

Hydrostratigraphic Database of West-Central Wisconsin



Site:	Town of Warren TCE Site
Location:	Warren, St. Croix County, Wisconsin
Unit Evaluated:	Ordovician St. Peter, Prairie du Chien

File includes excerpts from:

Cedar Corporation, 2003, Site Investigation Report, Town of Warren TCE Investigation, Town of Warren, St. Croix County, Wisconsin, on file at Wisconsin Department of Natural Resources.

- Text: executive summary, hydrogeology discussion
- Tables: groundwater elevations, vertical gradient calculations
- Figures: site plans, TCE plume maps, water table maps, cross-sections
- Boring logs

Cedar Corporation, 2005, unpublished slug test results for the Town of Warren TCE Site, supplied by the Wisconsin Department of Natural Resources.

- Slug test data and analyses (4 wells)

SITE INVESTIGATION REPORT

SITE:

Town of Warren TCE Investigation
Section 19, T29N, R18W
Town of Warren
St. Croix County, Wisconsin

Prepared for:

Wisconsin Department of Natural Resources
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July 2003

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Cedar Corporation Project #2481-0002
Wisconsin Department of Natural Resources Project #2000RRYY
Bureau of Remediation and Redevelopment Tracking System: # 02-56-373815

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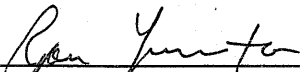
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SIGNATURE PAGE FOR:

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Town of Warren
St. Croix County, Wisconsin

I, Ryan Yarrington, hereby certify that I am a hydrogeologist as that term is defined in s. NR712.03(1), Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

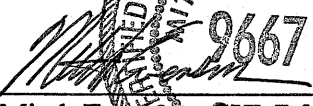


Ryan Yarrington, Hydrogeologist

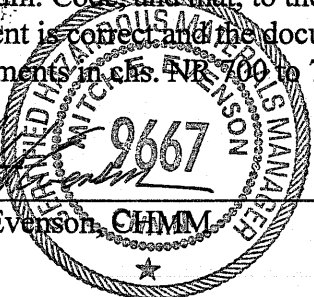
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Date

I, Mitch Evenson, hereby certify that I am a scientist as that term is defined in s. NR712.03(3), Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.




Mitch Evenson, CHMM



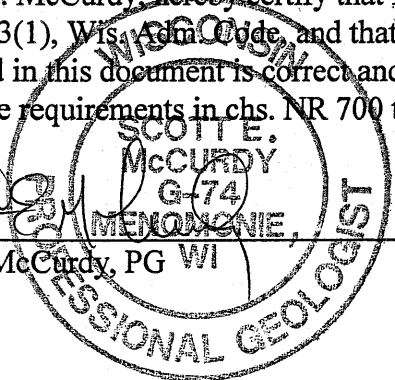
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Date

I, Scott E. McCurdy, hereby certify that I am a hydrogeologist as that term is defined in s. NR712.03(1), Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.



Scott E. McCurdy, PG WI



7-31-03

Date

EXECUTIVE SUMMARY

An environmental investigation has been completed in the Towns of Warren and Hudson, St. Croix County, WI (Figures 1 and 2). The purpose of the investigation is to evaluate the presence of persistent concentrations of TCE (trichloroethylene) in residential potable water supplies in the region. This work has been completed by Cedar Corporation under contract to the Wisconsin Department of Natural Resources (WDNR). The scope of work for this project was developed in collaboration with WDNR personnel familiar with the problems in this area and includes:

- A review of historical documents provided by WDNR.
- A review of regional geologic and hydrogeologic information that has been compiled by various agencies and St. Croix County.
- A review of historical aerial photos acquired by Cedar Corporation from the Wisconsin Department of Transportation (WDOT).
- A soil gas survey which included soil gas sampling at 87 soil probe locations.
- Construction of 22 soil borings with soil sampling within an area identified by the soil gas survey as the probable source of the contamination.
- The installation of 13 monitoring wells and 6 piezometers.
- Groundwater sampling of the monitoring well network.
- Sampling of area residential potable wells.
- Construction of seven soil vents and the completion of a Soil Vapor Extraction (SVE) pilot test.

The purpose of the investigation is to:

- Identify the location (hot spot) of highest concentrations of TCE (Trichloroethylene) which has contaminated local groundwater.
- Determine the degree and extent of soil and groundwater contamination.
- Conduct a pilot test to determine if Soil Vapor Extraction (SVE) is viable as an appropriate corrective action.
- Evaluate technically feasible and economically responsible options to restore the environment and protect human health.

The geology in the area consists of a thin overburden layer of glacial tills. Bedrock on topographic highs consists of, from near surface downward, an interbedded sequence of dolomites and sandstones that has regionally been mapped as the Sinnipee Formation dolomitic sandstone, the St. Peter sandstone, and the Prairie du Chien group dolomite. Groundwater is generally deep with the upper aquifer being encountered within 50 to 100 feet of surface, and is generally flowing west-northwest.

Groundwater monitoring of residential wells has been ongoing in this region since 1984 as part of the investigative studies completed for the NorLake Industries and Junkers Landfill groundwater contamination problems. The persistent presence of TCE in the Town of Warren located south east of the Junkers Landfill led the WDNR to believe an additional source of TCE may be present in this area.

This investigation and an evaluation of available historical information, has determined that sometime between 1950 and the 1970s, a release of material, primarily consisting of TCE, occurred south of 80th Avenue near the intersection of a private property driveway (currently known as the Polen residence - Figure 3). The soil boring and soil gas survey results suggest the release occurred within a 300 foot by 300 foot area. Of the soil samples recovered from the borings completed in this area, none could definitely identify the exact release point of the contaminant. However, based upon the compiled soil gas, soil, and groundwater data collected during this investigation, it is evident the original release point is within or near the described area.

As the unsaturated zone soil contamination that has been encountered and described in this report does not define an exact release point, it is possible to suggest that the contamination of the groundwater occurred through alternate means such as by subsurface injection or by a conduit such as an abandoned well. However, no evidence of a well or injection point being used for this purpose was identified during the investigation.

The possibility also exists that an excavation or pit may have been constructed with the base of the pit at the depth of bedrock or near bedrock. The TCE laden materials may have been dumped or pumped into the excavation, which was later filled, thus leaving no sign of contamination in the unsaturated zone. The physical examination of the samples from the borings does not reveal any solid or decayed residues which would suggest that the TCE was released from improperly disposed solid wastes. Historical photographs do reveal excavation activities in the 1960s and 1970s south of the identified source area on what is now the Ogburn property.

The alignment of 80th Avenue was changed in the 1940s or 1950s which involved the movement of large amounts of soil. This realignment of the road may have spread the original source area thus making the exact location of the release unidentifiable.

Although the soil sampling did not define an exact source location, a TCE groundwater plume has been defined. This contaminant plume starts in the 300 by 300 foot source area and extends approximately one mile in a northwesterly direction. The TCE plume is approximately 1500 feet wide and extends from the point of origin in the Town of Warren into the Town of Hudson near Kingsway Road where it appears based on the information available to commingle with another

known contaminated plume that has been identified in Section 24, T29N, R19W (Figure 9). The vertical extent of the plume has also been evaluated but not fully defined. Defining the exact location of the point where the plumes commingle is not within the scope of this project.

As part of this project, seven soil vents were installed within the identified source area. After installation of the soil vents, a Soil Vapor Extraction Pilot Test was completed to evaluate the ability to remove TCE from the subsurface. The results of this three day pilot test indicate that TCE can be recovered from the source area using this technology. Using pilot test recovery rates, it is estimated 800 to 2000 pounds per year of TCE can be recovered from the subsurface. However, it is unlikely that the recovery rates achieved during the pilot test can be attained over long time frames as the venting efficiencies for SVE systems normally decrease with time. In addition, the majority of the TCE mass identified during this investigation is located within the saturated zone. Therefore, SVE recovery rates would be limited to volatilization from the ground water/soil interface and would not address TCE contamination deeper in the aquifer. As the original quantity of TCE released is unknown, it is not possible to project a total quantity of TCE that could be recovered from the operation of an SVE system.

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January 24, 2001	Sampled the Burton private water supply well.
May 25, 2001	Set additional survey control points and benchmarks.
June 12, 2001 -	Install soil vents S-1, S-2, S-3, S-4, S-5 and S-7.
July 3, 2001	Install monitoring wells MW-9, MW-11 and MW-13, and piezometers P-6, P-10, and P-14. Develop monitoring wells, piezometers, and established horizontal and vertical coordinates. Completed soil borings B-1 and B-2.
July 20, 2001	Sampled all wells, piezometers, vents S-5 and S-6, and Junkers Landfill wells JW-11 and JW-13 for VOCs.
September 17, 2001	Sampled all wells, piezometers, vents S-5 and S-6, and Junkers Landfill wells JW-11 and JW-13 for VOCs. Also sampled the Albright, Burton, Ogburn, and Wilbur private water supply wells.
September 17-19, 2001	Conduct soil vapor extraction pilot test.
January 11, 2002	Residential sampling completed for VOCs.
February 25, 2002	Install monitoring wells MW-16 and MW-17.
March 13, 2002	Develop monitoring wells MW-16 and MW-17.
April 15, 2002	Sampled all wells, piezometers, vents S-5 and S-6, and Junkers Landfill well JW-11 for VOCs.
June 4-6, 2002	Complete soil borings B-18 through B-35.

IV. DISCUSSION OF RESULTS

A. Site Specific Geology:

Forty-eight soil borings were advanced in this investigation, some as much as 195 feet into the subsurface. All borings were logged for geology. Five distinct soil lithologies were encountered during the boring process below topsoil. For the sake of this discussion, these units have been labeled as A, B, C, D, and E, and are briefly described as:

- (A) Silt with sand and clay, brown, fine grained (SM)
- (B) Clayey sands, brown, fine grained (SC)
- (C) Sand with silt, medium grained, moderately sorted, trace gravel, dry (GM)
- (D) Sandstone, white, poorly cemented, very weathered, fine grained (identified by characteristics and regional reference as the Ancell Group, St. Peter Sandstone Formation)
- (E) Sandy dolomite grading to dolomite (identified by characteristics and regional reference as the Sinnipee Group dolomite on or near topographic highs, and the Prairie du Chien dolomite at depth)

Subsurface investigations completed during this investigation determined the following geologic conditions within the local area:

- Bedrock near the Polen residence is near surface (within 5 feet) on a topographic high (elevation 1070). From this location, the bedrock surface slopes at approximately 13 percent northwest towards the closed depression on the Albright property (see Figure 3). The bedrock surface slopes northwest at a greater degree of slope than surface, thus it is deeper below the ground surface under this depression.
- At the topographic high near the Polen residence, Sinnipee Group dolomite is present near surface and is approximately 15 feet thick. Below the dolomite, a 137 foot thick sandstone unit (interpreted to be the St. Peter) is encountered. The Prairie du Chien sandy dolomite is encountered some 152 feet below surface. This topographic high is the only location where a dolomitic unit was encountered above sandstone bedrock.
- From the Albright property west (near monitoring wells MW-3 and P-4), the bedrock surface appears to flatten. The sandstone bedrock from this point west-northwest to Young Road is at an elevation of approximately 915 to 925 msl.

Three cross-sections (Figures 6, 7, and 8) have been prepared using soil boring logs from this investigation to fairly represent the subsurface geology.

B. Site Specific Hydrogeology:

1. Groundwater Contours

Groundwater is generally encountered in this area in the sandstone unit. Tables 1a and 1b present the top of monitoring well casing elevations (TOC), depth to groundwater measurements (DTW), top of screen elevations (TOS), and calculated groundwater elevations. The tables are prepared to fairly represent the groundwater hydrographs with adequate vertical scale as groundwater elevations across the investigation site vary from 897.81 feet in the northwest to 926.63 feet at the southeast end of the project area. By plotting the groundwater elevations at the respective monitoring points on scaled topographic maps, the groundwater elevations can be contoured. From these contours, groundwater flow direction and contaminant migration direction can be established. Groundwater contours using the April 15, 2002 depth to water measurements are presented on Figures 9 and 10. As was anticipated from the regional mapping, the localized groundwater flow is migrating in a northwesterly direction.

2. Hydraulic Gradients

The groundwater contours across the investigation area indicate three different zones each with a characteristic horizontal gradient and migration direction. For the sake of this discussion, these variations are divided into three zones - Zone I, Zone II, and Zone III. Zone I is in the area identified as the contaminant source area and can be defined by wells MW-2, MW-3 and MW-8 and other related wells in this area. Hydraulic gradients for Zone I have been calculated to be 0.0008 horizontal and the vertical gradient ranges from - 0.0093 to -0.0119 (MW-1/P-6 nest). Table 2 presents the piezometric elevations and vertical gradients.

Zone II underlies the Albright and Wilbur properties and can be defined by wells MW-3, MW-5, MW-9, MW-11, related piezometers and the former Albright water supply well. Immediately down gradient of the defined source area, the hydraulic gradient in Zone II steepens to 0.007 and turns slightly westward (~ 316° azimuth from ~ 321° azimuth). The vertical gradient decreases to a range of -0.0026 to -0.0042, at the up gradient edge

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of the zone (MW-3/P-4 nest). Piezometer nests MW-9/P-10 and MW-11/P-12 identify the down gradient edge of Zone II with vertical gradients ranging from - 0.0065 to -0.0097. On Table 2, the MW-11/P-12 nest is noted to have a vertical gradient of + 0.0179 for the 9/17/2001 monitoring event. Well MW-11 has a well pump installed for a local resident to use as a non-potable water supply. The well may have been pumped recently prior to the 9/17/01 monitoring event and this particular data point is considered unreliable.

Zone III encompasses the area from wells MW-9 and MW-11 to the Junker's landfill well JW-11 (just south of Highway 12). This area includes wells MW-13, P-14, and P-15. Groundwater migration in this area is more northerly (~ 336° azimuth) than in Zones I and II and is characterized by a horizontal gradient of 0.005 and an upward vertical gradient at nest MW-13/P-14 ranging from 0.0053 to 0.0075.

The negative value for a vertical gradient indicates that the aquifer is in a recharge condition (groundwater is moving downward). For most upland areas in Wisconsin this is a normal condition and is expected in this area. The upward or discharge vertical gradient at well nest MW-13/P-14 is unexplained, at present.

With the dissolution of the contaminant into groundwater, the mechanics governing the flow become more complicated than in the unsaturated media above the water table. A comparison of the magnitude of the horizontal to vertical gradient can provide some insight on the potential migration vector of a contaminant solute as it migrates through the pores of the aquifer media. H/V greater than 1 indicate a more horizontal migration preference, as opposed to H/V ratios of less than 1. Again the sign of the ratio is indicative of the vertical movement of the groundwater at the measurement location. The ratios for the different Zones are:

Zone I:	I_h	0.0008	I_v	- 0.0093 to 0.0119	I_h/I_v	= - 0.082
Zone II:	I_h	0.007	I_v	- 0.0026 to 0.0097	I_h/I_v	= - 2.69 to - 0.556
Zone III:	I_h	0.005	I_v	+ 0.0053 to 0.0075	I_h/I_v	= + 0.94 to 0.667

The overall vector for groundwater migration at the source area is downward but with a horizontal component that directs the contaminant solute horizontally in a northwesterly direction. As the solute enters Zone II, a stronger horizontal gradient is encountered which results in a more horizontal plume. The plume is further mixed in Zone III where the

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upward vertical gradient is present. This mixing effect can be seen in the analytical results which show relatively similar concentrations of TCE contaminants in the monitoring well and the piezometer (MW-13 and P-14), even though the screens are some 25 feet apart. These effects are compounded by the physical characteristics of the contaminant. TCE has a density of 1.46, thus is heavier than water and will tend to sink into the aquifer. Downward vectors encountered in the aquifer will enhance the downward migration of this contaminant.

3. Average Linear Velocity

Using the available data, the average linear velocity of this aquifer can be determined. Darcy's Law can be described as:

$$V_{av} = \frac{KI_h}{n}$$

where V_{av} = average linear velocity
 K = hydraulic conductivity
 I_h = horizontal hydraulic gradient
 n = porosity

For this project, it was necessary to assume certain parameters including permeability and porosity. Specific hydraulic conductivity tests could not be completed on the sandstone aquifer because of the rapid recovery rates experienced during attempted slug and bail down testing for hydraulic conductivity. However, the St. Peter sandstone is a well documented unit and literature numbers (as referenced for sandstone from Fetter, 1994) were used;

$$K = 0.001 \text{ to } 0.01 \text{ cm/sec.}$$

$$n = 0.30$$

Calculations of average linear velocity for Zone I are:

$$I_h = 0.0008$$

$$\text{and; } V_{av} = \frac{0.001 \times 0.0008}{0.30} = 2.67 \times 10^{-6} \text{ cm/sec.} = 3 \text{ ft./yr.}$$

$$\text{and; } V_{av} = \frac{0.01 \times 0.0008}{0.30} = 2.67 \times 10^{-5} \text{ cm/sec.} = 27 \text{ ft./yr.}$$

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Calculations of average linear velocity for Zone II are:

$$\begin{aligned} I_h &= 0.007 \\ \text{and; } V_{av} &= \frac{0.001 \times 0.007}{0.30} = 2.33 \times 10^{-5} \text{ cm/sec.} &= 24 \text{ ft./yr.} \\ \text{and; } V_{av} &= \frac{0.01 \times 0.007}{0.30} = 2.33 \times 10^{-4} \text{ cm/sec.} &= 241 \text{ ft./yr.} \end{aligned}$$

Calculations of average linear velocity for Zone III are:

$$\begin{aligned} I_h &= 0.005 \\ \text{and; } V_{av} &= \frac{0.001 \times 0.005}{0.30} = 1.67 \times 10^{-5} \text{ cm/sec.} &= 17 \text{ ft./yr.} \\ \text{and; } V_{av} &= \frac{0.01 \times 0.005}{0.30} = 1.67 \times 10^{-4} \text{ cm/sec.} &= 172 \text{ ft./yr.} \end{aligned}$$

The average linear velocity varies from Zone to Zone from 3 to 241 feet per year in the upper aquifer. The velocity ranges overlap as a range of estimates for hydraulic conductivity were used in the calculations. It is likely that the groundwater linear velocity falls within the calculated ranges but further definition is not possible without an accurate in-situ hydraulic conductivity. In consideration of the costs to derive this information, it was felt that gaining that accuracy was not as important as defining the extent and magnitude of the contamination. This velocity defines the anticipated horizontal rate of movement for the groundwater and is not necessarily reflective of the contaminant migration rate. Physical factors of adsorption and retardation, biologic degradation, and other factors also influence the migration rate of the contaminant solute. However, using the high ranges for linear velocity at each zone, and assuming the front edge of the plume is 4,800 feet from the source area, an estimated age of the spill can be calculated. Based on the above hypothesis, the release of TCE occurred in the late 1950s or approximately 45 years ago.

C. Soil Gas Survey

The first phase of the investigation commenced in October 2000. This phase included the installation of 87 soil gas probes, one geoprobe boring, and the collection of two Summa canister air samples, one each from the Ogburn horse barn well and Roberts Landfill monitoring well. Prior to starting the soil gas survey, Cedar Corporation established vertical and horizontal control across the area to be investigated. Survey control was

TABLE 1a
GROUNDWATER ELEVATIONS AND HYDROGRAPH
WISCONSIN DEPARTMENT OF NATURAL RESOURCES
DNR TCE INVESTIGATION
TOWN OF WARREN, ST. CROIX COUNTY, WI

	MW-1	MW-2	MW-3	P-4	MW-5	P-6	MW-7	MW-8	MW-16	MW-17
UNIQUE WELL ID	JS 421	JS 422	JS 423	JS 424	JS 425	JS 456	JS 427	JS 428		
TOC, MSL	1024.95	1069.87	995.88	995.6	998.56	1031.25	978.78	1013.85	1064.19	1032.03
WELL DEPTH, FT	114	152	83	106	84	143	65	101	148	117
SCREEN LENGTH	20	20	20	5	20	5	20	20	20	20
TOS, MSL	930.95	937.87	932.88	894.6	934.56	893.25	933.78	932.85	936.19	935.03
DATE	DEPTH TO GROUNDWATER MEASUREMENTS									
12/5/2000	100.98	145.37	72.18	72	79.5		54.9	89.86		
1/3/2001	100.89	145.28	72.04	71.87	79.37		54.8	89.74		
7/20/2001	100.34	144.65	71.59	71.39	79.28	106.92	54.26	89.19		
9/17/2001	99.5	143.9	70.79	70.6	78.35	106.09	53.45	88.4		
4/15/2002	98.78	143.24	69.99	69.84	77.28	105.44	52.76	87.66	137.86	105.73
DATE	GROUNDWATER ELEVATIONS									
12/5/2000	923.97	924.5	923.7	923.6	919.06		923.88	923.99		
1/3/2001	924.06	924.59	923.84	923.73	919.19		923.98	924.11		
7/20/2001	924.61	925.22	924.29	924.21	919.28	924.33	924.52	924.66		
9/17/2001	925.45	925.97	925.09	925	920.21	925.16	925.33	925.45		
4/15/2002	926.17	926.63	925.89	925.76	921.28	925.81	926.02	926.19	926.33	926.3

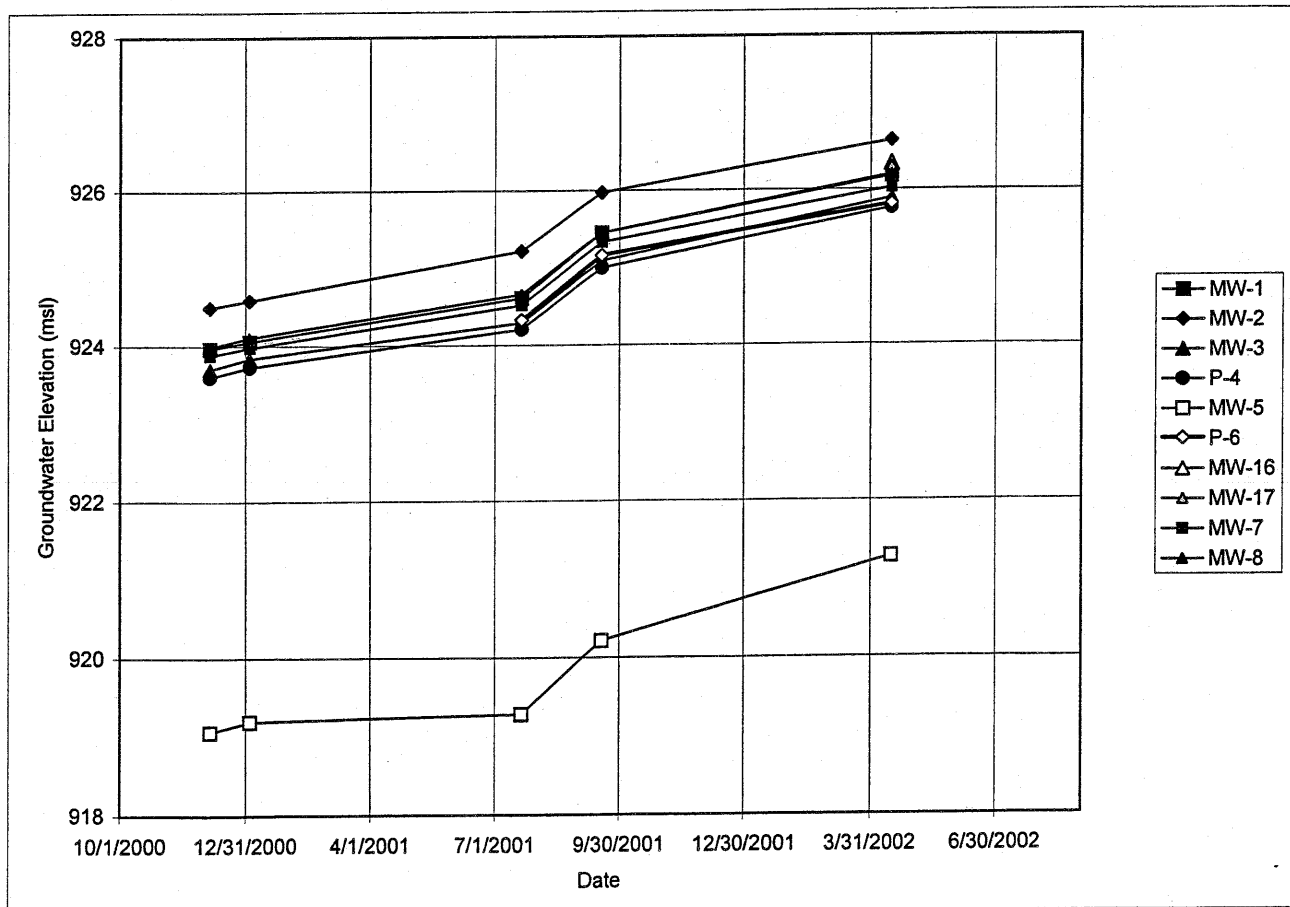


TABLE 1b
GROUNDWATER ELEVATIONS AND HYDROGRAPH
WISCONSIN DEPARTMENT OF NATURAL RESOURCES
DNR TCE INVESTIGATION
TOWN OF WARREN, ST. CROIX COUNTY, WI

	MW-9	P-10	MW-11	P-12	MW-13	P-14	P-15	JW-11	JW-13
UNIQUE WELL ID	JS 459	JS 460	JS 451	JS 452	JS 453	JS 454	JS 455	GT 505	GT 504
TOC, MSL	1057.41	1057.94	1051.83	1052.89	959.04	958.92	1065.78	1031.3	1008.99
WELL DEPTH, FT	160	183	156	182	72	87	193		
SCREEN LENGTH	20	5	20	5	20	5	5		
TOS, MSL	917.41	879.94	915.83	875.89	907.04	876.92	877.78		
DATE	DEPTH TO GROUNDWATER MEASUREMENTS								
12/5/2000									
1/3/2001									
7/20/2001	149.79	150.6	144.03	145.3	57.52	57.25	162.89	133.78	113.35
9/17/2001	149.21	150	143.3	143.78	57.04	56.8	162.44	133.57	115.25
4/15/2002	148.66	149.48	142.8	144.07	56.71	56.42	162.12	133.49	
DATE	GROUNDWATER ELEVATIONS								
12/5/2000									
1/3/2001									
7/20/2001	907.62	907.34	907.8	907.59	901.52	901.67	902.89	897.52	895.64
9/17/2001	908.2	907.94	908.53	909.11	902	902.12	903.34	897.73	893.74
4/15/2002	908.75	908.46	909.03	908.82	902.33	902.5	903.66	897.81	

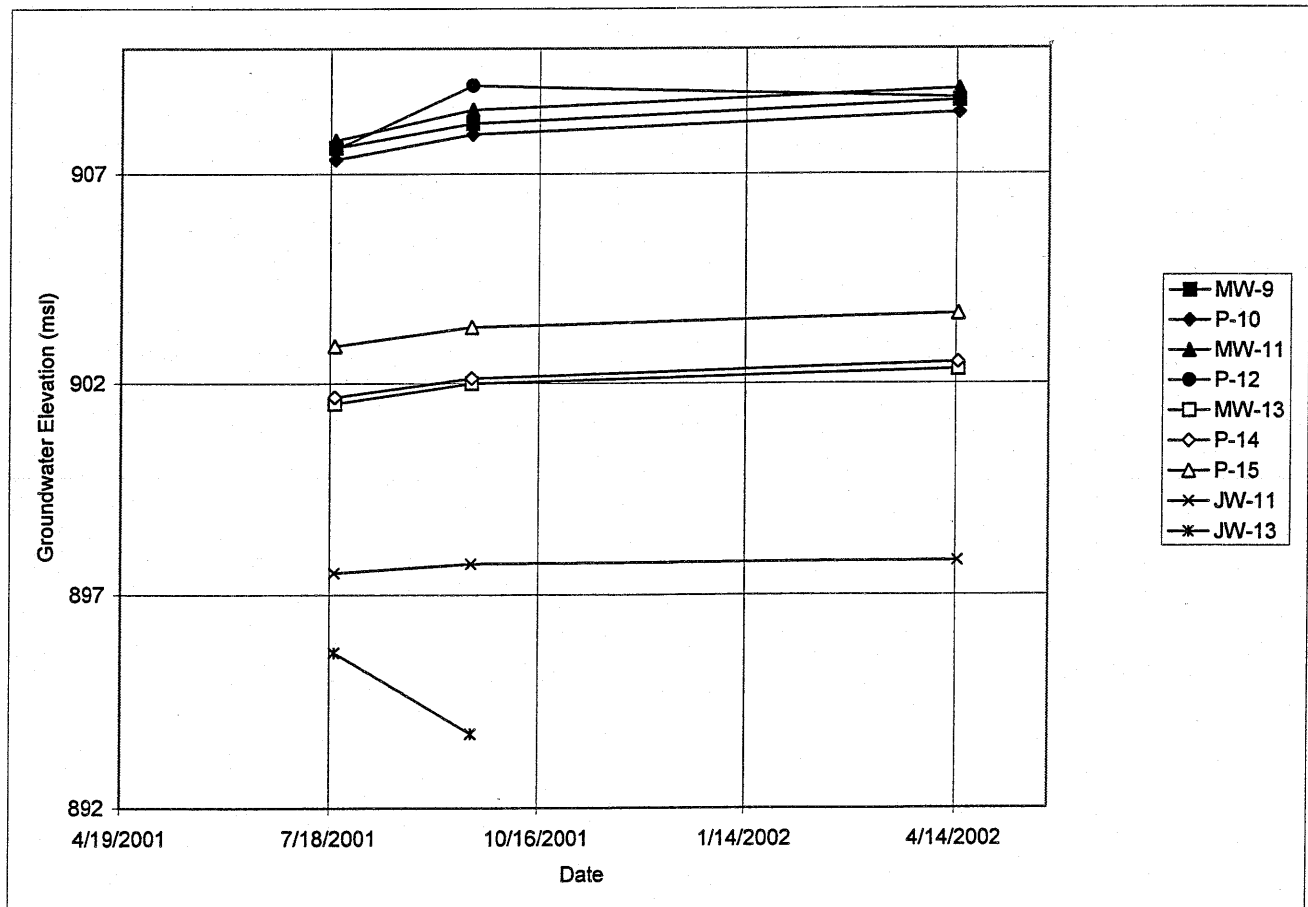


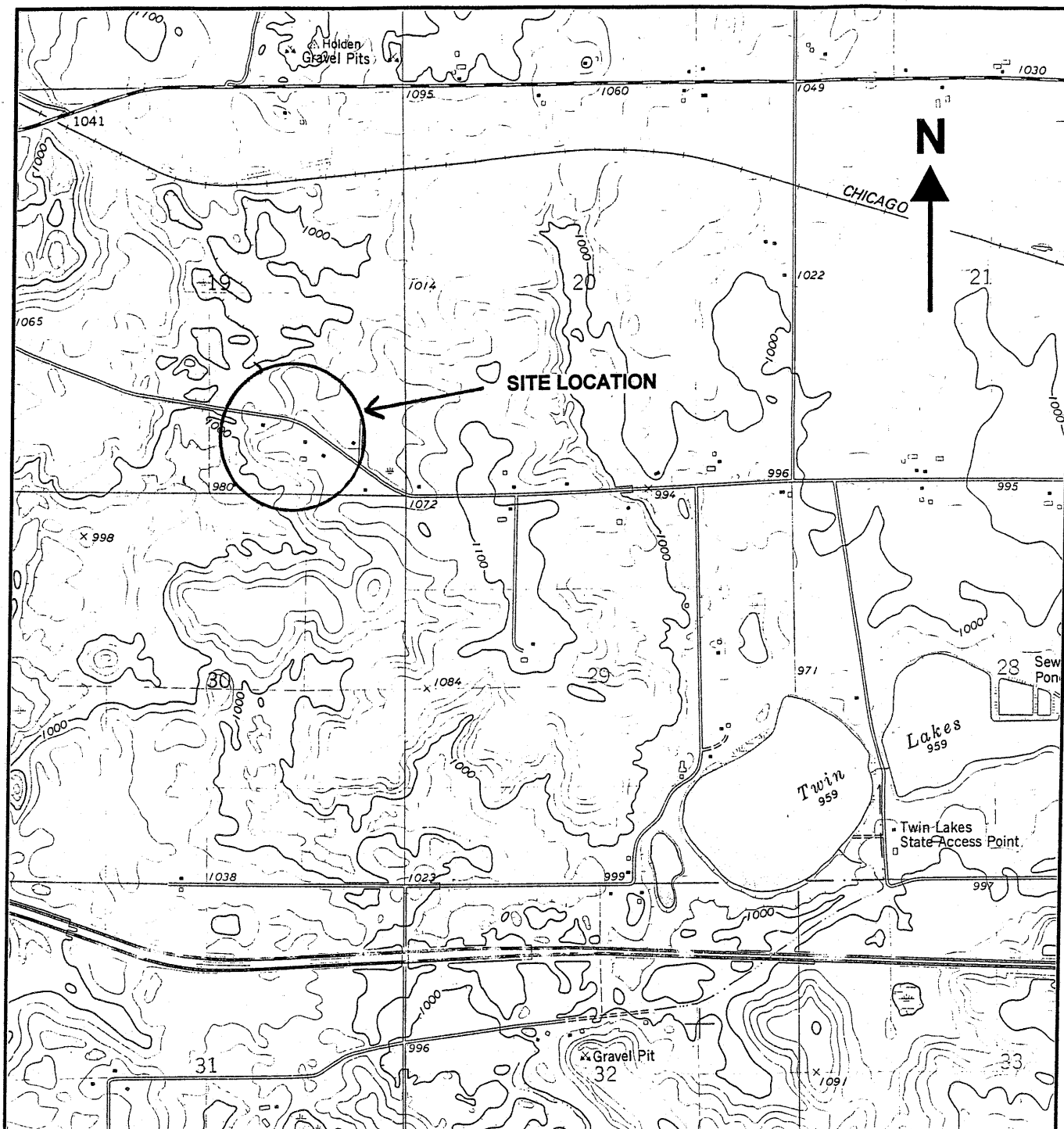
TABLE 2
PIEZOMETRIC ELEVATIONS AND VERTICAL GRADIENTS
WISCONSIN DEPARTMENT OF NATURAL RESOURCES
DNR TCE INVESTIGATION
TOWN OF WARREN, ST. CROIX COUNTY, WI

	MW-1	P-6		MW-3	P-4		MW-9	P-10		MW-11	P-12		MW-13	P-14	
UNIQUE WELL ID	JS 421	JS 456		JS 423	JS 424		JS 459	JS 460		JS 451	JS 452		JS 453	JS 454	
TOC, MSL	1024.95	1031.25		995.88	995.60		1057.41	1057.94		1051.83	1052.89		959.04	958.92	
WELL DEPTH, FT	114	143		83	106		160	183		156	182		72	87	
SCREEN LENGTH	20	5		20	5		20	5		20	5		20	5	
TOS, MSL	930.95	893.25		932.88	894.60		917.41	879.94		915.83	875.89		907.04	876.92	
SCREEN ELEVATION	920.95	890.75		922.88	892.10		907.41	877.44		905.83	873.39		897.04	874.42	
DATE	DEPTH TO GROUNDWATER MEASUREMENTS														
12/5/2000	100.98			72.18	72.00										
1/3/2001	100.89			72.04	71.87										
7/20/2001	100.34	106.92		71.59	71.39		149.79	150.60		144.03	145.30		57.52	57.25	
9/17/2001	99.50	106.09		70.79	70.60		149.21	150.00		143.30	143.78		57.04	56.80	
4/15/2002	98.78	105.44		69.99	69.84		148.66	149.48		142.80	144.07		56.71	56.42	
	GROUNDWATER ELEVATIONS AND VERTICAL GRADIENTS (VG)														
	MW-1	P-6	VG	MW-3	P-4	VG	MW-9	P-10	VG	MW-11	P-12	VG	MW-13	P-14	VG
12/5/2000	923.97			923.7	923.6	-0.0032									
1/3/2001	924.06			923.84	923.73	-0.0036									
7/20/2001	924.61	924.33	-0.0093	924.29	924.21	-0.0026	907.62	907.34	-0.0093	907.8	907.59	-0.0065	901.52	901.67	0.0066
9/17/2001	925.45	925.16	-0.0096	925.09	925	-0.0029	908.2	907.94	-0.0087	908.53	909.11	0.0179	902	902.12	0.0053
4/15/2002	926.17	925.81	-0.0119	925.89	925.76	-0.0042	908.75	908.46	-0.0097	909.03	908.82	-0.0065	902.33	902.5	0.0075

Vertical Gradient =
$$\frac{(-1) \times (GWE_{mw} - GWE_p)}{\text{Difference in Screen Elevations}}$$

Negative Gradient indicates a downward groundwater migration or recharge condition

Screen Elevations are defined as the mid point of the screen.



LEGEND

ROBERTS WIS.
USGS TOPOGRAPHIC QUADRANGLE
7.5 MINUTE SERIES, 1974

CONTOUR INTERVAL = 20 FEET



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DRAWN BY
USGS

DATE
9/20/02

REVISED BY
RJY

SCALE
1" : 2000'

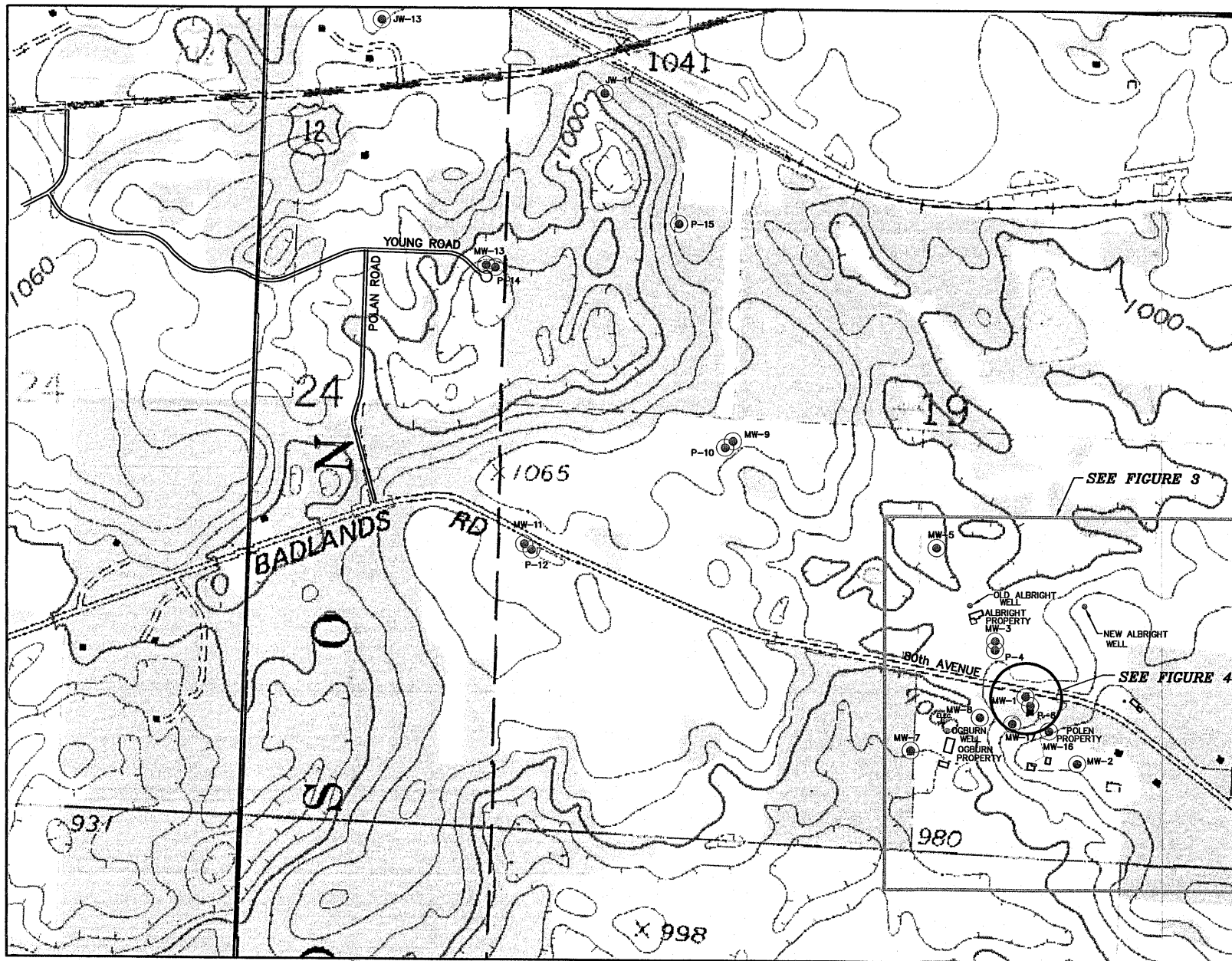
SITE LOCATION MAP

TOWN OF WARREN
TCE INVESTIGATION
ROBERTS, WI

CHECKED BY
RJY

JOB NO.
2481

FIGURE
1



- KEY**
- = MONITORING WELLS
 - = SAMPLED RESIDENTIAL WELLS

JOB NO.	W2481-002
BOOK NO.	
DRAWN BY	PKF
CHECKED BY	MEE
DATE	OCT. 2001
REVISIONS	
REFERENCE FILE	
DRAWING FILE	QUAD.DWG

604 Main Avenue
Neenah, Wisconsin 54951

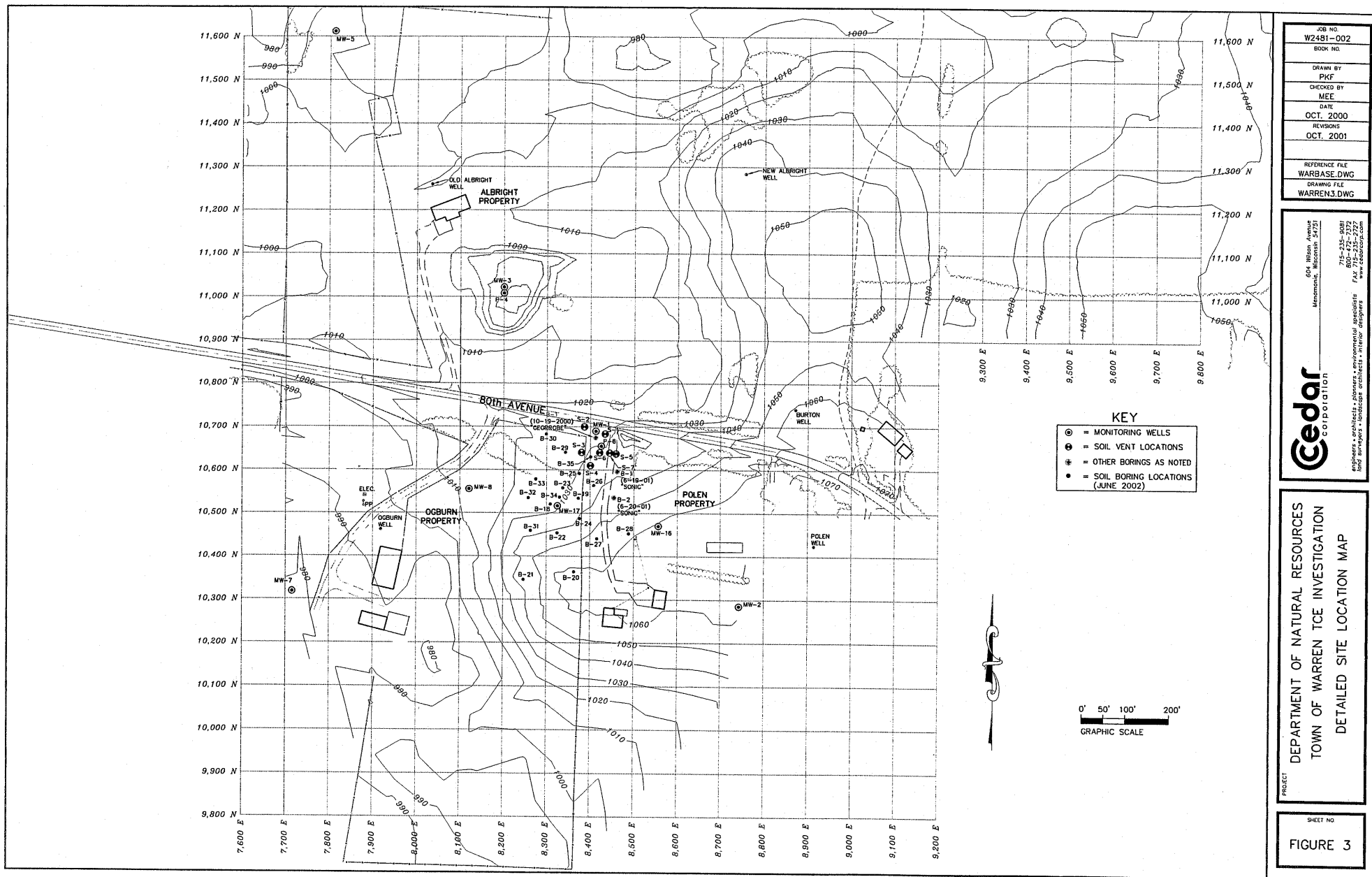
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DEPARTMENT OF NATURAL RESOURCES
TOWN OF WARREN TCE INVESTIGATION
SITE LOCATION MAP

SHEET NO.
FIGURE 2



JOB NO.	W2481-002
BOOK NO.	
DRAWN BY	PKF
CHECKED BY	MEE
DATE	OCT. 2000
REVISIONS	OCT. 2001
REFERENCE FILE	WARBASE.DWG
DRAWING FILE	WARREN3.DWG

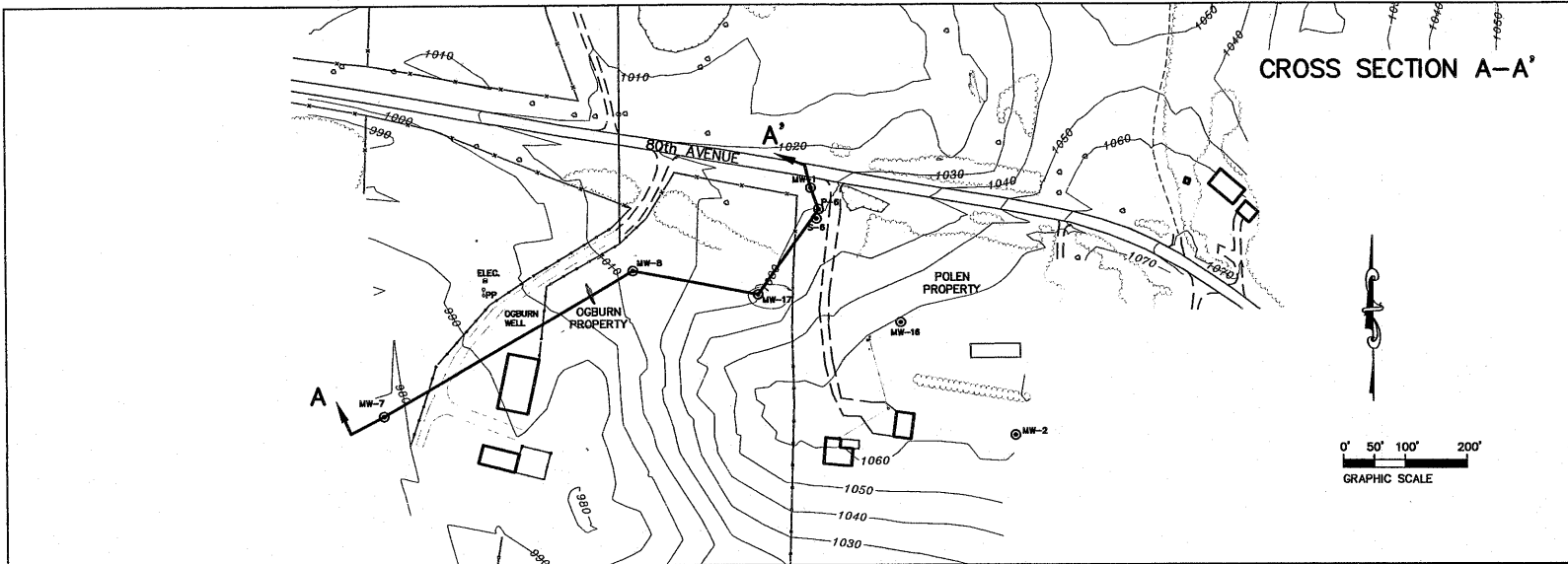
604 Wilson Avenue
Menomonee, Wisconsin 54751
715-235-9881
715-235-9882
FAX 715-235-2222
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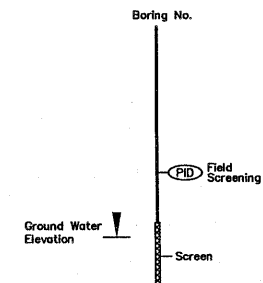
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PROJECT
DEPARTMENT OF NATURAL RESOURCES
TOWN OF WARREN TCE INVESTIGATION
DETAILED SITE LOCATION MAP

SHEET NO.
FIGURE 3



LEGEND OF BORING



KEY

- 200 — ISOCONCENTRATION
TCE (ppb)
- ? — 200 — ? — INFERED ISOCONCENTRATION
TCE (ppb)

GEOLOGIC LEGEND

- (A) — SILT WITH SAND & CLAY
BROWN FINE GRAIN
- (B) — CLAY, BROWN FINE GRAIN
- (C) — SAND WITH SILT, MEDIUM GRAIN
MODERATELY SORTED TRACE GRAVEL
DRY, NO ODOR
- (D) — SANDSTONE, WHITE, POORLY CEMENTED
VERY WEATHERED FINE GRAIN
- (E) — LIME ROCK, LIGHT BROWN, HARD

GROUNDWATER ELEVATIONS BASED ON
JAN. 3, 2001 DATA

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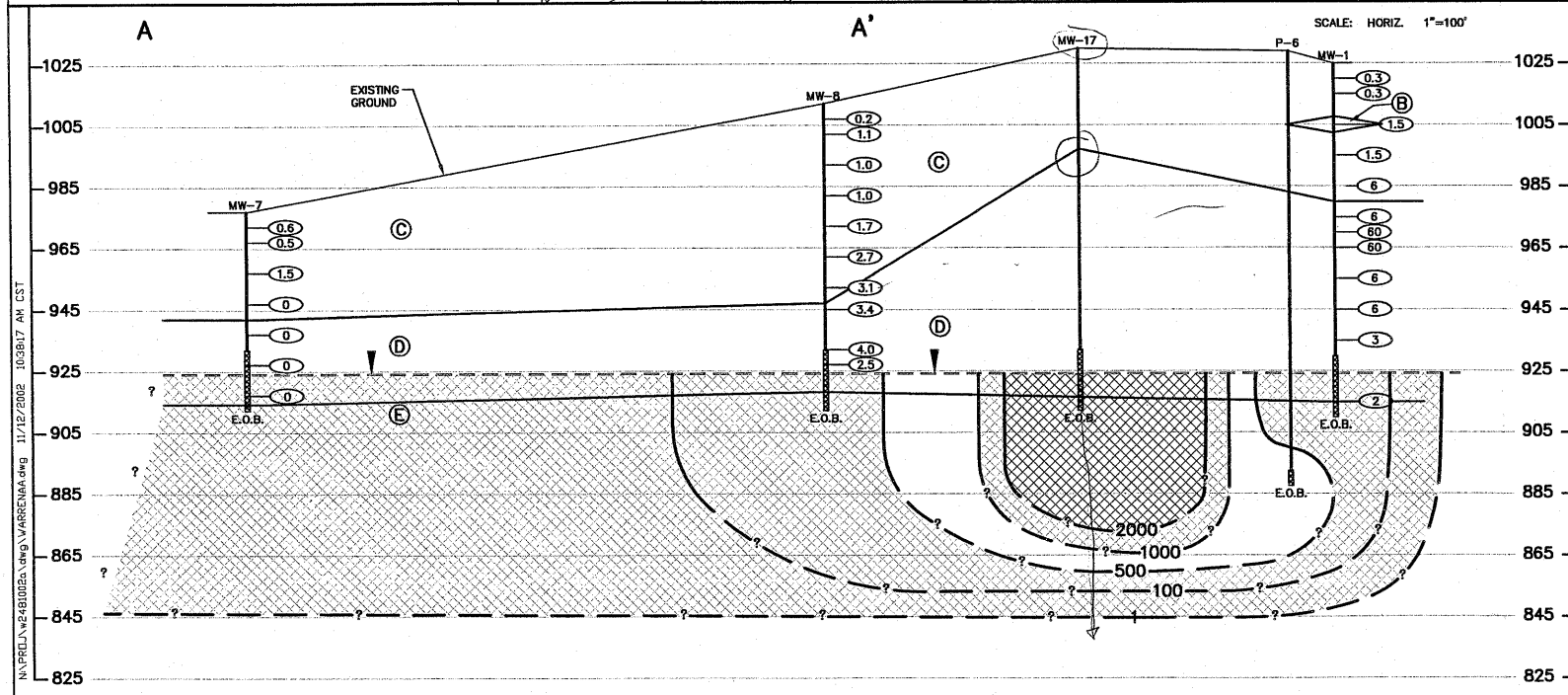
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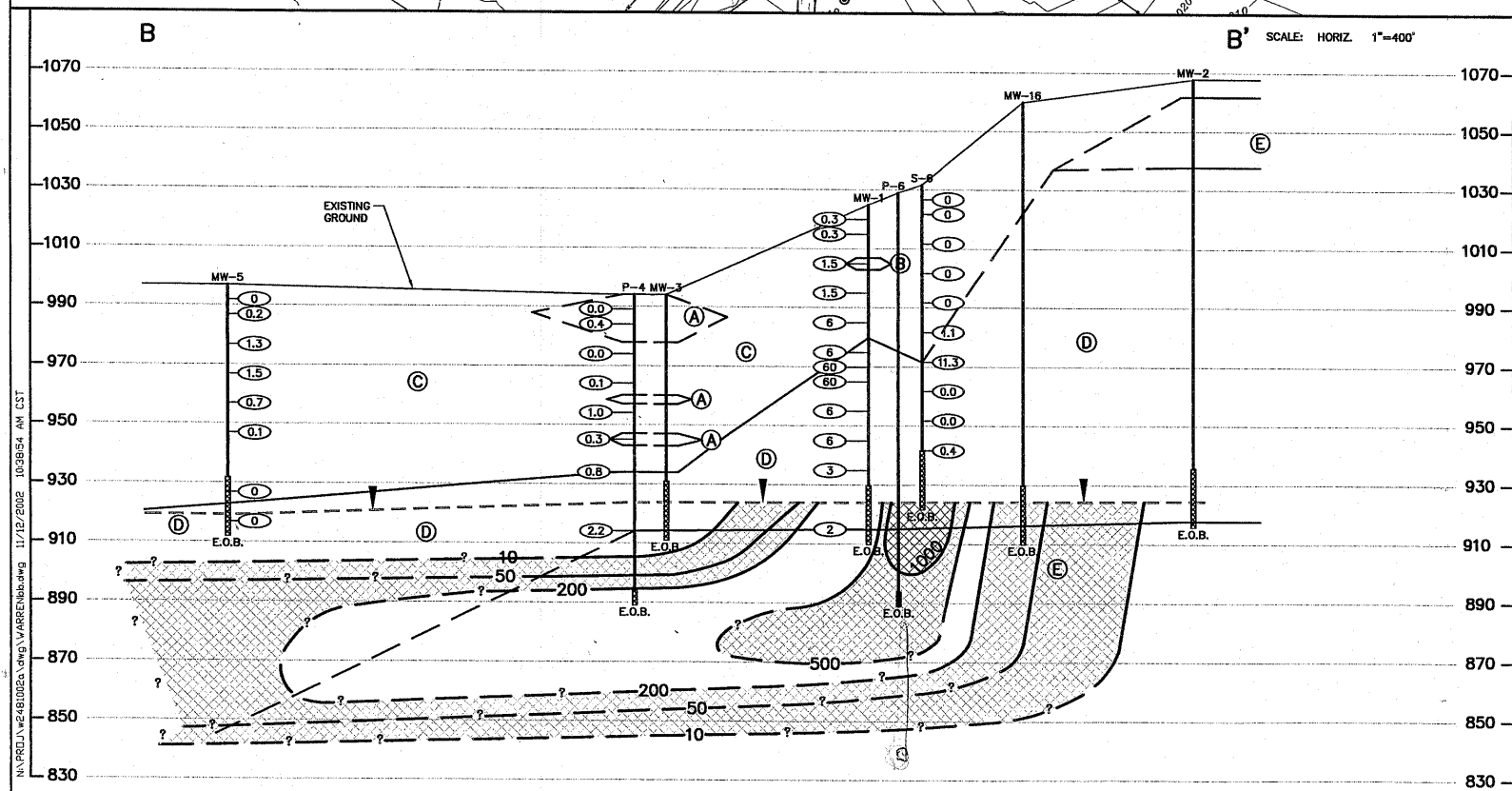
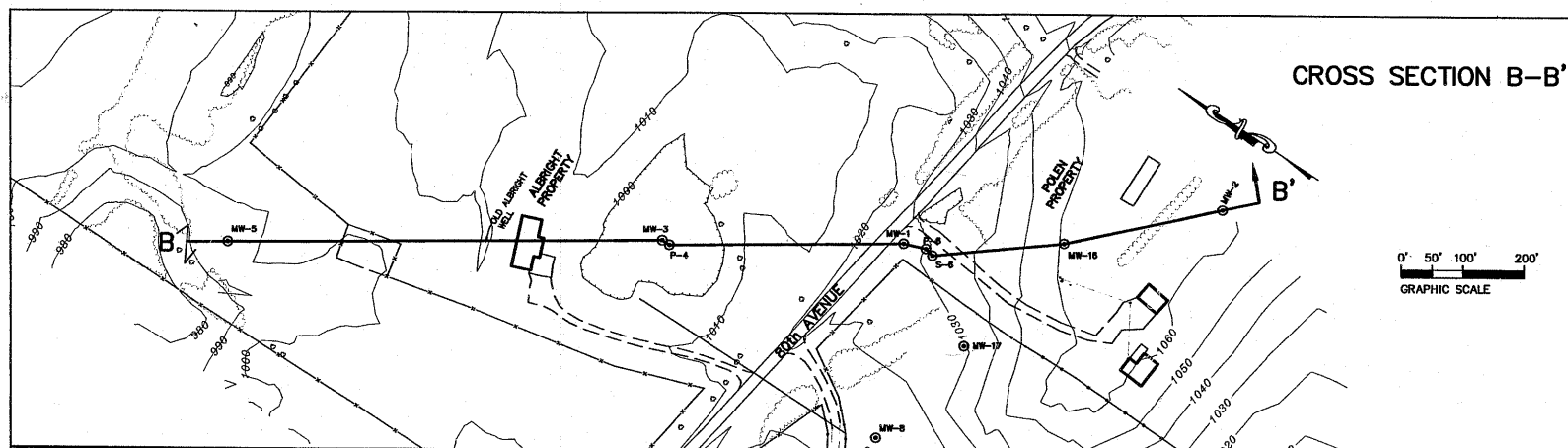
DEPARTMENT OF NATURAL RESOURCES
TOWN OF WARREN
TCE INVESTIGATION

CROSS SECTION A-A'
FIGURE 6

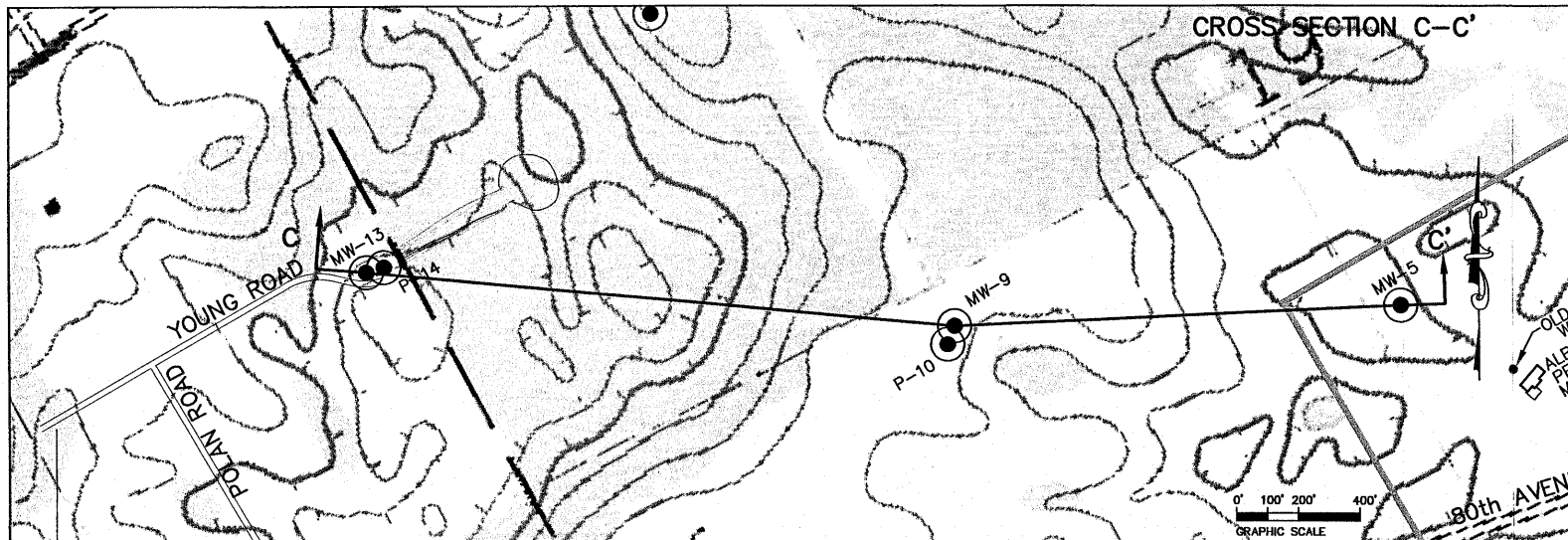
Drawn By	PKF	Plans Checked	MEE
Drawing File	WARRENAA.DWG	Job Number	W2481-002



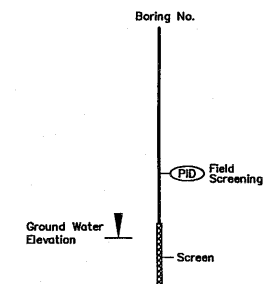
N:\PRL\N2481002A.dwg WARRENAA.dwg 11/12/2002 10:38:17 AM CST



CROSS SECTION B-B'
FIGURE 7



LEGEND OF BORING



KEY

- 200 — ISOCONCENTRATION TCE (ppb)
- ? - 200 - ? - INFERED ISOCONCENTRATION TCE (ppb)

GEOLOGIC LEGEND

- (A) — FINE-MEDIUM BROWN, WELL GRADED GRAVELLY SAND (USCS-SW)
- (B) — FINE, BROWN, SILTY-SAND (USCS-SM)
- (C) — MEDIUM, BROWN, POORLY-GRADED SAND (USCS-SP)
- (D) — SANDSTONE, WHITE, POORLY CEMENTED VERY WEATHERED FINE GRAIN
- (E) — LIME ROCK, LIGHT BROWN, HARD

GROUNDWATER ELEVATIONS BASED ON 9-17-01 DATA

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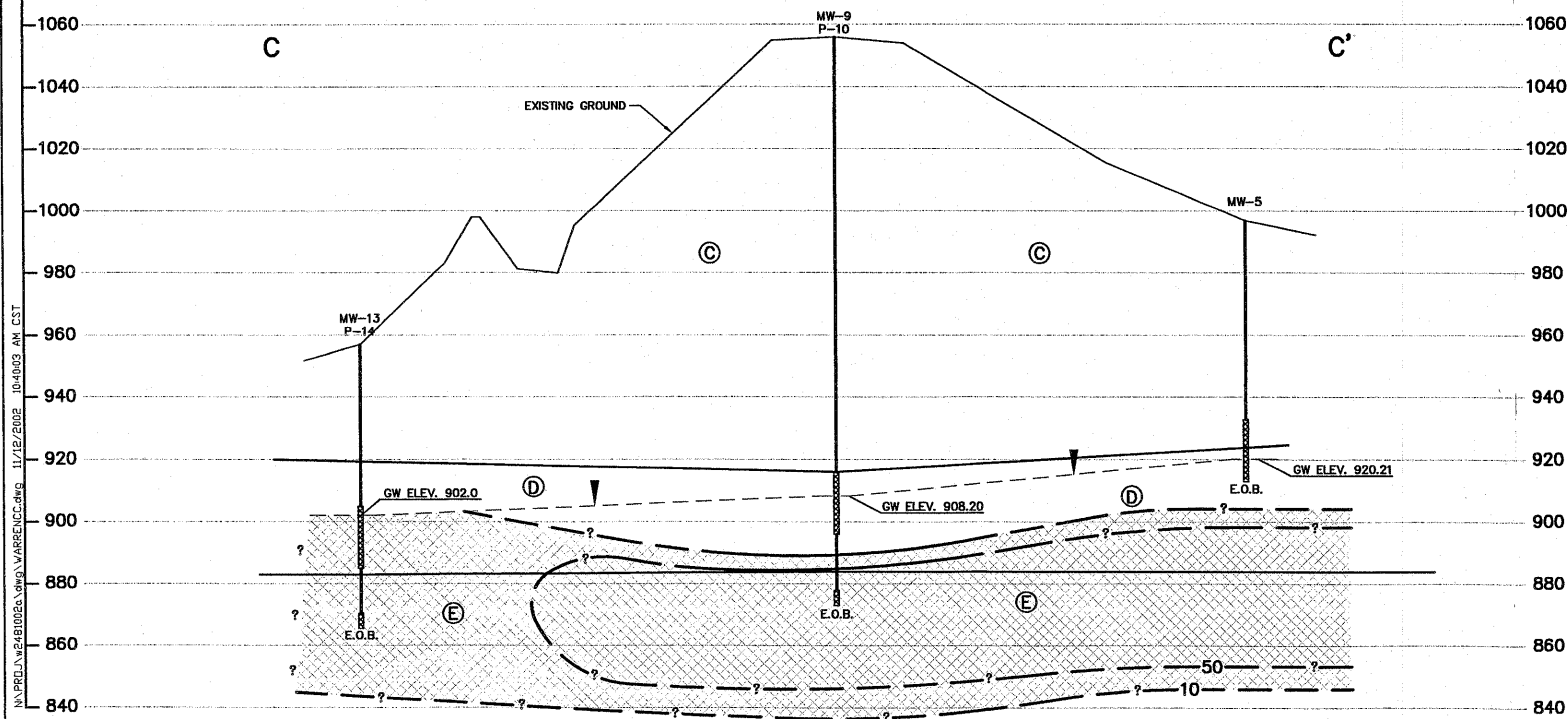
804 Wilson Avenue
Menomonie, Wisconsin 54751

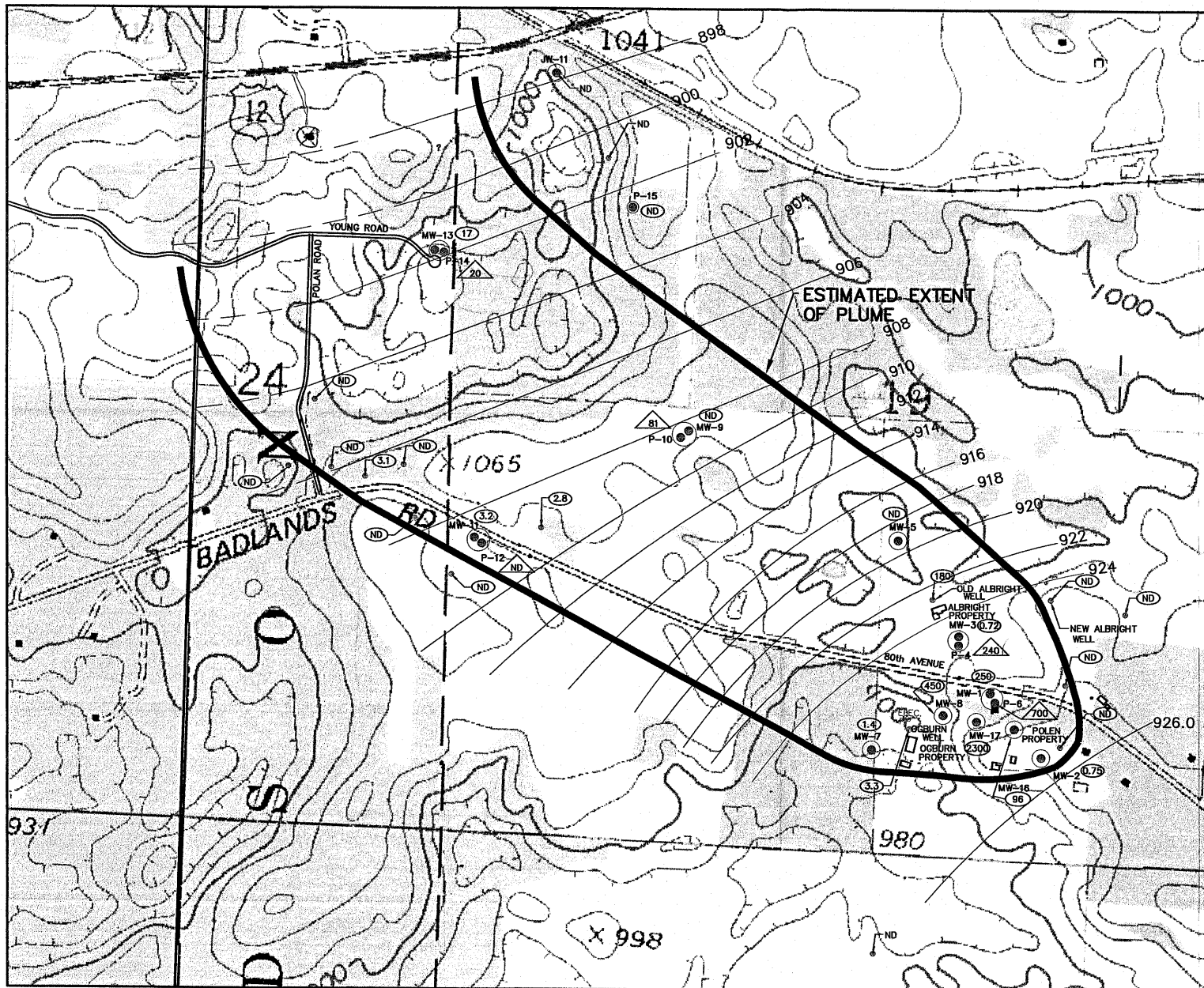
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DEPARTMENT OF NATURAL RESOURCES
TOWN OF WARREN
TCE INVESTIGATION

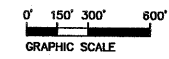
CROSS SECTION C-C' FIGURE 8

Drawn By	CAS	Plans Checked	MEE
Drawing File	WARRENCC.DWG	Job Number	W2481-002





- KEY**
- ND = NO DETECTION
 - (12) = CONCENTRATION OF TCE IN ppb
 - △ 370 = PIZOMETER MONITORING WELL
CONCENTRATION OF TCE IN ppb
 - = MONITORING WELLS
 - = RESIDENTIAL WELLS



JOB NO.
W2481-002
BOOK NO.

DRAWN BY
PKF
CHECKED BY
MEE
DATE
OCT. 2001
REVISIONS

REFERENCE FILE
QUAD.DWG
DRAWING FILE
G.WP.MAP.DWG

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Mason, Massachusetts 02471

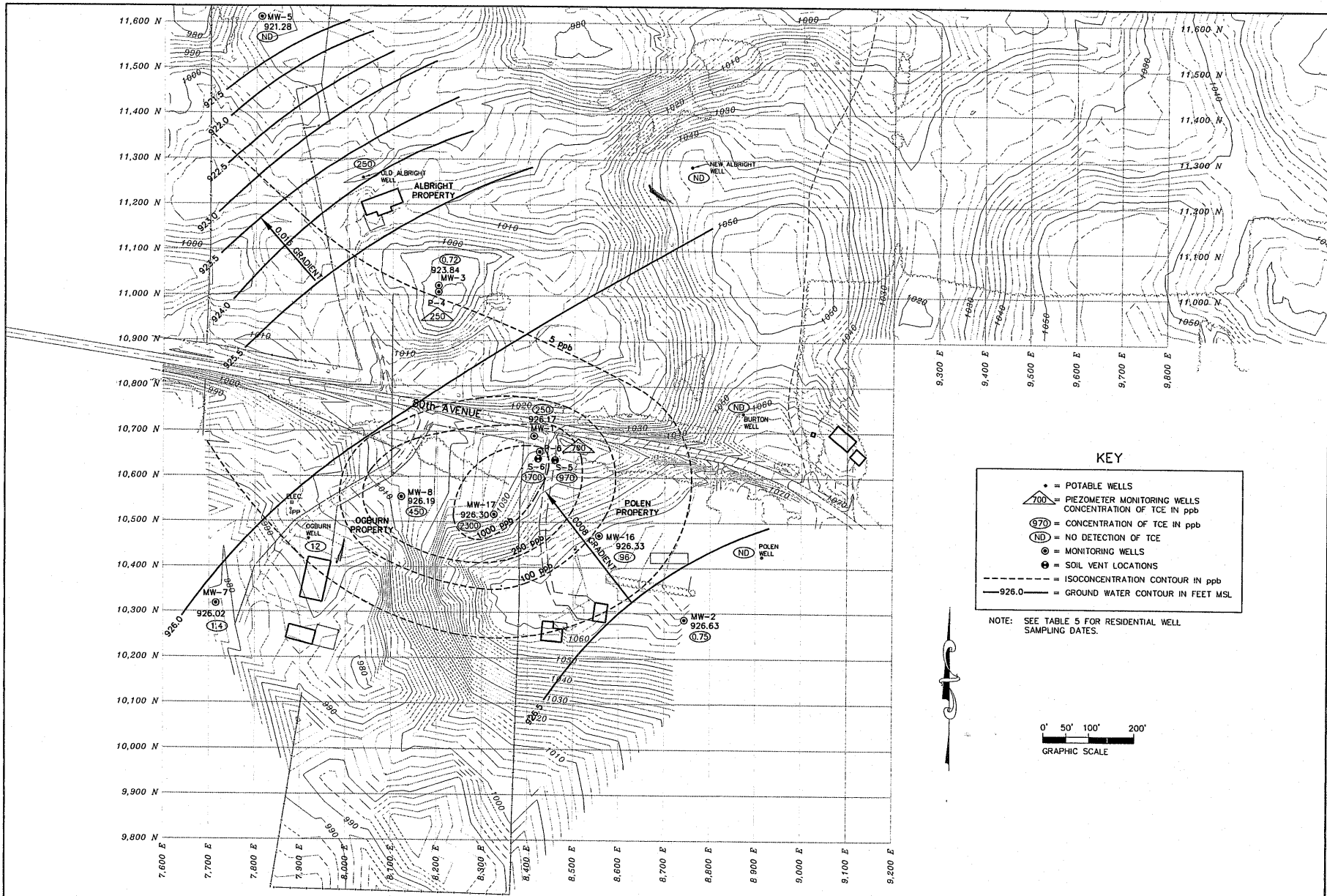
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DEPARTMENT OF NATURAL RESOURCES
TOWN OF WARREN TCE INVESTIGATION
TCE GROUND WATER PLUME MAP (4-15-02)

SHEET NO.
FIGURE 9



JOB NO.	W2481-002
BOOK NO.	
DRAWN BY	PKF
CHECKED BY	MEF
DATE	OCT. 2000
REVISIONS	
REFERENCE FILE	WARBASE.DWG
DRAWING FILE	WARGWF2.DWG

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PROJECT
DEPARTMENT OF NATURAL RESOURCES
TOWN OF WARREN TCE INVESTIGATION
GROUND WATER CONTOUR/ISOCONCENTRATION MAP (4-15-2002)

SHEET NO.
FIGURE 10

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☒ Other ☐

Page 1 of 2

Facility/Project Name <u>Town of Warren TCE Investigation</u>			License/Permit/Monitoring Number _____			Boring Number <u>MW-1</u>		
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: _____ Last Name: _____ Firm: <u>Traut Hydrotech</u>			Date Drilling Started <u>11/13/2000</u> m m d d y y y y			Date Drilling Completed <u>11/13/2000</u> m m d d y y y y		
WI Unique Well No. <u>5421</u>			DNR Well ID No. _____			Well Name <u>MW-1</u>		
Final Static Water Level <u>924.0</u> Feet MSL			Surface Elevation <u>1024.9</u> Feet MSL			Borehole Diameter <u>7</u> inches		
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/> State Plane _____ N, _____ E S/C/N			Lat _____ ' " _____			Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W		
SW 1/4 of SE 1/4 of Section <u>19</u> , T <u>29</u> N, R <u>18</u> E <u>(W)</u>			Long _____			Feet _____		
Facility ID _____			County <u>St. Croix</u>			County Code <u>56</u>		
Civil Town/City/ or Village <u>Town of Warren</u>								

Sample Number and Type	Length Att. & Recovered (ft)	Blow Counts	Depth in Feet (Below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	
5			5	Top Soil				.3						
5			10	Sand, brown trace gravel, medium grain Dry Moderately sorted	SW			.3						
4			15	As above some rocks										
4			20	Clay brown soft fine grain	SM			1.5						
9			25	Sand, brown fine grain Cobbles ↓ more gold	SW									
			30	Course sand + gravel some silt				1.5						0930, VOC 28-30' Dry
10			35	fine sand gold dry well sorted ↓ more silt and some gravel near base	SW			6						
			40	fine sand with silt brown hard	SM									
10			45	soft white fine sandstone poorly cemented very weathered	SW			6						0950, VOC 48-50' Dry
			50	silt with sand brown fine ↓	SM			6						
10			55	Sandstone very weathered white fine grain solvent odor	SW			60						
			60	↓				60						1010 VOC 58-60' Dry

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: [Signature] Firm: Cedar Corporation

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural ResourcesRoute to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☒ Underground Tanks ☐ Other ☐MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 4-90

Facility/Project Name <u>Sum of Warr - TCE</u>	Local Grid Location of Well ft. <input type="checkbox"/> N <input type="checkbox"/> S <input type="checkbox"/> E <input type="checkbox"/> W	Well Name <u>MW# 1. JS421</u>
Facility License, Permit or Monitoring Number	Grid Origin Location Lat. _____ Long. _____ or St. Plane _____ ft. N. _____ ft. E.	Wis. Unique Well Number <u>15421</u> DNR Well Number _____
Type of Well: Water Table Observation Well <input checked="" type="checkbox"/> 11 Piezometer <input type="checkbox"/> 12	Section Location of Waste/Source <u>SW 1/4 of SE 1/4 of Sec. 19, T. 29N, R. 18W</u>	Date Well Installed <u>11/13/00</u> m m d d y y
Distance Well Is From Waste/Source Boundary <u>Source</u> ft.	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input type="checkbox"/> Sidegradient d <input checked="" type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	Well Installed By: (Person's Name and Firm) <u>DK - Traut Hydrotech</u>
Is Well A Point of Enforcement Std. Application? <input type="checkbox"/> Yes <input type="checkbox"/> No		<u>Logan, Mike A</u>

A. Protective pipe, top elevation _____ ft. MSL	1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. Well casing, top elevation <u>1026.59</u> ft. MSL	2. Protective cover pipe: a. Inside diameter: <u>6.0</u> in. b. Length: <u>6.0</u> ft. c. Material: Steel <input checked="" type="checkbox"/> 04 Other <input type="checkbox"/>
C. Land surface elevation <u>1024.9</u> ft. MSL	d. Additional protection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe: _____
D. Surface seal, bottom _____ ft. MSL or <u>4.0</u> ft.	3. Surface seal: Bentonite <input type="checkbox"/> 30 Concrete <input checked="" type="checkbox"/> 01 Other <input type="checkbox"/>
12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input type="checkbox"/> SM <input type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input type="checkbox"/> CH <input type="checkbox"/> Bedrock <input checked="" type="checkbox"/>	4. Material between well casing and protective pipe: Bentonite <input type="checkbox"/> 30 Annular space seal <input type="checkbox"/> Other <input checked="" type="checkbox"/> <u>Cement</u>
13. Sieve analysis attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. Annular space seal: a. Granular Bentonite <input type="checkbox"/> 33 b. _____ Lbs/gal mud weight ... Bentonite-sand slurry <input type="checkbox"/> 35 c. _____ Lbs/gal mud weight ... Bentonite slurry <input checked="" type="checkbox"/> 31 d. _____ % Bentonite ... Bentonite-cement grout <input type="checkbox"/> 50 e. _____ Ft ³ volume added for any of the above f. How installed: Tremie <input type="checkbox"/> 01 Tremie pumped <input checked="" type="checkbox"/> 02 Gravity <input type="checkbox"/> 08
14. Drilling method used: Rotary <input type="checkbox"/> 50 Hollow Stem Auger <input type="checkbox"/> 41 <u>Sonic</u> Other <input checked="" type="checkbox"/>	6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 33 b. <input type="checkbox"/> 1/4 in. <input checked="" type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite pellets <input checked="" type="checkbox"/> 32 c. _____ Other <input type="checkbox"/>
15. Drilling fluid used: Water <input checked="" type="checkbox"/> 02 Air <input type="checkbox"/> 01 Drilling Mud <input type="checkbox"/> 03 None <input type="checkbox"/> 99	7. Fine sand material: Manufacturer, product name & mesh size a. <u>Baker State</u> <u>20</u> b. Volume added _____ ft ³
Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	8. Filter pack material: Manufacturer, product name and mesh size a. <u>Red Flint</u> <u>30</u> b. Volume added _____ ft ³
Describe _____	9. Well casing: Flush threaded PVC schedule 40 <input type="checkbox"/> 23 Flush threaded PVC schedule 80 <input checked="" type="checkbox"/> 24 Other <input type="checkbox"/>
17. Source of water (attach analysis): <u>City of Hudson</u>	10. Screen material: <u>PVC Sch 80</u> a. Screen type: Factory cut <input checked="" type="checkbox"/> 11 Continuous slot <input type="checkbox"/> 01 Other <input type="checkbox"/>
E. Bentonite seal, top _____ ft. MSL or <u>84.0</u> ft.	b. Manufacturer <u>Johnson</u> c. Slot size: <u>0.010</u> in. d. Slotted length: <u>20.0</u> ft.
F. Fine sand, top _____ ft. MSL or <u>89.0</u> ft.	11. Backfill material (below filter pack): None <input checked="" type="checkbox"/> 14 Other <input type="checkbox"/>
G. Filter pack, top _____ ft. MSL or <u>91.0</u> ft.	
H. Screen joint, top _____ ft. MSL or <u>94.0</u> ft.	
I. Well bottom _____ ft. MSL or <u>114.0</u> ft.	
J. Filter pack, bottom _____ ft. MSL or <u>115.0</u> ft.	
K. Borehole, bottom _____ ft. MSL or <u>125.0</u> ft.	
L. Borehole, diameter <u>7.0</u> in.	
M. O.D. well casing <u>2 3/8</u> in.	
N. L.D. well casing <u>2.0</u> in.	

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm

Traut Hydro-tech

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☒ Other ☐ _____

Page 1 of 2

Project Name <u>Town of Warren TCE Investigation</u>		License/Permit/Monitoring Number _____		Boring Number <u>B-2/MW-2</u>	
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: _____ Last Name: _____ Firm: <u>Tract Hydrotest</u>		Date Drilling Started <u>11/16/2000</u> m m d d y y y y		Date Drilling Completed <u>11/16/2000</u> m m d d y y y y	
Drilling Method <u>Sonic</u>		WI Unique Well No. <u>IS 422</u>		DNR Well ID No. _____	
Well Name <u>MW-2</u>		Final Static Water Level <u>924.5</u> Feet MSL		Surface Elevation <u>1067.9</u> Feet MSL	
Borehole Diameter <u>7</u> inches		Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/> State Plane _____ N, _____ E S/C/N		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
SW 1/4 of SE 1/4 of Section <u>19</u> , T <u>29</u> N, R <u>18</u> E <u>(W)</u>		Lat <u>0</u> ' " Long <u>0</u> ' "		Feet <u> </u> Feet <u> </u>	
Facility ID _____		County <u>St. Croix</u>		County Code <u>56</u>	
Civil Town/City/ or Village <u>Town of Warren</u>					

[illegible]

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Sig	<i>[Signature]</i>	Firm	Cedar Corporation
-----	--------------------	------	-------------------

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural ResourcesRoute to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☒ Underground Tanks ☐ Other ☐MONITORING WELL CONSTRUCTION
Form 4400-113A
Rev. 4-90

City/Project Name <u>OWN of Waver - TCE</u>	Local Grid Location of Well ft. <input type="checkbox"/> N <input type="checkbox"/> S <input type="checkbox"/> E <input type="checkbox"/> W	Well Name <u>MW# 2</u>
Facility License, Permit or Monitoring Number	Grid Origin Location Lat. _____ Long. _____ or St. Plane _____ ft. N. _____ ft. E.	Well Unique Well Number DNR Well Number <u>33422</u>
Type of Well Water Table Observation Well <input checked="" type="checkbox"/> 1 Piezometer <input type="checkbox"/> 12	Section Location of Waste/Source <u>SE 1/4 of SE 1/4 of Sec. 19, T. 29N, R. 18E</u>	Date Well Installed <u>11/17/00</u> m m d d y y
Distance Well Is From Waste/Source Boundary <u>± 300</u> ft.	Location of Well Relative to Waste/Source u <input checked="" type="checkbox"/> Upgradient s <input type="checkbox"/> Sidegradient d <input type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	Well Installed By: (Person's Name and Firm) <u>Logan, Mike A</u>
Is Well A Point of Enforcement Std. Application? <input type="checkbox"/> Yes <input type="checkbox"/> No		

A. Protective pipe, top elevation _____ ft. MSL	1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. Well casing, top elevation <u>1069.87</u> ft. MSL	2. Protective cover pipe: a. Inside diameter: <u>6</u> in. b. Length: <u>6</u> ft. c. Material: Steel <input checked="" type="checkbox"/> 04 Other <input type="checkbox"/>
C. Land surface elevation <u>1067.9</u> ft. MSL	d. Additional protection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe: _____
D. Surface seal, bottom _____ ft. MSL or <u>4</u> ft.	3. Surface seal: Bentonite <input type="checkbox"/> 30 Concrete <input checked="" type="checkbox"/> 01 Other <input type="checkbox"/>
12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input type="checkbox"/> SM <input type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input type="checkbox"/> CH <input type="checkbox"/> Bedrock <input checked="" type="checkbox"/>	4. Material between well casing and protective pipe: Bentonite <input type="checkbox"/> 30 Annular space seal <input type="checkbox"/> Other <input checked="" type="checkbox"/> <u>Neat Cement</u>
13. Sieve analysis attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. Annular space seal: a. Granular Bentonite <input type="checkbox"/> 33 b. _____ Lbs/gal mud weight ... Bentonite-sand slurry <input type="checkbox"/> 35 c. _____ Lbs/gal mud weight ... Bentonite slurry <input checked="" type="checkbox"/> 31 d. _____ % Bentonite ... Bentonite-cement grout <input type="checkbox"/> 50 e. _____ Ft ³ volume added for any of the above f. How installed: Tremie <input type="checkbox"/> 01 Tremie pumped <input checked="" type="checkbox"/> 02 Gravity <input type="checkbox"/> 08
14. Drilling method used: Rotary <input type="checkbox"/> 50 Hollow Stem Auger <input type="checkbox"/> 41 <u>Sonic</u> Other <input checked="" type="checkbox"/>	6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 33 b. <input type="checkbox"/> 1/4 in. <input type="checkbox"/> 3/8 in. <input checked="" type="checkbox"/> 1/2 in. Bentonite pellets <input type="checkbox"/> 32 c. _____ Other <input type="checkbox"/>
15. Drilling fluid used: Water <input checked="" type="checkbox"/> 02 Air <input type="checkbox"/> 01 Drilling Mud <input type="checkbox"/> 03 None <input type="checkbox"/> 99	7. Fine sand material: Manufacturer, product name & mesh size a. <u>Baker 20</u> <input checked="" type="checkbox"/> 20 b. Volume added _____ ft ³
Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	8. Filter pack material: Manufacturer, product name and mesh size a. <u>Red Flint</u> <input checked="" type="checkbox"/> 30 b. Volume added _____ ft ³
Describe _____	9. Well casing: Flush threaded PVC schedule 40 <input type="checkbox"/> 23 Flush threaded PVC schedule 80 <input checked="" type="checkbox"/> 24 Other <input type="checkbox"/>
17. Source of water (attach analysis): <u>City of Hudson</u>	10. Screen material: <u>PVC Sch 80</u> a. Screen type: Factory cut <input checked="" type="checkbox"/> 11 Continuous slot <input type="checkbox"/> 01 Other <input type="checkbox"/>
E. Bentonite seal, top _____ ft. MSL or <u>123</u> ft.	b. Manufacturer <u>Johnson</u> c. Slot size: <u>0.010</u> in. d. Slotted length: <u>20.0</u> ft.
F. Fine sand, top _____ ft. MSL or <u>128</u> ft.	11. Backfill material (below filter pack): None <input checked="" type="checkbox"/> 14 Other <input type="checkbox"/>
G. Filter pack, top _____ ft. MSL or <u>130</u> ft.	
H. Screen joint, top _____ ft. MSL or <u>132</u> ft.	
I. Well bottom _____ ft. MSL or <u>152</u> ft.	
J. Filter pack, bottom _____ ft. MSL or <u>152</u> ft.	
K. Borehole, bottom _____ ft. MSL or <u>152</u> ft.	
L. Borehole, diameter <u>7</u> in.	
M. O.D. well casing <u>2 3/4</u> in.	
N. I.D. well casing <u>2</u> in.	

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☒ Other ☐

Page 1 of 1

F /Project Name Town of Warren TCE Investigation			License/Permit/Monitoring Number _____		Boring Number B-3/MW-3		
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: _____ Last Name: _____ Firm: Tract Hydrotech			Date Drilling Started 11/15/2000 m m d d y y y y		Date Drilling Completed 11/15/2000 m m d d y y y y		
WT Unique Well No. JS423		DNR Well ID No. _____		Well Name MW-3		Final Static Water Level 923.7 Feet MSL	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/>		State Plane _____ N, _____ E S/C/N		Lat _____ ' "		Local Grid Location _____ Feet <input type="checkbox"/> N _____ Feet <input type="checkbox"/> E _____ Feet <input type="checkbox"/> S _____ Feet <input type="checkbox"/> W	
SW 1/4 of SE 1/4 of Section 19, T 29 N, R 18 E		County St. Croix		County Code 56		Civil Town/City/ or Village Town of Warren	
Facility ID _____		County _____		County Code _____		Civil Town/City/ or Village _____	

Sample		Blow Counts	Depth in Feet (below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	
				Grass + weeds Blind Drill to 83 feet See Boring Log P-4 for geological Descriptions.										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Sig: [Signature] Firm: Cedar Corporation

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural ResourcesRoute to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☒ Underground Tanks ☐ Other ☐MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 4-90

Facility/Project Name

Town of Warren - TCE

Local Grid Location of Well

ft. ☐ N ☐ S ft. ☐ E ☐ W

Well Name

MW# 3

Facility License, Permit or Monitoring Number

Grid Origin Location

Lat. _____ Long. _____ or

Wis. Unique Well Number: DNR Well Number:

12423

Type of Well - Water Table Observation Well ☒ 11Piezometer ☐ 12

St. Plane _____ ft. N. _____ ft. E.

Date Well Installed

11/15/00
m m d d y y

Distance Well Is From Waste/Source Boundary

± 300'

Section Location of Waste/Source

SE 1/4 of SE 1/4 of Sec. 19 T. 29 N. R. 18 E. W.

Well Installed By: (Person's Name and Firm)

DK

Is Well A Point of Enforcement Std. Application?

☐ Yes☐ No

Location of Well Relative to Waste/Source

u ☐ Upgradient s ☐ Sidegradientd ☒ Downgradient n ☐ Not Known

Logan, Mike A

A. Protective pipe, top elevation _____ ft. MSL

B. Well casing, top elevation 995.88 ft. MSLC. Land surface elevation 994.0 ft. MSLD. Surface seal, bottom _____ ft. MSL or 4 ft.

12. USCS classification of soil near screen:

GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐Bedrock ☒13. Sieve analysis attached? ☐ Yes ☒ No14. Drilling method used: Rotary ☐ 50Hollow Stem Auger ☐ 41

Sonic

Other ☒15. Drilling fluid used: Water ☒ 02 Air ☐ 01Drilling Mud ☐ 03 None ☐ 9916. Drilling additives used? ☐ Yes ☒ No

Describe _____

17. Source of water (attach analysis):

City of Hudson

E. Bentonite seal, top _____ ft. MSL or 54 ft.F. Fine sand, top _____ ft. MSL or 59 ft.G. Filter pack, top _____ ft. MSL or 61 ft.H. Screen joint, top _____ ft. MSL or 63 ft.I. Well bottom _____ ft. MSL or 87 ft.J. Filter pack, bottom _____ ft. MSL or 83 ft.

K. Borehole, bottom _____ ft. MSL or _____ ft.

L. Borehole, diameter 2 in.M. O.D. well casing 2 3/4 in.N. I.D. well casing 2 in.1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:

a. Inside diameter: 6 in.b. Length: 6 ft.c. Material: Steel ☒ 04Other ☐d. Additional protection? ☐ Yes ☒ No

If yes, describe: _____

3. Surface seal:

Bentonite ☐ 30Concrete ☒ 01Other ☐

4. Material between well casing and protective pipe:

Bentonite ☐ 30Annular space seal ☐Other ☒

5. Annular space seal:

a. Granular Bentonite ☐ 33b. _____ Lbs/gal mud weight _____ Bentonite-sand slurry ☐c. _____ Lbs/gal mud weight _____ Bentonite slurry ☒d. _____ % Bentonite _____ Bentonite-cement grout ☐ 50e. _____ Ft³ volume added for any of the abovef. How installed: Tremie ☐ 01Tremie pumped ☒ 02Gravity ☐ 08

6. Bentonite seal:

a. Bentonite granules ☐ 33b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite pellets ☒ 32c. _____ Other ☐

7. Fine sand material: Manufacturer, product name & mesh size

a. Baker Int 20b. Volume added _____ ft³

8. Filter pack material: Manufacturer, product name and mesh size

a. Red Flint 30b. Volume added _____ ft³9. Well casing: Flush threaded PVC schedule 40 ☐ 23Flush threaded PVC schedule 80 ☒ 24Other ☐10. Screen material: PVC Sch 80a. Screen type: Factory cut ☒ 11Continuous slot ☐ 01Other ☐b. Manufacturer Johnsonc. Slot size: 0.010 in.d. Slotted length: 20.5 ft.11. Backfill material (below filter pack): None ☐ 14Other ☐

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm

Traut Hydro-tech

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☒ Other ☐

Page 1 of 2

Project Name <u>Town of Warren TCE Investigation</u>		License/Permit/Monitoring Number _____		Boring Number <u>B-4 / P-4</u>	
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: _____ Last Name: _____		Date Drilling Started <u>11/15/2000</u> m m d d y y y y		Date Drilling Completed <u>11/15/2000</u> m m d d y y y y	
Firm: <u>Trant Hydrotech</u>		Drilling Method <u>Sonic</u>			
WI Unique Well No. <u>JS424</u>	DNR Well ID No. _____	Well Name <u>P-4</u>	Final Static Water Level <u>923.6</u> Feet MSL	Surface Elevation <u>994.1</u> Feet MSL	Borehole Diameter <u>7</u> inches
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/>		State Plane _____ N, _____ E S/C/N		Local Grid Location _____	
SW 1/4 of SE 1/4 of Section <u>19</u> , T <u>29</u> N, R <u>18</u> E <u>4</u>		Lat _____ Long _____		Feet <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
Facility ID _____		County <u>St. Croix</u>	County Code <u>56</u>	Civil Town/City/ or Village <u>Town of Warren</u>	

Sample			Depth in Feet (below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments	
Number and Type	Length Att. & Recovered (in)	Blow Counts							Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200		
	5		5	Gravel + Topsoil silt, brown to black, some sand and clay stiff				0.0							
	5		10	↓ more sand				0.4							
	10		15	↓ less sand more silt											
			20	Sand, brown, medium grain, trace silt and gravel				0.0							
	10		25	↓ As above											
			30	↓				0.1							
	10		35	Silt Layer 2 ft. thick											
			40	Sand, brown, medium grain poorly sorted gravel				1.0							
	10		45												
			50	Silt with sand clay + gravel, brown fine grain poorly sorted											
			55	Sand, brown, medium grain				0.3							
	10		60	Silt, with sand + clay, brown Sandstone, white, fine grain weathered				0.8							

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: [Signature] Firm: Cedar Corporation

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State of Wisconsin
Department of Natural Resources

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☒ Underground Tanks ☐ Other ☐

MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 4-90

Facility/Project Name <u>Town of Weyon - TCE</u>	Local Grid Location of Well _____ ft. <input type="checkbox"/> N _____ ft. <input type="checkbox"/> E _____ ft. <input type="checkbox"/> S _____ ft. <input type="checkbox"/> W	Well Name. <u>MW 17</u>
Facility License, Permit or Monitoring Number _____	Grid Origin Location Lat. _____ Long. _____ or _____	Wis. Unique Well Number DNR-Well No. _____
Type of Well Water Table Observation Well <input checked="" type="checkbox"/> 11 Piezometer <input type="checkbox"/> 12	St. Plane _____ ft. N. _____ ft. E.	Date Well Installed <u>02/26/02</u> m m d d y y
Distance Well Is From Waste/Source Boundary <u>Source</u> ft.	Section Location of Waste/Source <u>S₁/4 of SE₁/4 of Sec. 19, T. 29 N., R. 18 E.</u>	Well Installed By: (Person's Name and Firm) <u>Robbil Torres</u>
Is Well A Point of Enforcement Std. Application? <input type="checkbox"/> Yes <input type="checkbox"/> No	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input type="checkbox"/> Sidgradient d <input type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	<u>Traut Hydro Tech</u>

A. Protective pipe, top elevation _____ ft. MSL

B. Well casing, top elevation 1032.03 ft. MSL

C. Land surface elevation 1030.0 ft. MSL

D. Surface seal, bottom _____ ft. MSL or _____ ft.

12. USCS classification of soil near screen:

GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
 SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
 Bedrock ☒

13. Sieve analysis attached? ☐ Yes ☒ No

14. Drilling method used: Rotary ☒ 50
 Hollow Stem Auger ☐ 41
 Other ☐

15. Drilling fluid used: Water ☐ 02 Air ☐ 01
 Drilling Mud ☒ 03 None ☐ 99

16. Drilling additives used? ☐ Yes ☒ No

Describe _____

17. Source of water (attach analysis):
City of Hudson

E. Bentonite seal, top 88 ft. MSL or _____ ft.

F. Fine sand, top 93 ft. MSL or _____ ft.

G. Filter pack, top 95 ft. MSL or _____ ft.

H. Screen joint, top 97 ft. MSL or _____ ft.

I. Well bottom 117 ft. MSL or _____ ft.

J. Filter pack, bottom 117.5 ft. MSL or _____ ft.

K. Borehole, bottom 117.5 ft. MSL or _____ ft.

L. Borehole, diameter 6 1/2 in.

M. O.D. well casing 2.46 in.

N. I.D. well casing 1.87 in.

1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:
 a. Inside diameter: 6 in.
 b. Length: 2 ft.
 c. Material: Steel ☒ 04
 Other ☐
 d. Additional protection? ☐ Yes ☒ No
 If yes, describe: _____

3. Surface seal: Bentonite ☒ 30
 Concrete ☐ 01
 Other ☐

4. Material between well casing and protective pipe:
 Bentonite ☒ 30
 Annular space seal ☐
 Other ☐

5. Annular space seal:
 a. Granular Bentonite ☐ 33
 b. _____ Lbs/gal mud weight ... Bentonite-sand slurry ☒ 35
 c. _____ Lbs/gal mud weight ... Bentonite slurry ☐
 d. _____ % Bentonite ... Bentonite-cement grout ☐
 e. _____ Ft³ volume added for any of the above
 f. How installed: Tremie ☒ 01
 Tremie pumped ☐ 02
 Gravity ☐ 08

6. Bentonite seal:
 a. Bentonite granules ☐ 33
 b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite pellets ☐ 32
 c. _____ Other ☐

7. Fine sand material: Manufacturer, product name & mesh size
 a. Red Flint
 b. Volume added 2 ft³

8. Filter pack material: Manufacturer, product name and mesh size
 a. Red Flint
 b. Volume added 2.8 ft³

9. Well casing: Flush threaded PVC schedule 40 ☐ 23
 Flush threaded PVC schedule 80 ☒ 24
 Other ☐

10. Screen material:
 a. Screen type: Factory cut ☒ 11
 Continuous slot ☐ 01
 Other ☐
 b. Manufacturer _____
 c. Slot size: 0.012 in.
 d. Slotted length: 20.0 ft.

11. Backfill material (below filter pack): None ☒ 14
 Other ☐

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature Robert Jones Firm Trout Wells

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Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☒ Other ☐

Page 1 of 1

Facility/Project Name <u>Town of Warren TCE Investigation</u>			License/Permit/Monitoring Number _____		Boring Number <u>MW-17</u>
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: <u>Robbie</u> Last Name: <u>Teirres</u> Firm: <u>Trent Wells</u>			Date Drilling Started <u>02/25/2002</u> m m d d y y y y	Date Drilling Completed <u>02/25/2002</u> m m d d y y y y	Drilling Method <u>Mud Rotary</u>
WI Unique Well No. <u>JS139</u>	DNR Well ID No. _____	Well Name <u>MW-17</u>	Final Static Water Level <u>926</u> Feet MSL	Surface Elevation <u>1030</u> Feet MSL	Borehole Diameter <u>6 3/4</u> inches
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/> State Plane _____ N, _____ E S/C/N			Local Grid Location Lat _____ Long _____ Feet <input type="checkbox"/> N <input type="checkbox"/> E Feet <input type="checkbox"/> S <input type="checkbox"/> W		
Facility ID _____			County <u>St. Croix</u>	County Code <u>56</u>	Civil Town/City/ or Village <u>Town of Warren</u>

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet (Below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	
			10	CLAY BROWN										
			20	Sand + Gravel, brown										
			30											
			40	Sandstone, Tan										
			50											
			60											
			70											
			80											
			90											
			100											
			110	Water Shale										
			120	Limestone										
				E.O.B. 118 ft.										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature [Signature] Firm Cedar Corporation

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State of Wisconsin
Department of Natural ResourcesRoute to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☒ Underground Tanks ☐ Other ☐MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 4-90

Facility/Project Name <u>Town of Warren - TCE</u>	Local Grid Location of Well ft. <input type="checkbox"/> N. <input type="checkbox"/> S. <input type="checkbox"/> E. <input type="checkbox"/> W.	Well Name <u>MW 16</u>
Facility License, Permit or Monitoring Number	Grid Origin Location Lat. _____ Long. _____ or	Well Unique Well Number <u>DNR-Well N</u>
Type of Well <u>Water Table Observation Well</u> <input checked="" type="checkbox"/> 11 Piezometer <input type="checkbox"/> 12	St. Plane _____ ft. N. _____ ft. E.	Date Well Installed <u>02/25/02</u> m m d d y y
Distance Well Is From Waste/Source Boundary <u>± 100'</u> ft.	Section Location of Waste/Source <u>SW 1/4 of SE 1/4 of Sec. 19, T. 29N. R. 18E.</u>	Well Installed By: (Person's Name and Firm) <u>Robbie Terres</u> <u>Traut Hydro Tech</u>
Is Well A Point of Enforcement Std. Application? <input type="checkbox"/> Yes <input type="checkbox"/> No	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input checked="" type="checkbox"/> Sidegradient d <input type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	

A. Protective pipe, top elevation _____ ft. MSL	1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. Well casing, top elevation <u>1064.19</u> ft. MSL	2. Protective cover pipe: a. Inside diameter: <u>8.</u> in. b. Length: <u>7.</u> ft. c. Material: Steel <input checked="" type="checkbox"/> 04 Other <input type="checkbox"/>
C. Land surface elevation <u>1062.0</u> ft. MSL	d. Additional protection? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, describe: _____
D. Surface seal, bottom _____ ft. MSL or _____ ft.	3. Surface seal: Bentonite <input checked="" type="checkbox"/> 30 Concrete <input type="checkbox"/> 01 Other <input type="checkbox"/>
12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input type="checkbox"/> SM <input type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input type="checkbox"/> CH <input type="checkbox"/> Bedrock <input checked="" type="checkbox"/>	4. Material between well casing and protective pipe: Bentonite <input checked="" type="checkbox"/> 30 Annular space seal <input type="checkbox"/> Other <input type="checkbox"/>
13. Sieve analysis attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. Annular space seal: a. Granular Bentonite <input type="checkbox"/> 33 b. _____ Lbs/gal mud weight ... Bentonite-sand slurry <input checked="" type="checkbox"/> 35 c. _____ Lbs/gal mud weight ... Bentonite slurry <input type="checkbox"/> 31 d. <u>15</u> % Bentonite ... Bentonite-cement grout <input type="checkbox"/> e. _____ Ft ³ volume added for any of the above
14. Drilling method used: Rotary <input checked="" type="checkbox"/> 50 Hollow Stem Auger <input type="checkbox"/> 41 Other <input type="checkbox"/>	f. How installed: Tremie <input type="checkbox"/> 01 Tremie pumped <input checked="" type="checkbox"/> 02 Gravity <input type="checkbox"/> 08
15. Drilling fluid used: Water <input type="checkbox"/> 02 Air <input type="checkbox"/> 01 Drilling Mud <input checked="" type="checkbox"/> 03 None <input type="checkbox"/> 99	6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 33 b. <input type="checkbox"/> 1/4 in. <input checked="" type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite pellets <input type="checkbox"/> 32 c. _____ Other <input type="checkbox"/>
16. Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7. Fine sand material: Manufacturer, product name & mesh size a. <u>Red Flint</u> b. Volume added <u>12</u> ft ³
Describe _____	8. Filter pack material: Manufacturer, product name and mesh size a. <u>#30</u> b. Volume added <u>55</u> ft ³
17. Source of water (attach analysis): <u>City of Hudson</u>	9. Well casing: Flush threaded PVC schedule 40 <input type="checkbox"/> 23 Flush threaded PVC schedule 80 <input checked="" type="checkbox"/> 24 Other <input type="checkbox"/>
E. Bentonite seal, top <u>119</u> ft. MSL or _____ ft.	10. Screen material: <u>PVC</u> a. Screen type: Factory cut <input checked="" type="checkbox"/> 11 Continuous slot <input type="checkbox"/> 01 Other <input type="checkbox"/>
F. Fine sand, top <u>124</u> ft. MSL or _____ ft.	b. Manufacturer _____ c. Slot size: <u>0.040</u> in. d. Slotted length: <u>20.0</u> ft.
G. Filter pack, top <u>126</u> ft. MSL or _____ ft.	11. Backfill material (below filter pack): None <input checked="" type="checkbox"/> 14 Other <input type="checkbox"/>
H. Screen joint, top <u>128</u> ft. MSL or _____ ft.	
I. Well bottom <u>148</u> ft. MSL or _____ ft.	
J. Filter pack, bottom <u>148.5</u> ft. MSL or _____ ft.	
K. Borehole, bottom <u>148.5</u> ft. MSL or _____ ft.	
L. Borehole, diameter <u>8.5</u> in.	
M. O.D. well casing <u>4.5</u> in.	
N. I.D. well casing <u>3.826</u> in.	

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelpment ☒ Other ☐

Page 1 of 1

Facility/Project Name <u>Town of Warren TCE Investigation</u>			License/Permit/Monitoring Number _____		Boring Number <u>MW-16</u>		
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: <u>Robbie</u> Last Name: <u>Terres</u> Firm: <u>Traut Wells</u>			Date Drilling Started <u>02/25/2002</u> m m d d y y y y		Date Drilling Completed <u>02/25/2002</u> m m d d y y y y		
WI Unique Well No. <u>JS138</u>		DNR Well ID No. _____		Well Name <u>MW-16</u>		Final Static Water Level <u>926.3</u> Feet MSL	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/>		State Plane _____ N, _____ E S/C/N		Lat _____ ° ' "		Local Grid Location _____ Feet <input type="checkbox"/> N _____ Feet <input type="checkbox"/> E _____ Feet <input type="checkbox"/> S _____ Feet <input type="checkbox"/> W	
SW 1/4 of SE 1/4 of Section 19, T 29 N, R 18 E (W)		County <u>St. Croix</u>		County Code <u>56</u>		Civil Town/City/ or Village <u>Town of Warren</u>	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet (below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	
			20	CLAY										
			20	Sand + Gravel										
			40	Sandstone Tan										
			60											
			80											
			100											
			120											
			140	Water Limestone										
			160	E.O.B. 150 ft.										
			180											
			200											

I certify that the information on this form is true and correct to the best of my knowledge.

Signature [Signature] Firm Cedar Corporation

Facility/Project Name <u>Town of Warren</u>	Local Grid Location of Well _____ ft. <input type="checkbox"/> N _____ ft. <input type="checkbox"/> E _____ ft. <input type="checkbox"/> S _____ ft. <input type="checkbox"/> W	Well Name <u>P#15</u>
Facility License, Permit or Monitoring Number _____	Grid Origin Location Lat. _____ Long. _____ or St. Plane _____ ft. N. _____ ft. E.	Wis. Unique Well Number DNR Well Num. <u>JS 455</u>
Type of Well Water Table Observation Well <input type="checkbox"/> 11 Piezometer <input checked="" type="checkbox"/> 12	Section Location of Waste/Source <u>N 1/4 of NW 1/4 of Sec. 19, T. 29 N, R. 18 E, W.</u>	Date Well Installed <u>6/21/01</u> m m d d y y
Distance Well Is From Waste/Source Boundary <u>3600'</u> ft.	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input checked="" type="checkbox"/> Sidegradient d <input type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	Well Installed By: (Person's Name and Firm) <u>Robbie Terris</u> <u>Trant Wells</u>
Is Well A Point of Enforcement Std. Application? <input type="checkbox"/> Yes <input type="checkbox"/> No		

A. Protective pipe, top elevation _____ ft. MSL	1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. Well casing, top elevation <u>1065.78</u> ft. MSL	2. Protective cover pipe: a. Inside diameter: <u>8</u> in. b. Length: <u>7</u> ft. c. Material: Steel <input checked="" type="checkbox"/> 04 Other <input type="checkbox"/>
C. Land surface elevation <u>1064.1</u> ft. MSL	d. Additional protection? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, describe: _____
D. Surface seal, bottom _____ ft. MSL or _____ ft.	3. Surface seal: Bentonite <input checked="" type="checkbox"/> 30 Concrete <input type="checkbox"/> 01 Other <input type="checkbox"/>
12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input type="checkbox"/> SM <input type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input type="checkbox"/> CH <input type="checkbox"/> Bedrock <input checked="" type="checkbox"/>	4. Material between well casing and protective pipe: Bentonite <input checked="" type="checkbox"/> 30 Annular space seal <input type="checkbox"/>
13. Sieve analysis attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. Annular space seal: a. Granular Bentonite <input type="checkbox"/> 33 b. _____ Lbs/gal mud weight ... Bentonite-sand slurry <input type="checkbox"/> 35 c. _____ Lbs/gal mud weight ... Bentonite slurry <input type="checkbox"/> d. <u>15</u> % Bentonite ... Bentonite-cement grout <input type="checkbox"/> 50 e. _____ Ft ³ volume added for any of the above f. How installed: Tremie <input type="checkbox"/> 01 Tremie pumped <input checked="" type="checkbox"/> 02 Gravity <input type="checkbox"/> 08
14. Drilling method used: Rotary <input checked="" type="checkbox"/> 50 Hollow Stem Auger <input type="checkbox"/> 41 Other <input type="checkbox"/>	6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 33 b. <input type="checkbox"/> 1/4 in. <input checked="" type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite pellets <input type="checkbox"/> 32 c. _____ Other <input type="checkbox"/>
15. Drilling fluid used: Water <input type="checkbox"/> 02 Air <input type="checkbox"/> 01 Drilling Mud <input checked="" type="checkbox"/> 03 None <input type="checkbox"/> 99	7. Fine sand material: Manufacturer, product name & mesh size a. <u>Red Flint</u> <u>20</u> b. Volume added <u>2</u> ft ³
16. Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Describe _____	8. Filter pack material: Manufacturer, product name and mesh size a. <u>Red Flint</u> <u>20</u> b. Volume added <u>12</u> ft ³
17. Source of water (attach analysis): <u>City of Hudson</u>	9. Well casing: Flush threaded PVC schedule 40 <input type="checkbox"/> 23 Flush threaded PVC schedule 80 <input checked="" type="checkbox"/> 24 Other <input type="checkbox"/>
E. Bentonite seal, top <u>176</u> ft. MSL or _____ ft.	10. Screen material: <u>PVC</u> a. Screen type: Factory cut <input checked="" type="checkbox"/> 11 Continuous slot <input type="checkbox"/> 01 Other <input type="checkbox"/>
F. Fine sand, top <u>181</u> ft. MSL or _____ ft.	b. Manufacturer _____ c. Slot size: <u>0.010</u> in. d. Slotted length: <u>50</u> ft.
G. Filter pack, top <u>183</u> ft. MSL or _____ ft.	11. Backfill material (below filter pack): None <input checked="" type="checkbox"/> 14 Other <input type="checkbox"/>
H. Screen joint, top <u>188</u> ft. MSL or _____ ft.	
I. Well bottom <u>193</u> ft. MSL or _____ ft.	
J. Filter pack, bottom <u>195</u> ft. MSL or _____ ft.	
K. Borehole, bottom <u>195</u> ft. MSL or _____ ft.	
L. Borehole, diameter <u>8.5</u> in.	
M. O.D. well casing <u>4.5</u> in.	
N. I.D. well casing <u>3.820</u> in.	

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature _____

Firm _____

Trant Wells

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☒ Other ☐

Page 1 of 1

Facility/Project Name <u>Town of Warren TCE Investigation</u>		License/Permit/Monitoring Number _____		Boring Number <u>P-15</u>	
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: <u>Robbie</u> Last Name: <u>Terri's</u> Firm: <u>Trout Wells</u>		Date Drilling Started <u>06/21/2001</u> m m d d y y y y		Date Drilling Completed <u>06/21/2001</u> m m d d y y y y	
Drilling Method <u>Mud Rotary</u>		Final Static Water Level <u>903</u> Feet MSL		Surface Elevation <u>1064.1</u> Feet MSL	
Well Unique Well No. <u>JS 455</u>		DNR Well ID No. _____		Well Name <u>P-15</u>	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/>		State Plane _____ N, _____ E S/C/N		Lat _____ ' " _____	
_____ NW 1/4 of NW 1/4 of Section <u>19</u> , T <u>29</u> N, R <u>18</u> EW		Long _____ ' " _____		Local Grid Location _____ Feet <input type="checkbox"/> N _____ Feet <input type="checkbox"/> E _____ Feet <input type="checkbox"/> S _____ Feet <input type="checkbox"/> W	
Facility ID _____		County <u>St. Croix</u>		County Code <u>56</u>	
_____		Civil Town/City/ or Village <u>Town of Warren</u>		_____	

Sample		Blow Counts	Depth in Feet (Below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	
				CLAY										
			20	Sand + Gravel, brown										
			40											
			60											
			80											
			100	Sand, brown										
			110	Sand + Gravel, brown										
			120	Clay										
			140	Sand + Gravel Brown										
			150	Clay										
			160	Sand + Gravel										
			170	CLAY water										
			180	Limestone										
			200	E.O.B. 195 ft.										
			220											
			240											

I _____ by certify that the information on this form is true and correct to the best of my knowledge.

Signature [Signature] Firm Cedar Corporation

Facility/Project Name <u>Town of Warren</u>	Local Grid Location of Well ft. <input type="checkbox"/> N <input type="checkbox"/> S ft. <input type="checkbox"/> E <input type="checkbox"/> W	Well Name <u>#14</u>
Facility License, Permit or Monitoring Number	Grid Origin Location Lat. _____ Long. _____ or St. Plane _____ ft. N. _____ ft. E.	Wis. Unique Well Number DNR Well Num. <u>35454</u>
Type of Well Water Table Observation Well <input type="checkbox"/> 11 Piezometer <input checked="" type="checkbox"/> 12	Section Location of Waste/Source <u>SE 1/4 of NE 1/4 of Sec 24, T. 29 N, R. 19 E, W.</u>	Date Well Installed <u>6/29/01</u> m m d d y y
Distance Well Is From Waste/Source Boundary <u>4200'</u> ft.	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input type="checkbox"/> Sidegradient d <input checked="" type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	Well Installed By: (Person's Name and Firm) <u>Robbie Terris</u> <u>Trant Wells</u>
Is Well A Point of Enforcement Std. Application? <input type="checkbox"/> Yes <input type="checkbox"/> No		

A. Protective pipe, top elevation _____ ft. MSL	1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. Well casing, top elevation <u>958.92</u> ft. MSL	2. Protective cover pipe: a. Inside diameter: <u>6</u> in. b. Length: <u>7</u> ft. c. Material: Steel <input checked="" type="checkbox"/> 04 Other <input type="checkbox"/>
C. Land surface elevation <u>956.9</u> ft. MSL	d. Additional protection? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, describe: _____
D. Surface seal, bottom _____ ft. MSL or _____ ft.	3. Surface seal: Bentonite <input checked="" type="checkbox"/> 30 Concrete <input type="checkbox"/> 01 Other <input type="checkbox"/>
12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input type="checkbox"/> SM <input type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input type="checkbox"/> CH <input type="checkbox"/> Bedrock <input checked="" type="checkbox"/>	4. Material between well casing and protective pipe: Bentonite <input checked="" type="checkbox"/> 30 Annular space seal <input type="checkbox"/> Other <input type="checkbox"/>
13. Sieve analysis attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. Annular space seal: a. Granular Bentonite <input checked="" type="checkbox"/> 33 b. _____ Lbs/gal mud weight ... Bentonite-sand slurry <input type="checkbox"/> 35 c. _____ Lbs/gal mud weight ... Bentonite slurry <input checked="" type="checkbox"/> d. <u>15</u> % Bentonite ... Bentonite-cement grout <input type="checkbox"/> 50 e. _____ Ft ³ volume added for any of the above f. How installed: Tremie <input type="checkbox"/> 01 Tremie pumped <input checked="" type="checkbox"/> 02 Gravity <input type="checkbox"/> 08
14. Drilling method used: Rotary <input checked="" type="checkbox"/> 50 Hollow Stem Auger <input type="checkbox"/> 41 Other <input type="checkbox"/>	6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 33 b. <input type="checkbox"/> 1/4 in. <input checked="" type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite pellets <input type="checkbox"/> 32 c. _____ Other <input type="checkbox"/>
15. Drilling fluid used: Water <input type="checkbox"/> 02 Air <input type="checkbox"/> 01 Drilling Mud <input checked="" type="checkbox"/> 03 None <input type="checkbox"/> 99	7. Fine sand material: Manufacturer, product name & mesh size a. <u>Red Flint</u> <u>70</u> b. Volume added <u>2</u> ft ³
16. Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Describe _____	8. Filter pack material: Manufacturer, product name and mesh size a. <u>Red Flint</u> <u>30</u> b. Volume added <u>16</u> ft ³
17. Source of water (attach analysis): <u>City of Hudson</u>	9. Well casing: Flush threaded PVC schedule 40 <input type="checkbox"/> 23 Flush threaded PVC schedule 80 <input checked="" type="checkbox"/> 24 Other <input type="checkbox"/>
E. Bentonite seal, top <u>72</u> ft. MSL or _____ ft.	10. Screen material: <u>PVC</u> a. Screen type: Factory cut <input checked="" type="checkbox"/> 11 Continuous slot <input type="checkbox"/> 01 Other <input type="checkbox"/>
F. Fine sand, top <u>75</u> ft. MSL or _____ ft.	b. Manufacturer _____ c. Slot size: <u>0.010</u> in. d. Slotted length: _____ ft.
G. Filter pack, top <u>77</u> ft. MSL or _____ ft.	11. Backfill material (below filter pack): None <input checked="" type="checkbox"/> 14 Other <input type="checkbox"/>
H. Screen joint, top <u>82</u> ft. MSL or _____ ft.	
I. Well bottom <u>87</u> ft. MSL or _____ ft.	
J. Filter pack, bottom <u>93</u> ft. MSL or _____ ft.	
K. Borehole, bottom <u>93</u> ft. MSL or _____ ft.	
L. Borehole, diameter <u>6.3</u> in.	
M. O.D. well casing <u>2.46</u> in.	
N. I.D. well casing <u>1.87</u> in.	

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm

Trant Wells

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Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☒ Other ☐

Page 1 of 1

Facility/Project Name <u>Town of Warren TCE Investigation</u>		License/Permit/Monitoring Number _____		Boring Number <u>P-14</u>	
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: <u>Robbie</u> Last Name: <u>Terris</u> Firm: <u>Trout Wells</u>		Date Drilling Started <u>06/19/2001</u> m m d d y y y y		Date Drilling Completed <u>06/19/2001</u> m m d d y y y y	
WI Unique Well No. <u>JS 454</u>		DNR Well ID No. _____		Well Name _____	
Final Static Water Level <u>901.7</u> Feet MSL		Surface Elevation <u>956.9</u> Feet MSL		Borehole Diameter <u>6 3/4</u> inches	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/>		State Plane <u>N</u> , <u>E</u> S/C/N		Lat <u>0</u> ' <u>"</u>	
SE 1/4 of NE 1/4 of Section <u>24</u> , T <u>29</u> N, R <u>18</u> EW		Long <u>0</u> ' <u>"</u>		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
Facility ID _____		County <u>St. Croix</u>		County Code <u>56</u>	
Civil Town/City/ or Village <u>Town of Hudson</u>					

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet (below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	
			10	Sand + Gravel, brown										
			20	Silty Clay										
			30	Sand + Gravel, brown										
			40	Silty clay										
			50	Sand, brown										
			60	Water										
			70											
			80	limestone										
			90											
			100	E.O.B. 93 ft.										
			110											
			120											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm

Facility/Project Name <u>Town of Warren</u>	Local Grid Location of Well ft. <input type="checkbox"/> N <input type="checkbox"/> S <input type="checkbox"/> E <input type="checkbox"/> W	Well Name <u>MW #13</u>
Facility License, Permit or Monitoring Number	Grid Origin Location Lat. _____ Long. _____ or St. Plane _____ ft. N. _____ ft. E.	Wis. Unique Well Number DNR Well Num. <u>35452</u>
Type of Well - Water Table Observation Well <input checked="" type="checkbox"/> 11 Piezometer <input type="checkbox"/> 12	Section Location of Waste/Source <u>SE 1/4 of NE 1/4 of Sec. 24, T. 29 N. R. 19 W.</u>	Date Well Installed <u>6/19/01</u> m m d d y y
Distance Well Is From Waste/Source Boundary <u>± 4200'</u> ft.	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input type="checkbox"/> Sidegradient d <input checked="" type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	Well Installed By: (Person's Name and Firm) <u>Robbie Ferris</u> <u>Trant Wells</u>
Is Well A Point of Enforcement Std. Application? <input type="checkbox"/> Yes <input type="checkbox"/> No		

A. Protective pipe, top elevation _____ ft. MSL	1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. Well casing, top elevation <u>959.04</u> ft. MSL	2. Protective cover pipe: a. Inside diameter: <u>6</u> in. b. Length: <u>7</u> ft. c. Material: Steel <input checked="" type="checkbox"/> 04 Other <input type="checkbox"/>
C. Land surface elevation <u>957.3</u> ft. MSL	d. Additional protection? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, describe: _____
D. Surface seal, bottom _____ ft. MSL or _____ ft.	3. Surface seal: Bentonite <input checked="" type="checkbox"/> 30 Concrete <input type="checkbox"/> 01 Other <input type="checkbox"/>
12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input type="checkbox"/> SM <input type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input type="checkbox"/> CH <input type="checkbox"/> Bedrock <input checked="" type="checkbox"/>	4. Material between well casing and protective pipe: Bentonite <input checked="" type="checkbox"/> 30 Annular space seal <input type="checkbox"/> Other <input type="checkbox"/>
13. Sieve analysis attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. Annular space seal: a. Granular Bentonite <input type="checkbox"/> 33 b. _____ Lbs/gal mud weight ... Bentonite-sand slurry <input type="checkbox"/> 35 c. _____ Lbs/gal mud weight ... Bentonite slurry <input type="checkbox"/> d. _____ % Bentonite ... Bentonite-cement grout <input type="checkbox"/> 50 e. _____ Ft ³ volume added for any of the above
14. Drilling method used: Rotary <input checked="" type="checkbox"/> 50 Hollow Stem Auger <input type="checkbox"/> 41 Other <input type="checkbox"/>	f. How installed: Tremie <input type="checkbox"/> 01 Tremie pumped <input type="checkbox"/> 02 Gravity <input checked="" type="checkbox"/> 08
15. Drilling fluid used: Water <input type="checkbox"/> 02 Air <input type="checkbox"/> 01 Drilling Mud <input checked="" type="checkbox"/> 03 None <input type="checkbox"/> 99	6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 33 b. <input type="checkbox"/> 1/4 in. <input checked="" type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite pellets <input type="checkbox"/> 32 c. _____ Other <input type="checkbox"/>
16. Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7. Fine sand material: Manufacturer, product name & mesh size a. <u>Red Flint</u> <u>#20</u> b. Volume added <u>2</u> ft ³
Describe _____	8. Filter pack material: Manufacturer, product name and mesh size a. <u>Red Flint</u> <u>#20</u> b. Volume added <u>28</u> ft ³
17. Source of water (attach analysis): <u>City of Hudson</u>	9. Well casing: Flush threaded PVC schedule 40 <input type="checkbox"/> 23 Flush threaded PVC schedule 80 <input checked="" type="checkbox"/> 24 Other <input type="checkbox"/>
E. Bentonite seal, top <u>959.04</u> ft. MSL or _____ ft.	10. Screen material: <u>PVC</u> a. Screen type: Factory cut <input checked="" type="checkbox"/> 11 Continuous slot <input type="checkbox"/> 01 Other <input type="checkbox"/>
F. Fine sand, top <u>45</u> ft. MSL or _____ ft.	b. Manufacturer _____
G. Filter pack, top <u>47</u> ft. MSL or _____ ft.	c. Slot size: <u>0.010</u> in.
H. Screen joint, top <u>52</u> ft. MSL or _____ ft.	d. Slotted length: <u>20.0</u> ft.
I. Well bottom <u>72</u> ft. MSL or _____ ft.	11. Backfill material (below filter pack): None <input checked="" type="checkbox"/> 14 Other <input type="checkbox"/>
J. Filter pack, bottom <u>75</u> ft. MSL or _____ ft.	
K. Borehole, bottom <u>75</u> ft. MSL or _____ ft.	
L. Borehole, diameter <u>6.34</u> in.	
M. O.D. well casing <u>2.46</u> in.	
N. I.D. well casing <u>1.87</u> in.	

I hereby certify that the information on this form is true and correct to the best of my knowledge.
Signature _____ Firm Trant Wells

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☒ Other ☐

Page 1 of 1

Facility/Project Name <u>Town of Warren TCE Investigation</u>		License/Permit/Monitoring Number _____		Boring Number <u>MW-13</u>	
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: <u>Robbie</u> Last Name: <u>Terris</u> Firm: <u>Trant Wells</u>		Date Drilling Started <u>06/19/2001</u> m m d d y y y y		Date Drilling Completed <u>06/19/2001</u> m m d d y y y y	
Drilling Method <u>Mod Rotary</u>		WT Unique Well No. <u>JS 453</u>		DNR Well ID No. _____	
Well Name <u>MW-13</u>		Final Static Water Level <u>901.5</u> Feet MSL		Surface Elevation <u>957.3</u> Feet MSL	
Borehole Diameter <u>6 3/4</u> inches		Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/>		State Plane _____ N, _____ E S/C/N	
Lat _____ ' "		Long _____ ' "		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
Facility ID _____		County <u>St. Croix</u>		County Code <u>56</u>	
Civil Town/City/ or Village <u>Town of Hudson</u>		1/4 of <u>NE</u> 1/4 of Section <u>24</u> , T <u>29</u> N, R <u>19</u> E (W)			

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet (Below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	
			10	Sand + Gravel, brown										
			20	Silty Clay										
			30	Sand + Gravel, brown										
			40	Silty Clay										
			50	Limestone										
			60	Water										
			70											
			80	E.O.B. 75 ft.										
			90											
			100											

I hereby certify that the information on this form is true and correct to the best of my knowledge.
Signature [Signature] Firm Cedar Corporation

Facility/Project Name <u>Town of Warren</u>	Local Grid Location of Well ft. <input type="checkbox"/> N. <input type="checkbox"/> S. <input type="checkbox"/> E. <input type="checkbox"/> W.	Well Name <u>P#12</u>
Facility License, Permit or Monitoring Number	Grid Origin Location Lat. _____ Long. _____ or _____	Wis. Unique Well Number DNR Well Num. <u>15452</u>
Type of Well - Water Table Observation Well <input type="checkbox"/> 11 Piezometer <input checked="" type="checkbox"/> 12	St. Plane _____ ft. N. _____ ft. E.	Date Well Installed <u>6/14/01</u> m m d d y y
Distance Well Is From Waste/Source Boundary <u>13000'</u> ft.	Section Location of Waste/Source <u>1/4 of SW 1/4 of Sec. 19, T. 29 N, R. 18 E</u>	Well Installed By: (Person's Name and Firm) <u>Rebbie Terris</u> <u>Trant Wells</u>
Is Well A Point of Enforcement Std. Application? <input type="checkbox"/> Yes <input type="checkbox"/> No	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input checked="" type="checkbox"/> Sidegradient d <input type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	

A. Protective pipe, top elevation _____ ft. MSL	1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. Well casing, top elevation <u>1052.89</u> ft. MSL	2. Protective cover pipe: a. Inside diameter: <u>8</u> in. b. Length: <u>2</u> ft. c. Material: Steel <input checked="" type="checkbox"/> 04 Other <input type="checkbox"/>
C. Land surface elevation <u>1051.1</u> ft. MSL	d. Additional protection? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, describe: _____
D. Surface seal, bottom _____ ft. MSL or _____ ft.	3. Surface seal: Bentonite <input checked="" type="checkbox"/> 30 Concrete <input type="checkbox"/> 01 Other <input type="checkbox"/>
12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input checked="" type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input type="checkbox"/> SM <input type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input type="checkbox"/> CH <input type="checkbox"/> Bedrock <input type="checkbox"/>	4. Material between well casing and protective pipe: Bentonite <input checked="" type="checkbox"/> 30 Annular space seal <input type="checkbox"/> Other <input type="checkbox"/>
13. Sieve analysis attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. Annular space seal: a. Granular Bentonite <input type="checkbox"/> 33 b. _____ Lbs/gal mud weight ... Bentonite-sand slurry <input type="checkbox"/> 35 c. _____ Lbs/gal mud weight ... Bentonite slurry <input checked="" type="checkbox"/> d. <u>15</u> % Bentonite ... Bentonite-cement grout <input type="checkbox"/> 50 e. _____ Ft ³ volume added for any of the above f. How installed: Tremie <input type="checkbox"/> 01 Tremie pumped <input checked="" type="checkbox"/> 02 Gravity <input type="checkbox"/> 08
14. Drilling method used: Rotary <input checked="" type="checkbox"/> 50 Hollow Stem Auger <input type="checkbox"/> 41 Other <input type="checkbox"/>	6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 33 b. <input type="checkbox"/> 1/4 in. <input checked="" type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite pellets <input type="checkbox"/> 32 c. _____ Other <input type="checkbox"/>
15. Drilling fluid used: Water <input type="checkbox"/> 02 Air <input type="checkbox"/> 01 Drilling Mud <input checked="" type="checkbox"/> 03 None <input type="checkbox"/> 99	7. Fine sand material: Manufacturer, product name & mesh size a. <u>Red Flint #70</u> b. Volume added <u>2</u> ft ³
16. Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Describe _____	8. Filter pack material: Manufacturer, product name and mesh size a. <u>Red Flint #30</u> b. Volume added <u>15</u> ft ³
17. Source of water (attach analysis): <u>City of Hudson</u>	9. Well casing: Flush threaded PVC schedule 40 <input type="checkbox"/> 23 Flush threaded PVC schedule 80 <input checked="" type="checkbox"/> 24 Other <input type="checkbox"/>
E. Bentonite seal, top <u>163</u> ft. MSL or _____ ft.	10. Screen material: <u>PVC</u> a. Screen type: Factory cut <input checked="" type="checkbox"/> 11 Continuous slot <input type="checkbox"/> 01 Other <input type="checkbox"/>
F. Fine sand, top <u>168</u> ft. MSL or _____ ft.	b. Manufacturer _____ c. Slot size: <u>0.010</u> in. d. Slotted length: <u>5.0</u> ft.
G. Filter pack, top <u>170</u> ft. MSL or _____ ft.	11. Backfill material (below filter pack): None <input checked="" type="checkbox"/> 14 Other <input type="checkbox"/>
H. Screen joint, top <u>177</u> ft. MSL or _____ ft.	
I. Well bottom <u>182</u> ft. MSL or _____ ft.	
J. Filter pack, bottom <u>185</u> ft. MSL or _____ ft.	
K. Borehole, bottom <u>185</u> ft. MSL or _____ ft.	
L. Borehole, diameter <u>8 1/2</u> in.	
M. O.D. well casing <u>4.5</u> in.	
N. I.D. well casing <u>3.826</u> in.	

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☒ Other ☐

Page 1 of 1

Facility/Project Name <u>Town of Warren TCE Investigation</u>			License/Permit/Monitoring Number _____		Boring Number <u>P-12</u>
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: <u>Robbie</u> Last Name: <u>Tenns</u> Firm: <u>Trust Wells</u>			Date Drilling Started <u>06/14/2001</u> m m / d d / y y y y	Date Drilling Completed <u>06/14/2001</u> m m / d d / y y y y	Drilling Method <u>Mud Rotary</u>
WT Unique Well No. <u>JS452</u>	DNR Well ID No. _____	Well Name <u>P-12</u>	Final Static Water Level <u>907.6</u> Feet MSL	Surface Elevation <u>1051.1</u> Feet MSL	Borehole Diameter _____ inches
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/> State Plane _____ N, _____ E S/C/N <u>NW</u> 1/4 of <u>SW</u> 1/4 of Section <u>19</u> , T <u>29</u> N, R <u>18</u> E(W)			Lat _____ Long _____	Local Grid Location Feet <input type="checkbox"/> N <input type="checkbox"/> E Feet <input type="checkbox"/> S <input type="checkbox"/> W	
Facility ID _____		County <u>St. Croix</u>	County Code <u>56</u>	Civil Town/City/ or Village <u>Town of Warren</u>	

Sample		Blow Counts	Depth in Feet (Below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	
			20	clay Sand + Gravel										
			40	clay Sand + Gravel										
			60	clay										
			80	Sand, brown										
			100	Clay										
			120	Sand + Gravel										
			140	Water ↓										
			160											
			180	NO LOG E.O.B. 185 ft.										
			200											
			220											
			240											

I _____ by certify that the information on this form is true and correct to the best of my knowledge.

Signature [Signature] Firm Cedar Corporation

Facility/Project Name <u>Town of Warren</u>	Local Grid Location of Well ft. <input type="checkbox"/> N. <input type="checkbox"/> S. <input type="checkbox"/> E. <input type="checkbox"/> W.	Well Name <u>MW 11</u>
Facility License, Permit or Monitoring Number	Grid Origin Location Lat. _____ Long. _____ or _____	Wis. Unique Well Number <u>DNR Well Num.</u> <u>JS4451</u>
Type of Well: Water Table Observation Well <input checked="" type="checkbox"/> 11 Piezometer <input type="checkbox"/> 12	Section Location of Waste/Source St. Plane _____ ft. N. _____ ft. E.	Date Well Installed <u>6/14/01</u> m m d d y y
Distance Well Is From Waste/Source Boundary <u>± 3000'</u> ft.	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input checked="" type="checkbox"/> Sidegradient d <input type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	Well Installed By: (Person's Name and Firm) <u>Robbie Turris</u> <u>Trout Wells</u>
Is Well A Point of Enforcement Std. Application? <input type="checkbox"/> Yes <input type="checkbox"/> No		

A. Protective pipe, top elevation _____ ft. MSL	1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. Well casing, top elevation <u>1051.83</u> ft. MSL	2. Protective cover pipe: a. Inside diameter: <u>8</u> in. b. Length: <u>2</u> ft. c. Material: Steel <input checked="" type="checkbox"/> 04 Other <input type="checkbox"/> d. Additional protection? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, describe: _____
C. Land surface elevation <u>1049.9</u> ft. MSL	3. Surface seal: Bentonite <input checked="" type="checkbox"/> 30 Concrete <input type="checkbox"/> 01 Other <input type="checkbox"/>
D. Surface seal, bottom _____ ft. MSL or _____ ft.	4. Material between well casing and protective pipe: Bentonite <input checked="" type="checkbox"/> 30 Annular space seal <input type="checkbox"/> Other <input type="checkbox"/>
12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input checked="" type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input type="checkbox"/> SM <input type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input type="checkbox"/> CH <input type="checkbox"/> Bedrock <input type="checkbox"/>	5. Annular space seal: a. Granular Bentonite <input type="checkbox"/> 33 b. _____ Lbs/gal mud weight ... Bentonite-sand slurry <input type="checkbox"/> 35 c. <u>✓</u> Lbs/gal mud weight ... Bentonite slurry <input checked="" type="checkbox"/> 3 d. <u>15</u> % Bentonite ... Bentonite-cement grout <input type="checkbox"/> 5 e. _____ Ft ³ volume added for any of the above f. How installed: Tremie <input type="checkbox"/> 01 Tremie pumped <input checked="" type="checkbox"/> 02 Gravity <input type="checkbox"/> 08
13. Sieve analysis attached? <input type="checkbox"/> Yes <input type="checkbox"/> No	6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 33 b. <input type="checkbox"/> 1/4 in. <input checked="" type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite pellets <input checked="" type="checkbox"/> 32 c. _____ Other <input type="checkbox"/>
14. Drilling method used: Rotary <input checked="" type="checkbox"/> 50 Hollow Stem Auger <input type="checkbox"/> 41 Other <input type="checkbox"/>	7. Fine sand material: Manufacturer, product name & mesh size a. <u>Red Flint</u> b. Volume added <u>2</u> ft ³
15. Drilling fluid used: Water <input type="checkbox"/> 02 Air <input type="checkbox"/> 01 Drilling Mud <input checked="" type="checkbox"/> 03 None <input type="checkbox"/> 99	8. Filter pack material: Manufacturer, product name and mesh size a. <u>#30</u> b. Volume added <u>36</u> ft ³
16. Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	9. Well casing: Flush threaded PVC schedule 40 <input type="checkbox"/> 23 Flush threaded PVC schedule 80 <input checked="" type="checkbox"/> 24 Other <input type="checkbox"/>
Describe _____	10. Screen material: <u>PVC</u> a. Screen type: Factory cut <input checked="" type="checkbox"/> 11 Continuous slot <input type="checkbox"/> 01 Other <input type="checkbox"/>
17. Source of water (attach analysis): <u>City of Hudson WI</u>	b. Manufacturer _____ c. Slot size: <u>0.10</u> in. d. Slotted length: <u>20</u> ft.
E. Bentonite seal, top <u>122</u> ft. MSL or _____ ft.	11. Backfill material (below filter pack): None <input checked="" type="checkbox"/> 14 Other <input type="checkbox"/>
F. Fine sand, top <u>122</u> ft. MSL or _____ ft.	
G. Filter pack, top <u>129</u> ft. MSL or _____ ft.	
H. Screen joint, top <u>136</u> ft. MSL or _____ ft.	
I. Well bottom <u>156</u> ft. MSL or _____ ft.	
J. Filter pack, bottom <u>161</u> ft. MSL or _____ ft.	
K. Borehole, bottom <u>161</u> ft. MSL or _____ ft.	
L. Borehole, diameter <u>8.5</u> in.	
M. O.D. well casing <u>4.5</u> in.	
N. I.D. well casing <u>3.826</u> in.	

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature [Signature] Firm Trout Wells

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☒ Other ☐

Page 1 of 1

Facility/Project Name <u>Town of Warren TCE Investigation</u>		License/Permit/Monitoring Number _____		Boring Number <u>MW-11</u>	
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: <u>Pobbie</u> Last Name: <u>Tennis</u> Firm: <u>Traut Wells</u>		Date Drilling Started <u>06/14/2001</u> m m / d d / y y y y		Date Drilling Completed <u>06/14/2001</u> m m / d d / y y y y	
WI Unique Well No. <u>JS 451</u>		DNR Well ID No. _____		Well Name <u>MW-11</u>	
Final Static Water Level <u>907.8</u> Feet MSL		Surface Elevation <u>1049.9</u> Feet MSL		Borehole Diameter <u>8 1/2</u> inches	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/> State Plane _____ N, _____ E S/C/N		Lat _____ Long _____		Local Grid Location _____ Feet <input type="checkbox"/> N _____ Feet <input type="checkbox"/> E _____ Feet <input type="checkbox"/> S _____ Feet <input type="checkbox"/> W	
Facility ID _____		County <u>St. Croix</u>		County Code <u>56</u>	
Civil Town/City/ or Village <u>Town of Warren</u>					

Sample Number and Type	Length Alt. & Recovered (in)	Blow Counts	Depth in Feet (Below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/RID	Soil Properties					RQD/ Comments
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	
			20	Silty Clay Sand + Gravel, brown										
			40	CLAY										
			60	Sand, gravel, brown										
			80											
			100	Clay Sand, Brown										
			120											
			140	Silty Clay water										
			160	Sand, Brown										
			180											
			200											
			220											
			240											

I, by certify that the information on this form is true and correct to the best of my knowledge.

Signature [Signature] Firm Cedar Corporation

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

Facility/Project Name <u>Town of Warren</u>	Local Grid Location of Well ft. <u>11</u> N. <u>12</u> S. ft. <u>11</u> E. <u>12</u> W.	Well Name <u>#10</u>
Facility License, Permit or Monitoring Number	Grid Origin Location Lat. _____ Long. _____ or _____	Wis. Unique Well Number DNR Well Number <u>15460</u>
Type of Well Water Table Observation Well <input type="checkbox"/> 11 Piezometer <input checked="" type="checkbox"/> 12	St. Plane _____ ft. N. _____ ft. E.	Date Well Installed <u>6/13/01</u> m m d d y y
Distance Well Is From Waste/Source Boundary <u>±2400'</u> ft.	Section Location of Waste/Source <u>NE 1/4 of SW 1/4 of Sec. 19, T. 29 N, R. 18 E, W.</u>	Well Installed By: (Person's Name and Firm) <u>Robbie Terris</u> <u>Traut Wells</u>
Is Well A Point of Enforcement Std. Application? <input type="checkbox"/> Yes <input type="checkbox"/> No	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input type="checkbox"/> Sidegradient d <input checked="" type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	

A. Protective pipe, top elevation _____ ft. MSL	1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. Well casing, top elevation <u>1057.94</u> ft. MSL	2. Protective cover pipe: a. Inside diameter: <u>8</u> in. b. Length: <u>7</u> ft. c. Material: Steel <input checked="" type="checkbox"/> 04 Other <input type="checkbox"/>
C. Land surface elevation <u>1056.0</u> ft. MSL	d. Additional protection? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, describe: _____
D. Surface seal, bottom _____ ft. MSL or _____ ft.	3. Surface seal: Bentonite <input checked="" type="checkbox"/> 30 Concrete <input type="checkbox"/> 01 Other <input type="checkbox"/>
12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input type="checkbox"/> SM <input type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input type="checkbox"/> CH <input type="checkbox"/> Bedrock <input checked="" type="checkbox"/>	4. Material between well casing and protective pipe: Bentonite <input checked="" type="checkbox"/> 30 Annular space seal <input type="checkbox"/> Other <input type="checkbox"/>
13. Sieve analysis attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. Annular space seal: a. Granular Bentonite <input type="checkbox"/> 33 b. _____ Lbs/gal mud weight ... Bentonite-sand slurry <input type="checkbox"/> 35 c. _____ Lbs/gal mud weight ... Bentonite slurry <input checked="" type="checkbox"/> 3 d. <u>15</u> % Bentonite ... Bentonite-cement grout <input type="checkbox"/> 50 e. _____ Ft ³ volume added for any of the above
14. Drilling method used: Rotary <input checked="" type="checkbox"/> 50 Hollow Stem Auger <input type="checkbox"/> 41 Other <input type="checkbox"/>	f. How installed: Tremie <input type="checkbox"/> 01 Tremie pumped <input checked="" type="checkbox"/> 02 Gravity <input type="checkbox"/> 08
15. Drilling fluid used: Water <input type="checkbox"/> 02 Air <input type="checkbox"/> 01 Drilling Mud <input checked="" type="checkbox"/> 03 None <input type="checkbox"/> 99	6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 33 b. <input type="checkbox"/> 1/4 in. <input checked="" type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite pellets <input checked="" type="checkbox"/> 32 c. _____ Other <input type="checkbox"/>
16. Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7. Fine sand material: Manufacturer, product name & mesh size a. <u>Red Flint</u> b. Volume added <u>2</u> ft ³
Describe _____	8. Filter pack material: Manufacturer, product name and mesh size a. <u>#30 Red Flint</u> b. Volume added <u>12</u> ft ³
17. Source of water (attach analysis): <u>City of Hudson</u>	9. Well casing: Flush threaded PVC schedule 40 <input type="checkbox"/> 23 Flush threaded PVC schedule 80 <input checked="" type="checkbox"/> 24 Other <input type="checkbox"/>
E. Bentonite seal, top <u>166</u> ft. MSL or _____ ft.	10. Screen material: <u>PVC</u> a. Screen type: Factory cut <input checked="" type="checkbox"/> 11 Continuous slot <input type="checkbox"/> 01 Other <input type="checkbox"/>
F. Fine sand, top <u>171</u> ft. MSL or _____ ft.	b. Manufacturer _____
G. Filter pack, top <u>173</u> ft. MSL or _____ ft.	c. Slot size: <u>0.010</u> in.
H. Screen joint, top <u>178</u> ft. MSL or _____ ft.	d. Slotted length: <u>5.0</u> ft.
I. Well bottom <u>183</u> ft. MSL or _____ ft.	11. Backfill material (below filter pack): None <input checked="" type="checkbox"/> 14 Other <input type="checkbox"/>
J. Filter pack, bottom <u>185</u> ft. MSL or _____ ft.	
K. Borehole, bottom <u>185</u> ft. MSL or _____ ft.	
L. Borehole, diameter <u>8.5</u> in.	
M. O.D. well casing <u>4.5</u> in.	
N. I.D. well casing <u>3.826</u> in.	

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm

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Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☒ Other ☐

Page 1 of 1

Facility/Project Name <u>Town of Warren TCE Investigation</u>		License/Permit/Monitoring Number _____		Boring Number <u>P-10</u>	
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: <u>Robbie</u> Last Name: <u>Terris</u> Firm: <u>Traut Wells</u>		Date Drilling Started <u>06/13/2001</u> m m d d y y y y		Date Drilling Completed <u>06/13/2001</u> m m d d y y y y	
Drilling Method <u>Mud Rotary</u>		Final Static Water Level <u>907.3</u> Feet MSL		Surface Elevation <u>1056</u> Feet MSL	
WI Unique Well No. <u>JS 460</u>	DNR Well ID No. _____	Well Name _____		Borehole Diameter <u>8 1/2</u> inches	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/> State Plane _____ N, _____ E S/C/N		Lat _____ ° ' " _____ Long _____ ° ' " _____		Local Grid Location _____ Feet <input type="checkbox"/> N _____ Feet <input type="checkbox"/> E _____ Feet <input type="checkbox"/> S _____ Feet <input type="checkbox"/> W	
Facility ID _____		County <u>St. Croix</u>	County Code <u>56</u>	Civil Town/City/ or Village <u>Town of Warren</u>	

Sample Number and Type	Length Alt. & Recovered (in)	Blow Counts	Depth in Feet (Below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					P 200	RQD/ Comments
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index			
			20	Silty Clay											
			40	Sand + Gravel, brown											
			60												
			80												
			100	Brown Silty Clay											
			120												
			140												
			160	Brown Sandstone											
			180												
			200	Dolomite											
			220												
			240												

I _____ by certify that the information on this form is true and correct to the best of my knowledge.
Signature _____ Firm Cedar Corporation

Facility/Project Name <u>Town of Warren</u>	Local Grid Location of Well ft. <u>8</u> N <u>5</u> S ft. <u>8</u> E <u>0</u> W	Well Name <u>MAN # 9</u>
Facility License, Permit or Monitoring Number	Grid Origin Location Lat. _____ Long. _____ or _____	Wis. Unique Well Number <u>15459</u> DNR Well Num. _____
Type of Well Water Table Observation Well <input checked="" type="checkbox"/> 11 Piezometer <input type="checkbox"/> 12	St. Plane _____ ft. N. _____ ft. E.	Date Well Installed <u>6/12/01</u> m m d d y y
Distance Well Is From Waste/Source Boundary <u>± 2400'</u> ft.	Section Location of Waste/Source <u>NE 1/4 of SW 1/4 of Sec. 19, T. 29 N, R. 18 W.</u>	Well Installed By: (Person's Name and Firm) <u>Kobbie Terris</u> <u>Trout Wells</u>
Is Well A Point of Enforcement Std. Application? <input type="checkbox"/> Yes <input type="checkbox"/> No	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input type="checkbox"/> Sidegradient d <input checked="" type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	

A. Protective pipe, top elevation _____ ft. MSL	1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. Well casing, top elevation <u>1057.41</u> ft. MSL	2. Protective cover pipe: a. Inside diameter: <u>8</u> in. b. Length: <u>7</u> ft. c. Material: Steel <input checked="" type="checkbox"/> 04 Other <input type="checkbox"/>
C. Land surface elevation <u>1055.4</u> ft. MSL	d. Additional protection? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, describe: _____
D. Surface seal, bottom _____ ft. MSL or _____ ft.	3. Surface seal: Bentonite <input checked="" type="checkbox"/> 30 Concrete <input type="checkbox"/> 01 Other <input type="checkbox"/>
12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input type="checkbox"/> SM <input type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input type="checkbox"/> CH <input type="checkbox"/> Bedrock <input checked="" type="checkbox"/>	4. Material between well casing and protective pipe: Bentonite <input checked="" type="checkbox"/> 30 Annular space seal <input type="checkbox"/> Other <input type="checkbox"/>
13. Sieve analysis attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. Annular space seal: a. Granular Bentonite <input type="checkbox"/> 33 b. _____ Lbs/gal mud weight ... Bentonite-sand slurry <input type="checkbox"/> 35 c. _____ Lbs/gal mud weight ... Bentonite slurry <input checked="" type="checkbox"/> d. <u>15</u> % Bentonite ... Bentonite-cement grout <input type="checkbox"/> 50 e. _____ Ft ³ volume added for any of the above f. How installed: Tremie <input type="checkbox"/> 01 Tremie pumped <input checked="" type="checkbox"/> 02 Gravity <input type="checkbox"/> 08
14. Drilling method used: Rotary <input checked="" type="checkbox"/> 50 Hollow Stem Auger <input type="checkbox"/> 41 Other <input type="checkbox"/>	6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 33 b. <input type="checkbox"/> 1/4 in. <input checked="" type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite pellets <input type="checkbox"/> 32 c. _____ Other <input type="checkbox"/>
15. Drilling fluid used: Water <input type="checkbox"/> 02 Air <input type="checkbox"/> 01 Drilling Mud <input checked="" type="checkbox"/> 03 None <input type="checkbox"/> 99	7. Fine sand material: Manufacturer, product name & mesh size a. <u>Red Flint #70</u> b. Volume added <u>2</u> ft ³
16. Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	8. Filter pack material: Manufacturer, product name and mesh size a. <u>Red Flint #70</u> b. Volume added <u>35</u> ft ³
Describe _____	9. Well casing: Flush threaded PVC schedule 40 <input type="checkbox"/> 23 Flush threaded PVC schedule 80 <input checked="" type="checkbox"/> 24 Other <input type="checkbox"/>
17. Source of water (attach analysis): <u>City of Hudson</u>	10. Screen material: <u>PVC</u> a. Screen type: Factory cut <input checked="" type="checkbox"/> 11 Continuous slot <input type="checkbox"/> 01 Other <input type="checkbox"/> b. Manufacturer _____ c. Slot size: <u>0.012</u> in. d. Slotted length: <u>20.0</u> ft.
E. Bentonite seal, top <u>123</u> ft. MSL or _____ ft.	11. Backfill material (below filter pack): None <input checked="" type="checkbox"/> 14 Other <input type="checkbox"/>
F. Fine sand, top <u>128</u> ft. MSL or _____ ft.	
G. Filter pack, top <u>130</u> ft. MSL or _____ ft.	
H. Screen joint, top <u>140</u> ft. MSL or _____ ft.	
I. Well bottom <u>160</u> ft. MSL or _____ ft.	
J. Filter pack, bottom <u>165</u> ft. MSL or _____ ft.	
K. Borehole, bottom <u>165</u> ft. MSL or _____ ft.	
L. Borehole, diameter <u>8.5</u> in.	
M. O.D. well casing <u>4.5</u> in.	
N. I.D. well casing <u>3.826</u> in.	

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature _____

Firm _____

Trout Wells

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☒ Other ☐

Page 1 of 1

Facility/Project Name <u>Town of Warren TCE Investigation</u>			License/Permit/Monitoring Number _____		Boring Number <u>MW-9</u>
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: <u>Robbie</u> Last Name: <u>Tennis</u> Firm: <u>Traut Wells</u>			Date Drilling Started <u>06/12/2001</u> m m / d d / y y y y	Date Drilling Completed <u>06/12/2001</u> m m / d d / y y y y	Drilling Method <u>Mud Rotary</u>
WI Unique Well No. <u>JS 459</u>	DNR Well ID No. _____	Well Name _____	Final Static Water Level <u>907.5</u> Feet MSL	Surface Elevation <u>1055.4</u> Feet MSL	Borehole Diameter <u>8 1/2</u> inches
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/> State Plane _____ N, _____ E S/C/N			Lat <u>0</u> ' " Long <u>0</u> ' "	Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
NE 1/4 of SW 1/4 of Section <u>19</u> , T <u>29</u> N, R <u>18</u> EW					
Facility ID _____	County <u>St. Croix</u>	County Code <u>56</u>	Civil Town/City/ or Village <u>Town of Warren</u>		

Sample		Blow Counts	Depth in Feet (Below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					P 200	RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index			
			20	Silty clay											
			40	Sand + Gravel, Brown											
			60	↓											
			80	Silty Clay Brown											
			100	↓											
			120	Silt											
			140	Water											
			160	Sand, Brown											
			180	↓											
			200												
			220												
			240												

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature [Signature] Firm Cedar Corporation

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State of Wisconsin
Department of Natural ResourcesRoute to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☒ Underground Tanks ☐ Other ☐MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 4-90

Facility/Project Name

Team of Warren - TCE
Facility License, Permit or Monitoring Number

Local Grid Location of Well

ft. ☐ N ☐ S ft. ☐ E ☐ W

Well Name

MW# 8

Grid Origin Location

Lat. _____ Long. _____ or

Well Unique Well Number DNR Well Number

J5428

Type of Well Water Table Observation Well ☒
Piezometer ☐

Date Well Installed

11/14/00
m m d d y y

Distance Well Is From Waste/Source Boundary

Is Well A Point of Enforcement Std. Application?

☐ Yes ☐ No

Section Location of Waste/Source

SW 1/4 of SE 1/4 of Sec. 19, T. 29 N, R. 18 E, W.

Location of Well Relative to Waste/Source

☐ Upgradient ☐ Sidegradient
☒ Downgradient ☐ Not Known

Well Installed By: (Person's Name and Firm)

DK

Logan, Mike A

A. Protective pipe, top elevation

ft. MSL

B. Well casing, top elevation

ft. MSL

C. Land surface elevation

ft. MSL

D. Surface seal, bottom

ft. MSL or

12. USCS classification of soil near screen:

GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☒

13. Sieve analysis attached?

☐ Yes ☒ No

14. Drilling method used:

Rotary ☐ 50Hollow Stem Auger ☐ 41Other ☒ Sonar

15. Drilling fluid used: Water

☒ 02Air ☐ 01Drilling Mud ☐ 03None ☐ 99

Drilling additives used?

☐ Yes ☒ No

Describe

17. Source of water (attach analysis):

City of Hudson

E. Bentonite seal, top

ft. MSL or

F. Fine sand, top

ft. MSL or

G. Filter pack, top

ft. MSL or

H. Screen joint, top

ft. MSL or

I. Well bottom

ft. MSL or

J. Filter pack, bottom

ft. MSL or

K. Borehole, bottom

ft. MSL or

L. Borehole, diameter

7. in.

M. O.D. well casing

2 3/4 in.

N. I.D. well casing

2. in.

1. Cap and lock?

☒ Yes ☐ No

2. Protective cover pipe:

a. Inside diameter:

6. in.

b. Length:

6. ft.

c. Material:

Steel ☒ 04Other ☐

d. Additional protection?

☐ Yes ☐ No

If yes, describe:

3. Surface seal:

Bentonite ☐ 30Concrete ☒ 01Other ☐

4. Material between well casing and protective pipe:

Bentonite ☐ 30Annular space seal ☐Other ☐

5. Annular space seal:

a. Granular Bentonite ☐ 33b. Lbs/gal mud weight ... Bentonite-sand slurry ☐ 35c. Lbs/gal mud weight ... Bentonite slurry ☒ 31d. % Bentonite ... Bentonite-cement grout ☐ 50e. Ft³ volume added for any of the above

f. How installed:

Tremie ☐ 01Tremie pumped ☒ 02Gravity ☐ 08

6. Bentonite seal:

a. Bentonite granules ☐ 33b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite pellets ☒ 32c. Other ☐

7. Fine sand material: Manufacturer, product name & mesh size

a. Badger State ☒ 20b. Volume added ft³

8. Filter pack material: Manufacturer, product name and mesh size

a. Red Flint ☒ 30b. Volume added ft³

9. Well casing:

Flush threaded PVC schedule 40 ☐ 23Flush threaded PVC schedule 80 ☒ 24Other ☐

10. Screen material:

a. Screen type:

Factory cut ☒ 11Continuous slot ☐ 01Other ☐

b. Manufacturer Johnson

c. Slot size: 0.010 in.

d. Slotted length: 20.0 ft.

11. Backfill material (below filter pack):

None ☒ 14Other ☐

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm

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[illegible]

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☒ Other ☐

F. /Project Name

Page 1 of 2

Town of Warren TCE Investigation

License/Permit/Monitoring Number

Boring Number

Boring Drilled By: Name of crew chief (first, last) and Firm

Date Drilling Started

Date Drilling Completed

Drilling Method

First Name:

Last Name:

Firm: Trant Hydrotech11/14/200011/14/2000Sonic

WI Unique Well No.

DNR Well ID No.

Well Name

Final Static Water Level

Surface Elevation

Borehole Diameter

JS 428MW-8924 Feet MSL1012.1 Feet MSL7 inchesLocal Grid Origin ☐ (estimated: ☐) or Boring Location ☐State Plane SW 1/4 of SE 1/4 of Section 19, T 29 N, R 18 ELat 0 ' "

Local Grid Location

Long 0 ' "Feet ☐ N ☐ EFeet ☐ S ☐ W

Facility ID

County

St. Croix

County Code

56

Civil Town/City/ or Village

Town of Warren

Sample			Town of Warren												
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet (below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PIV/FID	Soil Properties					RQD/ Comments	
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200		
	5		5	Top soil Silty sand brown fine grain, trace clay				0.2							
	5		10	Sand + gravel, brown, coarse grain trace fines moist				1.1							
	8		15	↓ grades to a medium sand, lighter brown less gravel Dry				1.0							
	10		25	↓ As above				1.0							
	10		35	Sand medium grain, brown, gravel				1.7							
			40	grades to fine brown sand				2.7							
	10		45	↓ fine silty sand, brown				3.1							
			50	↓ more silt + trace clay				2.7							
			55	Sand, medium grain, brown, trace gravel Dry				3.1							
			60	As above with cobbles				2.7							
			65	Silty sand fine grain brown trace clay				2.7							

0925
49-50'

↓

0925, 10x
49-50' Dry

↓

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm

Cedar Corporation

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State of Wisconsin
Department of Natural ResourcesRoute to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☒ Underground Tanks ☐ Other ☐MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 4-90

Facility/Project Name <u>Town of Warm-TCE</u>	Local Grid Location of Well ft. <input type="checkbox"/> N <input type="checkbox"/> S ft. <input type="checkbox"/> E <input type="checkbox"/> W	Well Name <u>MW# 7</u>
Facility License, Permit or Monitoring Number	Grid Origin Location Lat. _____ Long. _____ or St. Plane _____ ft. N. _____ ft. E.	Wis. Unique Well Number <u>35427</u> DNR Well Number
Type of Well - Water Table Observation Well <input checked="" type="checkbox"/> 11 Piezometer <input type="checkbox"/> 12	Section Location of Waste/Source <u>SW 1/4 of SE 1/4 of Sec. 19 T. 29 N. R. 18 W.</u>	Date Well Installed <u>11/14/00</u> m m d d y y
Distance Well Is From Waste/Source Boundary <u>+600'</u> ft.	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input checked="" type="checkbox"/> Sidegradient d <input type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	Well Installed By: (Person's Name and Firm) <u>DK Logan, Mike A</u>
Is Well A Point of Enforcement Std. Application? <input type="checkbox"/> Yes <input type="checkbox"/> No		

A. Protective pipe, top elevation _____ ft. MSL	1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. Well casing, top elevation <u>978.78</u> ft. MSL	2. Protective cover pipe: a. Inside diameter: <u>6.0</u> in. b. Length: <u>6.0</u> ft. c. Material: Steel <input checked="" type="checkbox"/> 04 Other <input type="checkbox"/>
C. Land surface elevation <u>977.1</u> ft. MSL	d. Additional protection? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, describe: _____
D. Surface seal, bottom _____ ft. MSL or <u>4</u> ft.	3. Surface seal: Bentonite <input type="checkbox"/> 30 Concrete <input checked="" type="checkbox"/> 01 Other <input type="checkbox"/>
12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input type="checkbox"/> SM <input type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input type="checkbox"/> CH <input type="checkbox"/> Bedrock <input checked="" type="checkbox"/>	4. Material between well casing and protective pipe: Bentonite <input type="checkbox"/> 30 Annular space seal <input type="checkbox"/> Concrete <input checked="" type="checkbox"/>
13. Sieve analysis attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. Annular space seal: a. Granular Bentonite <input type="checkbox"/> 33 b. _____ Lbs/gal mud weight ... Bentonite-sand slurry <input type="checkbox"/> 35 c. _____ Lbs/gal mud weight ... Bentonite slurry <input checked="" type="checkbox"/> 31 d. _____ % Bentonite ... Bentonite-cement grout <input type="checkbox"/> 50 e. _____ Ft ³ volume added for any of the above
14. Drilling method used: Rotary <input type="checkbox"/> 50 Hollow Stem Auger <input type="checkbox"/> 41 <u>Sonic</u> Other <input checked="" type="checkbox"/>	f. How installed: Tremie <input type="checkbox"/> 01 Tremie pumped <input checked="" type="checkbox"/> 02 Gravity <input type="checkbox"/> 08
15. Drilling fluid used: Water <input checked="" type="checkbox"/> 02 Air <input type="checkbox"/> 01 Drilling Mud <input type="checkbox"/> 03 None <input type="checkbox"/> 99	6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 33 b. <input type="checkbox"/> 1/4 in. <input checked="" type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite pellets <input checked="" type="checkbox"/> 32 c. _____ Other <input type="checkbox"/>
Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7. Fine sand material: Manufacturer, product name & mesh size a. <u>Baker State</u> <u>20</u> b. Volume added _____ ft ³
Describe _____	8. Filter pack material: Manufacturer, product name and mesh size a. <u>Red Flint</u> <u>30</u> b. Volume added _____ ft ³
17. Source of water (attach analysis): <u>City of Hudson</u>	9. Well casing: Flush threaded PVC schedule 40 <input type="checkbox"/> 23 Flush threaded PVC schedule 80 <input checked="" type="checkbox"/> 24 Other <input type="checkbox"/>
E. Bentonite seal, top _____ ft. MSL or <u>36</u> ft.	10. Screen material: <u>PVC Sch 80</u> a. Screen type: Factory cut <input checked="" type="checkbox"/> 11 Continuous slot <input type="checkbox"/> 01 Other <input type="checkbox"/>
F. Fine sand, top _____ ft. MSL or <u>41</u> ft.	b. Manufacturer <u>Johnson</u> c. Slot size: <u>0.010</u> in. d. Slotted length: <u>20.0</u> ft.
G. Filter pack, top _____ ft. MSL or <u>43</u> ft.	11. Backfill material (below filter pack): None <input checked="" type="checkbox"/> 14 Other <input type="checkbox"/>
H. Screen joint, top _____ ft. MSL or <u>45</u> ft.	
I. Well bottom _____ ft. MSL or <u>65</u> ft.	
J. Filter pack, bottom _____ ft. MSL or <u>65</u> ft.	
K. Borehole, bottom _____ ft. MSL or <u>65</u> ft.	
L. Borehole, diameter <u>7.1</u> in.	
M. O.D. well casing <u>2 3/8</u> in.	
N. I.D. well casing <u>2.1</u> in.	

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm

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Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☒ Other ☐

Project Name: Town of Warren TCE Investigation License/Permit/Monitoring Number: B-7/MW-7

Boring Drilled By: Name of crew chief (first, last) and Firm
First Name: Trant Last Name: Hydrotech Date Drilling Started: 11/14/2000 Date Drilling Completed: 11/14/2000 Drilling Method: Sonic

WI Unique Well No.: JS427 DNR Well ID No.: MW-7 Final Static Water Level: 924 Feet MSL Surface Elevation: 977.1 Feet MSL Borehole Diameter: 7 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☐
State Plane SW 1/4 of SE 1/4 of Section 19, T 29 N, R 18 E Q Lat 0 ' 0 " Long 0 ' 0 " Local Grid Location SW 1/4 of SE 1/4 of Section 19, T 29 N, R 18 E Q Feet 0 S Feet 0 W

Facility ID: St. Croix County Code: 56 Civil Town/City/ or Village: Town of Warren

Sample		Blow Counts	Depth in Feet (below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments		
Number and Type	Length Att. & Recovered (in)								Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200			
	S		5	Top Soil Silty sand brown, fine grain, trace clay.				0.0								
	S		10	Sand medium grain, brown, gravel, Dry				0.5								
	10		15	↓ As above				1.5								
			20													
			25													
	10		30	Silty Sand fine grain, stiff, brown, moist				0								
	10		35	Sandstone, white, fine to medium grain, Dry, weathered				19								
			40													
	10		45	↓ As Above Some Iron Staining				22/5/6w							49.58' 1600s	
			50	Wet As above ↓												
			55													
	10		60						35/5/6w							

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: [Signature] Firm: Cedar Corporation

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Facility/Project Name <u>Town of Warren</u>	Local Grid Location of Well _____ ft. N. _____ ft. E. _____ ft. S. _____ ft. W.	Well Name <u>P#6</u>
Facility License, Permit or Monitoring Number _____	Grid Origin Location Lat. _____ Long. _____ or St. Plane _____ ft. N. _____ ft. E.	Wis. Unique Well Number DNR Well Num. <u>5450</u>
Type of Well - Water Table Observation Well <input type="checkbox"/> 11 Piezometer <input checked="" type="checkbox"/> 12	Section Location of Waste/Source <u>SE 1/4 of SE 1/4 of Sec. 19, T. 29 N, R. 18 E, W.</u>	Date Well Installed <u>6/20/01</u> m m d d y y
Distance Well Is From Waste/Source Boundary <u>Source</u> ft.	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input type="checkbox"/> Sidegradient d <input type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	Well Installed By: (Person's Name and Firm) <u>Robbie Terris</u> <u>Trout Wells</u>
Is Well A Point of Enforcement Std. Application? <input type="checkbox"/> Yes <input type="checkbox"/> No		

A. Protective pipe, top elevation <u>2</u> ft. MSL	1. Cap and lock? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. Well casing, top elevation <u>1031.25</u> ft. MSL	2. Protective cover pipe: a. Inside diameter: <u>6</u> in. b. Length: <u>2</u> ft. c. Material: Steel <input checked="" type="checkbox"/> 04 Other <input type="checkbox"/>
C. Land surface elevation <u>1029.1</u> ft. MSL	d. Additional protection? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, describe: _____
D. Surface seal, bottom _____ ft. MSL or _____ ft.	3. Surface seal: Bentonite <input checked="" type="checkbox"/> 30 Concrete <input type="checkbox"/> 01 Other <input type="checkbox"/>
12. USCS classification of soil near screen: GP <input type="checkbox"/> GM <input type="checkbox"/> GC <input type="checkbox"/> GW <input type="checkbox"/> SW <input type="checkbox"/> SP <input type="checkbox"/> SM <input type="checkbox"/> SC <input type="checkbox"/> ML <input type="checkbox"/> MH <input type="checkbox"/> CL <input type="checkbox"/> CH <input type="checkbox"/> Bedrock <input checked="" type="checkbox"/>	4. Material between well casing and protective pipe: Bentonite <input checked="" type="checkbox"/> 30 Annular space seal <input type="checkbox"/> Other <input type="checkbox"/>
13. Sieve analysis attached? <input type="checkbox"/> Yes <input type="checkbox"/> No	5. Annular space seal: a. Granular Bentonite <input type="checkbox"/> 33 b. _____ Lbs/gal mud weight ... Bentonite-sand slurry <input type="checkbox"/> 35 c. _____ Lbs/gal mud weight ... Bentonite slurry <input checked="" type="checkbox"/> d. <u>15</u> % Bentonite ... Bentonite-cement grout <input type="checkbox"/> 50 e. _____ Ft ³ volume added for any of the above f. How installed: Tremie <input type="checkbox"/> 01 Tremie pumped <input checked="" type="checkbox"/> 02 Gravity <input type="checkbox"/> 08
14. Drilling method used: Rotary <input checked="" type="checkbox"/> 50 Hollow Stem Auger <input type="checkbox"/> 41 Other <input type="checkbox"/>	6. Bentonite seal: a. Bentonite granules <input type="checkbox"/> 33 b. <input type="checkbox"/> 1/4 in. <input checked="" type="checkbox"/> 3/8 in. <input type="checkbox"/> 1/2 in. Bentonite pellets <input type="checkbox"/> 32 c. _____ Other <input type="checkbox"/>
15. Drilling fluid used: Water <input type="checkbox"/> 02 Air <input type="checkbox"/> 01 Drilling Mud <input checked="" type="checkbox"/> 03 None <input type="checkbox"/> 99	7. Fine sand material: Manufacturer, product name & mesh size a. <u>Red Flint</u> <u>30</u> b. Volume added <u>2</u> ft ³
16. Drilling additives used? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	8. Filter pack material: Manufacturer, product name and mesh size a. <u>Red Flint</u> <u>30</u> b. Volume added <u>13</u> ft ³
Describe _____	9. Well casing: Flush threaded PVC schedule 40 <input type="checkbox"/> 23 Flush threaded PVC schedule 80 <input checked="" type="checkbox"/> 24 Other <input type="checkbox"/>
17. Source of water (attach analysis): <u>City of Hudson</u>	10. Screen material: <u>PVC</u> a. Screen type: Factory cut <input checked="" type="checkbox"/> 11 Continuous slot <input type="checkbox"/> 01 Other <input type="checkbox"/>
E. Bentonite seal, top <u>123</u> ft. MSL or _____ ft.	b. Manufacturer _____ c. Slot size: <u>0.010</u> in. d. Slotted length: <u>5</u> ft.
F. Fine sand, top <u>128</u> ft. MSL or _____ ft.	11. Backfill material (below filter pack): None <input checked="" type="checkbox"/> 14 Other <input type="checkbox"/>
G. Filter pack, top <u>130</u> ft. MSL or _____ ft.	
H. Screen joint, top <u>135</u> ft. MSL or _____ ft.	
I. Well bottom <u>140</u> ft. MSL or _____ ft.	
J. Filter pack, bottom <u>143</u> ft. MSL or _____ ft.	
K. Borehole, bottom <u>143</u> ft. MSL or _____ ft.	
L. Borehole, diameter <u>6.34</u> in.	
M. O.D. well casing <u>2.46</u> in.	
N. I.D. well casing <u>1.87</u> in.	

I hereby certify that the information on this form is true and correct to the best of my knowledge.
Signature _____ Firm Trout Wells

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelopment ☒ Other ☐

Page 1 of 1

Facility/Project Name <u>Town of Warren TCE Investigation</u>		License/Permit/Monitoring Number _____		Boring Number <u>P-6</u>	
Boring Drilled By: Name of crew chief (first, last) and Firm First Name: <u>Kobbie</u> Last Name: <u>Terris</u> Firm: <u>Travt Hydrotech</u>		Date Drilling Started <u>06/20/2001</u> m m d d y y y y		Date Drilling Completed <u>06/20/2001</u> m m d d y y y y	
Drilling Method <u>Mud Rotary</u>		WT Unique Well No. <u>JS456</u>		BNR Well ID No. _____	
Well Name <u>P-6</u>		Final Static Water Level <u>924.3</u> Feet MSL		Surface Elevation <u>1029.1</u> Feet MSL	
Borehole Diameter <u>8</u> inches		Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/> State Plane _____ N, _____ E S/C/N		Local Grid Location _____ Feet <input type="checkbox"/> N _____ Feet <input type="checkbox"/> E _____ Feet <input type="checkbox"/> S _____ Feet <input type="checkbox"/> W	
SW 1/4 of SE 1/4 of Section <u>19</u> , T <u>29</u> N, R <u>18</u> E(W)		Lat _____ Long _____		Civil Town/City/ or Village <u>Town of Warren</u>	
Facility ID _____		County <u>St. Croix</u>		County Code <u>56</u>	

Sample		Blow Counts	Depth in Feet (Below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	
				Sand + Gravel, brown										
			20	clay										
			40	Sand + Gravel Brown										
			60	brn Clay										
			80											
			100	White Sandstone										
			120											
			140	Dolomite										
			160											
			180											
			200											
			220											
			240											

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature [Signature] Firm Cedar Corporation

State of Wisconsin
Department of Natural ResourcesRoute to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☒ Underground Tanks ☐ Other ☐MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 4-90

Facility/Project Name <u>Town of Waver - TCE</u>	Local Grid Location of Well ft. <u>15</u> N. <u>15</u> E. <u>15</u> W.	Well Name <u>MW #5</u>
Facility License, Permit or Monitoring Number	Grid Origin Location Lat. _____ Long. _____ or _____	Wis. Unique Well Number <u>35425</u> DNR Well Number
Type of Well: Water Table Observation Well <input checked="" type="checkbox"/> 11 Piezometer <input type="checkbox"/> 12	St. Plane _____ ft. N. _____ ft. E.	Date Well Installed <u>11/21/00</u> m m d d y y
Distance Well Is From Waste/Source Boundary <u>1000</u> ft.	Section Location of Waste/Source <u>NE 1/4 of SE 1/4 of Sec. 19 T. 29 N. R. 12 E. W.</u>	Well Installed By: (Person's Name and Firm) <u>Daryl Karsch</u>
Is Well A Point of Enforcement Std. Application? <input type="checkbox"/> Yes <input type="checkbox"/> No	Location of Well Relative to Waste/Source u <input type="checkbox"/> Upgradient s <input type="checkbox"/> Sidegradient d <input checked="" type="checkbox"/> Downgradient n <input type="checkbox"/> Not Known	<u>Loogan, Mike</u>

A. Protective pipe, top elevation _____ ft. MSL

B. Well casing, top elevation 998.56 ft. MSL

C. Land surface elevation 996.8 ft. MSL

D. Surface seal, bottom _____ ft. MSL or 4 ft.

12. USCS classification of soil near screen:

GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☒

13. Sieve analysis attached? ☐ Yes ☒ No14. Drilling method used: Rotary ☐ 50Hollow Stem Auger ☐ 41SonicOther ☒15. Drilling fluid used: Water ☒ 02 Air ☐ 01Drilling Mud ☐ 03 None ☐ 9916. Drilling additives used? ☐ Yes ☒ No

Describe _____

17. Source of water (attach analysis):

City of HudsonE. Bentonite seal, top _____ ft. MSL or 55 ft.F. Fine sand, top _____ ft. MSL or 60 ft.G. Filter pack, top _____ ft. MSL or 62 ft.H. Screen joint, top _____ ft. MSL or 64 ft.I. Well bottom _____ ft. MSL or 84.0 ft.J. Filter pack, bottom _____ ft. MSL or 84 ft.K. Borehole, bottom _____ ft. MSL or 84 ft.L. Borehole, diameter 7 in.M. O.D. well casing 2 3/4 in.N. I.D. well casing 2 in.1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:

a. Inside diameter: 6 in.b. Length: 6 ft.c. Material: Steel ☒ 04Other ☐d. Additional protection? ☐ Yes ☐ No

If yes, describe: _____

3. Surface seal: Bentonite ☐ 30Concrete ☒ 01Other ☐

4. Material between well casing and protective pipe:

Bentonite ☐ 30Annular space seal ☐Other ☒5. Annular space seal: a. Granular Bentonite ☐ 33b. _____ Lbs/gal mud weight ... Bentonite-sand slurry ☐ 35c. _____ Lbs/gal mud weight ... Bentonite slurry ☒ 31d. _____ % Bentonite ... Bentonite-cement grout ☐ 50e. _____ Ft³ volume added for any of the abovef. How installed: Tremie ☐ 01Tremie pumped ☒ 02Gravity ☐ 086. Bentonite seal: a. Bentonite granules ☐ 33b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite pellets ☒ 32c. _____ Other ☐

7. Fine sand material: Manufacturer, product name & mesh size

a. Baker State 70b. Volume added _____ ft³

8. Filter pack material: Manufacturer, product name and mesh size

a. Red 7 Int 30b. Volume added _____ ft³9. Well casing: Flush threaded PVC schedule 40 ☐ 23Flush threaded PVC schedule 80 ☒ 24Other ☐

10. Screen material:

a. Screen type: Factory cut ☒ 11Continuous slot ☐ 01Other ☐b. Manufacturer Johnsonc. Slot size: 0.0 in.d. Slotted length: 20.0 ft.11. Backfill material (below filter pack): None ☒ 14Other ☐

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature

Firm

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

[illegible]

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Revelpment ☒ Other ☐

Page 1 of 2

F. /Project Name Town of Warren TCE Investigation License/Permit/Monitoring Number B-5/MW-5

Boring Drilled By: Name of crew chief (first, last) and Firm
First Name: Trout Last Name: Hydrotech Date Drilling Started 11/21/2000 Date Drilling Completed 11/21/2000 Drilling Method Sonic

WI Unique Well No. 55425 DNR Well ID No. MW-5 Final Static Water Level 919.0 Feet MSL Surface Elevation 996.8 Feet MSL Borehole Diameter 7 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☐
State Plane N, E S/C/N Lat 0 ' " Long 0 ' " Local Grid Location ☐ N ☐ E ☐ S ☐ W

Facility ID NW 1/4 of SE 1/4 of Section 19, T 29 N, R 18 EW County St. Croix County Code 56 Civil Town/City/ or Village Town of Warren

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet (below ground surface)	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/VID	Soil Properties					RQD/ Comments
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	
5			5	Snow + Grass										
3			10	Silty sand, brown, trace clay and gravel				6						
10			15	Sand, brown, medium grain, poorly sorted dry gravel				0.2						
10			20	As above				1.3						
10			25	As above				1.5						
10			35	As above Less gravel + slightly fine grain				0.7						
5			45	As above				0.1						
0			55	No Recovery										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: [Signature] Firm: Cedar Corporation

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file his form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural ResourcesRoute for: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☒ Underground Tanks ☐ Other ☐MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 4-90

Facility/Project Name

Local Grid Location of Well

Well Name

Facility License, Permit or Monitoring Number

Grid Origin Location

Wis. Unique Well Number DNR Well Number

Type of Well: Water Table Observation Well ☐ II
Piezometer ☒Lat. _____ Long. _____ or
St. Plane _____ ft. N. _____ ft. E.

Date Well Installed

Distance Well Is From Waste/Source Boundary
5300'

Section Location of Waste/Source

Well Installed By: (Person's Name and Firm)

Is Well A Point of Enforcement Std. Application?
☐ Yes ☐ NoLocation of Well Relative to Waste/Source
u ☐ Upgradient s ☐ Sidegradient
d ☒ Downgradient n ☐ Not Known

A. Protective pipe, top elevation _____ ft. MSL

1. Cap and lock? ☒ Yes ☐ No

B. Well casing, top elevation 995.60 ft. MSL

2. Protective cover pipe:

C. Land surface elevation 994.1 ft. MSL

a. Inside diameter: 6. in.

D. Surface seal, bottom _____ ft. MSL or 4. ft.

b. Length: 6. ft.

c. Material: Steel ☒ 04Other ☐d. Additional protection? ☐ Yes ☐ No

If yes, describe: _____

12. USCS classification of soil near screen:

GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☒13. Sieve analysis attached? ☐ Yes ☒ No14. Drilling method used: Rotary ☐ 50Hollow Stem Auger ☐ 41Sonic ☒ Other ☐15. Drilling fluid used: Water ☒ 02 Air ☐ 01Drilling Mud ☐ 03 None ☐ 993. Surface seal: Bentonite ☐ 30Concrete ☒ 01Other ☐

4. Material between well casing and protective pipe:

Bentonite ☐ 30Annular space seal ☐Cement ☒5. Annular space seal: a. Granular Bentonite ☐ 33b. _____ Lbs/gal mud weight ... Bentonite-sand slurry ☐ 35c. _____ Lbs/gal mud weight ... Bentonite slurry ☒ 31d. _____ % Bentonite ... Bentonite-cement grout ☐ 50e. _____ Ft³ volume added for any of the abovef. How installed: Tremie ☐ 01Tremie pumped ☒ 02Gravity ☐ 086. Bentonite seal: a. Bentonite granules ☐ 33b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite pellets ☒ 32c. _____ Other ☐

7. Fine sand material: Manufacturer, product name & mesh size

a. Baker 100 ☒ 20b. Volume added _____ ft³

8. Filter pack material: Manufacturer, product name and mesh size

a. Red Flint ☒ 30b. Volume added _____ ft³9. Well casing: Flush threaded PVC schedule 40 ☐ 23Flush threaded PVC schedule 80 ☒ 24Other ☐

10. Screen material: PVC Sch 80

a. Screen type: Factory cut ☒ 11Continuous slot ☐ 01Other ☐

b. Manufacturer Johnson

c. Slot size: 0.010 in.

d. Slotted length: 5.5 ft.

11. Backfill material (below filter pack): None ☒ 14Other ☐

E. Bentonite seal, top _____ ft. MSL or 92. ft.

F. Fine sand, top _____ ft. MSL or 97. ft.

G. Filter pack, top _____ ft. MSL or 99. ft.

H. Screen joint, top _____ ft. MSL or 101. ft.

I. Well bottom _____ ft. MSL or 106. ft.

J. Filter pack, bottom _____ ft. MSL or 106. ft.

K. Borehole, bottom _____ ft. MSL or 106. ft.

L. Borehole, diameter 7. in.

M. O.D. well casing 2 3/4 in.

N. I.D. well casing 2. in.

I hereby certify that the information on this form is true and correct to the best of my knowledge.

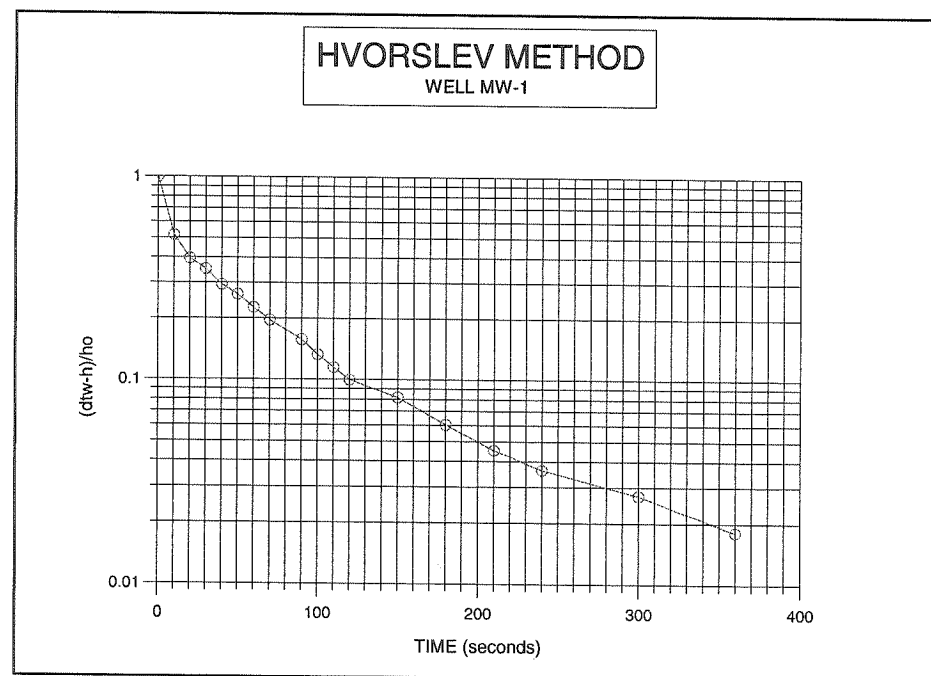
Signature

Firm

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

Hvorslev Drawdown Recovery Method to calculate Hydraulic Conductivity

				Submerged Screen Length (L) = 18.01	
				Static (h) = 96.99	
Time	(dtw-h)/ho	dtw	H= dtw-h		
seconds					
0	1.00	100.29	3.3	ho	Is L/R greater than 8?
10	0.52	98.7	1.71		L/R = 36.02
20	0.40	98.3	1.31		
30	0.35	98.15	1.16		If yes proceed.
40	0.29	97.96	0.97		
50	0.26	97.86	0.87		IF;
60	0.23	97.74	0.75		$K = (r*r * (\ln L/R)) / (2 * L * T0)$
70	0.20	97.64	0.65		AND;
90	0.16	97.51	0.52		r = 0.1667
100	0.13	97.43	0.44		R = 0.5
110	0.12	97.37	0.38		L = 18.01
120	0.10	97.32	0.33		T0= 25 from graph
150	0.08	97.26	0.27		THEN;
180	0.06	97.19	0.2		K = 1.11E-004 ft/sec
210	0.05	97.14	0.15		3.37E-003 cm/sec
240	0.04	97.11	0.12		
300	0.03	97.08	0.09		Select T0 from graph at right
360	0.02	97.05	0.06		by picking 0.37 on y axis and
					dropping perpendicular to graph
					then dropping to time line



Hvorslev Drawdown Recovery Method to calculate Hydraulic Conductivity

Submerged Screen Length (L) = 5			
Static (h) = 106.15			
Time seconds	(dtw-h)/ho	dtw	H= dtw-h
0	1.00	116.9	10.75
10	0.89	115.75	9.6
20	0.81	114.9	8.75
30	0.78	114.52	8.37
40	0.75	114.23	8.08
50	0.72	113.92	7.77
60	0.70	113.66	7.51
70	0.68	113.42	7.27
90	0.63	112.96	6.81
100	0.62	112.77	6.62
110	0.60	112.55	6.4
120	0.58	112.36	6.21
150	0.53	111.84	5.69
180	0.47	111.2	5.05
210	0.43	110.75	4.6
240	0.37	110.15	4
300	0.31	109.43	3.28
360	0.25	108.82	2.67

Is L/R greater than 8?
 $L/R = 7.499625$

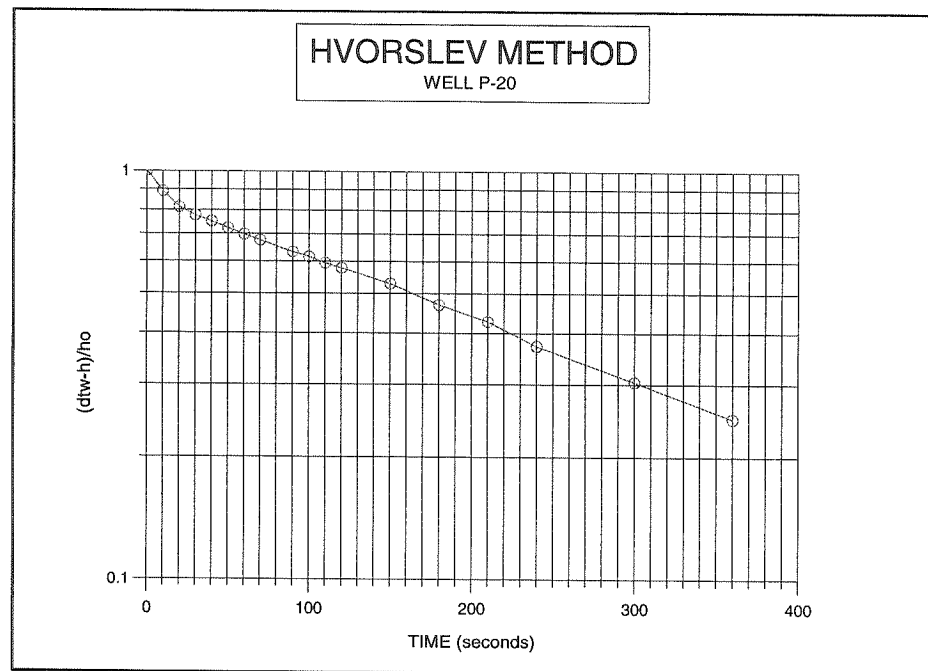
If yes proceed.

IF;
 $K = (r^*r * (\ln L/R)) / (2 * L * T_0)$

AND;
 $r = 0.333$
 $R = 0.6667$
 $L = 5$
 $T_0 = 240$ from graph

THEN;
 $K = 9.31E-005$ ft/sec
 $2.84E-003$ cm/sec

Select T0 from graph at right
 by picking 0.37 on y axis and
 dropping perpendicular to graph
 then dropping to time line



Hvorslev Drawdown Recovery Method to calculate Hydraulic Conductivity

Submerged Screen Length (L) = 14.49			
Static (h) = 104.01			
Time seconds	(dtw-h)/ho	dtw	H= dtw-h
0	1.00	108.7	4.69 ho
10	0.96	108.53	4.52
20	0.88	108.14	4.13
30	0.80	107.77	3.76
40	0.75	107.54	3.53
50	0.71	107.32	3.31
60	0.66	107.1	3.09
70	0.62	106.91	2.9
90	0.59	106.77	2.76
100	0.55	106.6	2.59
110	0.53	106.5	2.49
120	0.51	106.39	2.38
150	0.48	106.27	2.26
180	0.42	105.96	1.95
210	0.36	105.72	1.71
240	0.32	105.53	1.52
300	0.29	105.39	1.38
360	0.25	105.17	1.16

Is L/R greater than 8?
L/R = 28.98

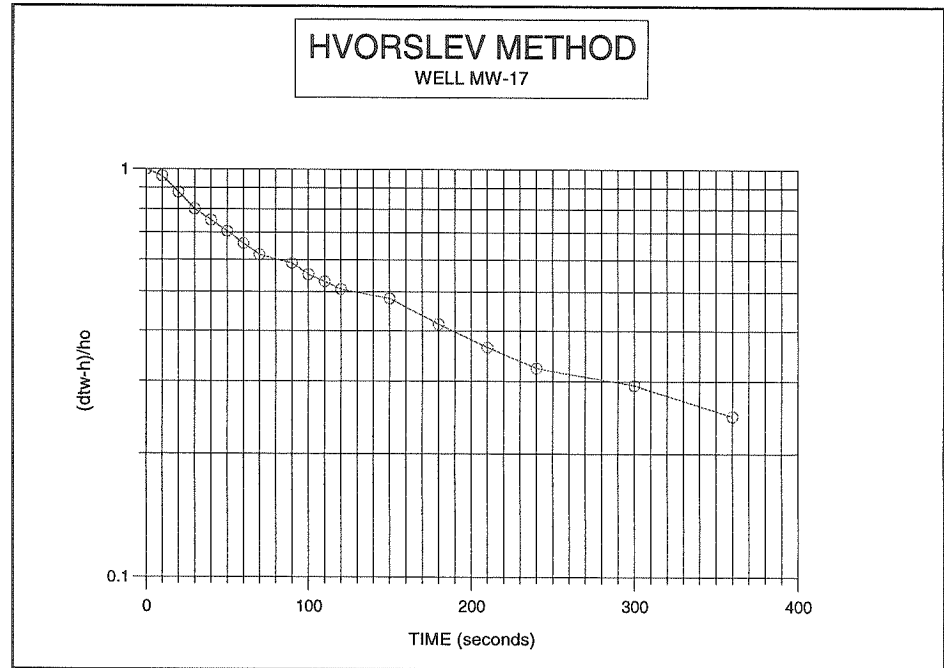
If yes proceed.

IF;
 $K = (r \cdot r \cdot (\ln L/R)) / (2 \cdot L \cdot T_0)$

AND;
r = 0.1677
R = 0.5
L = 14.49
T0 = 200 from graph

THEN;
K = 1.63E-005 ft/sec
4.98E-004 cm/sec

Select T0 from graph at right
by picking 0.37 on y axis and
dropping perpendicular to graph
then dropping to time line



Hvorslev Drawdown Recovery Method to calculate Hydraulic Conductivity

Submerged Screen Length (L) = 5			
Static (h) = 104.01			
Time seconds	(dtw-h)/ho	dtw	H= dtw-h
0	1.00	111.65	7.64 ho
10	0.93	111.11	7.1
20	0.74	109.7	5.69
30	0.65	108.94	4.93
40	0.57	108.4	4.39
50	0.51	107.9	3.89
60	0.46	107.53	3.52
70	0.42	107.21	3.2
90	0.38	106.9	2.89
100	0.34	106.63	2.62
110	0.31	106.39	2.38
120	0.27	106.11	2.1
150	0.25	105.93	1.92
180	0.18	105.41	1.4
210	0.14	105.08	1.07
240	0.09	104.7	0.69
300	0.06	104.49	0.48
360	0.03	104.23	0.22

Is L/R greater than 8?
L/R = 7.499625

If yes proceed.

IF;
 $K = (r*r * (\ln L/R)) / (2 * L * T0)$
AND;
r = 0.33
R = 0.6667
L = 5
T0= 90 from graph

THEN;
K = 2.44E-004 ft/sec
7.43E-003 cm/sec

Select T0 from graph at right
by picking 0.37 on y axis and
dropping perpendicular to graph
then dropping to time line

