

MEMORANDUM



TO: Tauren Beggs, WDNR

FROM: Mark McColloch, Shannon & Wilson

DATE: March 16, 2015

**RE: Status Report
WDNR BRRTS No. 02-36-544383
United Laundries and Dry Cleaners, Inc. 623 Reed Avenue, Manitowoc, Wisconsin**

Tauren,

Shannon & Wilson prepared this status reports to present results for soil gas samples collected on February 24th and groundwater samples collected on February 25th, 2015. These samples were collected in accordance with recommendation made in the Annual report for the First Year of Soil and Groundwater Remediation dated October 20, 2014 and subsequent discussions between WDNR and Shannon & Wilson. Historic groundwater samples are summarized in Table 1, and well locations are shown on the attached figure. Historic sub-floor soil gas sample results for probes at the Parkview Haven apartment building are summarized in Table 2, and soil gas sample from probes SGP-1, SGP-2, and SGP-3 are summarized in Table 3. Probe sample locations are also shown on the attached figure.

Groundwater monitoring results indicate that soil excavation and operation of the SVE system has resulted in an improvement in groundwater quality at wells MW-1, MW-2, MW-3, MW-4, MW-5, and MW-8. As shown in Table 1 PCE concentrations at these wells declined as follows:

- At MW-1 PCE declined from 72.7 µg/l in November 2013 to 30.7 µg/l in February to 20.3 µg/l in February 2015;
- At MW-2 PCE declined from 35.2 µg/l in November 2013 to 8.4 µg/l in February 2015;
- At MW-3 PCE declined from 8.4 µg/l in November 2013 to 7.1 µg/l in February 2015;
- At MW-4 PCE declined from 1.1 µg/l in November 2013 to non-detect in February 2015;
- At MW-5 PCE declined from 35.1 µg/l in November 2013 to 11.1 µg/l in February 2015, and
- At MW-8 PCE declined from 9.6 µg/l in November 2013 to 3.0 µg/l in February 2015.

PCE concentration at down gradient wells MW-6 and MW-7 increased slightly between November 2013 and February 2014 before declining in February 2015. As shown in Table 1 PCE concentrations at MW-6 and MW-7 declined as follows:

- At MW-6 PCE increased from 28.9 µg/l in November 2013 to 34.6 µg/l in February 2014 before declining to 22.7 µg/l in August 2014. PCE then increased to 36.3 µg/l in November 2014 before declining to 30.1 µg/l in February 2015, and
- At MW-7 PCE increased from 15.5 µg/l in November 2013 to 26.0 µg/l in February before declining to 10.3 µg/l in May 2014. PCE then increased to 21.4 µg/l in August and November 2014 and to 22.7 µg/l in February 2015.

Following removal of contaminant mass at the upgradient source area, PCE concentrations are expected to decline at down gradient wells. Additional samples will be collected in May and August 2015 to verify that PCE concentrations continue to decline at the source area and at downgradient wells.

In February 2015 Shannon & Wilson collected additional soil gas samples at the Parkview Haven property. The SVE system was shut off on January 7, 2015 and the sub-floor depressurization system was shut off on February 17th, one week prior to sample collection. Samples were collected at sub-floor vapor probes (VP-5, VP-6, and VP-7) and exterior soil gas probes (SGP-1, SGP-2 and SGP-3) concurrent with quarterly groundwater monitoring. Additionally, an indoor air sample was also collected from the apartment building basement.

The Vapor Risk Screening Levels (VRSL) for soil gas samples were calculated per Wisconsin Department of Natural Resources (WDNR) guidance. The Vapor Action Levels (VAL) for PCE is used to determine the VRSL; the VAL is divided by an attenuation factor (AF) to determine the VRSL¹. The VAL and AF used to calculate the VRSL were selected based on sample depth (i.e. sub-floor, shallow soil gas, and deep soil gas) and building size and use (i.e. commercial and residential) and are included in Tables 2 and 3.

As shown on Table 2 October 2012 and November 2013 soil gas samples collected at VP-5 and VP-7 exceeded the VRSL for PCE for residential use for residential/small commercial buildings size. PCE was detected at VP-6 at a low concentration below the VRSL. No VOCs were detected at VP-6 and VP-7 in February 2014. TCE exceeded the VRSL at VP-5 in February 2014, but PCE was detected at a low concentration below the VRSL. In February 2014 PCE was detected at VP-5, VP-6, and VP-7 at low concentrations below the VRSL. PCE and TCE were also detected in the indoor air sample at low concentrations below the VAL.

¹ *Quick Look-Up Table*, Wisconsin Department of Natural Resources, dated May 16, 2012.

As shown on Table 3 August 2012 soil gas samples collected at SGP-1, SGP-2, and SGP-3 exceeded the VRSL for PCE for residential use for residential/small commercial buildings size. PCE was detected at low concentrations below the VRSL in February 2015 samples collected from these probes.

Results for soil gas samples collected from sub-floor probes VP-5, VP-6, and VP-7 and exterior soil gas probes SGP-1, SGP-2, and SGP-3 indicate that the SSDS and SVE system has removed PCE in soil gas from beneath the basement and west end of the apartment building. No additional soil gas monitoring is recommended at this time. The sub-floor depressurization system was restarted following sample collection, but the SVE system will remain off.

Following collection of August groundwater samples, all soil gas and groundwater monitoring results will be presented in an annual report. That report will include recommendations for either continued monitoring, or case closure. Case closure with likely included continued operation the sub-floor depressurization systems as a continuing obligation. Additionally, all soil gas probes will be abandoned concurrent with the abandonment of all monitoring wells as a condition of closure.

Table 1
Historic Groundwater Sample Results
United Laundries and Dry Cleaners, Inc., 623 Reed Avenue, Manitowoc, Wisconsin

Sample Date / Analyte	Units	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	PAL	ES
<i>January 25, 2006</i>												
Tetrachloroethene (PCE)	µg/l	180	--	--	--	--	--	--	--	--	0.5	5
<i>March 19, 2010</i>												
Tetrachloroethene (PCE)	µg/l	120	41	17	--	--	--	--	--	--	0.5	5
1,1,1 Trichloroethane	µg/l	<1.8	<0.50>	<0.37>	--	--	--	--	--	--	40	200
<i>October 5, 2010</i>												
Tetrachloroethene (PCE)	µg/l	58.4	62.1	11.8(12.0)	5.2	41.1	--	--	--	--	0.5	5
Trichloroethene (TCE)	µg/l	0.67 J	<0.48	<0.48	<0.48	<0.48	--	--	--	--	0.5	5
1,1,1 Trichloroethane	µg/l	<0.90	1.7	<0.90	<0.90	<0.90	--	--	--	--	40	200
<i>April 27, 2011</i>												
Tetrachloroethene (PCE)	µg/l	87.4(83.1)	71.0	9.9	3.1	40.5	--	--	--	--	0.5	5
Trichloroethene (TCE)	µg/l	0.93 J	<0.48	<0.48	<0.48	<0.48	--	--	--	--	0.5	5
1,1,1 Trichloroethane	µg/l	<0.90	1.3	<0.90	<0.90	<0.90	--	--	--	--	40	200
<i>December 21, 2011</i>												
Tetrachloroethene (PCE)	µg/l	--	--	--	--	--	32.1(30.6)	23.9	--	--	0.5	5
Methylene Chloride	µg/l	--	--	--	--	--	0.46	<0.43	--	--	0.5	5
<i>November 14, 2012</i>												
Tetrachloroethene (PCE)	µg/l	--	--	--	--	--	--	--	13.6(14.2)	<0.45	0.5	5
<i>November 19, 2013</i>												
Tetrachloroethene (PCE)	µg/l	72.7	35.2	8.4	1.1	35.1(31.5)	28.9	15.5	9.6	<0.45	0.5	5
Trichloroethene (TCE)	µg/l	0.97 J	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	0.5	5
1,1,1 Trichloroethane	µg/l	0.59 J	0.59 J	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	40	200
<i>February 11, 2014</i>												
Tetrachloroethene (PCE)	µg/l	30.7(31.5)	36.7	--	<0.47	--	34.6	26.0	8.2	--	0.5	5
Trichloroethene (TCE)	µg/l	<0.36	<0.36	--	<0.36	--	<0.36	<0.36	<0.36	--	0.5	5
1,1,1 Trichloroethane	µg/l	<0.44	0.55 J	--	<0.44	--	<0.44	<0.44	<0.44	--	40	200
<i>May 14, 2014</i>												
Tetrachloroethene (PCE)	µg/l	27.0(27.3)	15.9	5.7	0.96	27.4	24.7	10.3	3.7	<0.45	0.5	5
<i>August 19, 2014</i>												
Tetrachloroethene (PCE)	µg/l	25.5	10.8	4.8	0.69 J	18.7(17.9)	22.7	21.4	2.1	<0.45	0.5	5
1,2-Dichlorobenzene	µg/l	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	<0.50	<0.50	<0.50	60	600
<i>November 25, 2014</i>												
Tetrachloroethene (PCE)	µg/l	19.5	9.2	6.8	<0.50	10.3	36.3	21.4(20.8)	3.5	<0.50	0.5	5
<i>February 25, 2015</i>												
Tetrachloroethene (PCE)	µg/l	20.3	8.4	7.1	<0.50	11.1	30.1/30.1	22.7	3.0			

PAL - Preventive Action Limit per Wisconsin Admin. Code sec. NR 141.10.

Concentrations exceeding the PAL are in italics.

ES - Enforcement Standard per Wisconsin Admin. Code sec. NR 141.10.

Concentrations exceeding the ES have been shaded.

< - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

Duplicate sample results are shown in parenthesis.

Table 2
Results for Subfloor Probes – Parkview Haven Apartment Building
United Laundries and Dry Cleaners, Inc., 623 Reed Avenue, Manitowoc, Wisconsin

Sample Location				VP-5	VP-5	VP-5	VP-5
Sample Date				Oct-12	Nov-13	Feb-14	Feb-15
Sample Depth (ft.)				< 1.0	< 1.0	< 1.0	< 1.0
Constituents	Vapor Risk Screening Level ⁽¹⁾	Vapor Action Level ⁽²⁾	Attenuation Factor ⁽³⁾	sub-slab basement	sub-slab basement	sub-slab basement	sub-slab basement
cis-1,2-Dichloroethene	--	NA	0.1	<7	<0.67	<0.67	<0.094
trans-1,2-Dichloroethene	--	NA	0.1	<7	<0.67	<0.67	<0.077
Tetrachloroethene (PCE)	62	6.2	0.1	1,310	689	1.61	5.2
Trichloroethene (TCE)	4	0.39	0.1	<7	<0.67	11.6	<0.062
Vinyl Chloride	6.5	0.65	0.1	<7	<0.67	<0.65	<0.069
Sample Location				VP-6	VP-6	VP-6	VP-6
Sample Date				Oct-12	Nov-13	Feb-14	Feb-15
Sample Depth (ft.)				< 1.0	< 1.0	< 1.0	< 1.0
Constituents	Vapor Risk Screening Level ⁽¹⁾	Vapor Action Level ⁽²⁾	Attenuation Factor ⁽³⁾	sub-slab hallway	sub-slab hallway	sub-slab hallway	sub-slab hallway
cis-1,2-Dichloroethene	--	NA	0.1	<0.90	<0.63	<0.67	<0.067
trans-1,2-Dichloroethene	--	NA	0.1	<0.90	<0.63	<0.67	<0.057
Tetrachloroethene (PCE)	62	6.2	0.1	31	6.2	<0.67	0.15
Trichloroethene (TCE)	4	0.39	0.1	<0.90	<0.63	<0.68	<0.046
Vinyl Chloride	6.5	0.65	0.1	<0.90	<0.63	<0.65	<0.05
Sample Location				VP-7	Dup-1/ VP-7	VP-7	VP-7
Sample Date				Oct-12	Nov-13	Feb-14	Feb-15
Sample Depth (ft.)				< 1.0	< 1.0	< 1.0	< 1.0
Constituents	Vapor Risk Screening Level ⁽¹⁾	Vapor Action Level ⁽²⁾	Attenuation Factor ⁽³⁾	sub-slab hallway	sub-slab hallway	sub-slab hallway	sub-slab hallway
cis-1,2-Dichloroethene	--	NA	0.1	<7	<7	<0.67	<0.069
trans-1,2-Dichloroethene	--	NA	0.1	<7	<7	<0.67	<0.057
Tetrachloroethene (PCE)	62	6.2	0.1	327	319	619	<0.67
Trichloroethene (TCE)	4	0.39	0.1	<7	<7	<0.67	<0.048
Vinyl Chloride	6.5	0.65	0.1	<7	<7	<0.67	<0.05
Sample Location				Basement	Basement	Basement	Basement
Sample Date				Oct-12	Nov-13	Feb-14	Feb-15
Sample Depth (ft.)				0	0	0	0
Constituents	Vapor Risk Screening Level ⁽¹⁾	Vapor Action Level ⁽²⁾	Attenuation Factor ⁽³⁾	--	--	--	PH Basement (Indoor Air)
cis-1,2-Dichloroethene	--	NA	0.1	--	--	--	<0.065
trans-1,2-Dichloroethene	--	NA	0.1	--	--	--	<0.055
Tetrachloroethene (PCE)	62	6.2	0.1	--	--	--	0.42
Trichloroethene (TCE)	4	0.39	0.1	--	--	--	0.031
Vinyl Chloride	6.5	0.65	0.1	--	--	--	<0.046

Notes:

- Vapor Risk Screening Level (VRSL)** = Vapor Action Level (VAL) ÷ Attenuation Factor (AF) per Wisconsin Department of Natural Resources Quick Look-Up Table, dated December 4, 2014.
 - Vapor Action Level (VAL)** for Residential Land Use per Wisconsin Department of Natural Resources Quick Look-Up Table, dated December 4, 2014.
 - Attenuation Factor (AF)** = 0.1 for sub-floor vapor for Residential/Small Commercial Buildings per Wisconsin Department of Natural Resources Quick Look-Up Table, dated December 4, 2014.
- Concentrations exceeding the VRSL are shaded.
 < Below reporting limit
 All units are reported in parts per billion by volume (ppbv)
 VP -Vapor Probe DUP-1 -Field duplicate

Table 3
Results for Soil Gas Probes – Parkview Haven Apartment Building
United Laundries and Dry Cleaners, Inc., 623 Reed Avenue, Manitowoc, Wisconsin

Sample Location				SGP-1	SGP-1	
Sample Date				Aug-12	Feb-15	
Sample Depth (ft.)				< 1.0	< 1.0	
Constituents	Vapor Risk Screening Level ⁽¹⁾	Vapor Action Level ⁽²⁾	Attenuation Factor ⁽³⁾	sub-slab basement	sub-slab basement	
cis-1,2-Dichloroethene	--	NA	0.1	<13.9	<0.065	
trans-1,2-Dichloroethene	--	NA	0.1	<13.9	<0.055	
Tetrachloroethene (PCE)	62	6.2	0.1	531	0.86	
Trichloroethene (TCE)	4	0.39	0.1	<13.9	<0.044	
Vinyl Chloride	6.5	0.65	0.1	<13.9	<0.046	
Sample Location				SGP-2	Dup-1	SGP-2
Sample Date				Aug-12	Feb-15	
Sample Depth (ft.)				< 1.0	< 1.0	
Constituents	Vapor Risk Screening Level ⁽¹⁾	Vapor Action Level ⁽²⁾	Attenuation Factor ⁽³⁾	sub-slab hallway	sub-slab hallway	
cis-1,2-Dichloroethene	--	NA	0.1	<13.9	<13.9	<0.065
trans-1,2-Dichloroethene	--	NA	0.1	<13.9	<13.9	<0.055
Tetrachloroethene (PCE)	62	6.2	0.1	3,290	2,610	1.5
Trichloroethene (TCE)	4	0.39	0.1	<13.9	<13.9	<0.044
Vinyl Chloride	6.5	0.65	0.1	<13.9	<13.9	<0.046
Sample Location				SGP-3	SGP-3	
Sample Date				Aug-12	Feb-15	
Sample Depth (ft.)				< 1.0	< 1.0	
Constituents	Vapor Risk Screening Level ⁽¹⁾	Vapor Action Level ⁽²⁾	Attenuation Factor ⁽³⁾	sub-slab hallway	sub-slab hallway	
cis-1,2-Dichloroethene	--	NA	0.1	<13.9	<0.065	
trans-1,2-Dichloroethene	--	NA	0.1	<13.9	<0.055	
Tetrachloroethene (PCE)	62	6.2	0.1	568	0.2 J	
Trichloroethene (TCE)	4	0.39	0.1	<13.9	<0.044	
Vinyl Chloride	6.5	0.65	0.1	<13.9	<0.046	

Notes:

- Vapor Risk Screening Level (VRSL)** = Vapor Action Level (VAL) ÷ Attenuation Factor (AF) per Wisconsin Department of Natural Resources Quick Look-Up Table, dated December 4, 2014.
- Vapor Action Level (VAL)** for Residential Land Use per Wisconsin Department of Natural Resources Quick Look-Up Table, dated December 4, 2014.
- Attenuation Factor (AF)** = 0.1 for sub-floor vapor for Residential/Small Commercial Buildings per Wisconsin Department of Natural Resources Quick Look-Up Table, dated December 4, 2014.

Concentrations exceeding the VRSL are shaded.

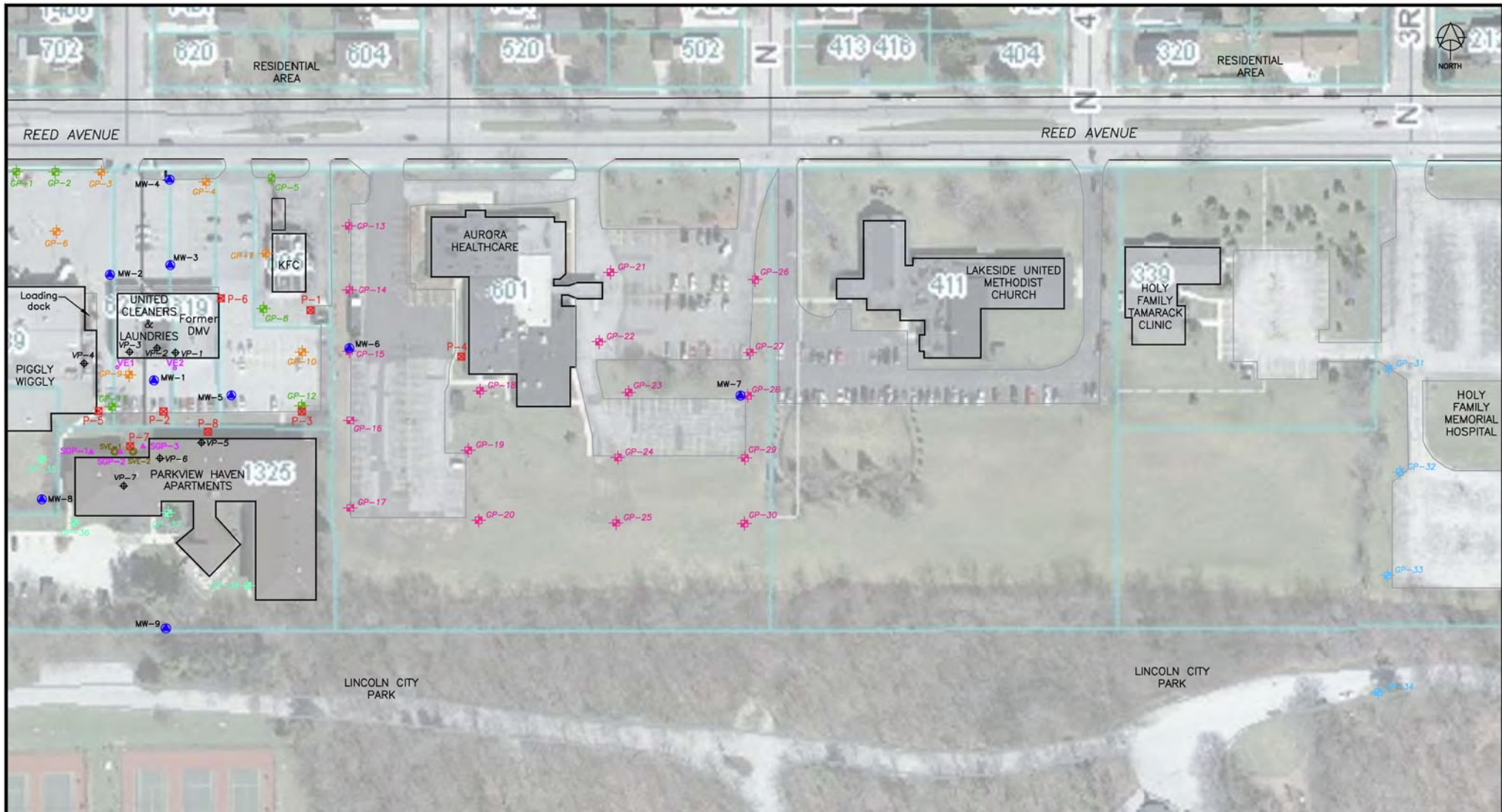
< Below reporting limit

J Estimated concentration at or above the LOD and below the LQD.

All units are reported in parts per billion by volume (ppbv)

SGP –Soil Gas Probe

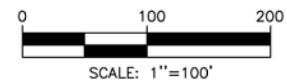
DUP-1 -Field duplicate



- LEGEND**
- VP-1 VAPOR PROBE LOCATION (VP-1 to VP-4 APRIL 2011) (VP-5 to VP-7 OCT 2012)
 - P-1 SOIL GAS SAMPLE POINT (DEC 2011, MARCH 2012)
 - SGP-1 SOIL GAS PROBE (AUG 2012)
 - SVE-1 SOIL VENT WELL (NOV 2012)
 - VE-1 SVE EXTRACTION POINT (2013)

- GP-1 SHALLOW GROUNDWATER BORING (APRIL 2011)
- GP-3 SHALLOW/DEEP GROUNDWATER NESTED BORING (APRIL 2011)
- GP-13 SHALLOW GROUNDWATER BORING (JULY 2011)
- GP-31 SHALLOW/DEEP GROUNDWATER BORING (MARCH 2012)
- GP-35 SHALLOW GROUNDWATER/SOIL GAS BORING (AUGUST 2012)

MW-1 MONITORING WELL



SOURCES:
 TERRACON, SITE DIAGRAM FOR PARKVIEW HAVEN APARTMENTS, DATED JANUARY 9, 2006.
 MANITOWOC COUNTY/CITY GIS, 2010 AERIAL PHOTOGRAPH.

UNITED DRY CLEANERS MANITOWOC, WISCONSIN	
FIGURE 2 HISTORICAL SAMPLE LOCATIONS (GROUNDWATER & SOIL GAS/VAPOR)	
<small>C:\PROJECTS\UNITED DRY CLEANERS\CAD\UDC-Site-2014.dwg [Figure 2 - Sample Lock]</small>	
<small>DRAWN BY: DDZ,DAN</small>	<small>DATE 10/3/2014</small>
<small>APPROVED BY: MSM</small>	<small>SHANNON&WILSON, INC.</small>