5	75	375	11	375
IP-13	8/15/2011	5	75	375	11	375
IP-14	8/15/2011	5	75	375	11	375
IP-15	8/15/2011	5	75	375	11	375
IP-V1	8/17/2011	3	20	60	5.5	50
IP-V2	8/17/2011	3	20	60	5.5	50
IP-V3	8/17/2011	3	20	60	5.5	50
IP-V4	8/17/2011	3	20	60	5.5	50
			Totals:	5,190	188	5,825

Appendix C Photographs

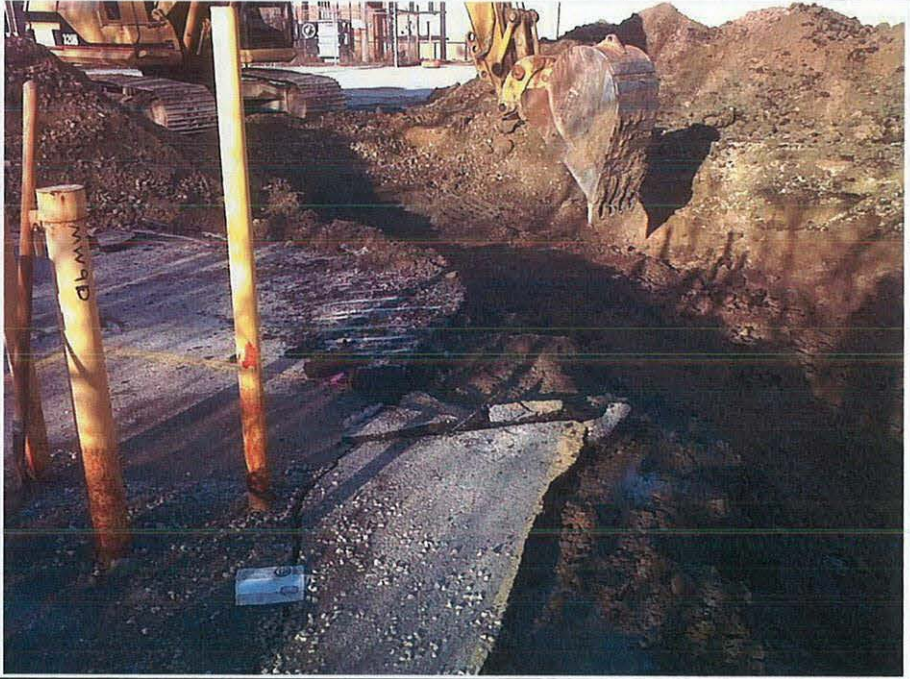





Photographic Log

Client Name:		Site Location:	Project No.:
Tecumseh Products Company		Grafton, Wisconsin	004169.0000
Photo No.	Date		
1	1/27/11		
Description			
Looking south at the injection field near MW-9.			
Photo No.	Date		
2	1/30/11		
Description			
Subsurface injection near MW-9.			



Photographic Log

Client Name:		Site Location:	Project No.:
Tecumseh Products Company		Grafton, Wisconsin	004169.0000
Photo No.	Date		
3	3/13/12		
Description			
Constructing trench for in situ placement of Daramend®.			
Photo No.	Date		
4	3/13/12		
Description			
Blending in the Daramend® near MW-9.			

Appendix D Laboratory Reports

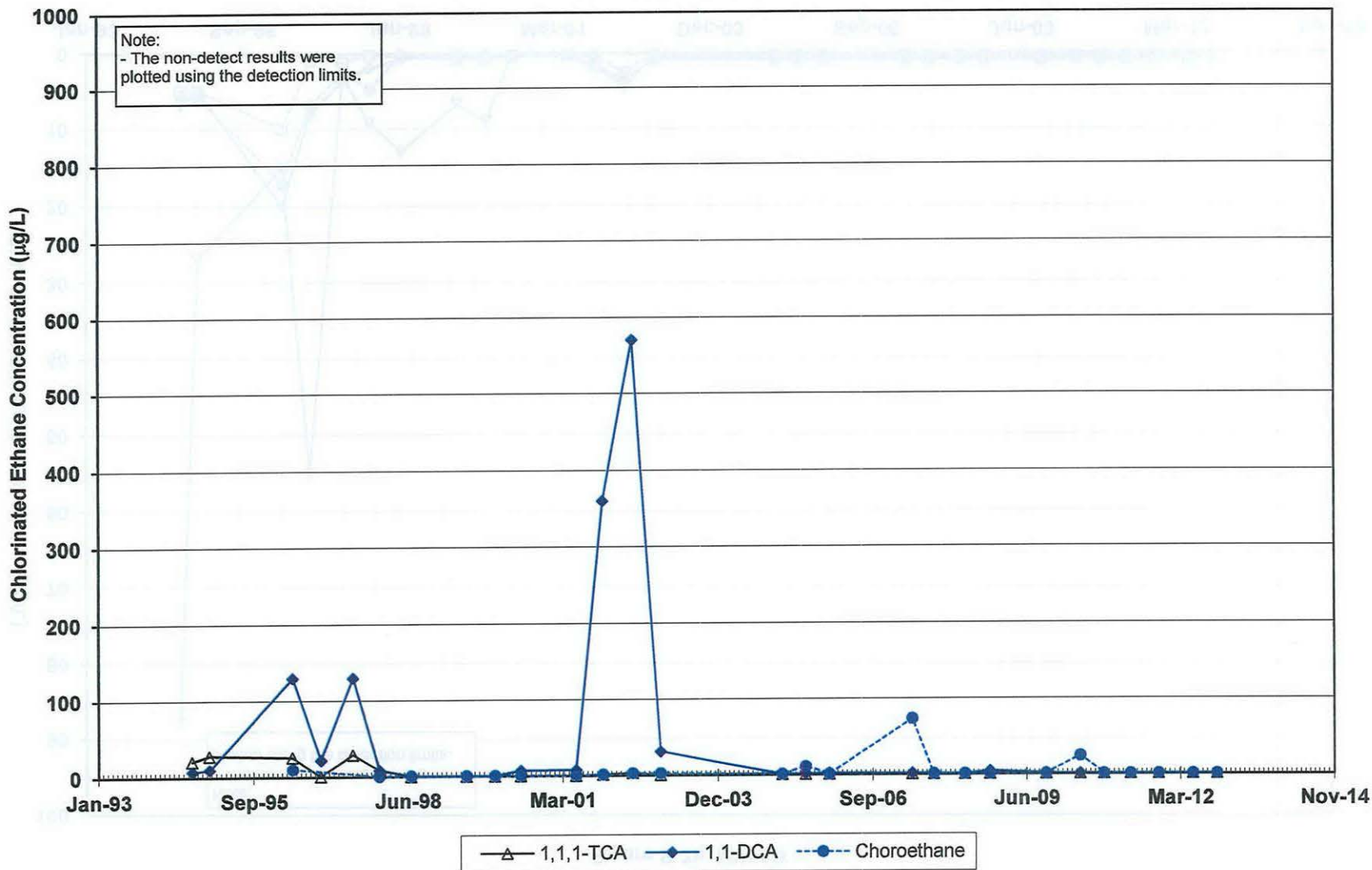
(pdf on attached CD)

Appendix E Trend Plots

Shallow Wells

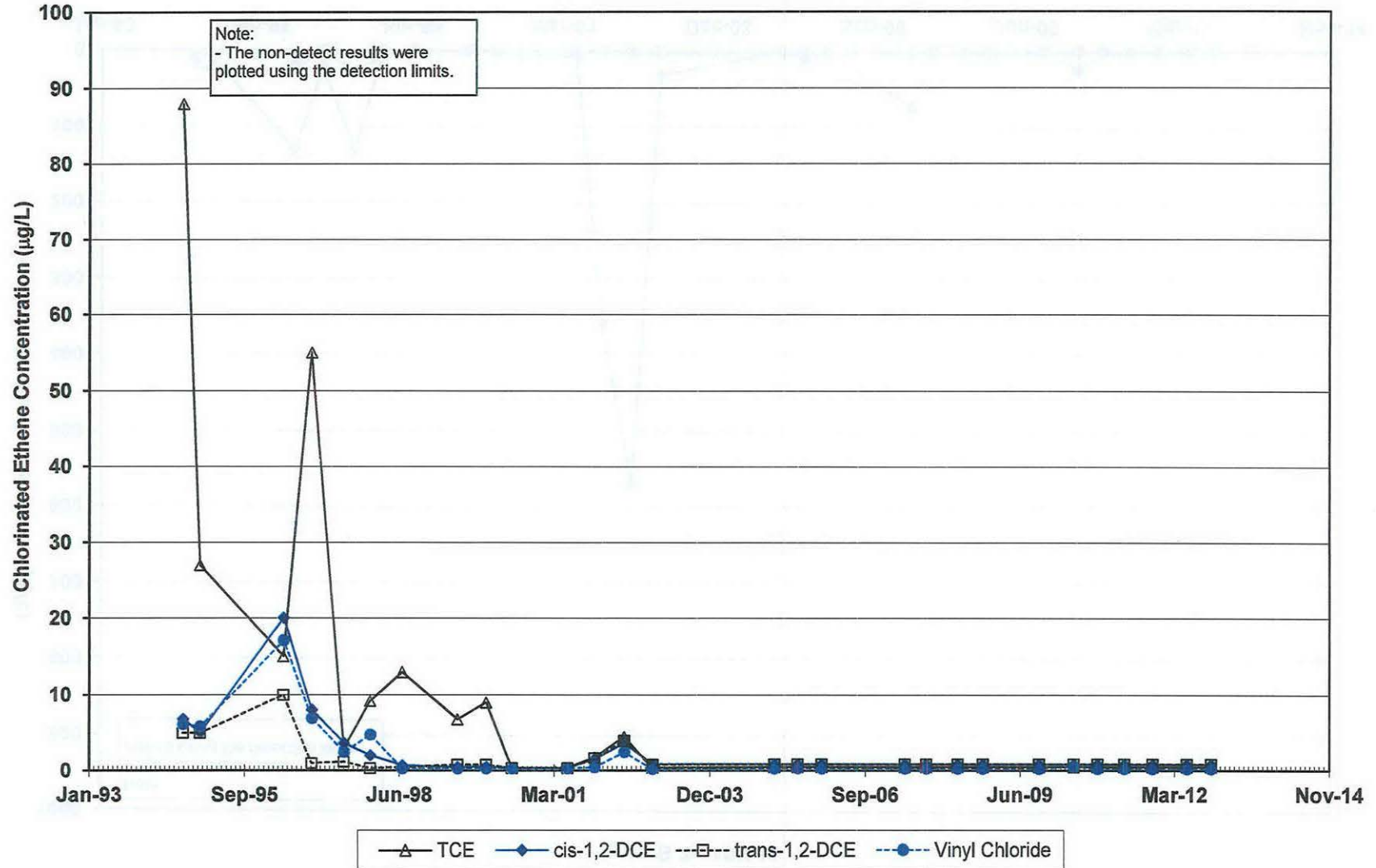
Tecumseh Products Co.
Grafton, WI

Figure B-7a MW 3D



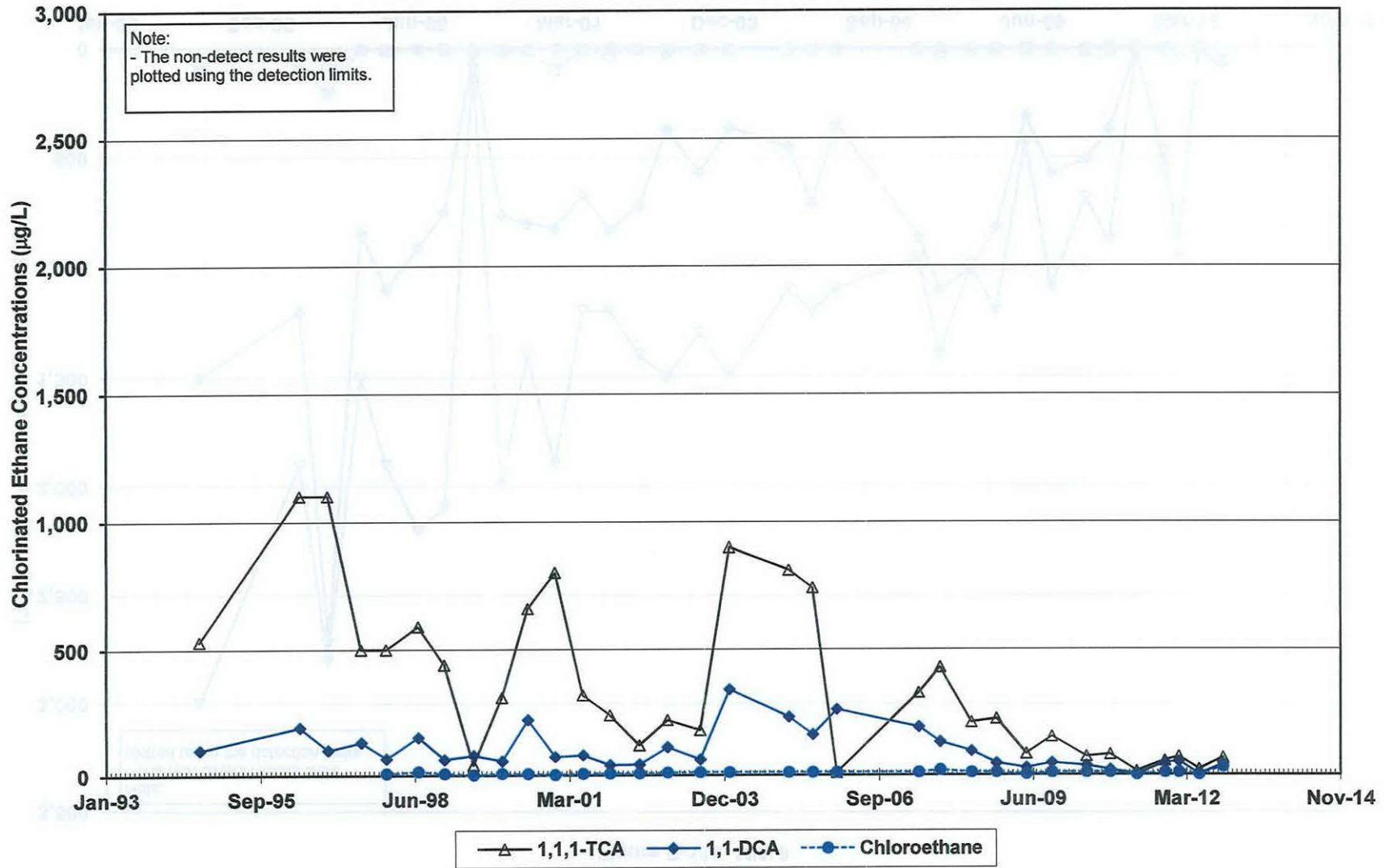
Tecumseh Products Co.
Grafton, WI

Figure B-7b MW 3D



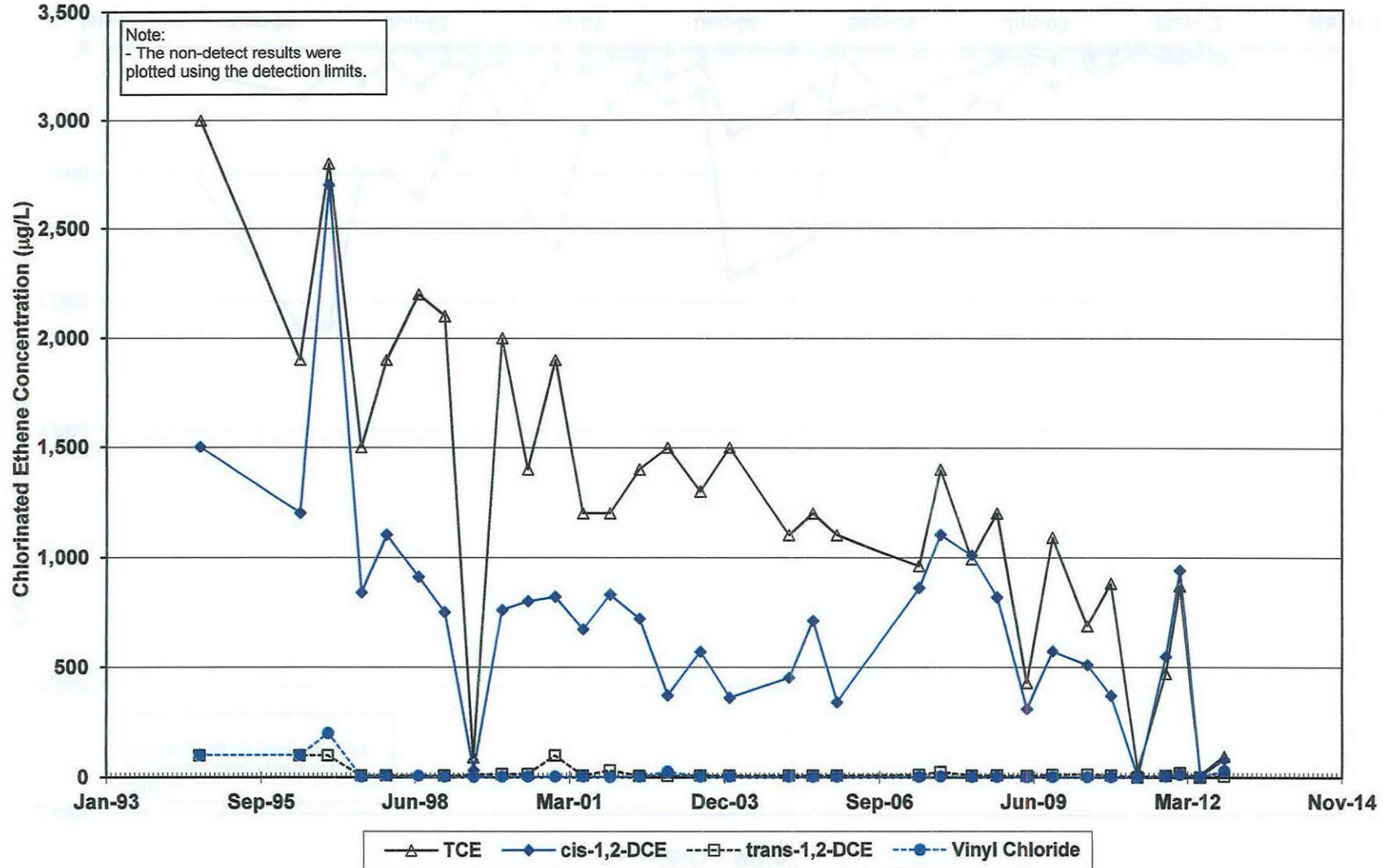
Tecumseh Products Co.
Grafton, WI

Figure B-11a MW 9



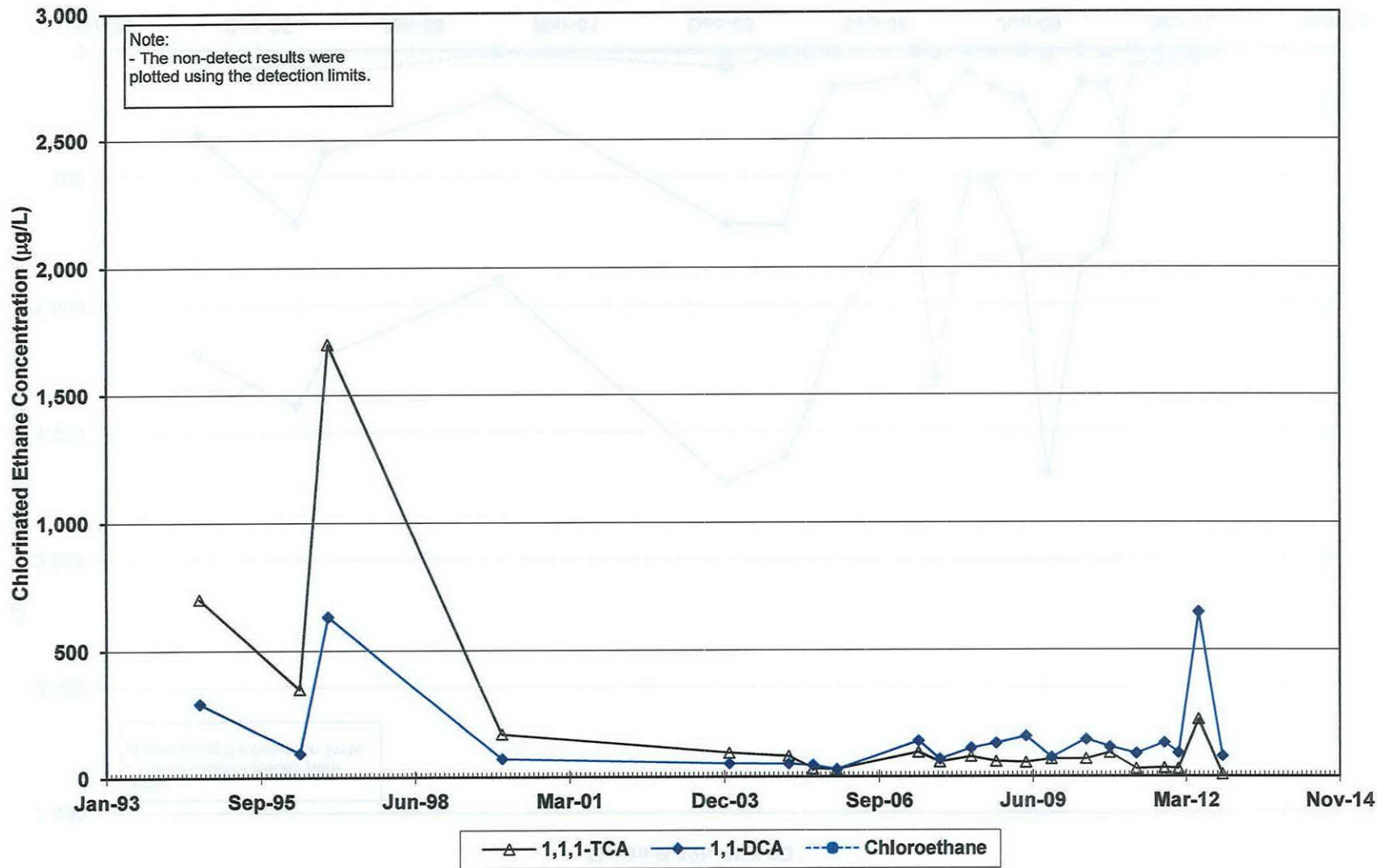
Tecumseh Products Co.
Grafton, WI

Figure B-11b MW 9



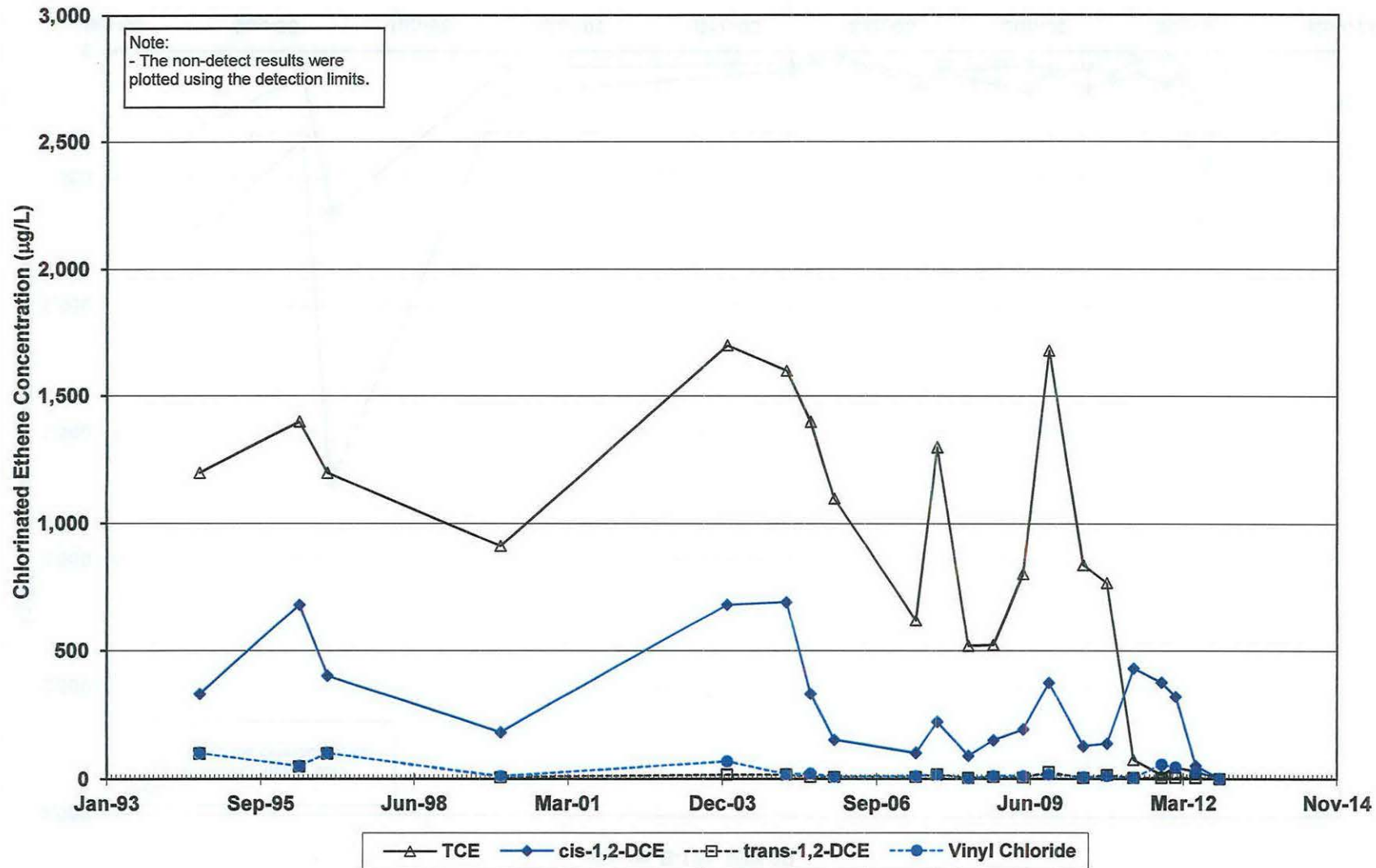
Tecumseh Products Co.
Grafton, WI

Figure B-12a MW 9D



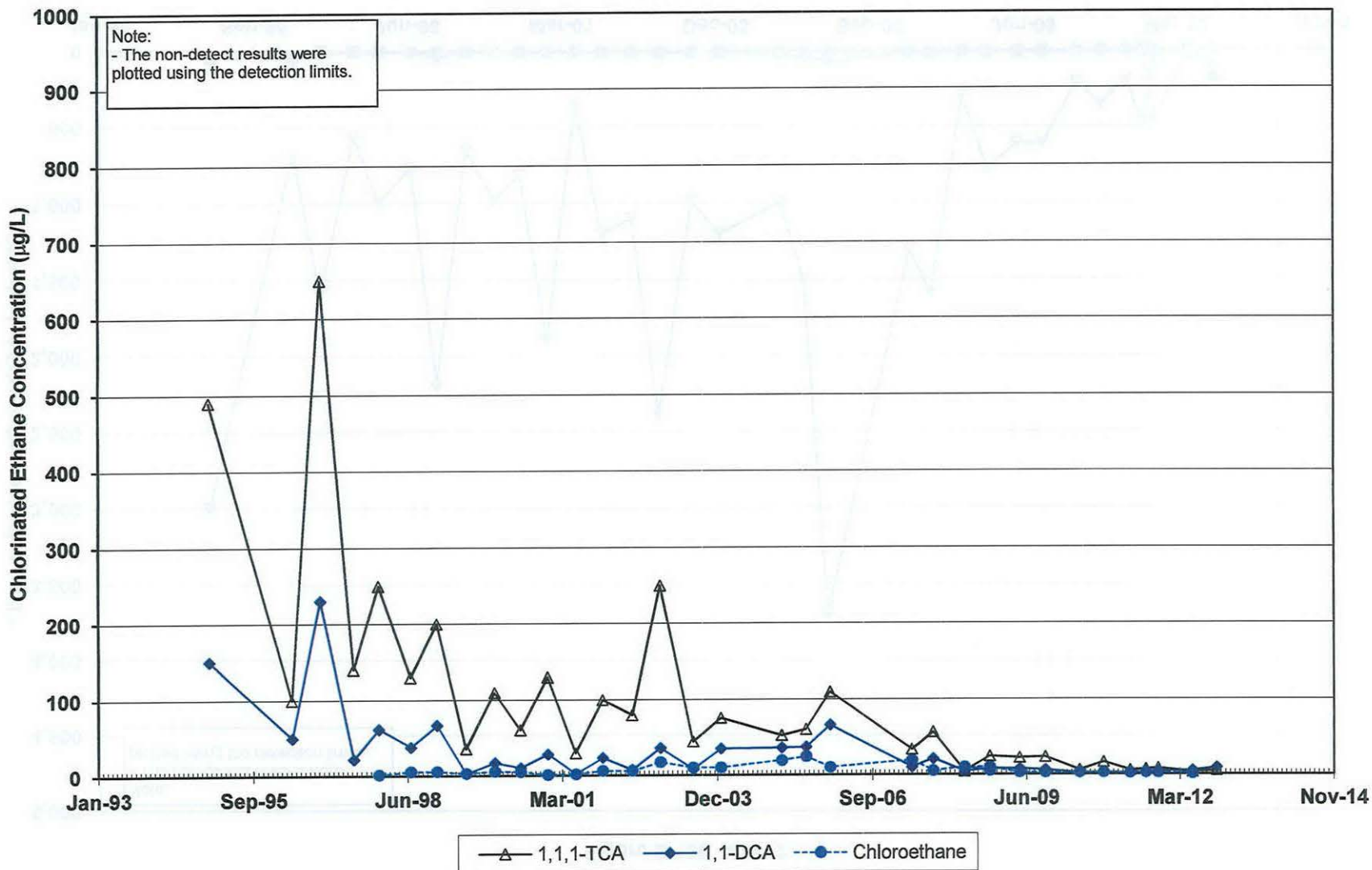
Tecumseh Products Co.
Grafton, WI

Figure B-12b MW 9D



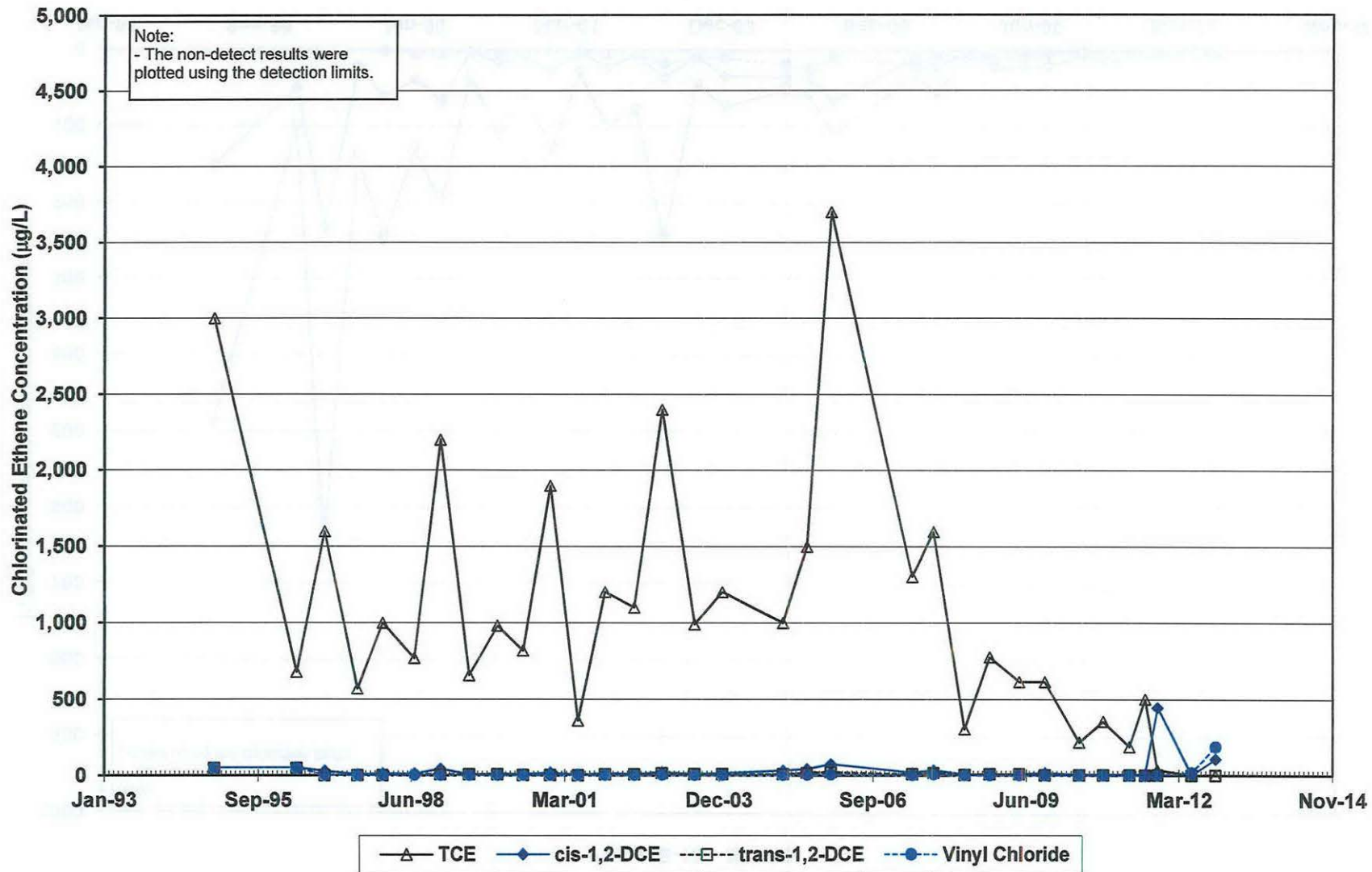
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Grafton, WI

Figure B-13a MW 12



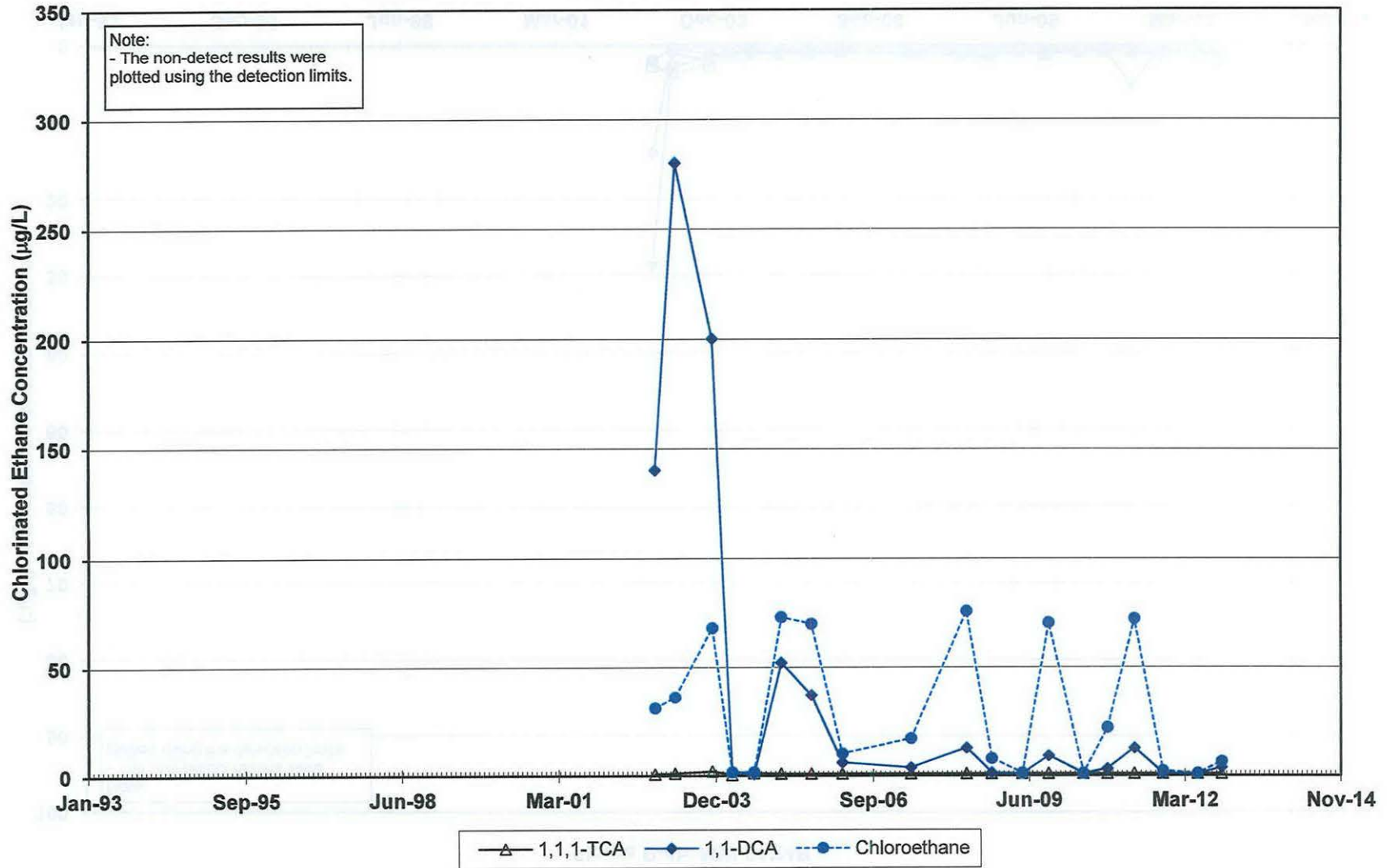
Tecumseh Products Co.
Grafton, WI

Figure B-13b MW 12



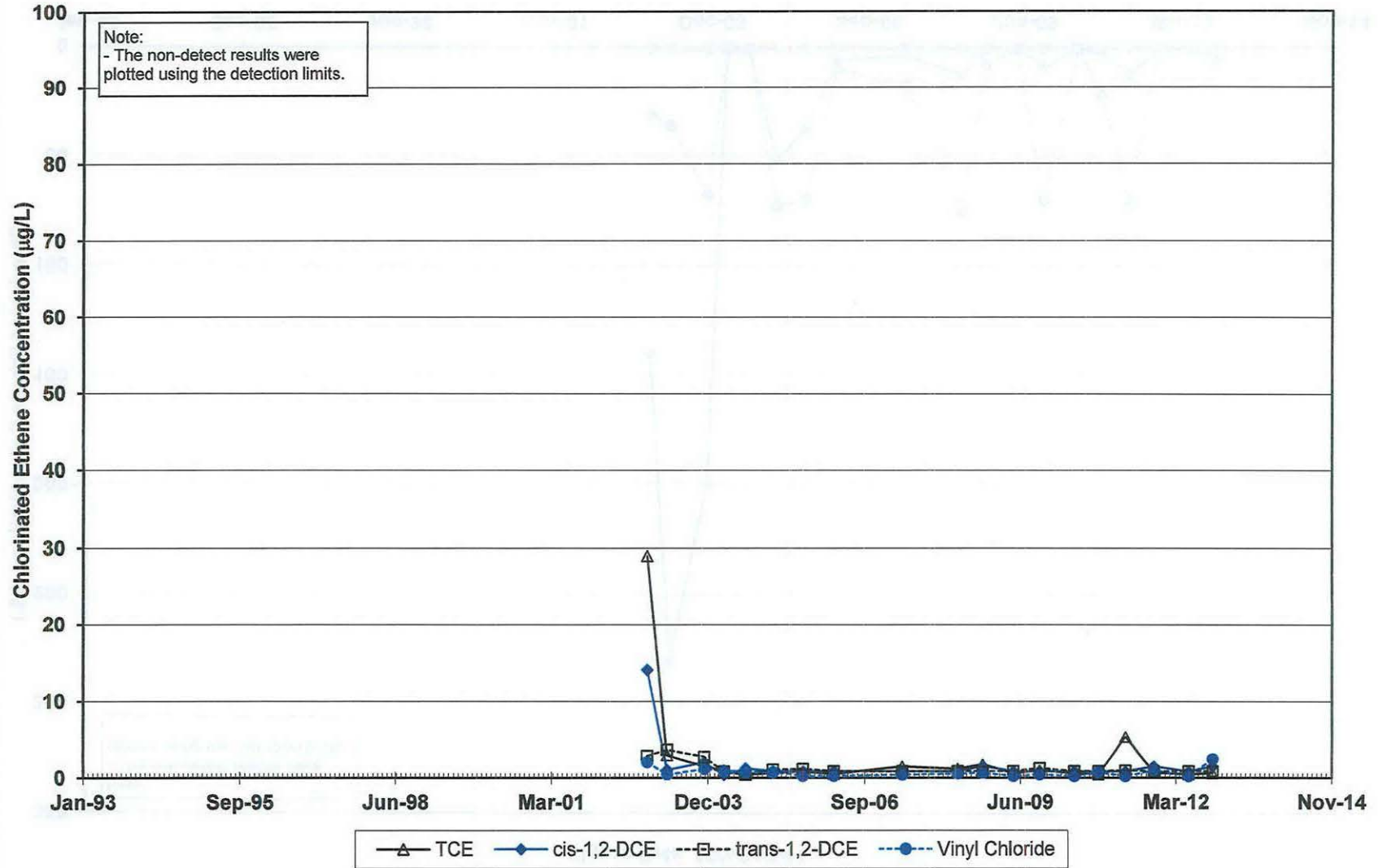
Tecumseh Products Co.
Grafton, WI

Figure B-4a MW-24/24R



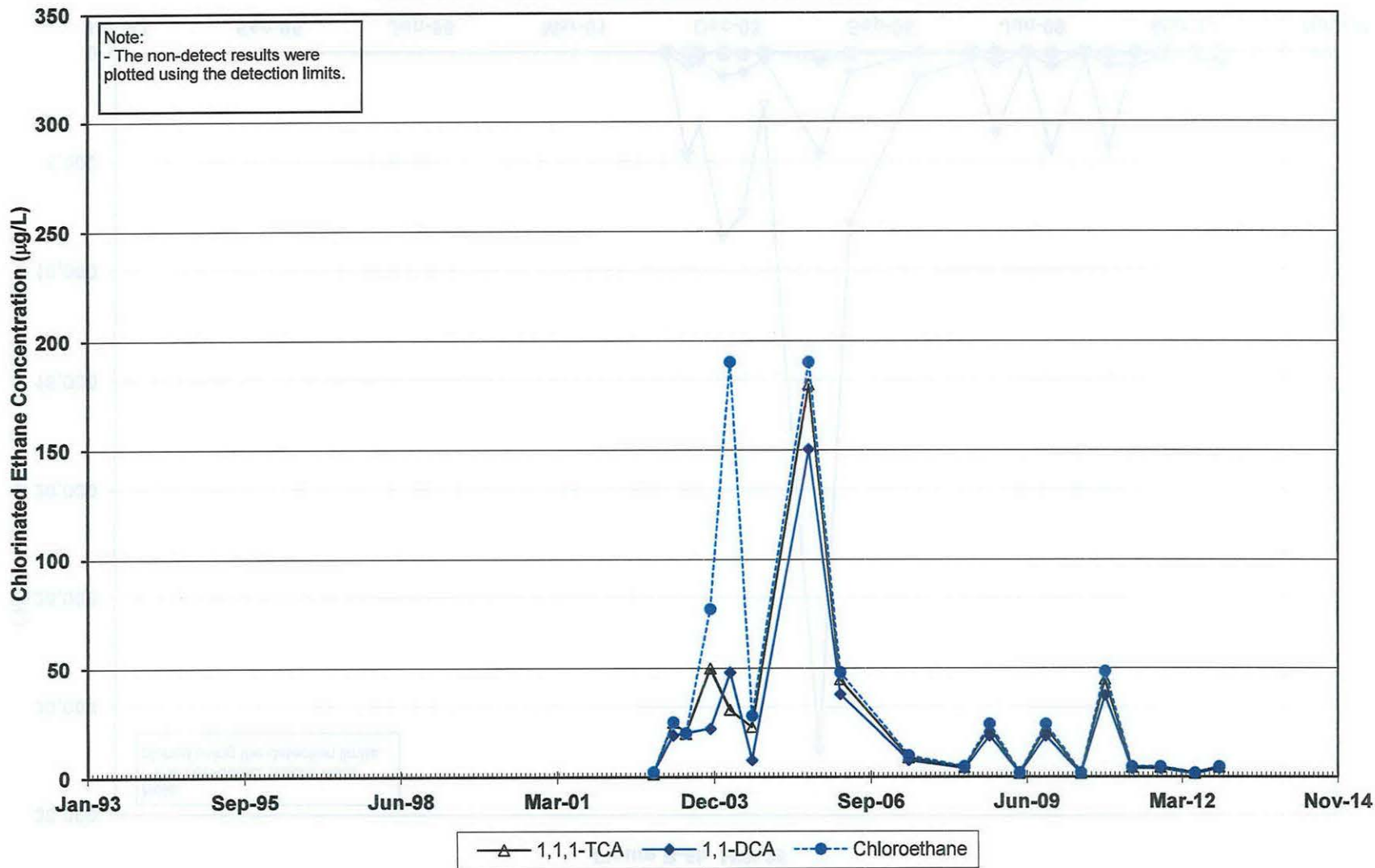
Tecumseh Products Co.
Grafton, WI

Figure B-4b MW-24/24R



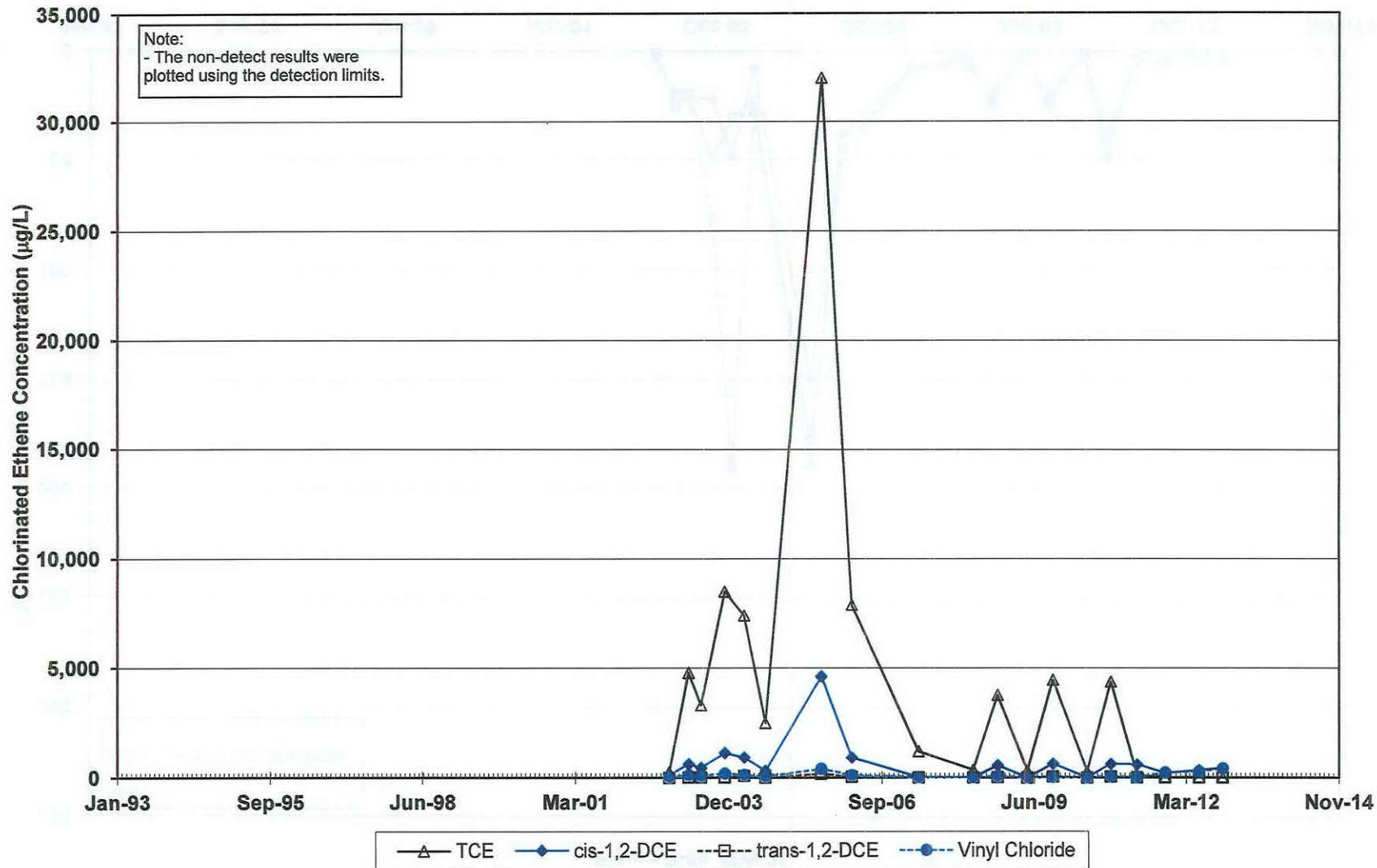
Tecumseh Products Co.
Grafton, WI

Figure B-5a MW-25



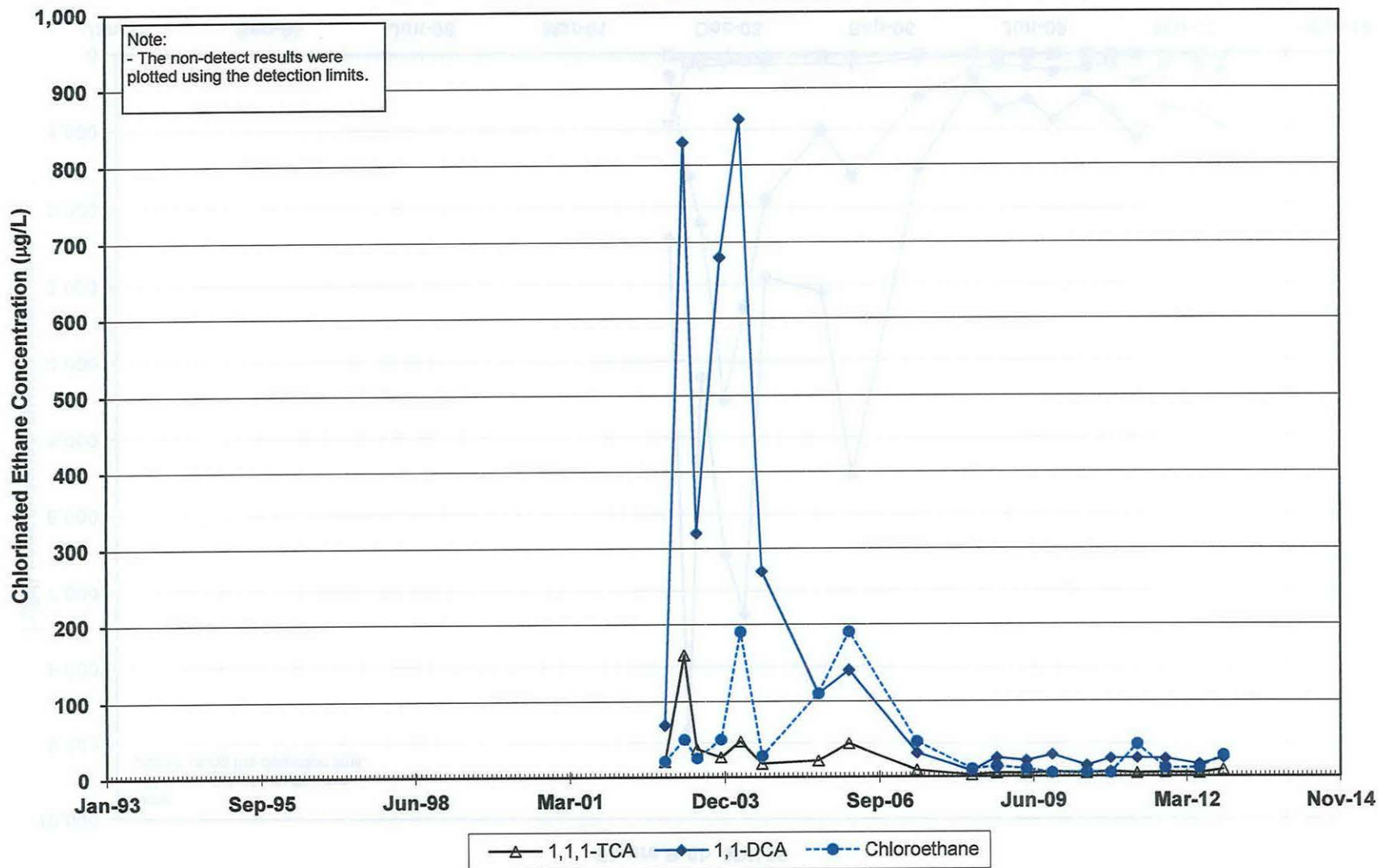
Tecumseh Products Co.
Grafton, WI

Figure B-5b MW-25



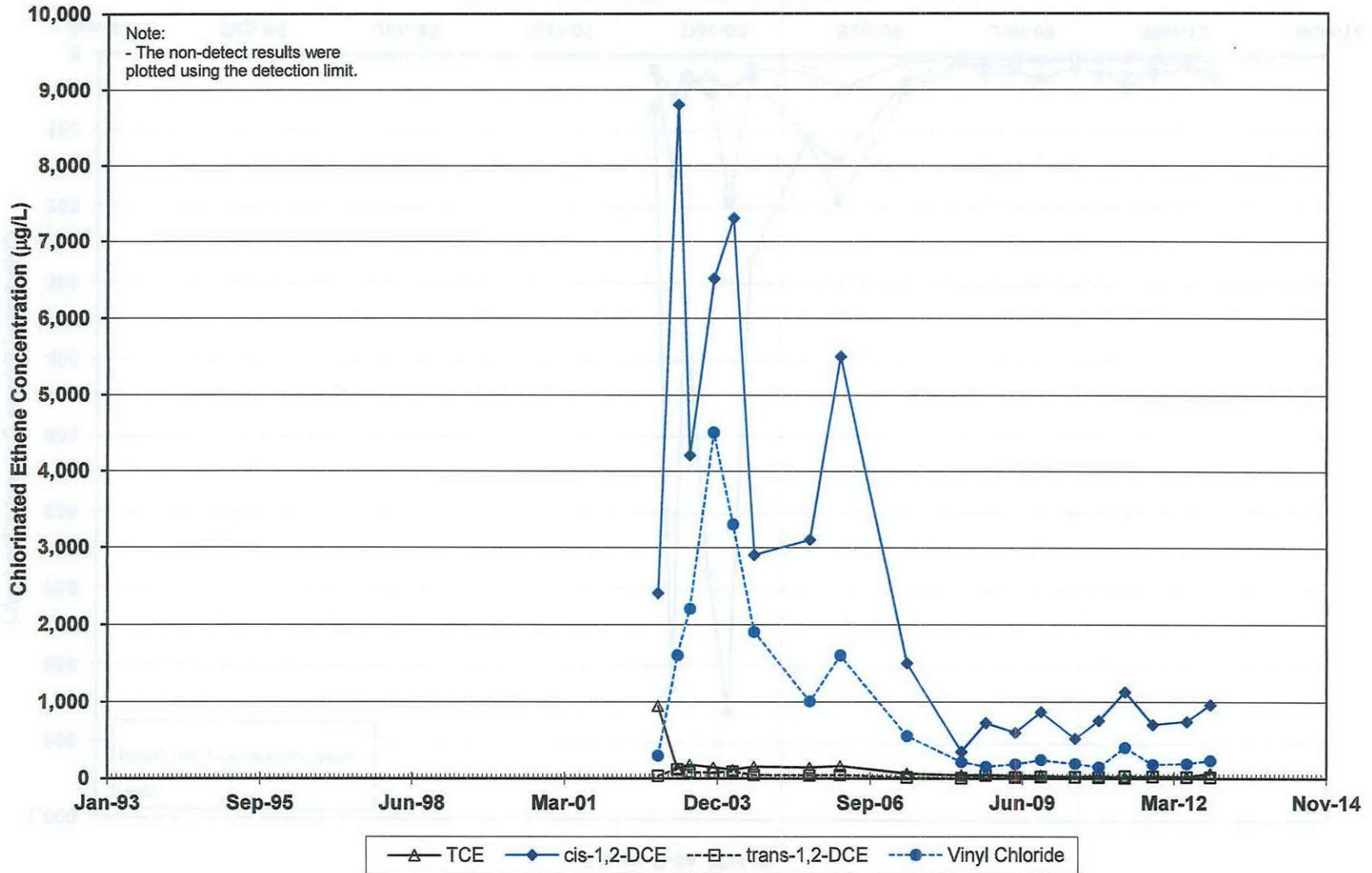
Tecumseh Products Co.
Grafton, WI

Figure B-6a MW 26



Tecumseh Products Co.
Grafton, WI

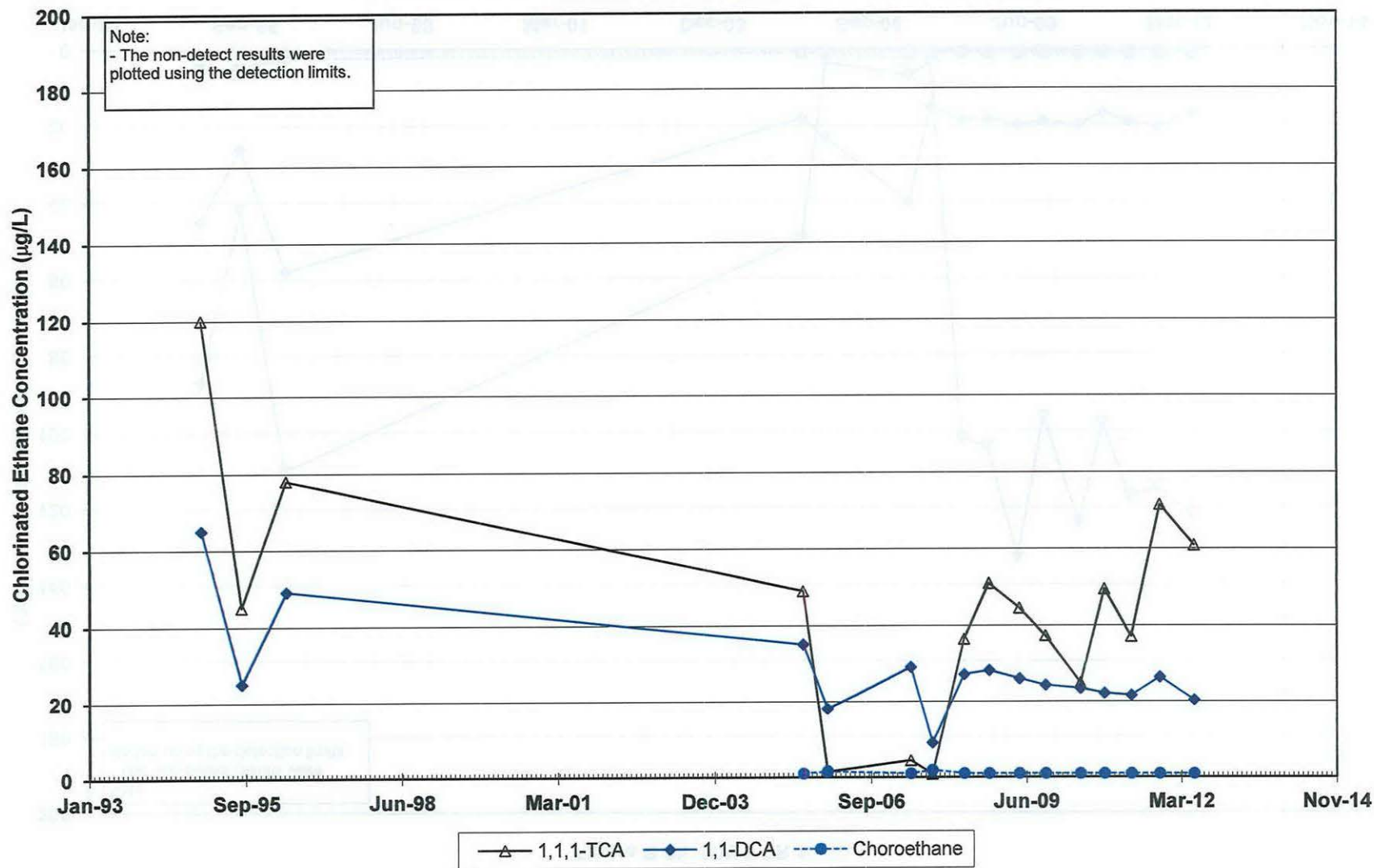
Figure B-6b MW 26



Bedrock Wells

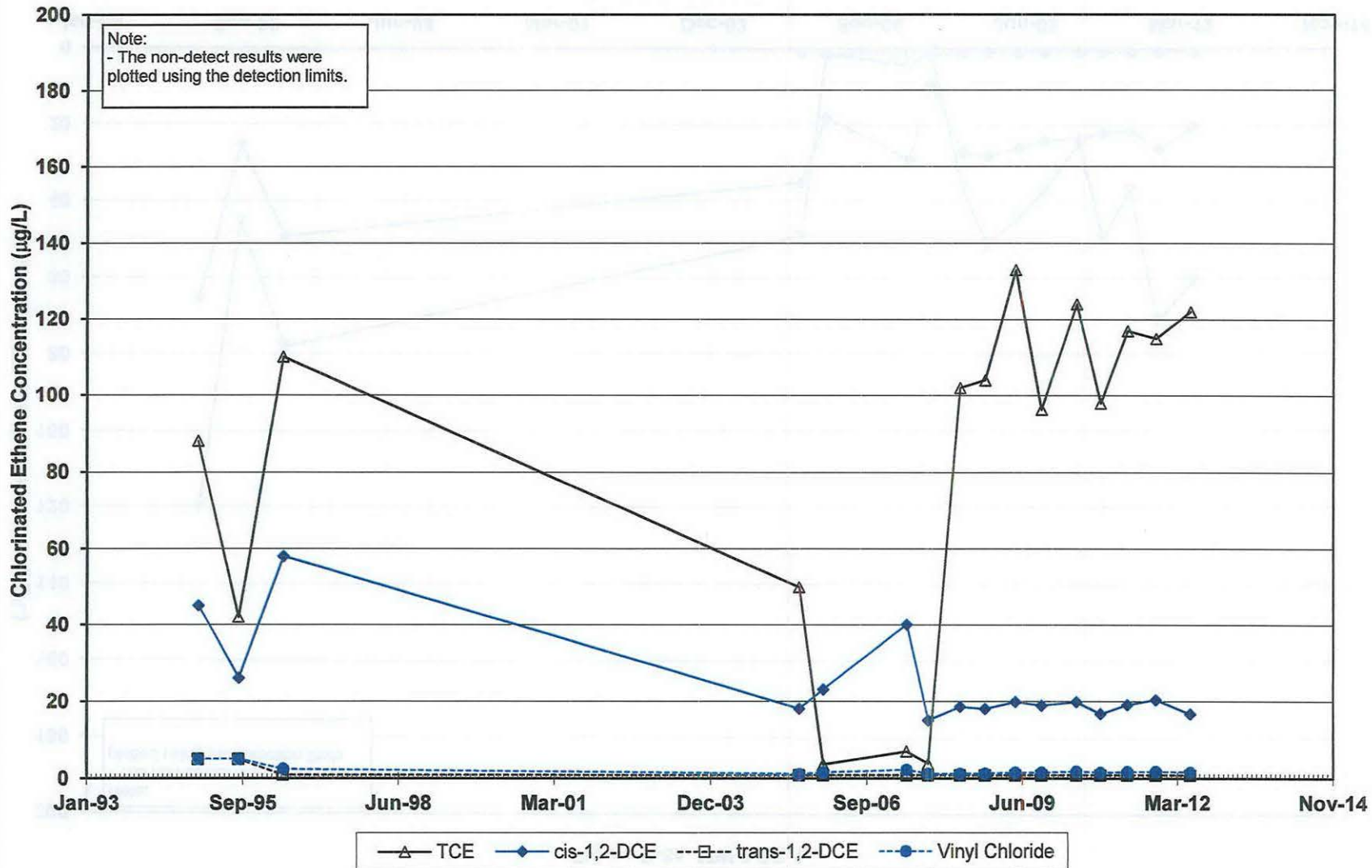
Tecumseh Products Co.
Grafton, WI

Figure B-8a MW 3 BR 1



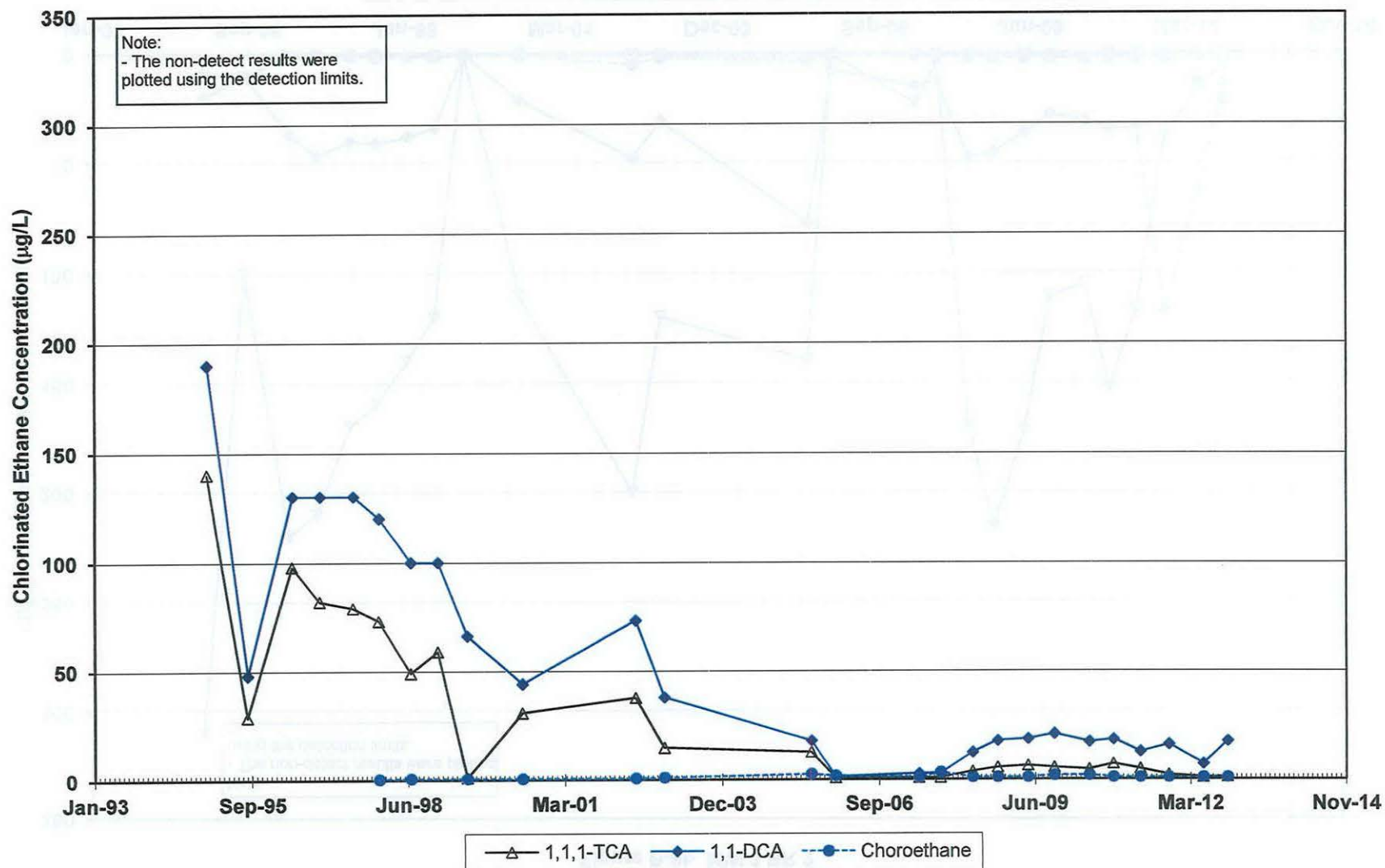
Tecumseh Products Co.
Grafton, WI

Figure B-8b MW 3 BR 1



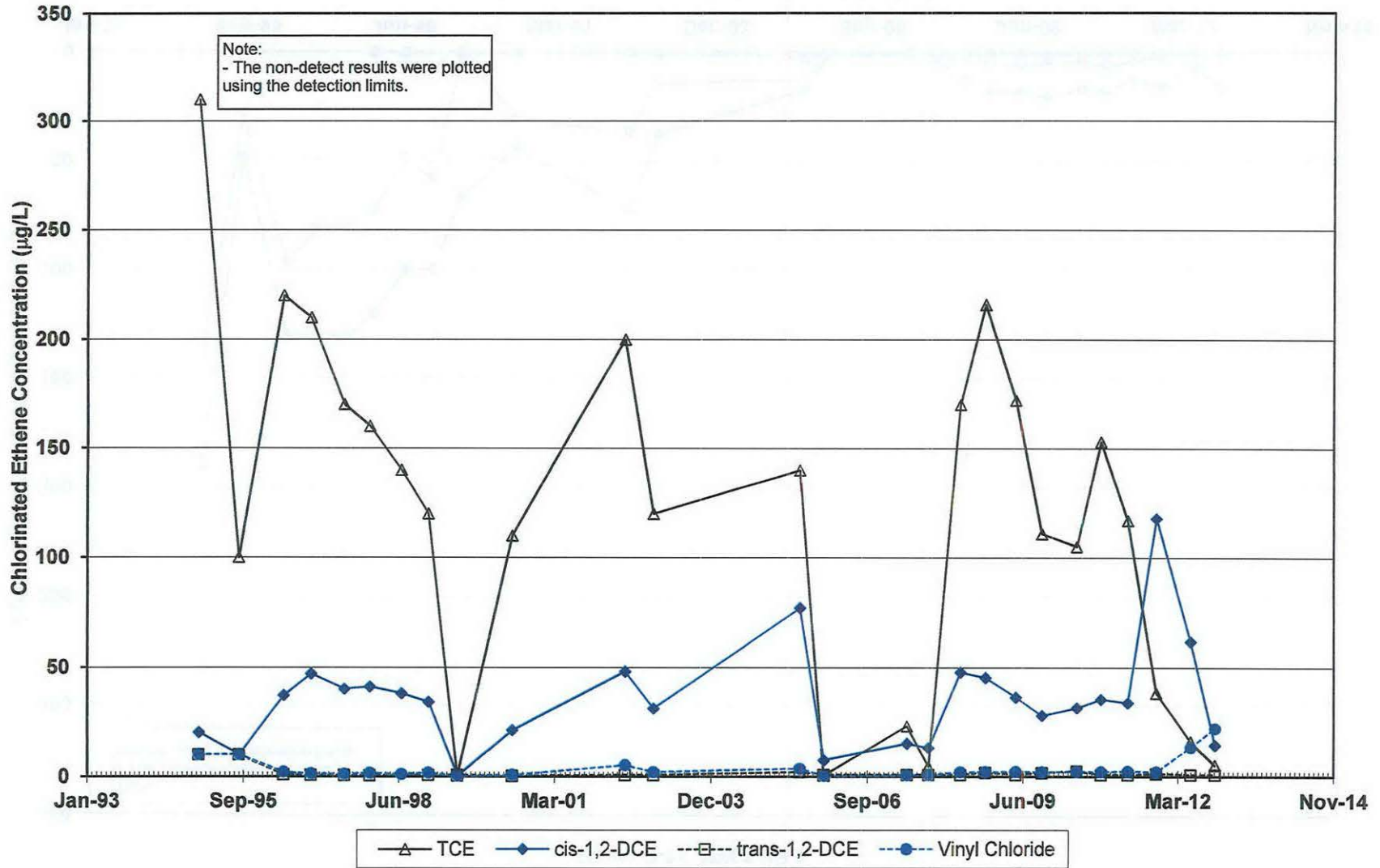
Tecumseh Products Co.
Grafton, WI

Figure B-9a MW 3 BR 2



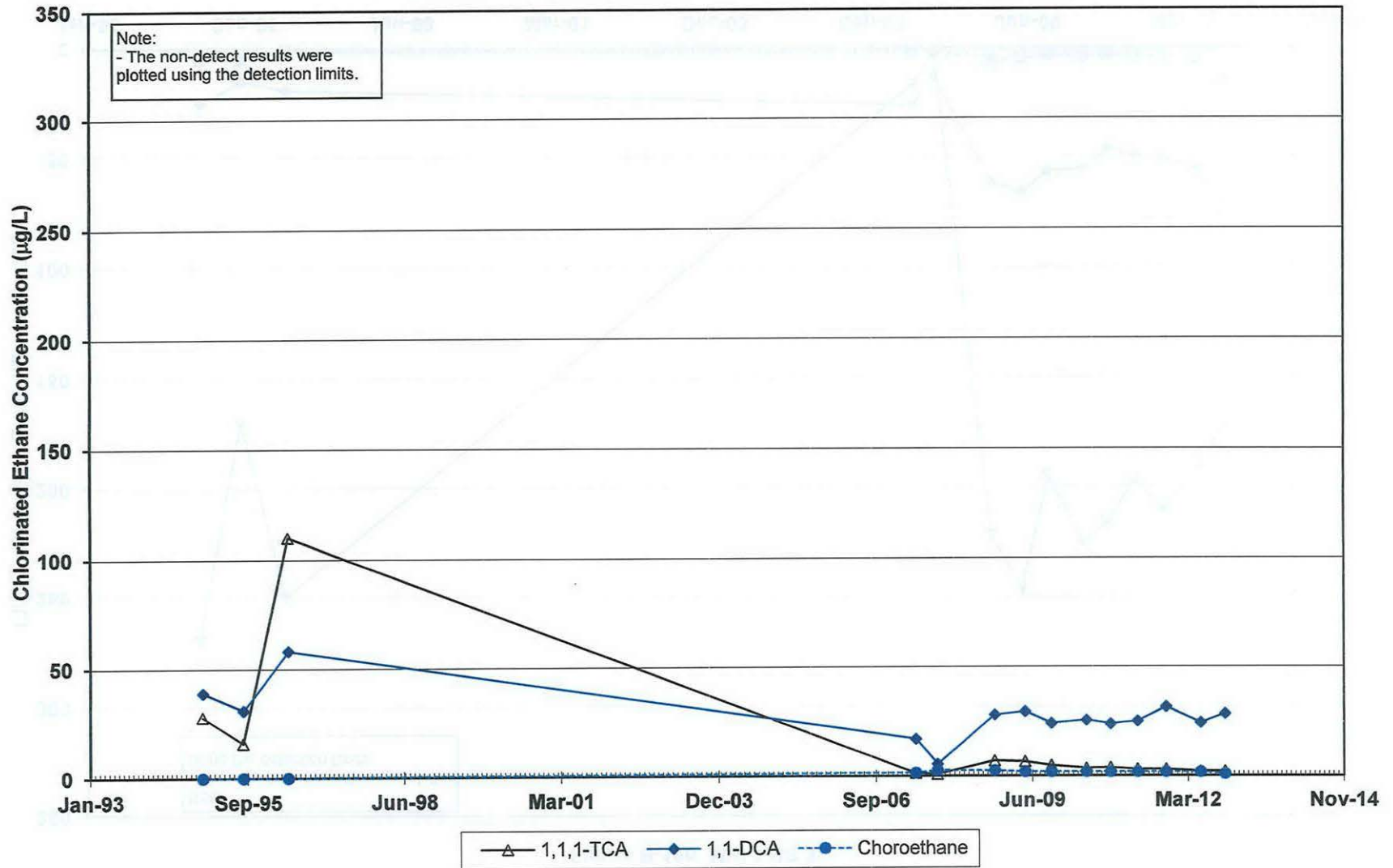
Tecumseh Products Co.
Grafton, WI

Figure B-9b MW 3 BR 2



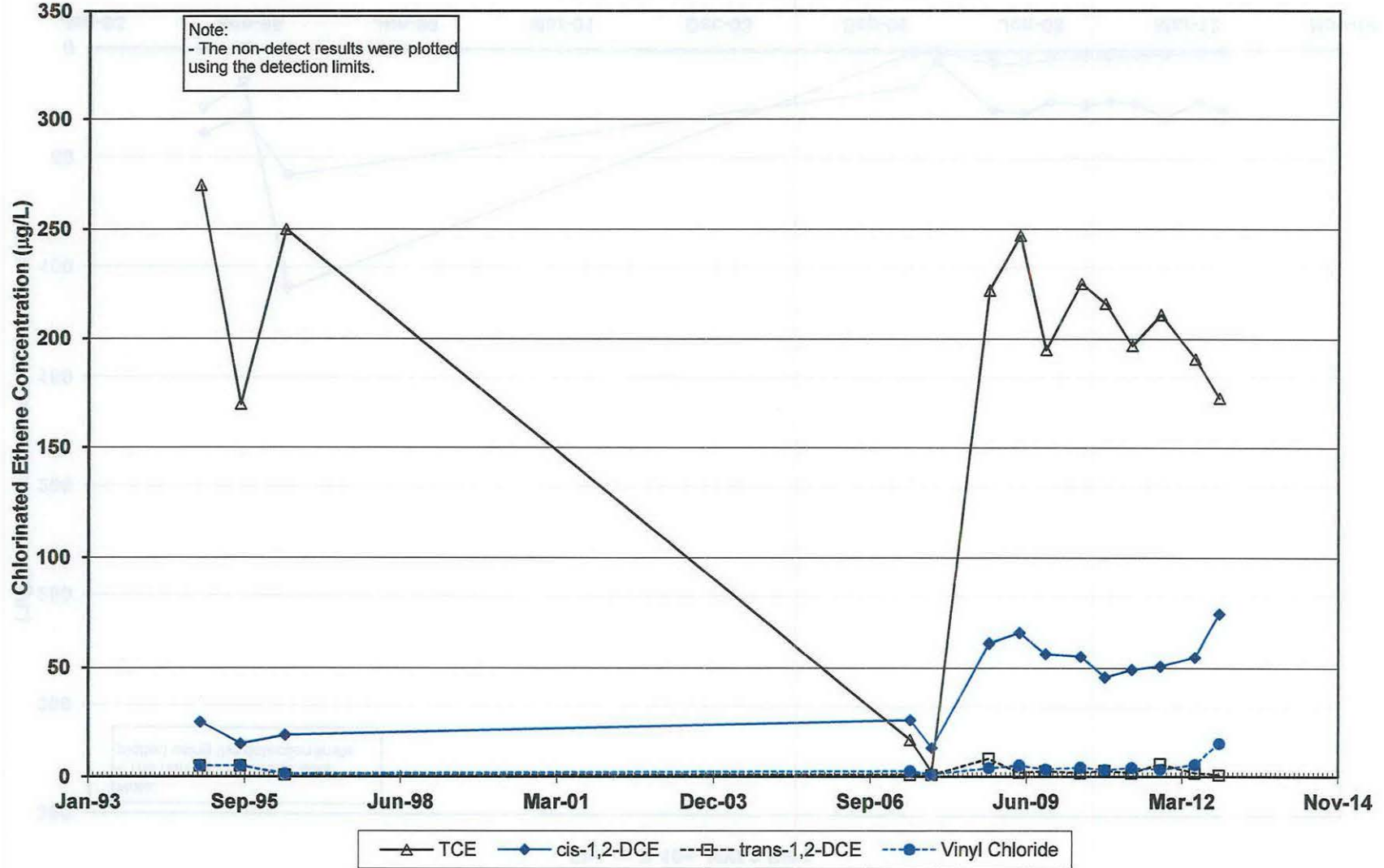
Tecumseh Products Co.
Grafton, WI

Figure B-10a MW 3 BR 3



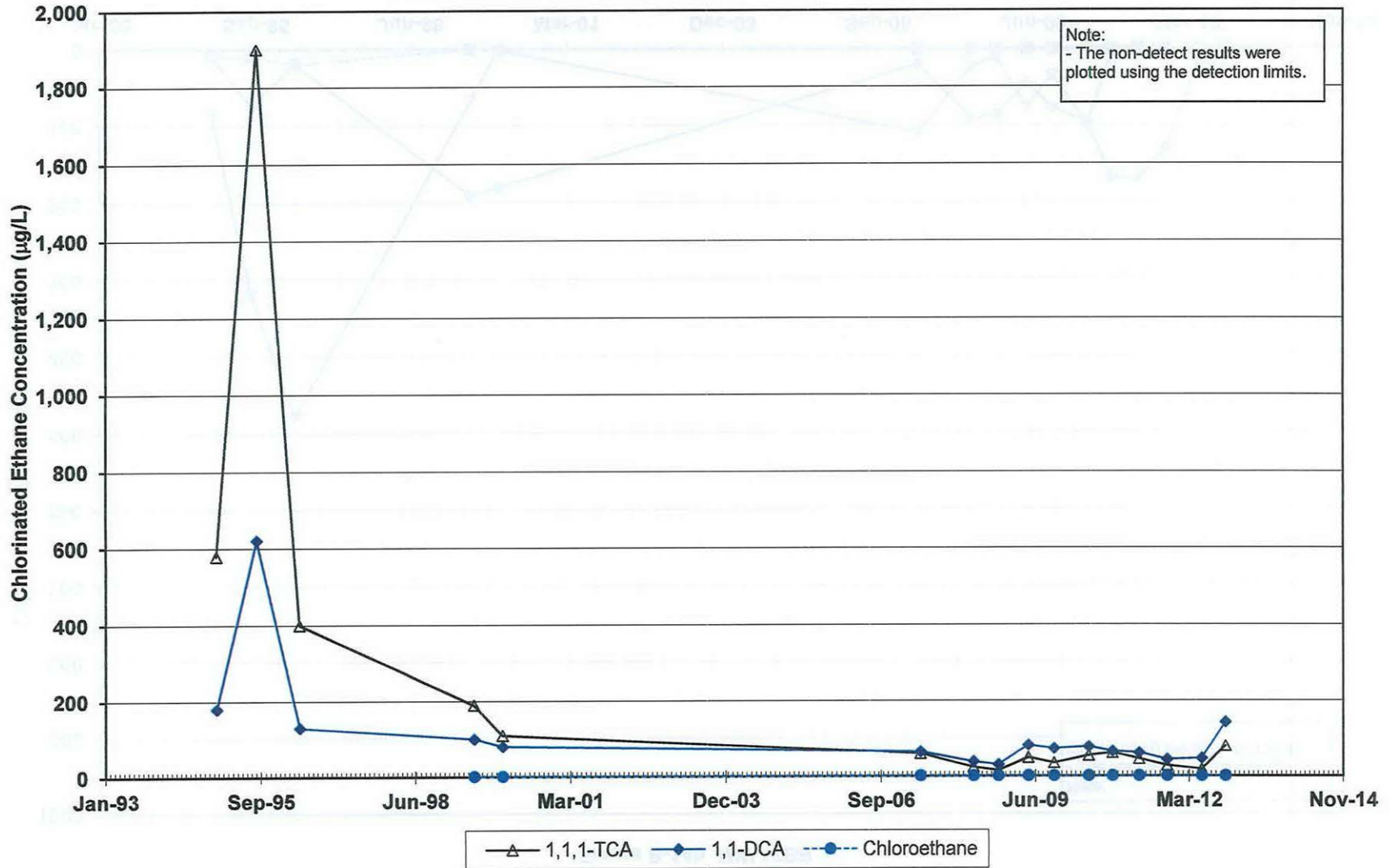
Tecumseh Products Co.
Grafton, WI

Figure B-10b MW 3 BR 3



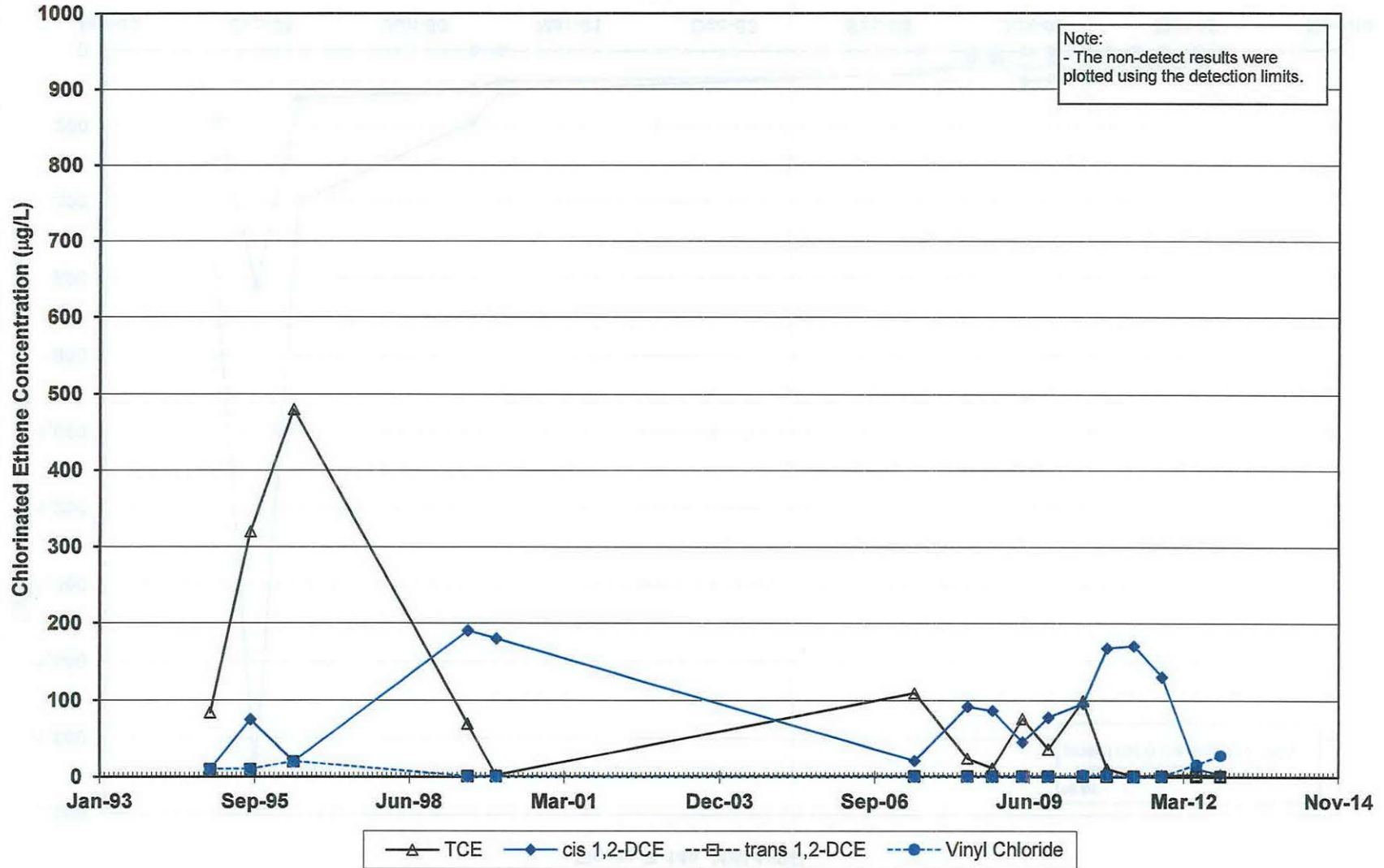
Tecumseh Products Co.
Grafton, WI

Figure B-14a MW 12BR



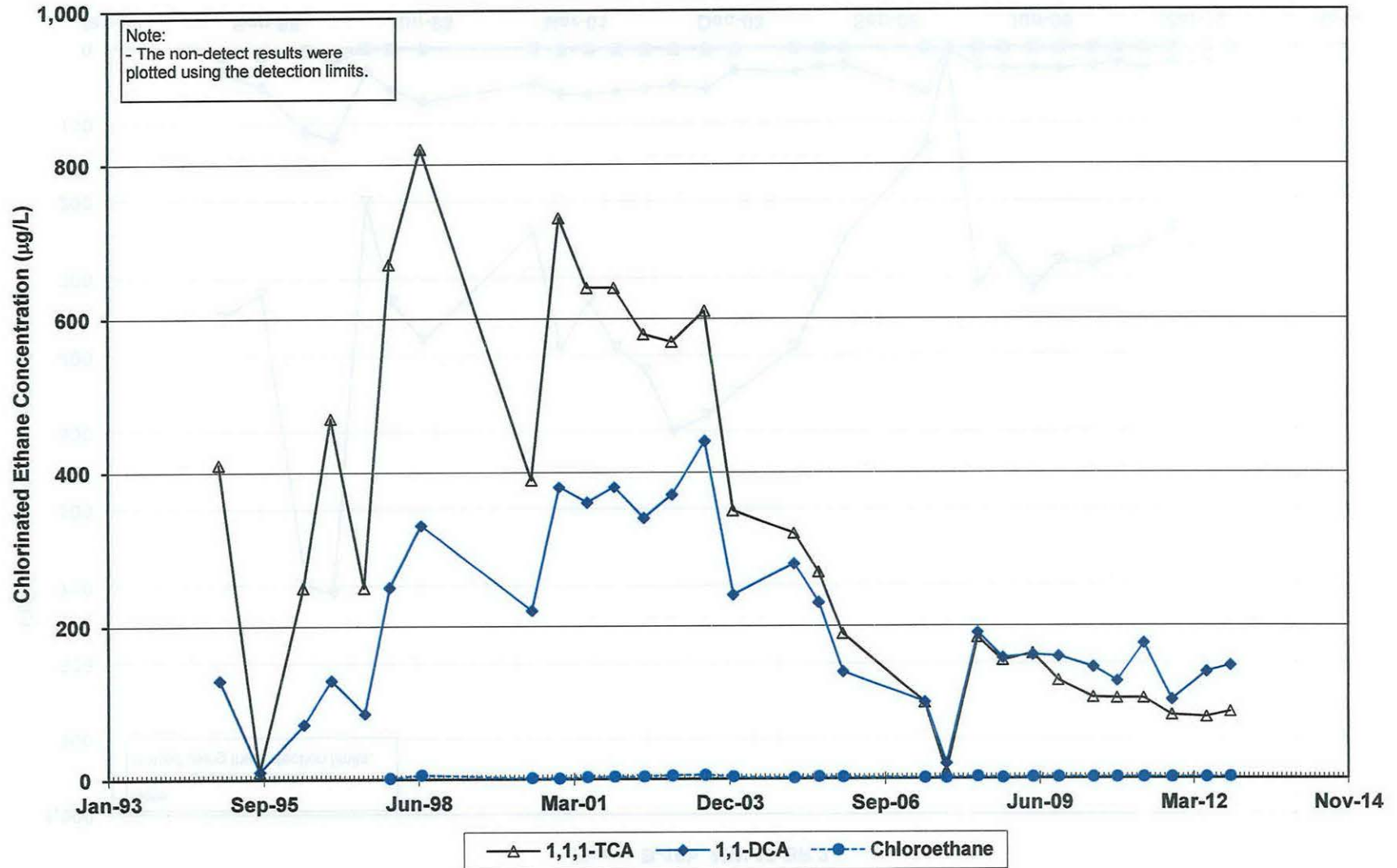
Tecumseh Products Co.
Grafton, WI

Figure B-14b MW 12BR



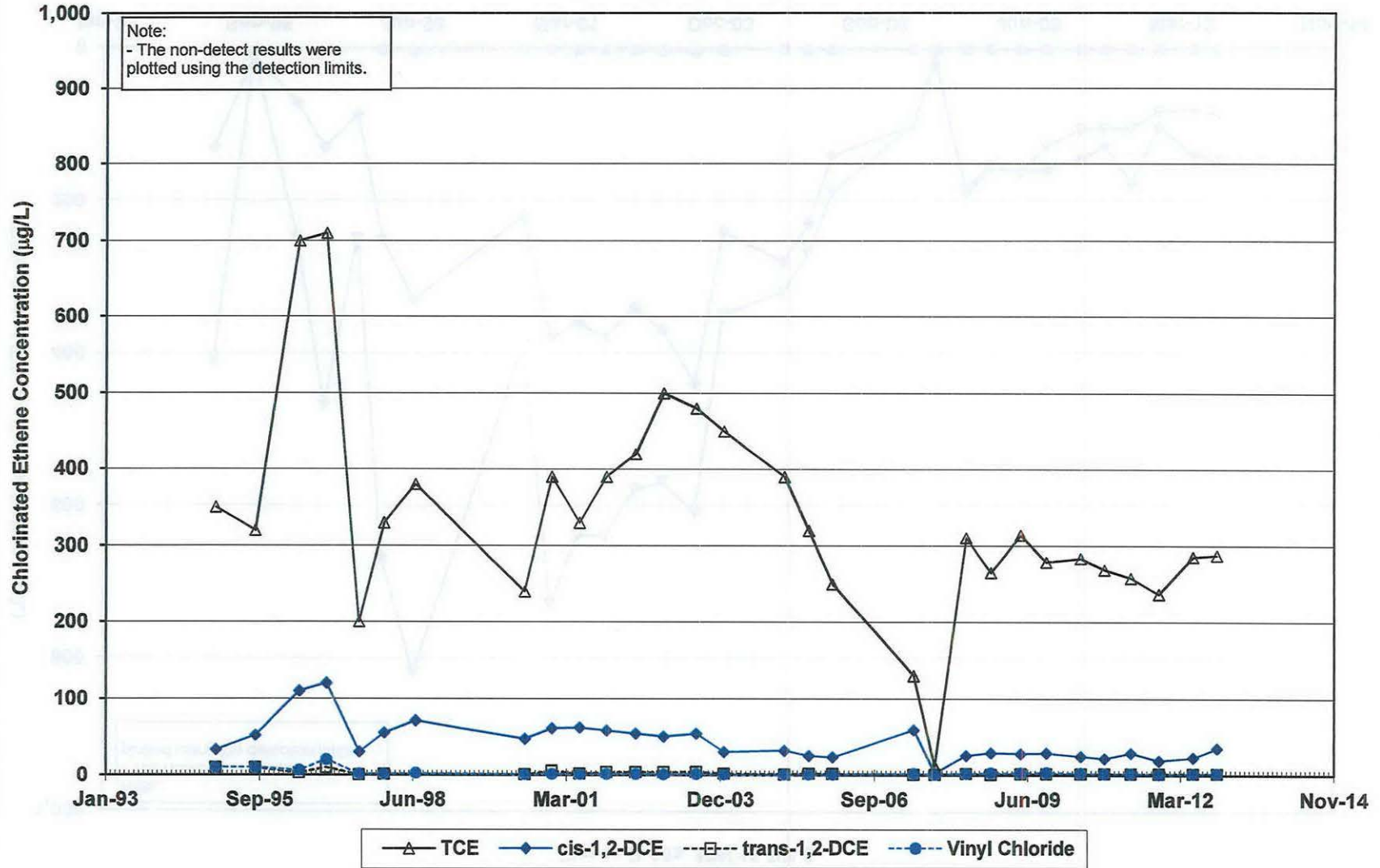
Tecumseh Products Co.
Grafton, WI

Figure B-16a MW 13 BR 2



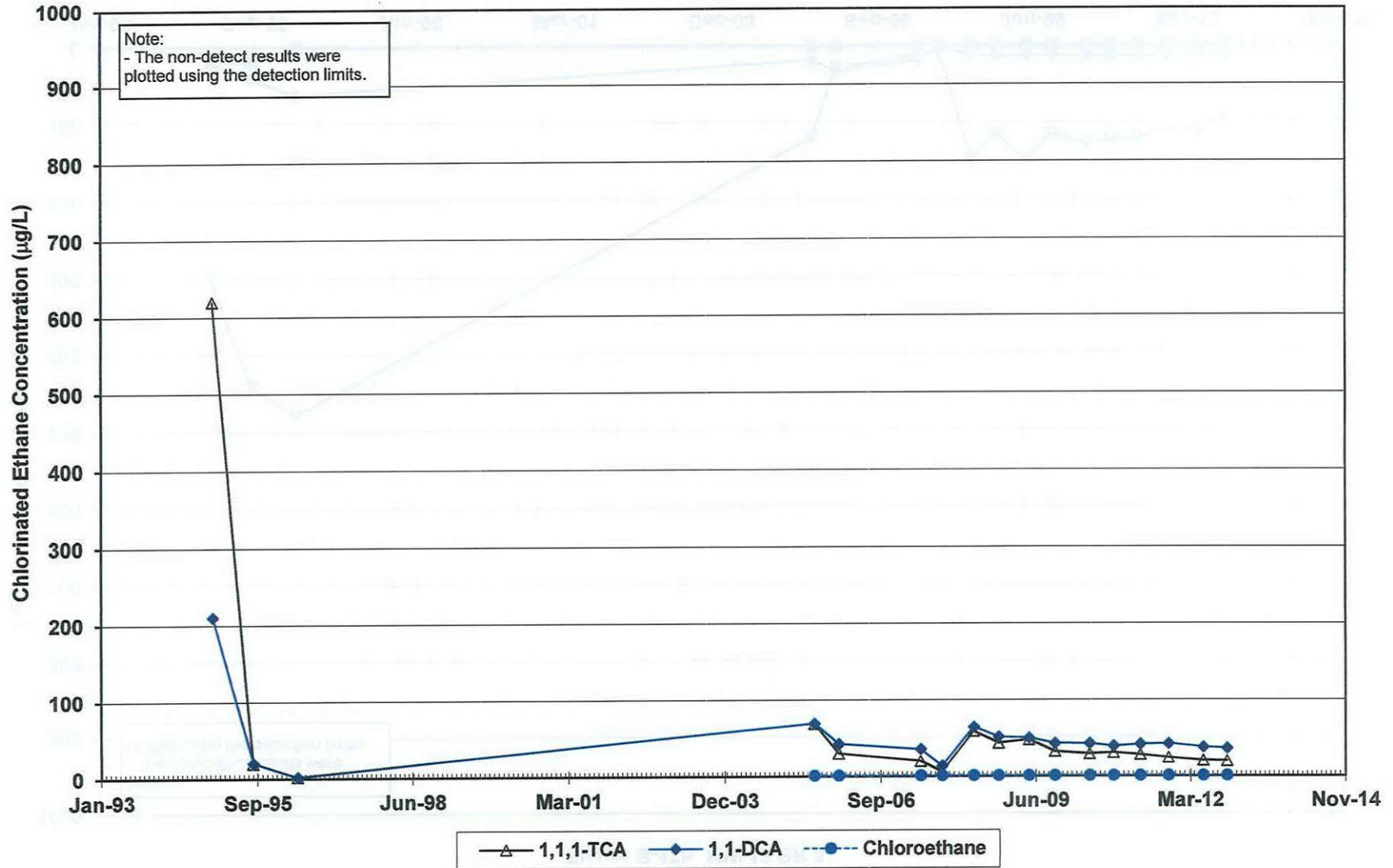
Tecumseh Products Co.
Grafton, WI

Figure B-16b MW 13 BR 2



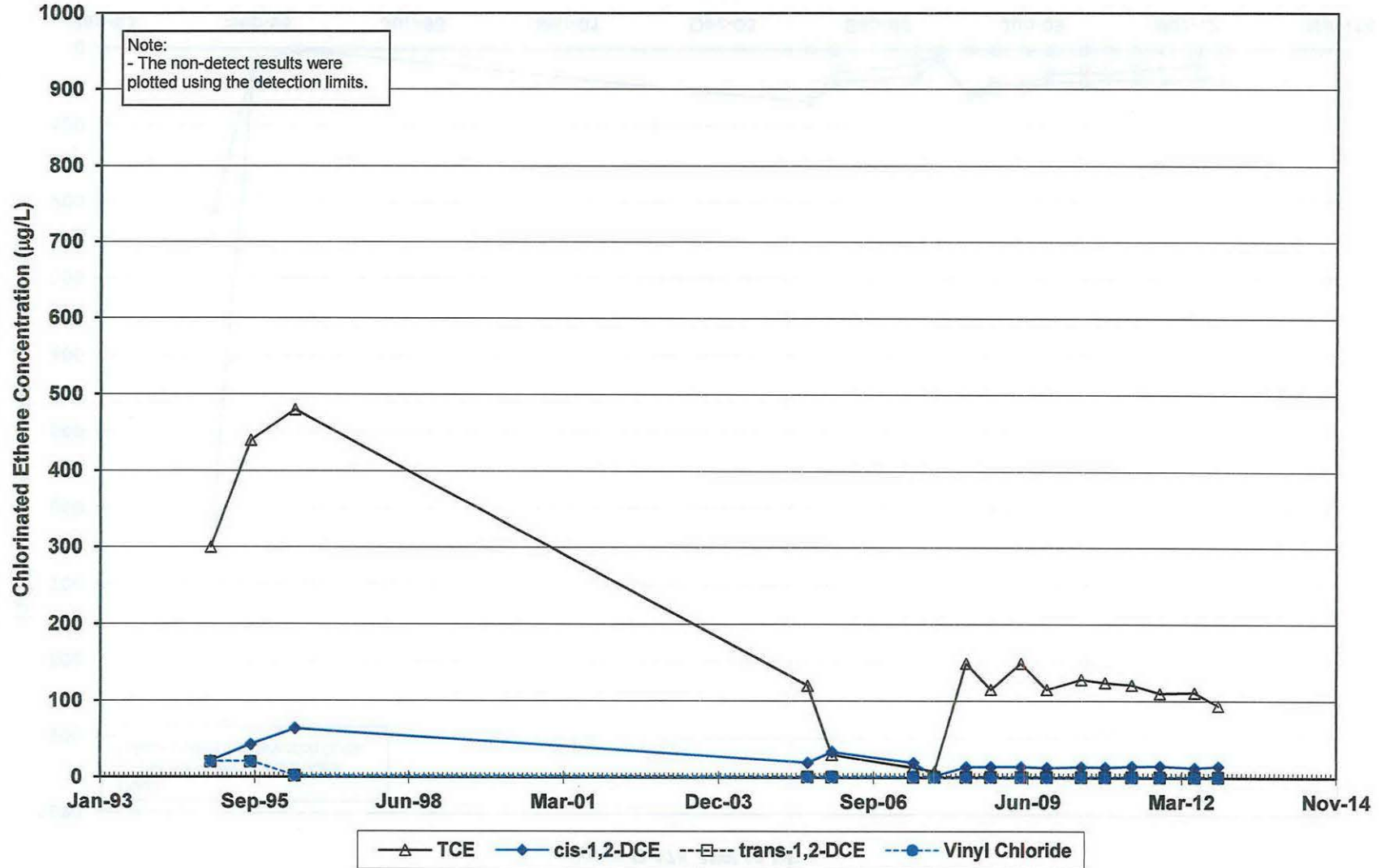
Tecumseh Products Co.
Grafton, WI

Figure B-17a MW 13 BR 3



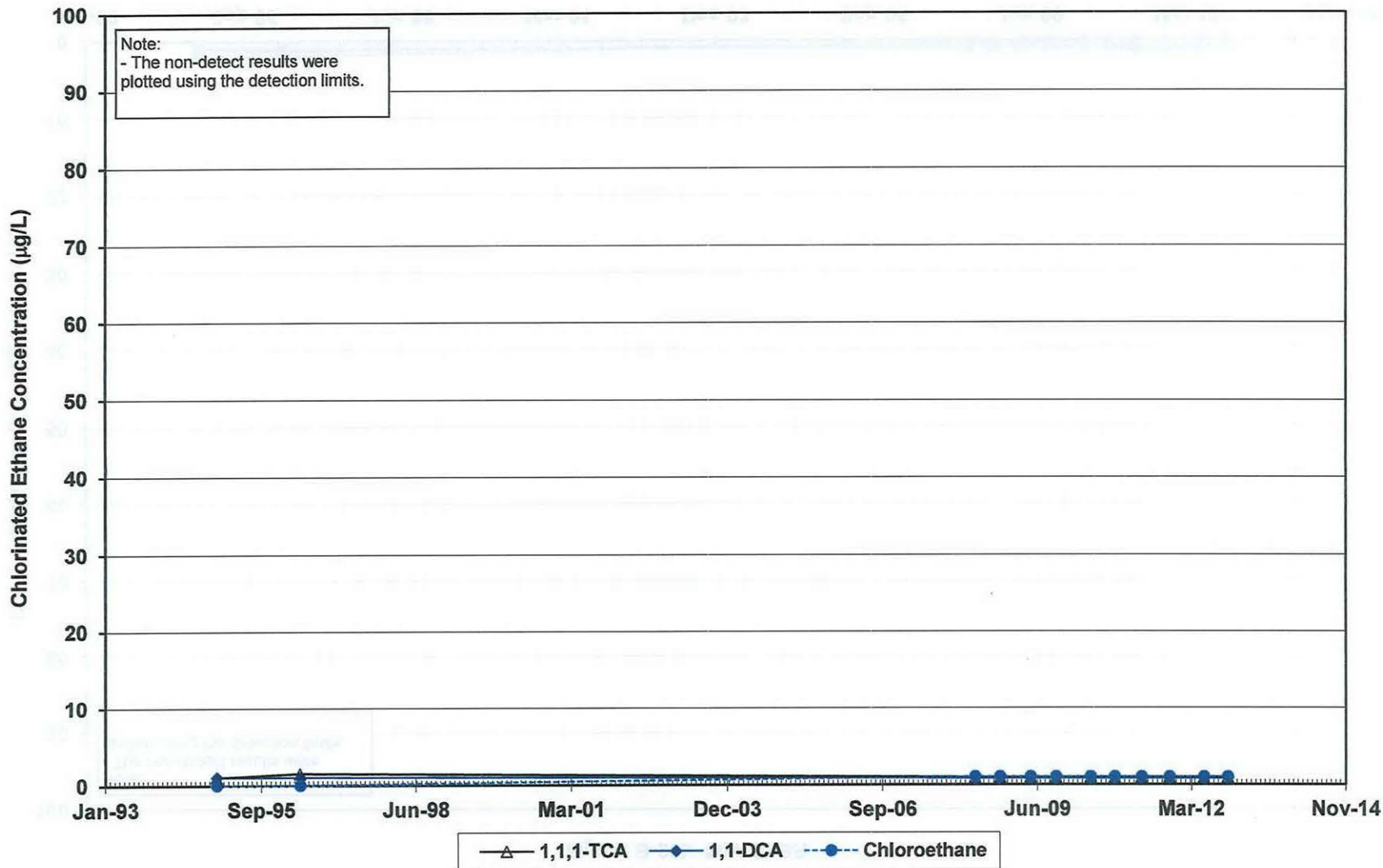
Tecumseh Products Co.
Grafton, WI

Figure B-17b MW 13 BR 3



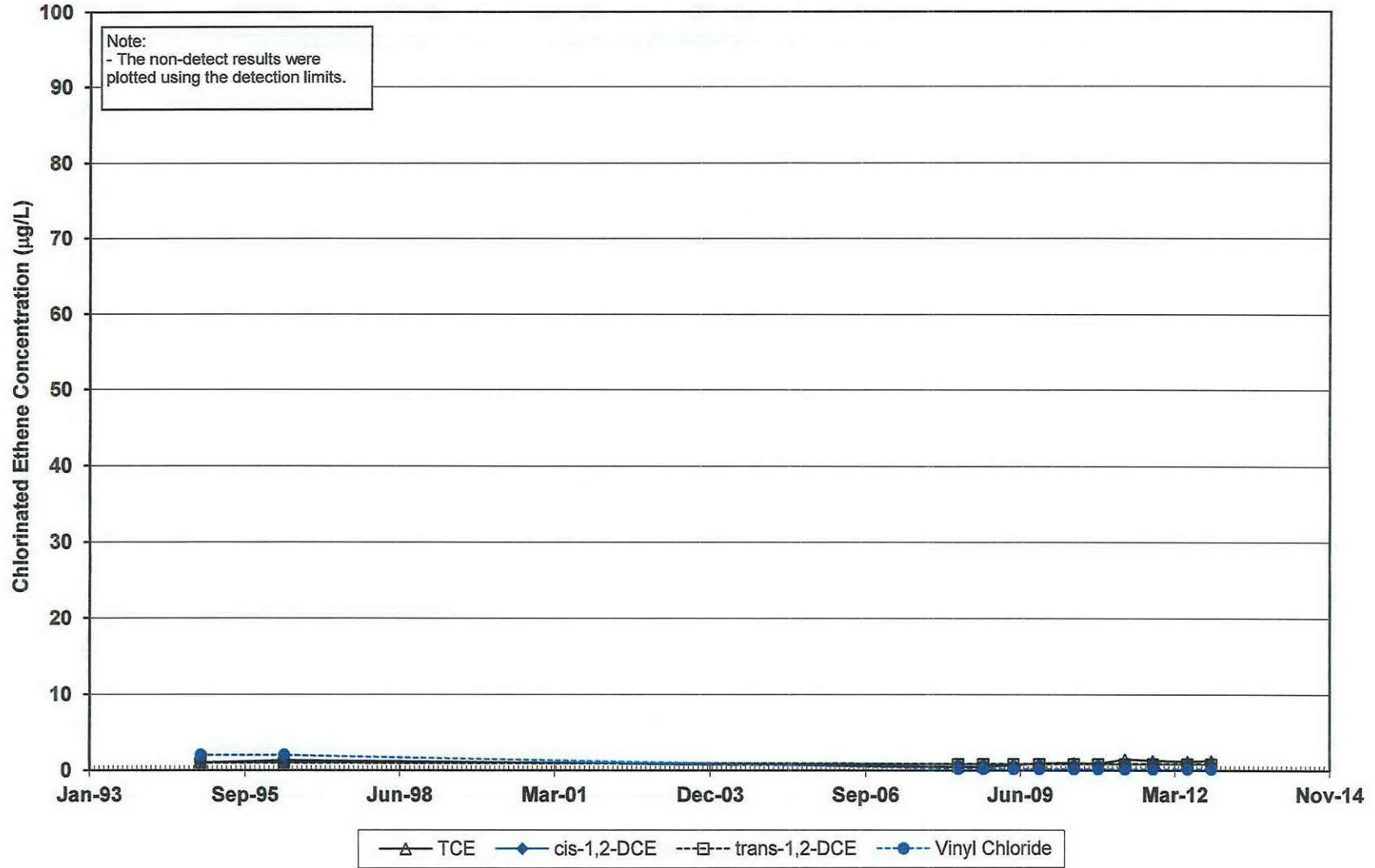
Tecumseh Products Co.
Grafton, WI

Figure B-26a MW 14 BR



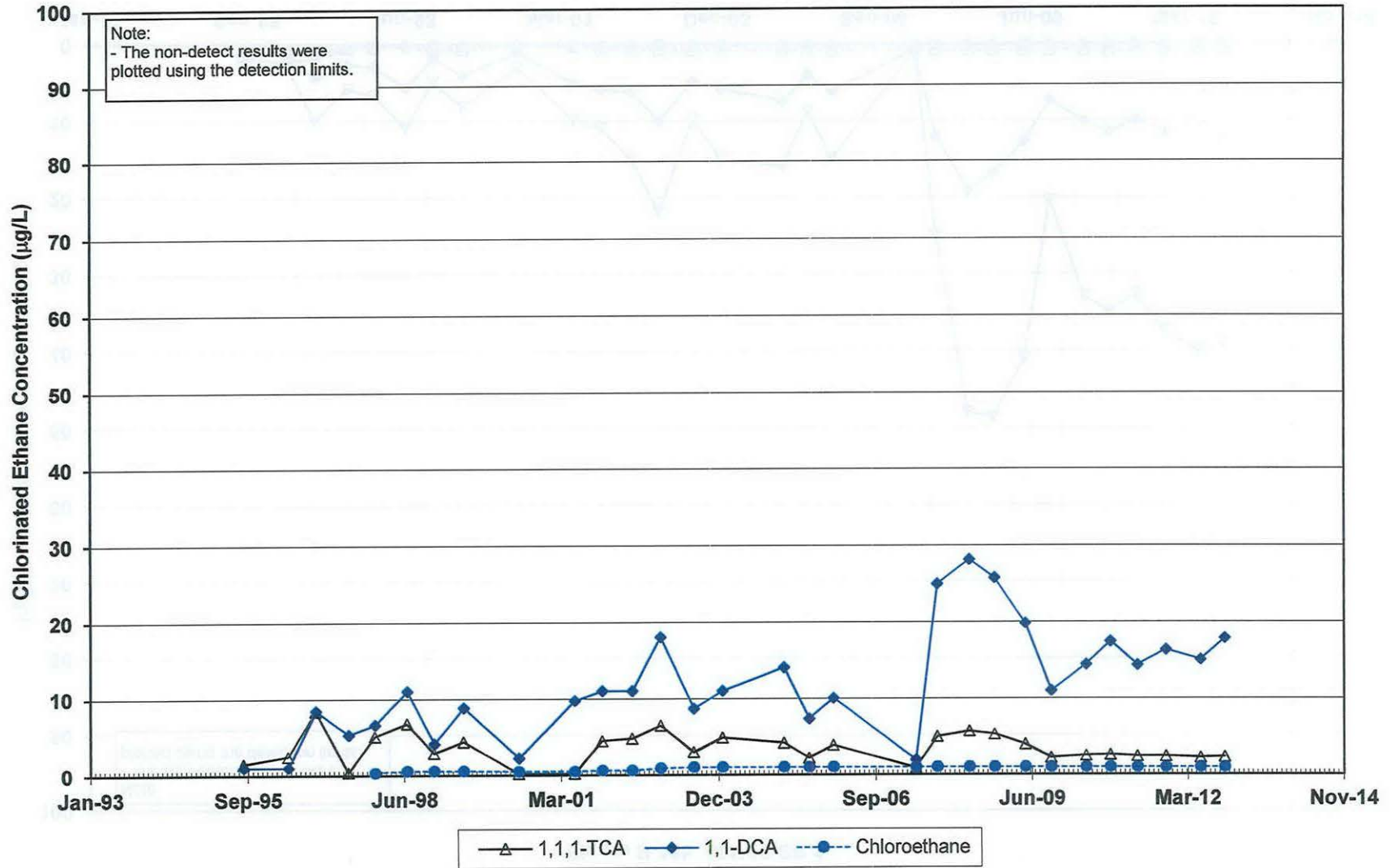
Tecumseh Products Co.
Grafton, WI

Figure B-26b MW 14 BR



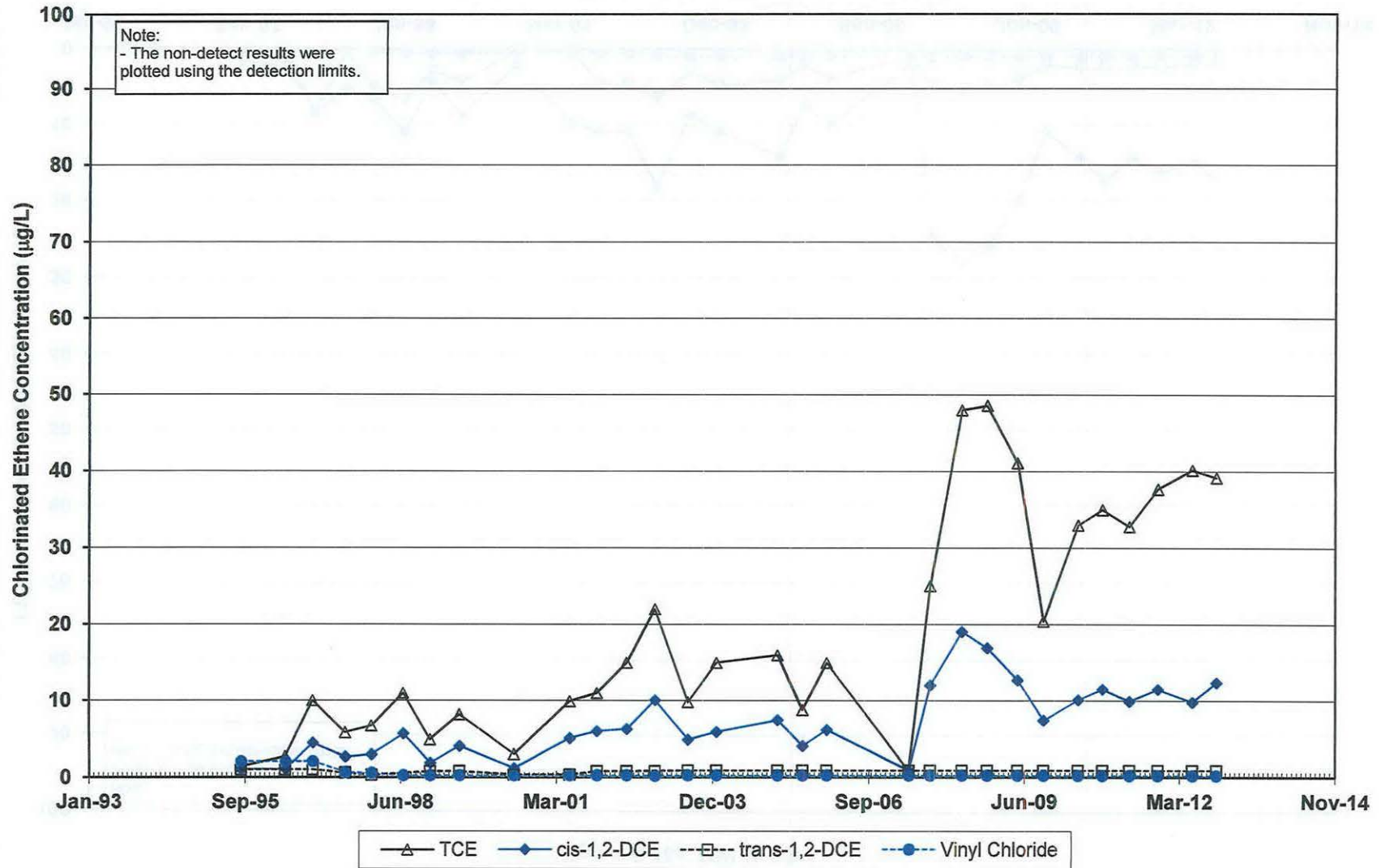
Tecumseh Products Co.
Grafton, WI

Figure B-18a MW 18 BR 1



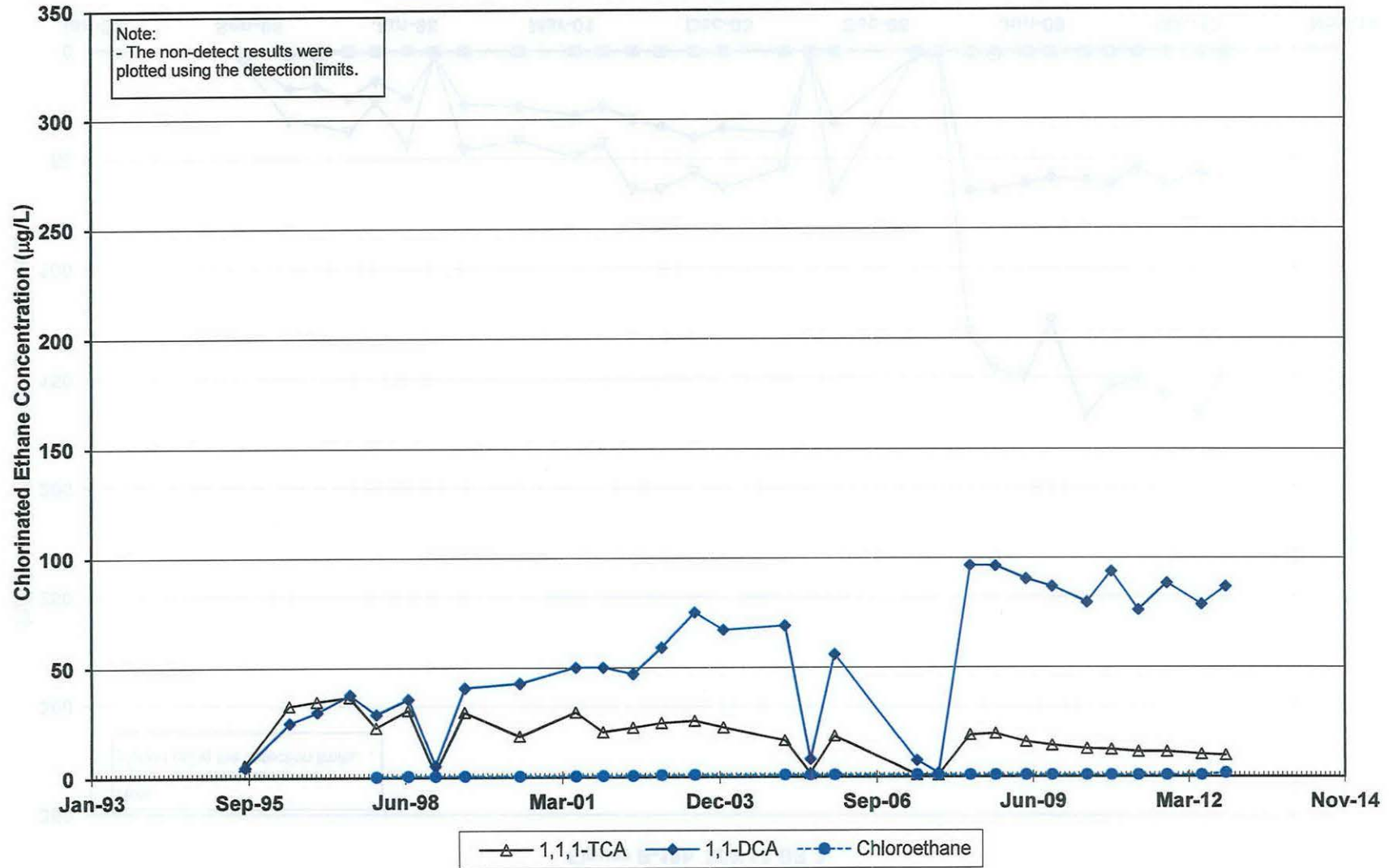
Tecumseh Products Co.
Grafton, WI

Figure B-18b MW 18 BR 1



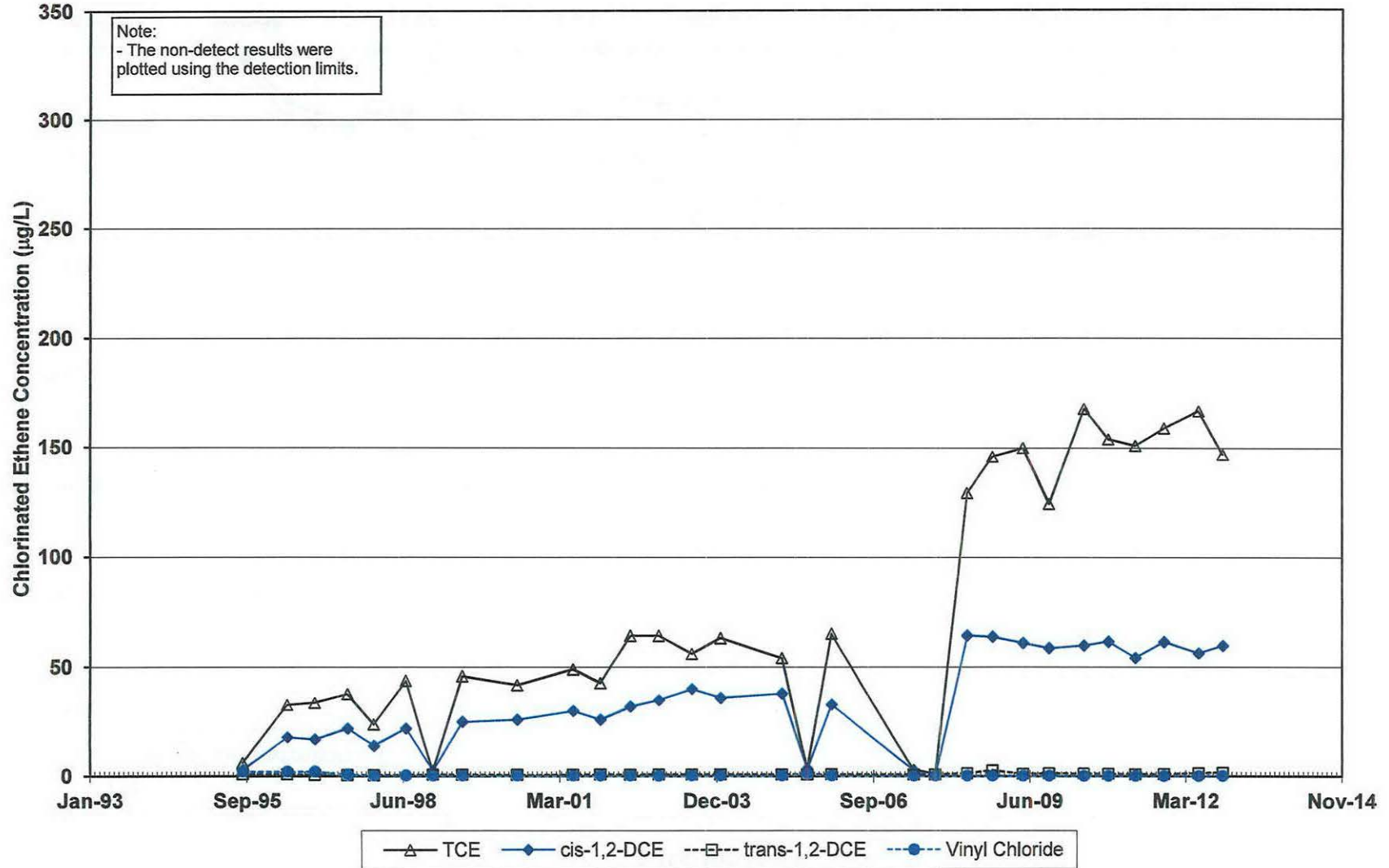
Tecumseh Products Co.
Grafton, WI

Figure B-19a MW 18 BR 2



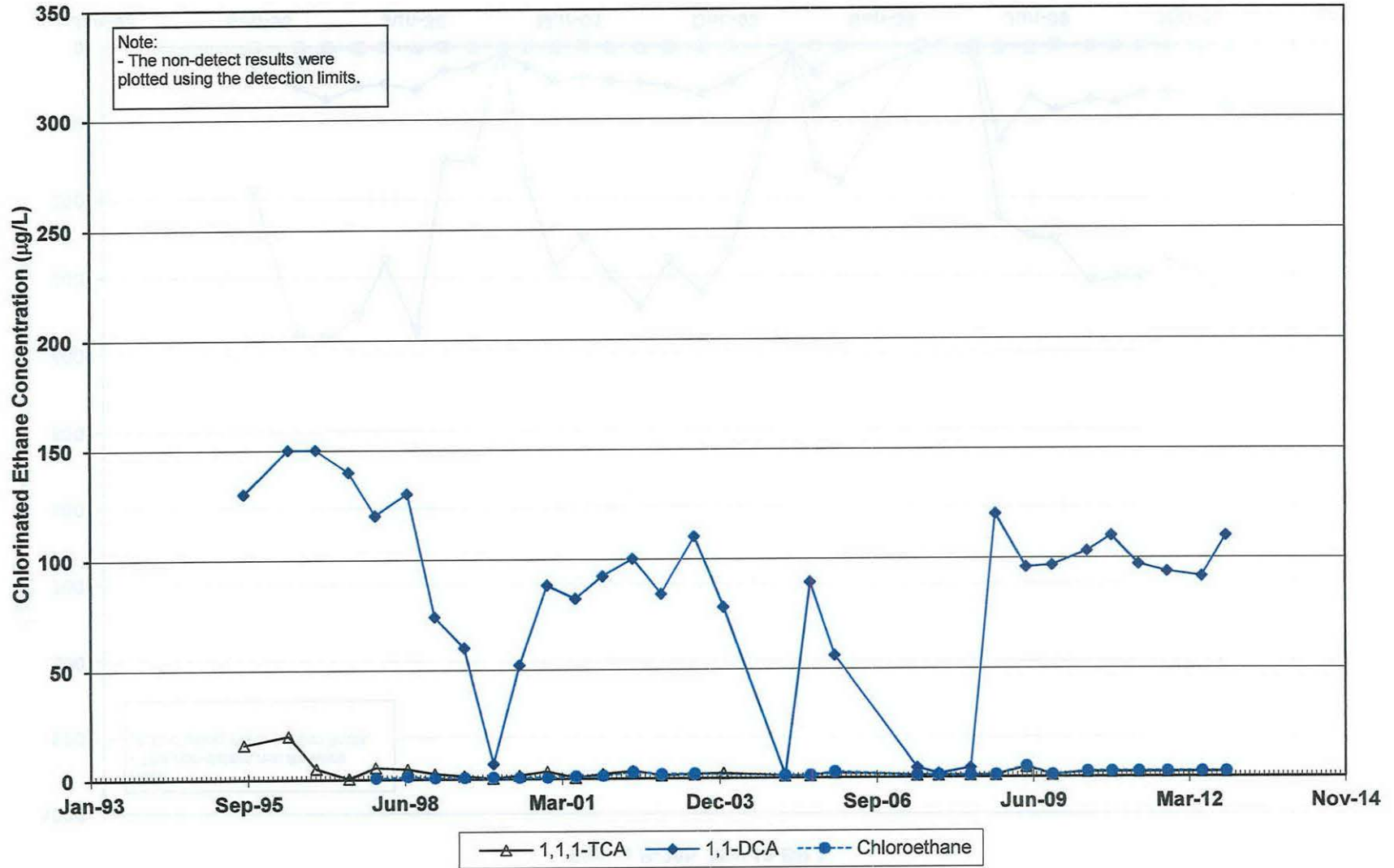
Tecumseh Products Co.
Grafton, WI

Figure B-19b MW 18 BR 2



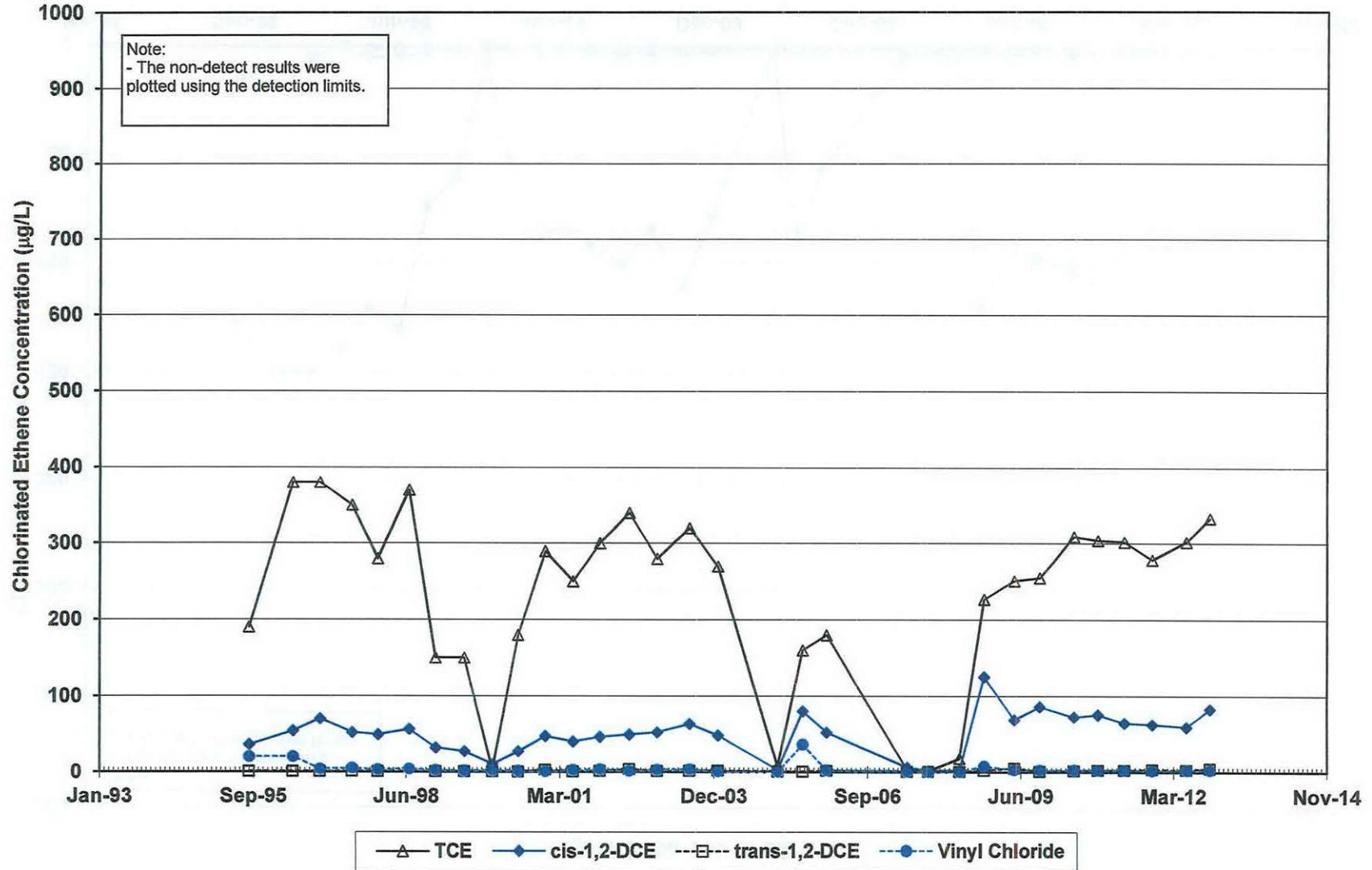
Tecumseh Products Co.
Grafton, WI

Figure B-20a MW 19 BR 1



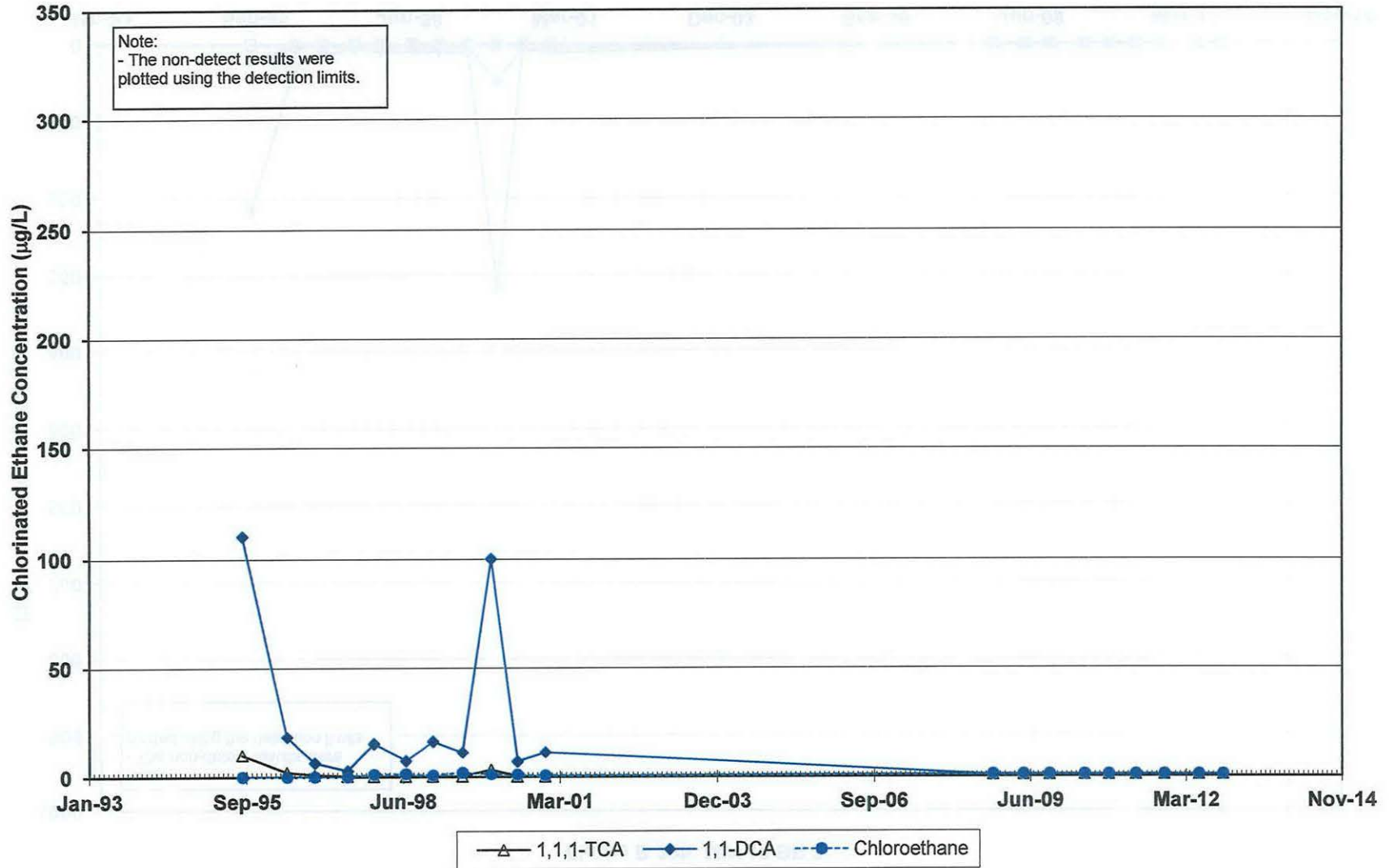
Tecumseh Products Co.
Grafton, WI

Figure B-20b MW 19 BR 1



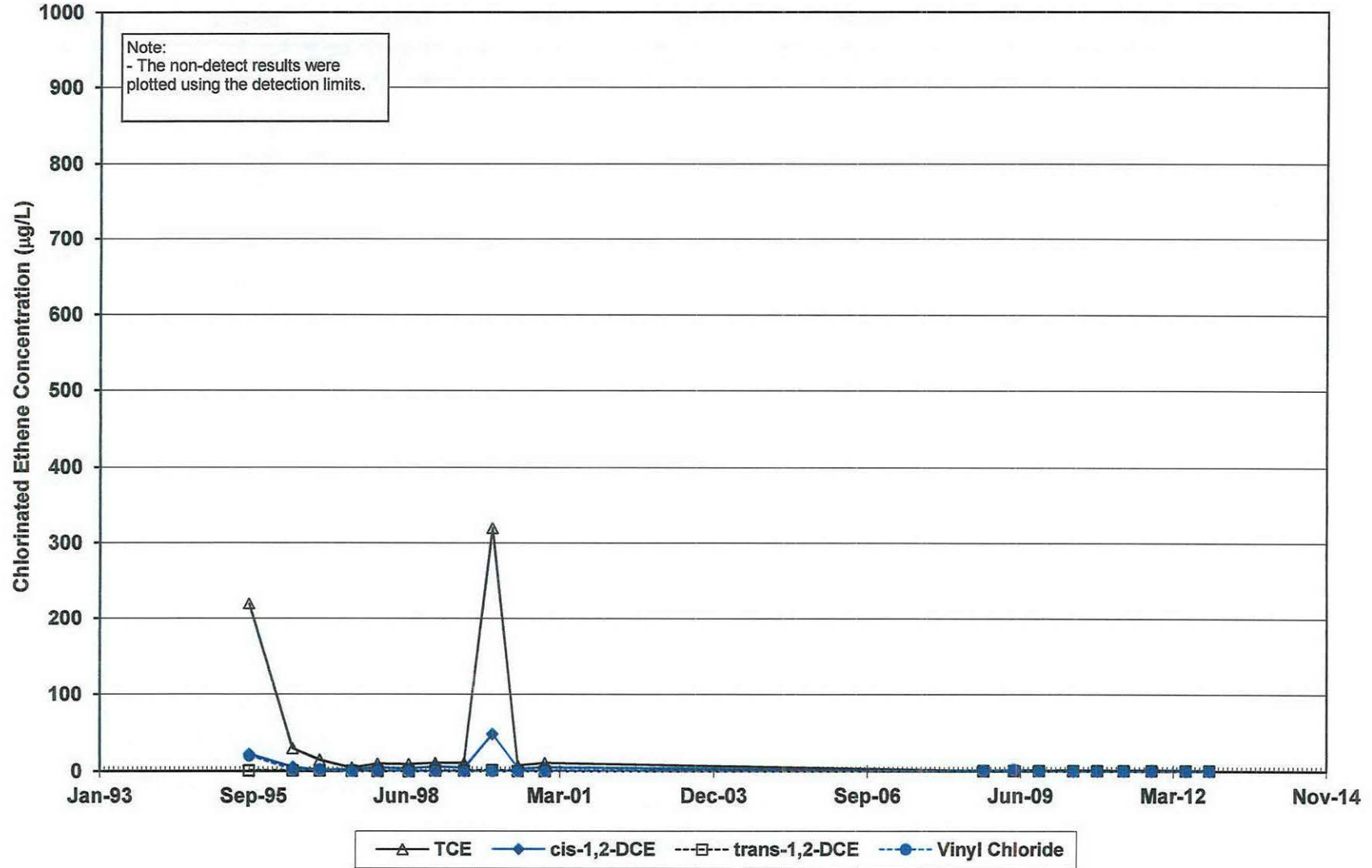
Tecumseh Products Co.
Grafton, WI

Figure B-20a MW 19 BR 2



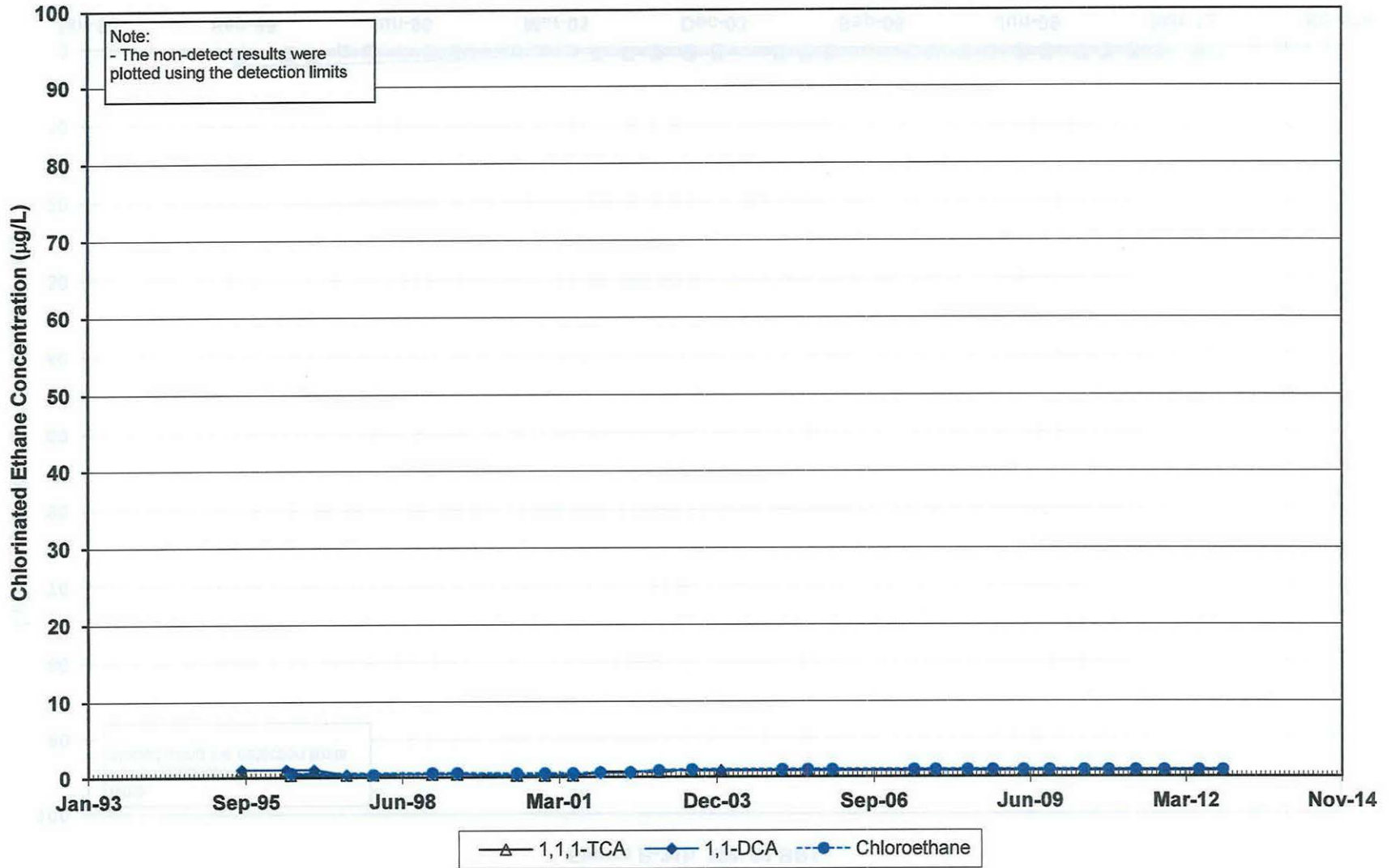
Tecumseh Products Co.
Grafton, WI

Figure B-20b MW 19 BR 2



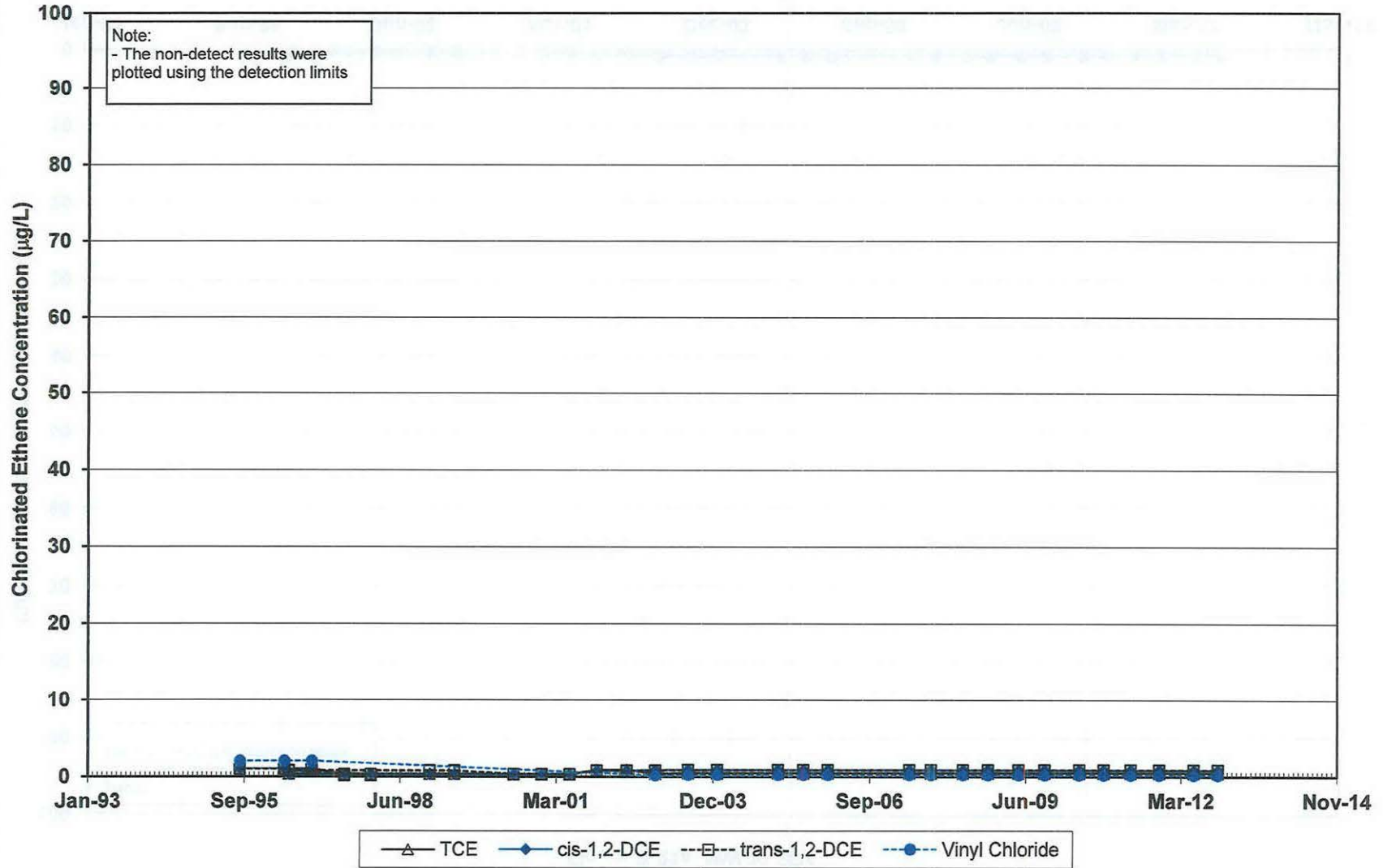
Tecumseh Products Co.
Grafton, WI

Figure B-21a MW 20 BR1



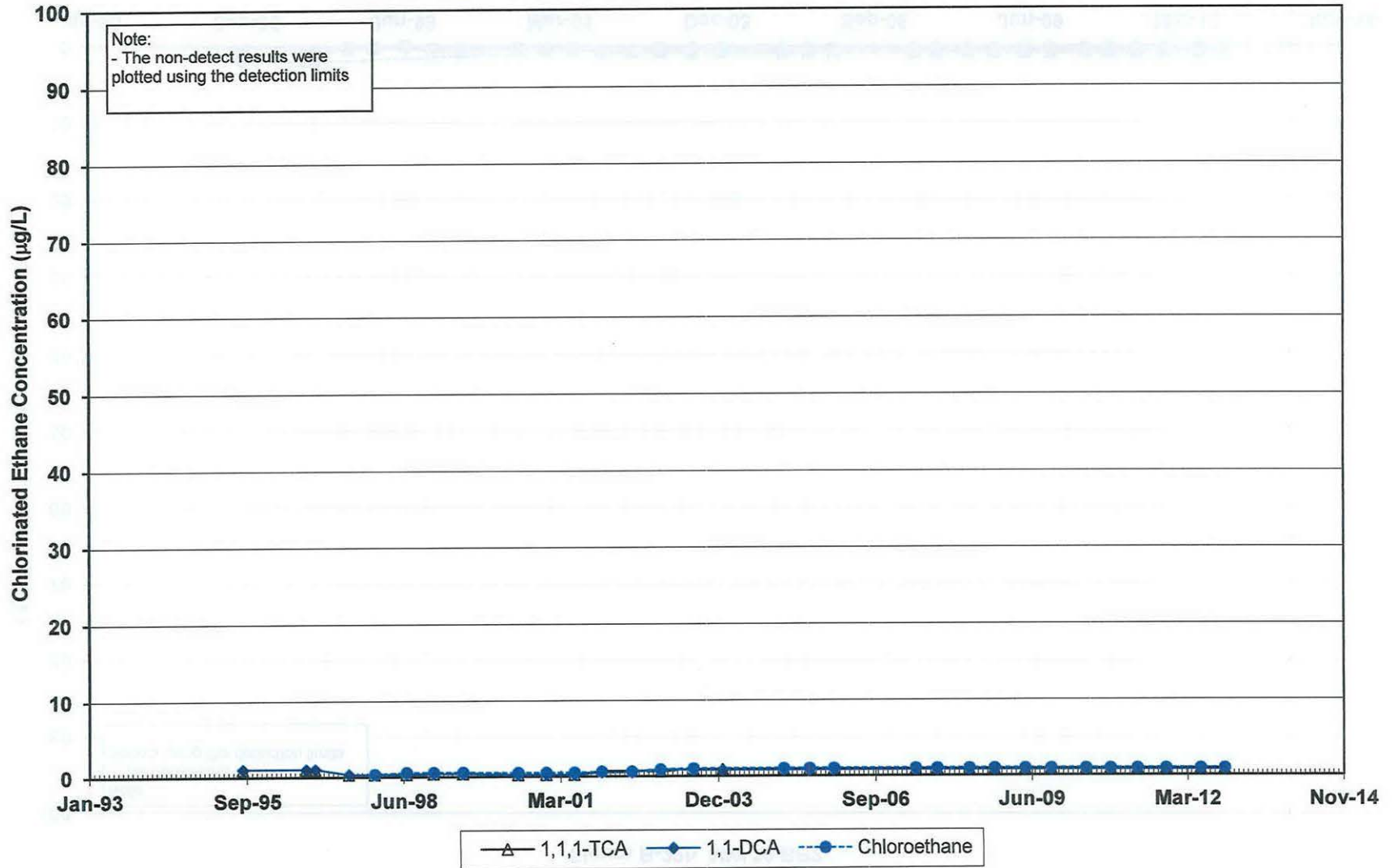
Tecumseh Products Co.
Grafton, WI

Figure B-21b MW 20 BR1



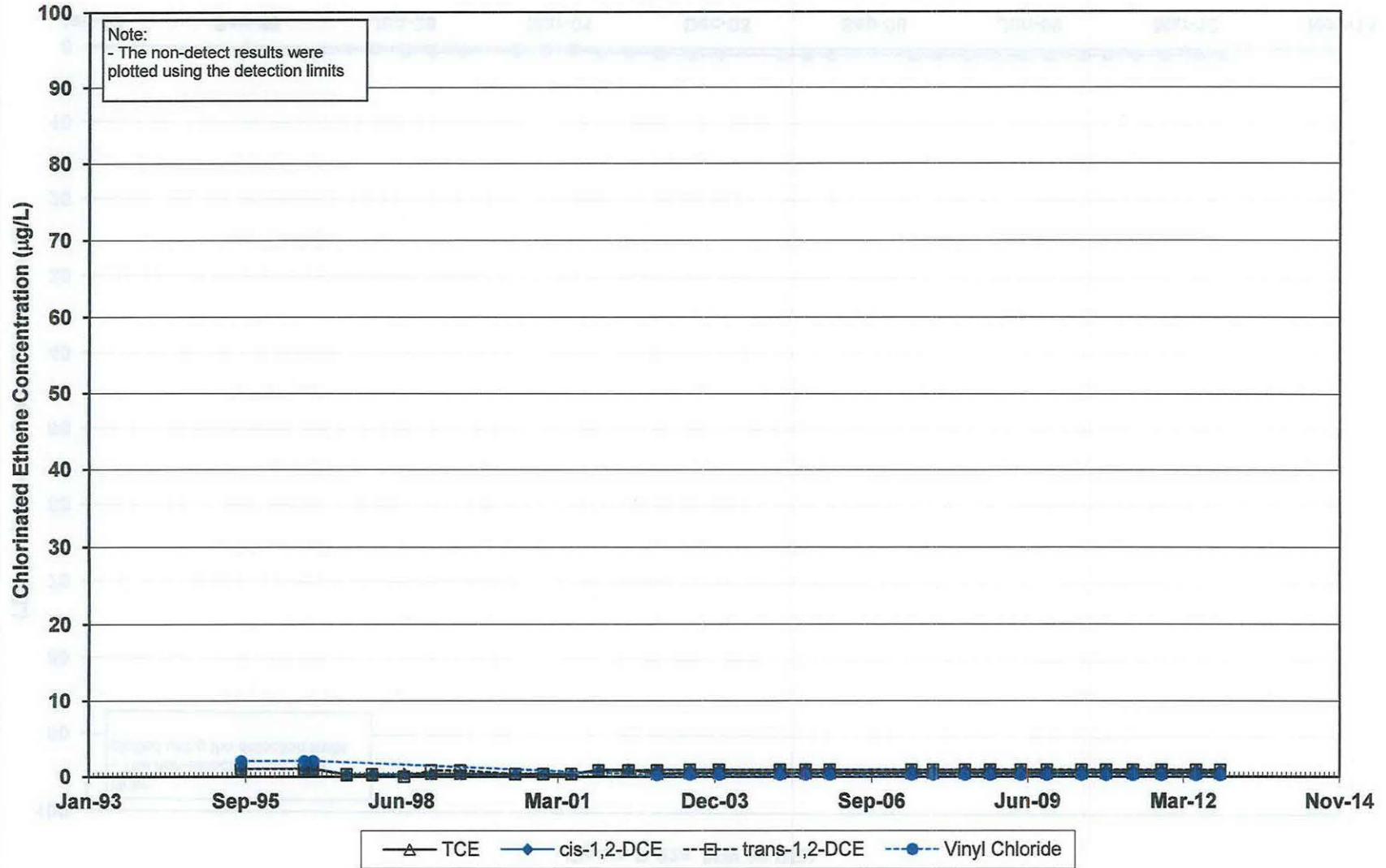
Tecumseh Products Co.
Grafton, WI

Figure B-22a MW 20 BR2



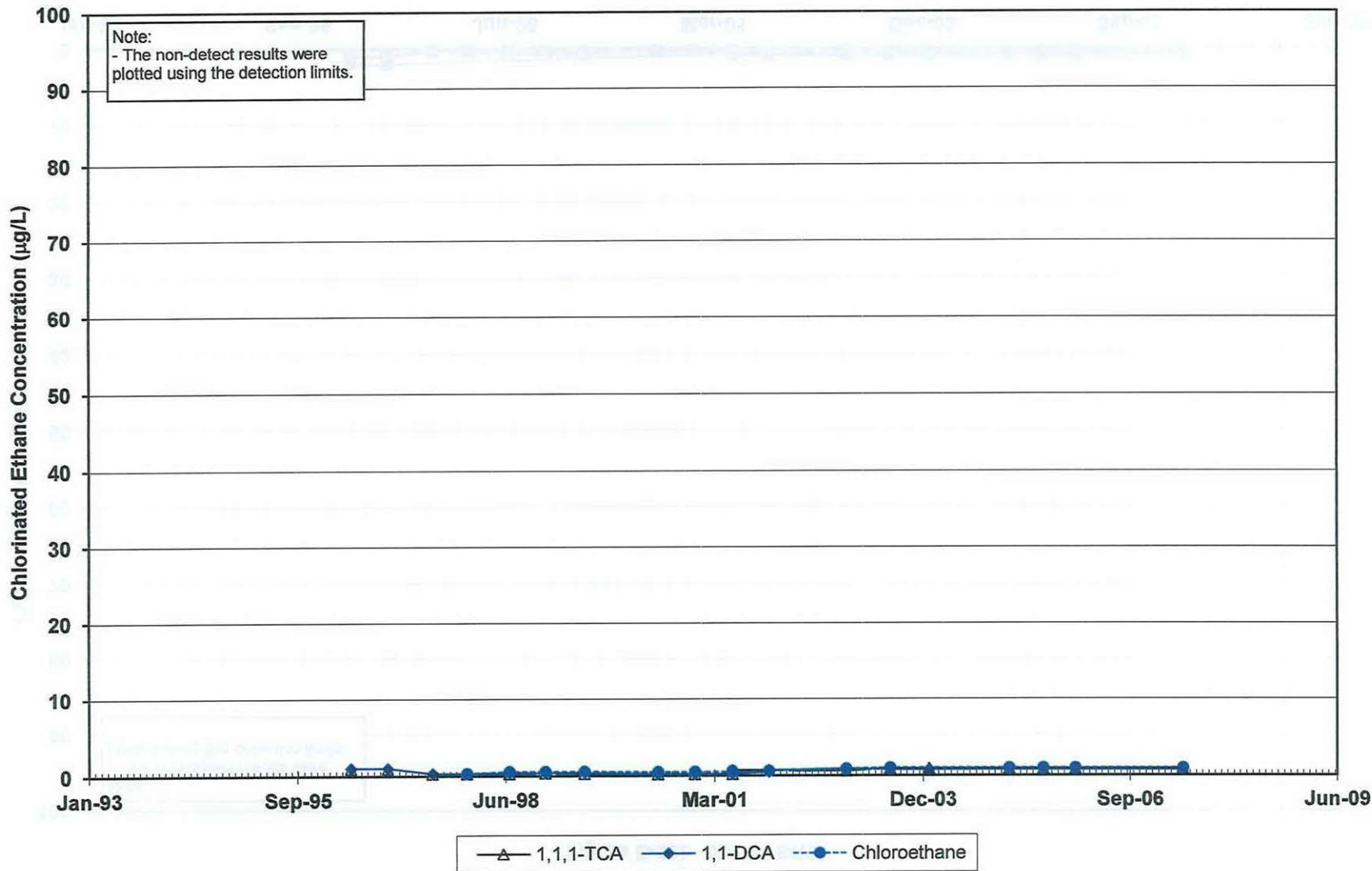
Tecumseh Products Co.
Grafton, WI

Figure B-22b MW 20 BR2



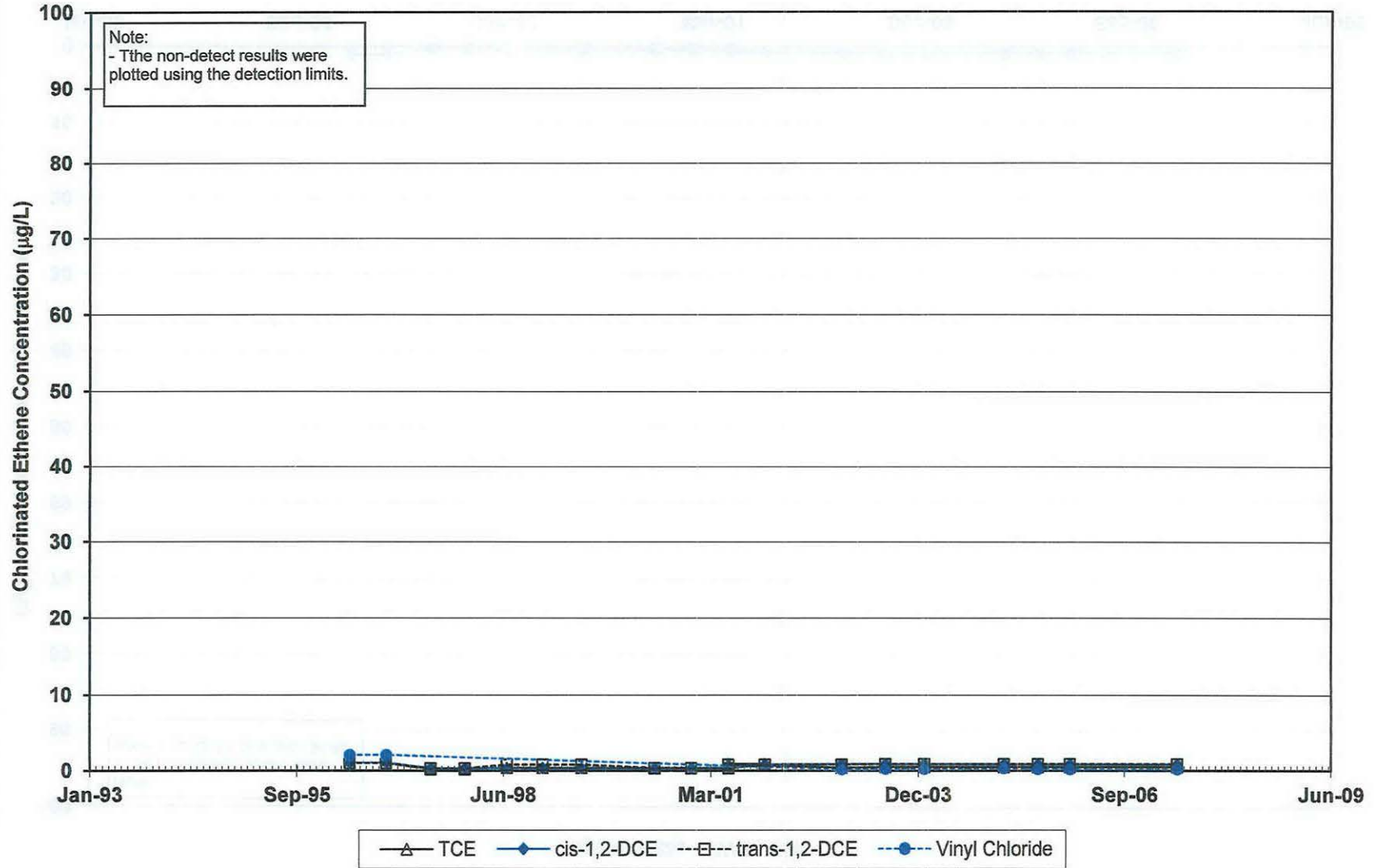
Tecumseh Products Co.
Grafton, WI

Figure B-23a MW 21 BR1



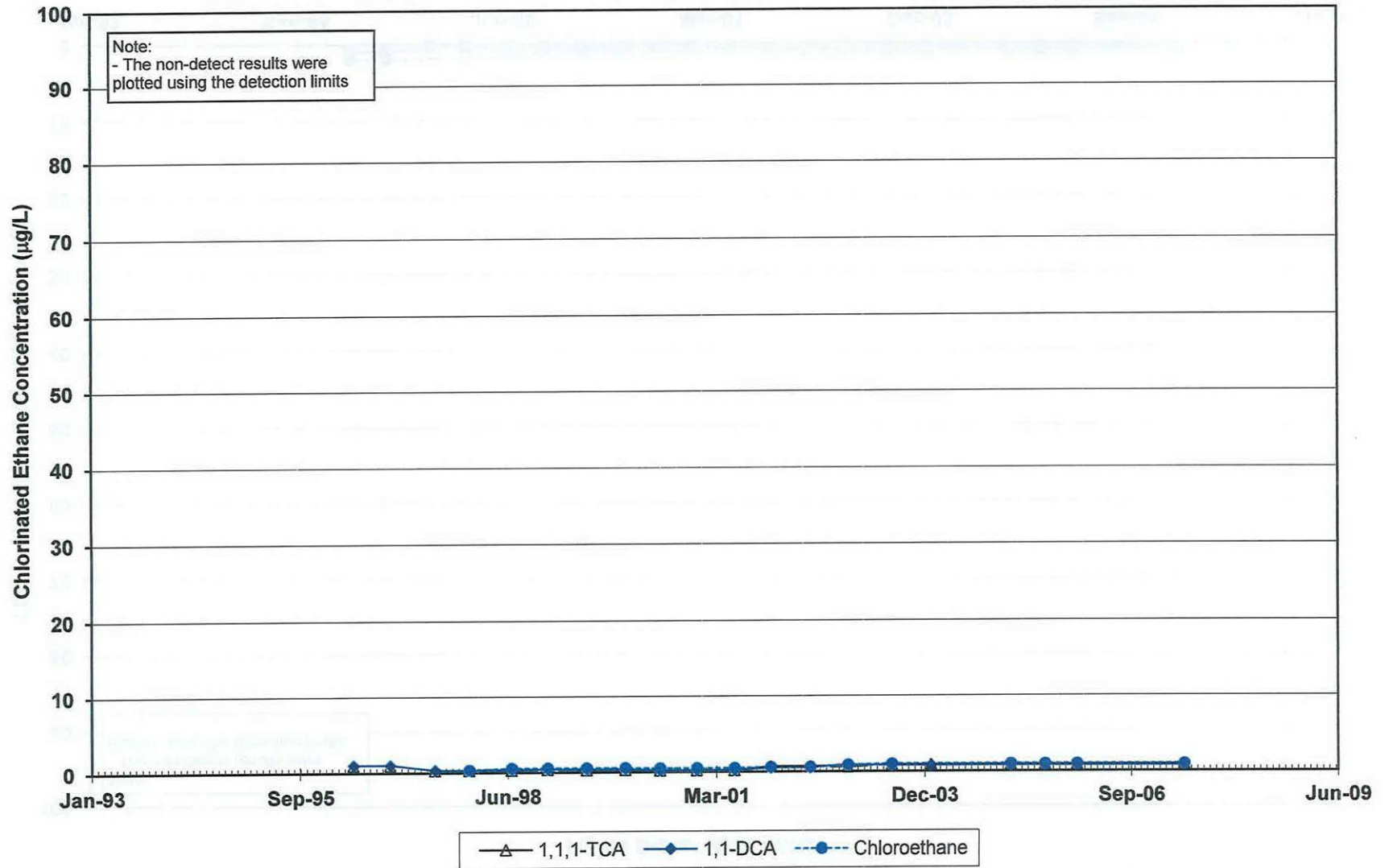
Tecumseh Products Co.
Grafton, WI

Figure B-23b MW 21 BR1



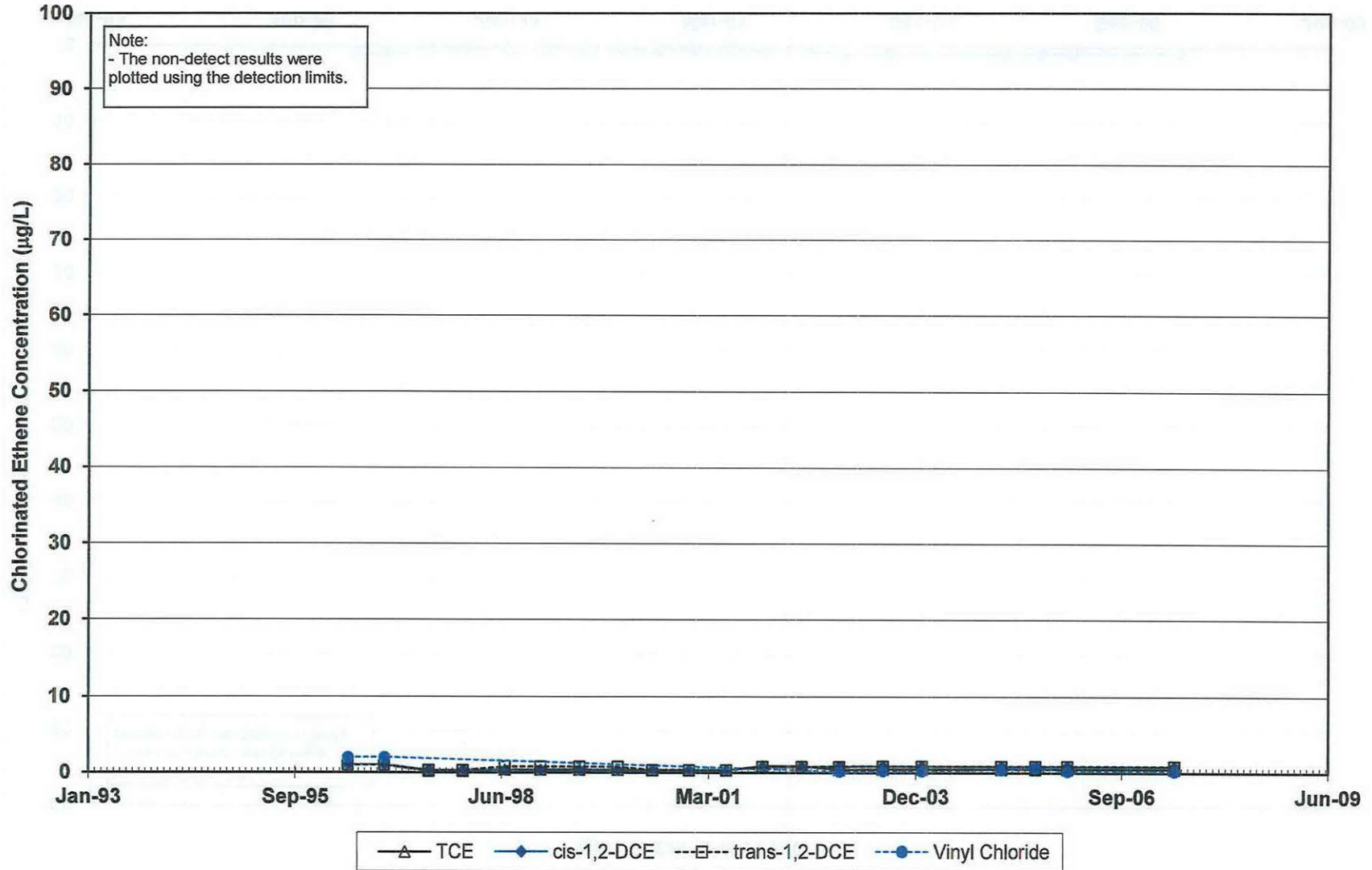
Tecumseh Products Co.
Grafton, WI

Figure B-24a MW 21 BR2



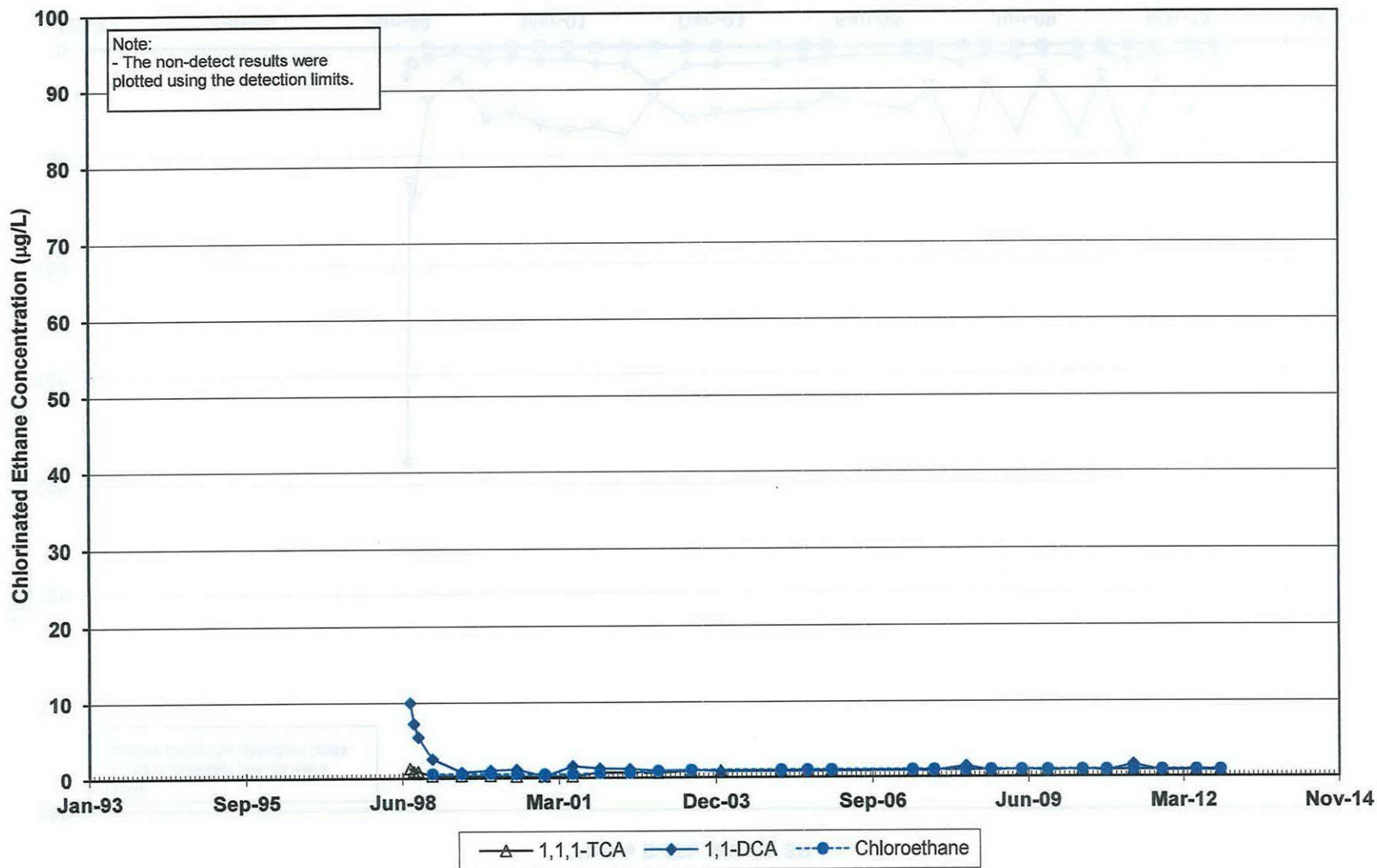
Tecumseh Products Co.
Grafton, WI

Figure B-24b MW 21 BR2



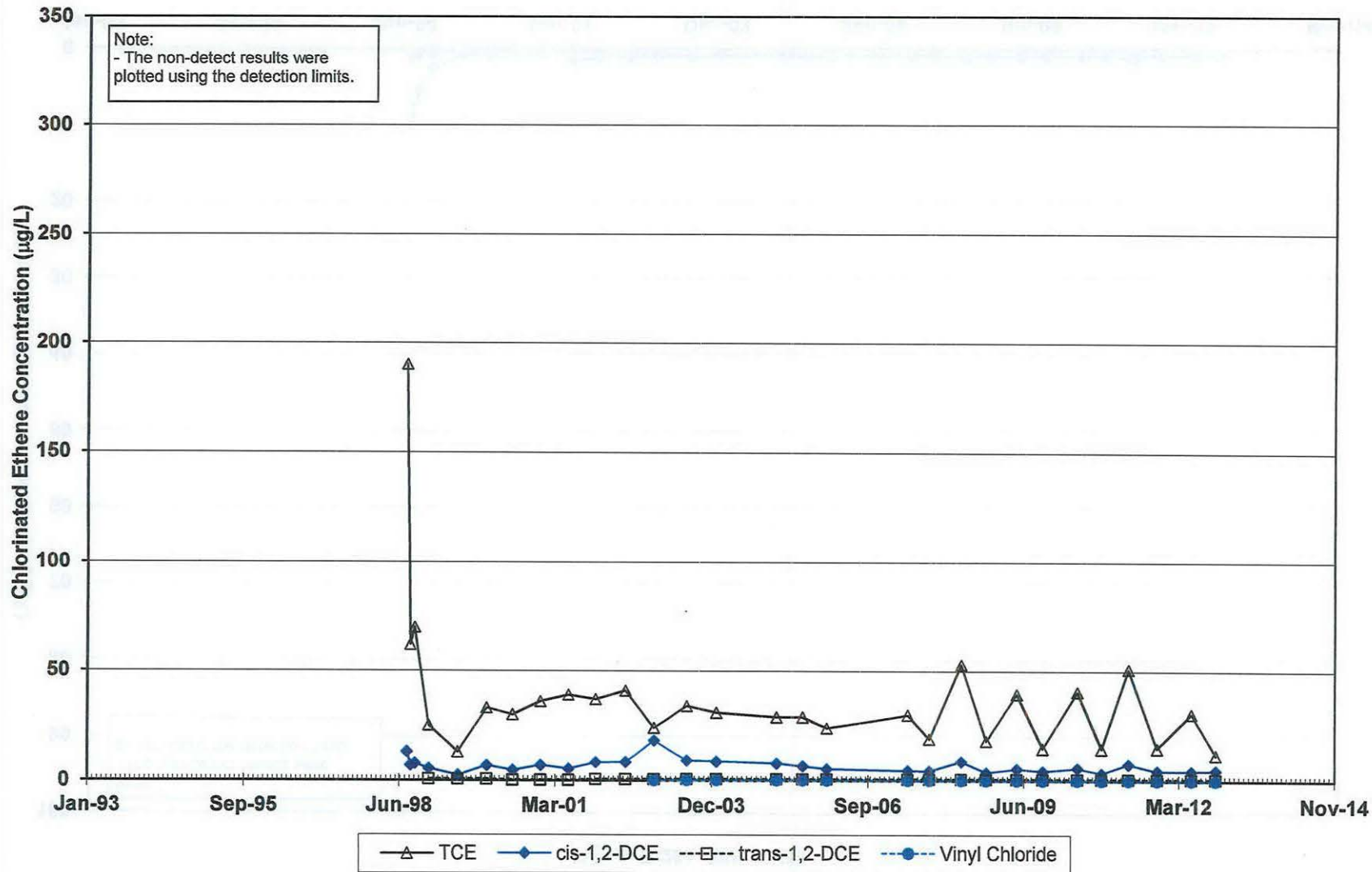
Tecumseh Products Co.
Grafton, WI

Figure B-25a MW 22 BR



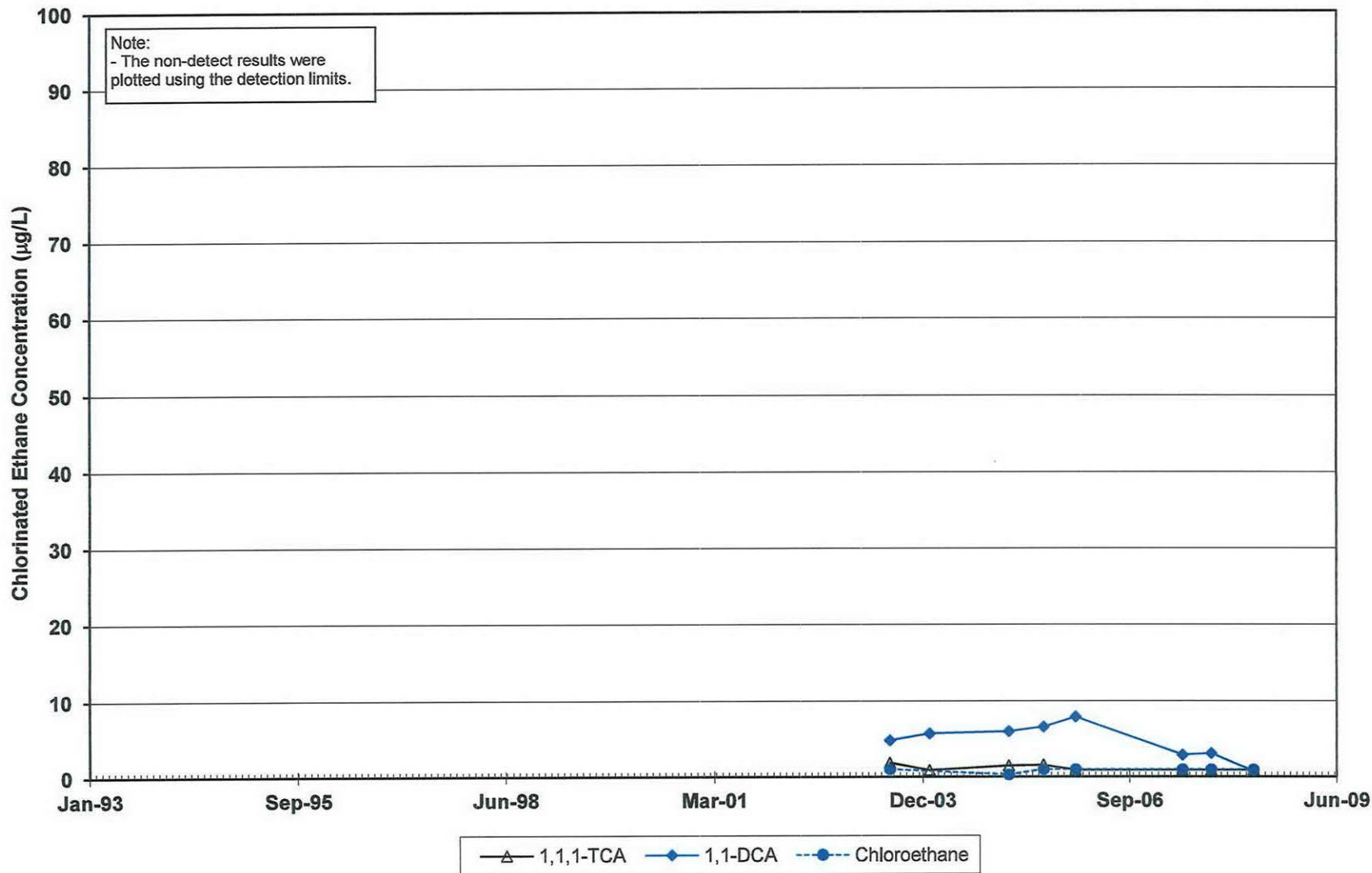
Tecumseh Products Co.
Grafton, WI

Figure B-25b MW 22 BR



Tecumseh Products Co.
Grafton, WI

Figure B-26a PW 30



Appendix F Cap Maintenance Plan

Cap Maintenance Plan Dated December 18, 2012

Former Tecumseh Products Facility
900 North Street
Grafton, WI 53024

WDNR Identification Numbers
FID# 246009170; BRRTS# 02-46-000751

Legal Description

See attached description (Attachment 1).

Introduction

This document is the Maintenance Plan for the existing building foundation and asphalt/concrete cover at the property referenced above (property), and has been prepared in accordance with NR 724.13(2), Wis. Admin. Code (WAC). The extent of the pavement and building foundation that is included in the Maintenance Plan is shown on Figure 1 and this pavement and foundation extent is herein referred to as the "Cap."

The Cap overlies soil and groundwater with residual impacts and functions to prevent direct contact with soil contamination and to minimize infiltration of water and prevent further groundwater contamination at the site. The Cap will serve as institutional control as required for case close out under NR726.05 (8) (b), WAC.

The property owner or operator will maintain a copy of this plan on-site and will make it available to all interested parties for viewing.

Contamination Description

Volatile organic compounds (VOCs) are present in the soil on-site at depths of approximately two to 15 feet below ground surface. Chlorinated VOCs are also present in the groundwater starting at a depth of approximately 15 feet below ground surface. The approximate extents of the known VOC impacts to soil and groundwater, based on sampling completed during the site investigations and following remediation activities, are shown on Figure 1. Additional areas of impacts to soil may be present below the Cap outside the areas shown on Figure 1.

More specific information about the extent of impacts and remedial actions completed at this site can be found in the case file in the WDNR's Plymouth regional office.

Cap Description

The Cap for this site consists of either asphalt/concrete constructed as a driving and base surface on the property or approximately 6-inches of concrete constructed as a slab on grade foundation for the building. When intact, these low permeability surfaces function to prevent direct contact and minimize infiltration of water and prevent further groundwater contamination at the site. Based on the current and potential future use of the property, the Cap should function as intended unless disturbed.

Annual Inspection

The extent of Cap shown on Figure 1 will be inspected at least once annually by the property owner, operator, or their designated representative. The inspection will be performed in the spring after all snow and ice has melted. The inspections will be performed to evaluate settling, compaction, rutting, wear from traffic and cracking. Any area where soils have become exposed and/or where infiltration from the surface will not be effectively minimized will be documented, and recommendations for repair will be noted.

A log of the inspections will be maintained by the property owner, operator, or their designated representative. An example inspection log is included in Attachment 2. Once repairs are completed, the log will be updated to document the repairs. A copy of the inspection log will be kept at the address of the property owner and will be available for submittal or inspection by the WDNR representatives upon their request.

Maintenance Activities

If problems are noted during the annual inspections or at any other time during the year, repairs will be scheduled as soon as practical. Repairs can include patching and filling or larger resurfacing or construction operations.

In the event that Cap repair activities or other site maintenance activities (e.g., utility repair) expose the underlying soil, the owner must inform maintenance workers of the direct contact exposure hazard and provide them with the appropriate personal protective equipment (PPE). If soil is excavated, the owner or operator will be required to sample the soil to determine if contamination remains. All excavated soil must be treated, stored and disposed of by the owner or operator in accordance with all applicable local, state and federal laws.

Any repaired section of the Cap will be constructed to be at least equally impervious as the existing Cap and will be subject to the same maintenance and inspection guidelines as outlined in this Maintenance Plan unless indicated otherwise by the WDNR or its successor.

Prohibited Activities

The following activities, outside of those required for Cap and site maintenance, are prohibited on the property within the area of the Cap shown Figure 1 unless prior written approval has been obtained from the WDNR: 1) removal of the Cap; 2) replacement of the Cap with another barrier; 3) excavating or grading of the land surface; or 4) construction or placement of a building or other structure.

Amendment or Withdrawal of Maintenance Plan




This maintenance plan can be amended or withdrawn by the property owner and its successors with the written approval of the WDNR.

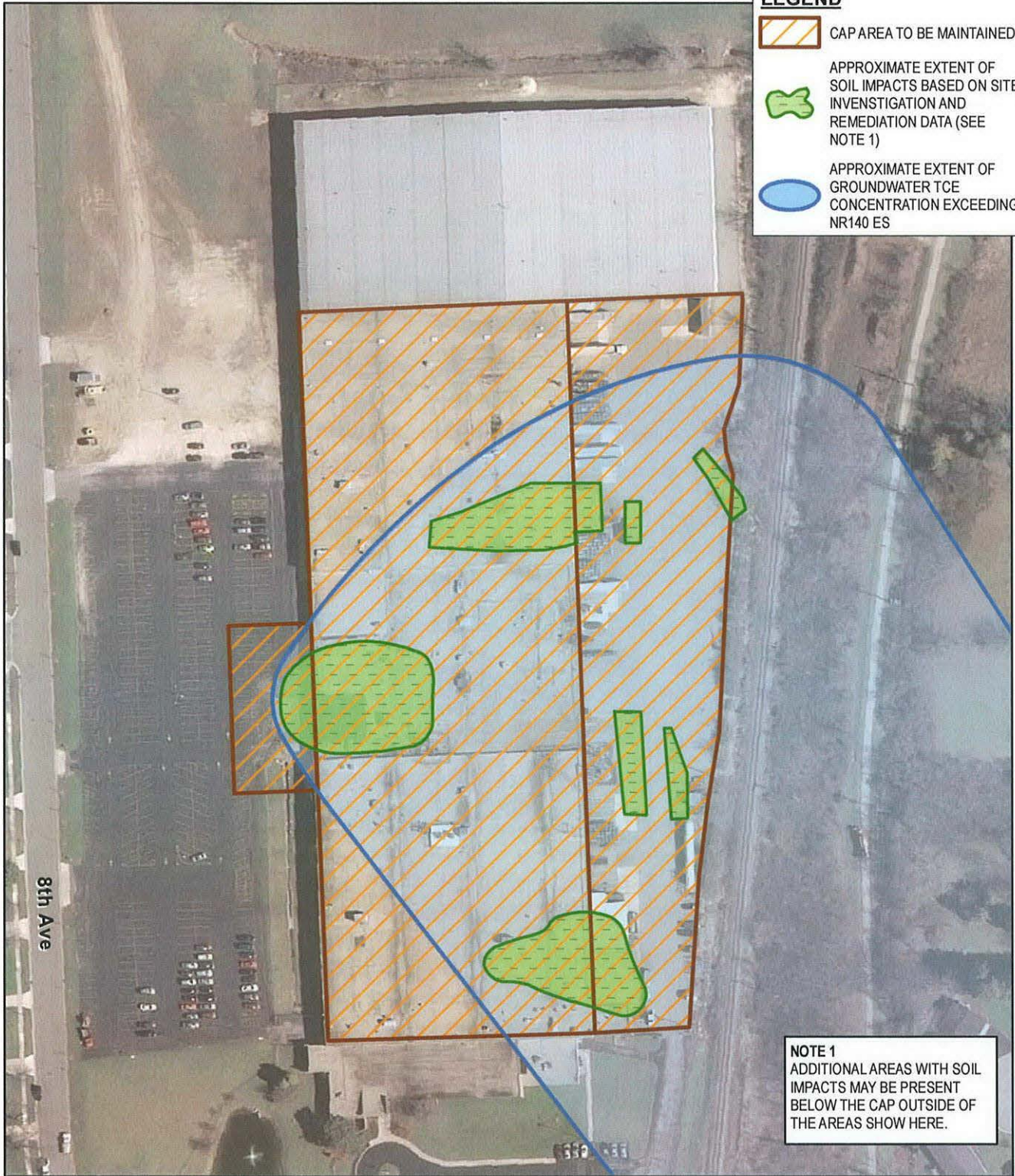
Contact Information

WDNR Contact: John Feeney
 Wisconsin Department of Natural Resources
 1155 Pilgrim Road
 Plymouth, WI 53073
 920-892-8756 Ext. 3023

Enclosures: Figure 1 – Site Map
 Attachment 1: Property Legal Description
 Attachment 2: Inspection and Maintenance Log

LEGEND

-  CAP AREA TO BE MAINTAINED
-  APPROXIMATE EXTENT OF SOIL IMPACTS BASED ON SITE INVESTIGATION AND REMEDIATION DATA (SEE NOTE 1)
-  APPROXIMATE EXTENT OF GROUNDWATER TCE CONCENTRATION EXCEEDING NR140 ES



NOTE 1
 ADDITIONAL AREAS WITH SOIL IMPACTS MAY BE PRESENT BELOW THE CAP OUTSIDE OF THE AREAS SHOW HERE.

BASE MAP IMAGERY FROM ESRI WEB-BASEMAP LAYER, "WORLD IMAGERY"



708 Heartland Trail
 Suite 3000
 Madison, WI 53717
 Phone: 608.826.3600

**900 NORTH STREET,
 GRAFTON, WISCONSIN**

CAP MAINTENANCE AREAS

DRAWN BY:	PAPEZ J
APPROVED BY:	STOLZENBURG T
PROJECT NO:	004169
FILE NO.	004169.006.mxd
DATE:	DECEMBER 2012

FIGURE 1

Attachment 1
Property Legal Description

785278

V1861P977

RECORDED

TRANSFER
\$10,375.80
FEE

2004 FEB 12 PM 12:05

QUIT CLAIM DEED

Ronald R. Vong
REGISTER OF DEEDS
OSHAKEE COUNTY, WI

Document Number _____

This Deed, made between TECUMSEH PRODUCTS COMPANY, a Michigan corporation, of the City of Tecumseh, County of Lenawee, and State of Michigan, Grantor, and TECUMSEH POWER COMPANY a Delaware corporation, of the City of Tecumseh, County of Lenawee, and State of Michigan, Grantee.

Grantor quit claims to Grantee the following described real estate in Ozaukee County, State of Wisconsin (the "Property"):

See Exhibit A attached hereto and made a part hereof.

Parcel Key No. 10-040-0002.000 *

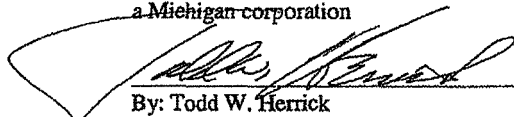
Property Address: 900 North Street, Village of Grafton, Wisconsin

This is not homestead property

Together with all appurtenant rights, title and interests.

Dated this 9th day of July, 2003.

TECUMSEH PRODUCTS COMPANY,
a Michigan corporation



By: Todd W. Herrick

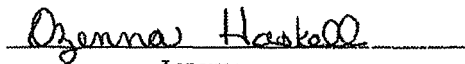
Its: Chairman of the Board, President and Chief Executive Officer

STATE OF MICHIGAN)

:ss

COUNTY OF LENAWEЕ)

The foregoing instrument was acknowledged before me this 9th day of July, 2003, by Todd W. Herrick, the Chairman of the Board, President and Chief Executive Officer of Tecumseh Products Company, a Michigan corporation, on behalf of the corporation.



Notary Public, Lenawee County, Michigan

My Commission Expires: August 27, 2006

THIS INSTRUMENT WAS DRAFTED BY
Andrew D. Bos, Attorney at Law
840 W. Long Lake Road, Suite 200
Troy, MI 48098
248-879-2000

Return to
\$13/PA

Exhibit A

That part of the South East One-Quarter and the South West One-Quarter, Section 13, Town 10 North, Range 21 East, in the Village of Grafton, Ozaukee County, Wisconsin, bounded and described as follows: Commencing at the South East corner of said south West 1/4 Section; thence West along the South line of said South West 1/4 Section 300.85 feet to a point in the center of proposed 8th Avenue; thence Northerly along the center line of said 8th Avenue on a curved line (whose center lies to the West, having a radius of 1641.97 feet, and whose long chord is 214.52 feet long, and bears N. 3 degrees 43 minutes 19 seconds W.) a distance of 214.68 feet to a point of reverse curve, thence continuing Northerly along the center line of said 8th Avenue on a curved line (whose center lies to the East, having a radius of 1641.97 feet, and whose long chord is 214.52 feet long, and bears N. 3 degrees 43 minutes 19 seconds E.) a distance of 214.68 feet to the point of tangency; thence N. 0 degrees 01 minutes 25 seconds E. along the center line of said 8th Avenue 1316.00 feet more or less to a point in the center line of a proposed 66 foot road; thence N. 88 degrees 05 minutes E. along the center line of said proposed 66 foot road and said center line, extended, and parallel to the south line of said south West 1/4 Section 876.42 feet to a point in the West line of the Chicago, Milwaukee, St. Paul and Pacific Railroad right of way; thence S. 7 degrees 41 minutes 30 seconds W. along the West line of said right of way 1775.00 feet to a point in the South line of said South East 1/4 Section; thence S. 89 degrees 02 minutes W. along the South line of said south East 1/4 Section 306.34 feet to the place of beginning, excepting the Westerly 33 feet, the North 33 feet of the West 575.70 feet, and the South 33 feet for street purposes.

Tax Key No.: 10-040-0002.000

Property Address: 900 North Street

BHLIB:416119.11088991-01055

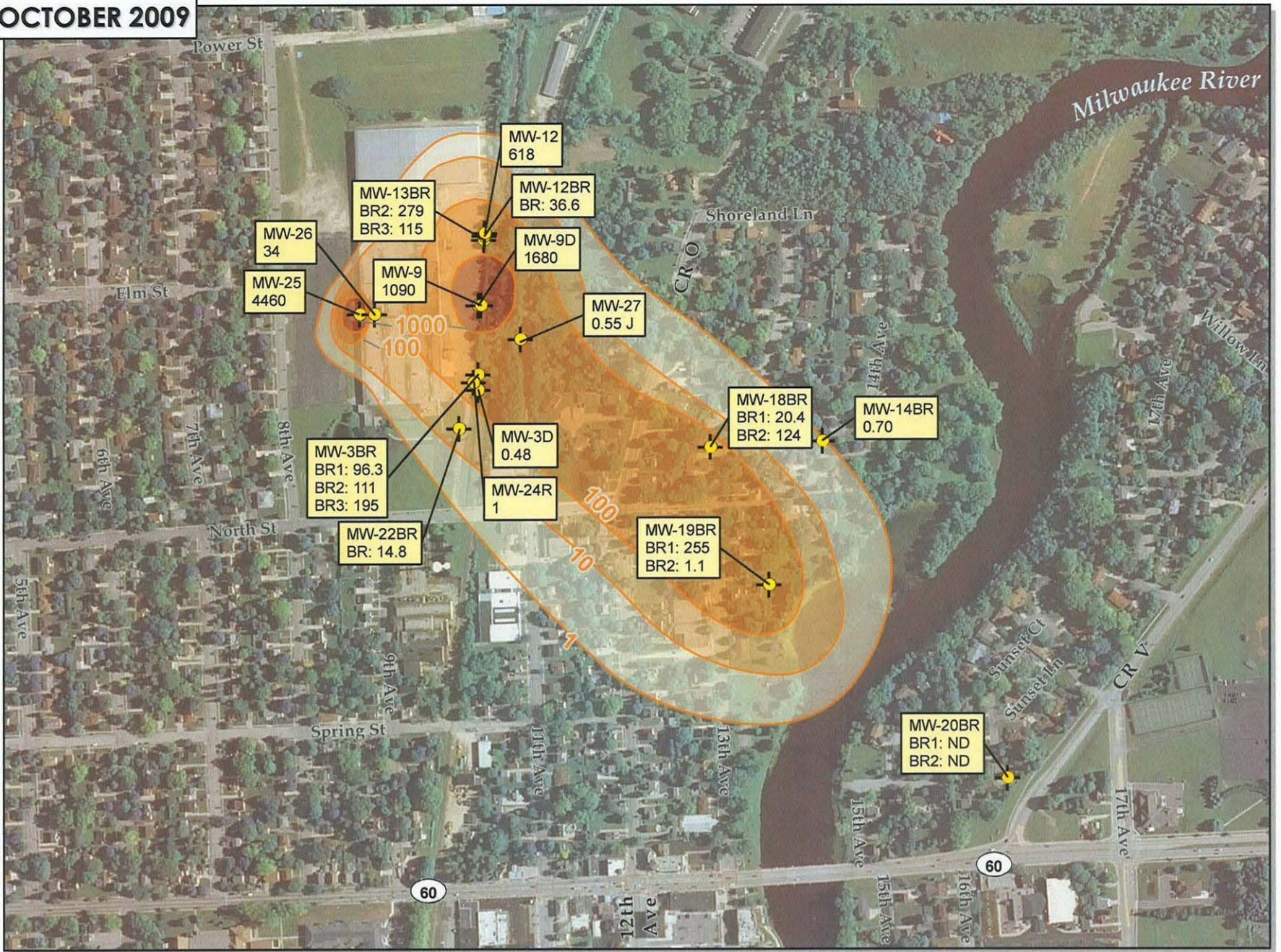
Attachment 2
Inspection and Maintenance Log

Attachment 2 – Cap Maintenance Plan
Inspection & Maintenance Log
900 North Street, Grafton, Wisconsin

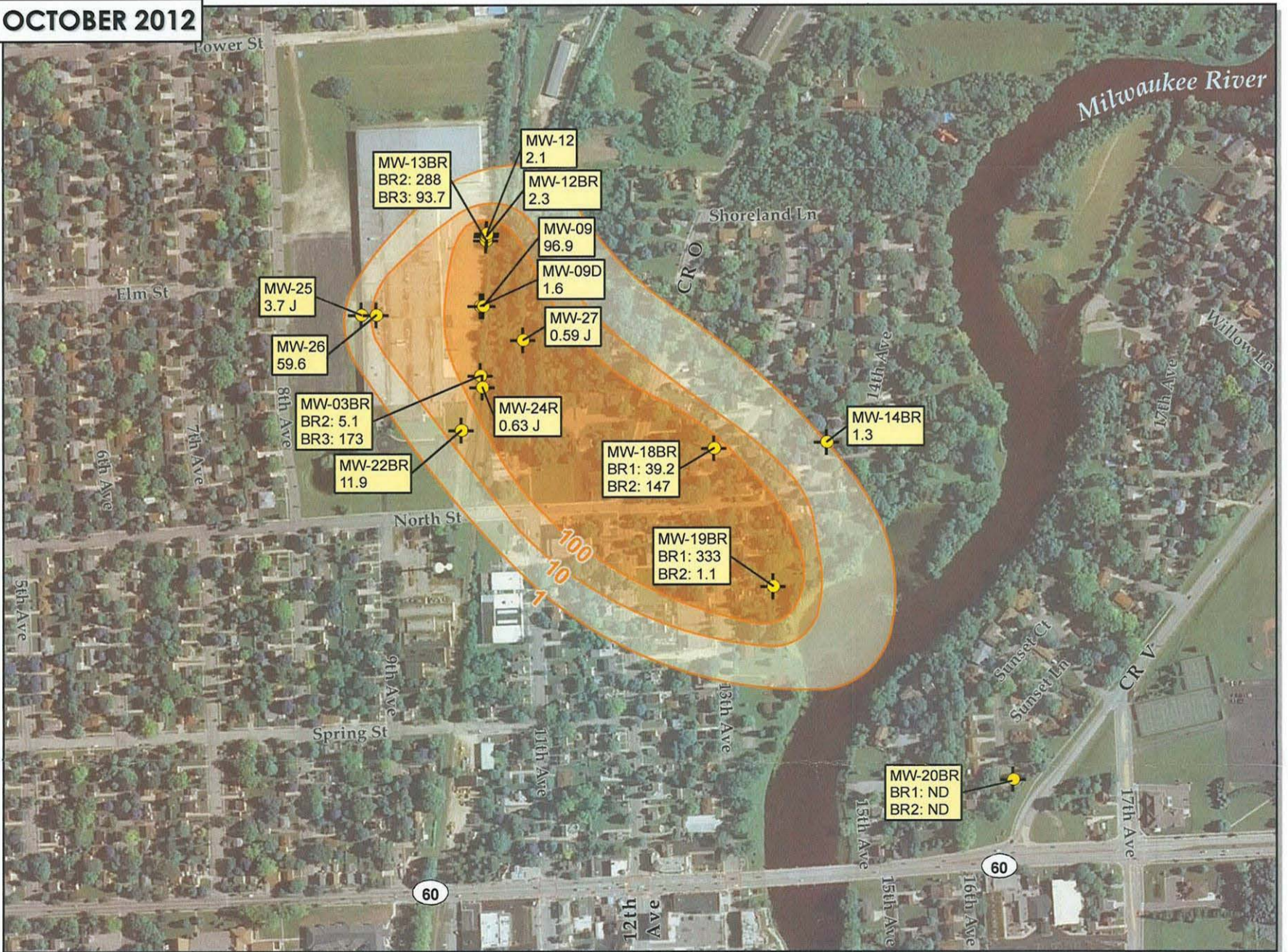
DATE	INSPECTOR	CONDITION OF CAP	RECOMMENDATIONS	HAVE RECOMMENDATIONS FROM PREVIOUS INSPECTION BEEN IMPLEMENTED? IF NOT, NOTE DEFICIENCY.

- Notes:
1. Cap to be inspected at least once annually. Timing of inspection should target spring after the snow melt.
 2. Log to also include any deficiencies observed in the interim and/or repairs.
 3. Cap includes foundation of the building and pavement/concrete surfaces over the extent shown on shown on Figure 1.

OCTOBER 2009



OCTOBER 2012



LEGEND

- WELL LOCATION WITH TCE RESULTS (ug/L)
- GROUNDWATER TCE CONCENTRATION CONTOUR (ug/L)

NOTES

1. AERIAL PHOTOGRAPHY FROM ESRI WEB-BASEMAP LAYER, "WORLD IMAGERY".
2. TCE = TRICHLOROETHENE
3. FOR WELLS WITH MULTIPLE VALUES (e.g. MW-18BR), RESULTS ARE LISTED CONSECUTIVELY BY LABEL (e.g. MW-18BR1, MW-18BR2,...).

Coordinate System: NAD 1927 StatePlane Wisconsin South FIPS 4803 (Foot US)
Map Rotation: 0Degrees

Printed By: JPAPAZ on never, never
Path: E:\Tecumseh\Grafton\WI\2012_004169\004169.009.mxd



708 Heartland Trail, Suite 3000
Madison, WI 53717
Phone: 608.826.3600
www.trcsolutions.com

DRAWN BY: PAPEZ J
CHECKED BY: SELLWOOD A
APPROVED BY: STOLZENBURG T
DATE: DECEMBER 2012

SCALE: 1:6,000
0 1" = 500' 500
DATE PRINTED: DEC 18 2012

TECUMSEH PRODUCTS COMPANY		GRAFTON, WI
TCE GROUNDWATER PLUME EXTENTS FROM 2009 TO 2012		
PROJ. NO. 004169	DWG. NAME 004169.009.mxd	FIGURE 4