



Moraine Environmental, Inc.

Design • Engineer • Construct

April 8, 2013

Project Reference No. 5735

Jerry & Barb Kuehl
5350 Cascade Drive
West Bend, WI 53095

Dear Jerry & Barb:

COPY

**RE: Subsurface Investigation Report
Quality Cleaners
1228 11th Avenue
Grafton, Wisconsin 53024**

This report is to summarize the subsurface investigation work completed by Moraine Environmental, Inc. (Moraine) at the Quality Cleaners property in Grafton.

Dry Cleaning Solvent Tetrachloroethylene

The active dry cleaning solvent tetrachloroethylene is also identified as PCE and will be referred to as PCE in this letter report.

Site Investigation Requirements

The Wisconsin Department of Natural Resources (WDNR) requires that the following items be evaluated as part of the Site Investigation:

- Soil impacts
- Groundwater impacts in the soil and bedrock
- Underground utility lines, if present on the site. Contaminated groundwater or soil vapors can migrate along the sand or stone backfill around underground utility lines.
- Vapor migration into the on-site building. The PCE in the soil and groundwater can volatilize and enter the vapors (air) in the soil beneath the on-site building. These vapors can migrate into the building through pipelines entering the building, cracks in the building foundation and in other ways.

Investigation Activities

Moraine has completed the following subsurface investigative activities at the 1228 11th Avenue property:

- February 21, 2013. Drilled soil borings B-1, B-2 and B-3. Boring B-1 was inside the building near where the former dry cleaning machine was located. Borings B-2 and B-3 were outside to the east of the building.
- March 18, 2013. Drilled soil borings B-4 through B-10. Each of these borings was located inside the building.
- March 21, 2013. Installed groundwater monitoring wells MW-1 and MW-2 in the rear parking lot area. Both of these wells were drilled into the bedrock.
- Soil samples collected during drilling of the soil borings were submitted to the Pace Analytical laboratory (Pace) in Green Bay, Wisconsin for analysis. A groundwater sample was also collected from wells MW-1 and MW-2 and submitted to Pace for analysis.

Soil Quality Findings

The WDNR has established a maximum concentration of 4.5 parts-per-billion for PCE in the soil to protect groundwater quality. As rainfall infiltrates into the soil, it can dissolve compounds such as PCE and carry these contaminants down to the groundwater table. At that point, the PCE dissolves in the groundwater and is carried with the groundwater as it flows. For this reason, the WDNR has set the 4.5 parts-per-billion maximum standard for PCE in the soil.

A second soil quality standard has been established by the WDNR to protect against direct human contact with contaminated soil. This standard applies only to the upper four feet of soil at a site. This standard for PCE is 30,700 parts-per-billion. This regulation means that a barrier, such as a concrete or asphalt surface or an existing building, must be in-place over any soils having PCE in concentrations greater than 30,700 parts-per-billion. This WDNR regulation is due to the concern about adults and children possibly eating the contaminated soil or breathing contaminated vapors or particulates from the impacted soil.

For most sites, all of the soil and groundwater contamination is not cleaned up prior to the WDNR closing the case and issuing a Case Closure letter. Usually, this is due to the high costs of cleaning up the impacted soil or groundwater to the WDNR cleanup standards. The WDNR recognizes the high cost of a complete cleanup and routinely closes cases with some residual soil or groundwater contamination. Properties closed by the WDNR with residual soil or groundwater contamination are listed by the WDNR on a database on the Internet known as the Geographic Information System registry. Information

about the type of contaminant and the extent of the contamination are provided on the site listing on the Internet.

The PCE levels in the soil samples analyzed from your property are summarized on Tables 1a and 1b in **Attachment A**. The PCE concentrations are also shown on the site plan provided in **Attachment B**. There was no detect for PCE at soil boring B-2, located outside the building to the immediate east. The remaining soil samples all had detects for PCE ranging from 63 parts-per-billion at boring B-3 to a high of 68,700 parts-per-billion at boring B-1. These concentrations exceed the groundwater protection standard of 4.5 parts-per-billion for PCE in the soil. PCE concentrations in the soil greater than 1,000 to 2,000 parts-per-billion are high and present potential vapor release issues as well as soil and groundwater protection concerns.

As part of the site investigation, the WDNR requires that the horizontal and vertical extent of both soil and groundwater contamination be defined. Based on the soil sample analysis completed to date, the lateral extent of the PCE in the shallow soil at the Quality Cleaners site has not been defined.

Groundwater Quality Findings

The WDNR has established two groundwater quality standards for PCE. These standards are 5 parts-per-billion and 0.5 parts-per-billion. The standard we are most concerned about is the 5 parts-per-billion concentration.

The PCE concentration at monitoring well MW-2 is 896 parts-per-billion and the PCE concentration at well MW-1 is 32.9 parts-per-billion. Both of these concentrations are greater than the 5 parts-per-billion groundwater quality standard. The PCE concentrations are summarized on Table 2 in **Attachment C**.

Based on the groundwater analysis completed to date, the lateral extent of the PCE in the groundwater at the Quality Cleaners site has not been defined.

Recommendations for Completing the Soil and Groundwater Investigation

To move our project toward a complete site investigation and case closure by the WDNR, Moraine recommends the following:

Soil Investigation

As stated earlier in this letter, the lateral extent of the PCE in the soil in concentrations greater than 4.5 parts-per-billion is required to be defined by the WDNR. To define the extent of the PCE in the soil, we recommend that 9 additional shallow soil borings be drilled. One or two soil samples will be collected from each boring and analyzed at the Pace laboratory for PCE. The locations of these soil borings are shown on the site plan provided in

Attachment D. Seven of the proposed soil borings are located along the north, west and south property lines of your site. Two of the soil borings are located in the parking lot area on the east (rear) side of the property. We are placing the majority of the borings along your property lines, as we need to have PCE concentrations less than the 4.5 parts-per-billion standard in these soil samples to successfully define the lateral extent of the PCE-impacted soils.

The estimated cost for drilling these soil borings and the laboratory costs is \$5,500.00.

Groundwater Investigation

We expect the horizontal groundwater flow direction at your property is from west to east toward the Milwaukee River. Similar to the soil impacts, we are required to define the lateral extent of the impacted groundwater. To minimize the costs for the groundwater investigation, we would like to continue this investigation in stages. At this time, we propose to install two additional groundwater monitoring wells. One well would be installed along the sidewalk along 11th Avenue in front of your building. As the groundwater flow is from west to east across your property, this well would be upgradient of the source of the PCE which is inside your building. The second down gradient monitoring well would be placed either along your east property line, on the neighboring property to the east or along 12th Avenue. Analysis of groundwater samples from these two wells will indicate whether or not the impacted groundwater has migrated to the west beneath 11th Avenue or further to the east of your property.

The estimated cost for drilling these two monitoring wells and the laboratory analytical costs is \$4,200.00.

Vapor Migration into the Building

As discussed earlier, the WDNR requires an investigation to determine if the impacted vapors are possibly migrating into the breathing space inside your building. PCE is a highly volatile chemical and presents a significant health risk if inhaled.

The depth to bedrock beneath your building is from 4 feet to approximately 6.5 feet below ground surface. During construction of the building, it is likely that the footings around the perimeter of the building extended down to the bedrock surface. With this construction, the contaminated soils beneath your building are contained in a "box", with the top of the bedrock surface being the bottom of the box, the footings around the perimeter of the building being the walls of the box and the concrete floor of the building being the top of the box.

To address the vapor migration issue, we have the following two approaches:

- Remove a small portion of the highly contaminated soils beneath the former dry cleaning machine area within your building.
- Install a vapor extraction system beneath your building to collect the PCE vapors before they can enter the building.

Excavation of all of the contaminated soils from beneath your building would be very costly and require significant disruption to the building and its operations. For these reasons, the soil removal and landfill disposal option is likely not financially or operationally feasible.

The installation of an active soil vapor extraction system appears to be the more feasible option to address the vapor migration issue at your site. The vapor extraction system removes soil vapors from the subsurface and discharges them to the atmosphere. The containment of the impacted soils in the above-described "box" beneath your building will improve the efficiency of a vapor extraction system. There generally is no treatment (i.e. reduction in the concentration of the PCE in the air) of the PCE in the air to be discharged, although this is possible if necessary. The installation and operation of a vapor extraction system would also be an advantage for your property if you decided to sell at some point as the new owner could operate without disruption once the vapor extraction system is installed and concrete is placed over the extraction system trenches in the floor.

The design of a vapor extraction system would require that we collect several soil vapor samples for laboratory analysis to determine the PCE concentrations in the air beneath your building. We would also conduct a test to determine the air flow rate to be expected during the actual vapor extraction system operation. This information would be used to select the vapor extraction system components and to be sure that the emissions from the system are in compliance with WDNR air emission regulations.

A conceptual cost estimate for a vapor extraction system for your building is from \$30,000.00 to \$35,000.00. There would also be ongoing operating costs including electricity and vapor extraction system monitoring and maintenance.

Drycleaner Environmental Response Fund

As we have discussed, the WDNR's Drycleaner Environmental Response Fund (DERF) has been closed to new applicants since August of 2008. Moraine will assist you in applying for acceptance into the DERF based on the lack of notification provided to you by the WDNR concerning access to the fund prior to 2008. In addition to the costs for soil boring advancement, monitoring well installation and soil vapor extraction system installation discussed above, there

will be additional engineering costs for preparation of the Site Investigation and Remedial Action Reports, ongoing groundwater monitoring and regulatory liaison.

Summary and Closing

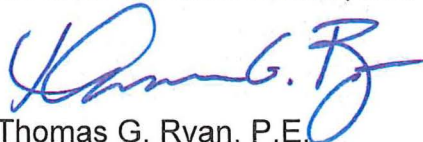
Moraine recommends that the following activities be completed at this time:

- Drill the 9 shallow soil borings to determine the lateral extent of the soil impacted with PCE.
- Install two additional groundwater monitoring wells. Analyze groundwater samples from the total of four monitoring wells to further evaluate the groundwater quality and the extent of the groundwater impacts.
- Collect two soil vapor samples from beneath the building for analysis for PCE to obtain design data for the full-scale vapor extraction system.

We will evaluate site conditions after the analysis of this soil and groundwater data and determine the most economical way to proceed toward completing the Site Investigation and moving toward site closure.

We look forward to discussing the Site Investigation activities with you during our meeting in the near future. If you have any immediate questions, please call our office at 377-9060. Thanks.

Sincerely,
Moraine Environmental, Inc.



Thomas G. Ryan, P.E.
Senior Project Engineer



Thomas C. Sweet
President

Attachment A

Soil Quality Summary Tables

Table 1a

Soil Quality Results for Tetrachloroethylene

The Residual Contaminant Level (RCL) concentration in soil for the groundwater protection pathway for Tetrachloroethylene for commercial properties is 4.5 micrograms per liter (ug/l). The groundwater pathway RCL concentrations are used to define the extent of soil impacts for listing on the WDNR's Geographic Information System registry.

<u>Soil Boring No.</u>	<u>Sample Date</u>	<u>Sample Depth</u>	<u>Tetrachloroethylene Concentration (ug/l)</u>
B-1	February 21, 2013	2 feet	68,700
B-2	February 21, 2013	6 feet	<25.0
B-3	February 21, 2013	5 feet	63.0 J
B-4	March 18, 2013	3 to 4 feet	5,070
B-4	March 18, 2013	6 feet	11,400
B-5	March 18, 2013	8 inches	7,240
B-6	March 18, 2013	1 foot	17,900
B-6	March 18, 2013	5 feet	4,420
B-7	March 18, 2013	2 feet	6,410
B-7	March 18, 2013	4 feet	717
B-8	March 18, 2013	4 feet	9,020
B-9	March 18, 2013	1 foot	28,300
B-9	March 18, 2013	5 feet	18,300
B-10	March 18, 2013	3 feet	1,090
B-10	March 18, 2013	5 feet	4,250

The "J" Flag means the estimated contaminant concentration is above the adjusted method detection limit and below the adjusted reporting limit.

Table 1b

Soil Quality Results for Tetrachloroethylene

The Residual Contaminant Level (RCL) concentration in soil for the direct contact pathway for Tetrachloroethylene for commercial properties is 30,700 ug/l. The direct contact pathway RCL concentrations are used to define the extent of the Quality Cleaners property which requires an engineered barrier to prevent direct human contact with the impacted soils.

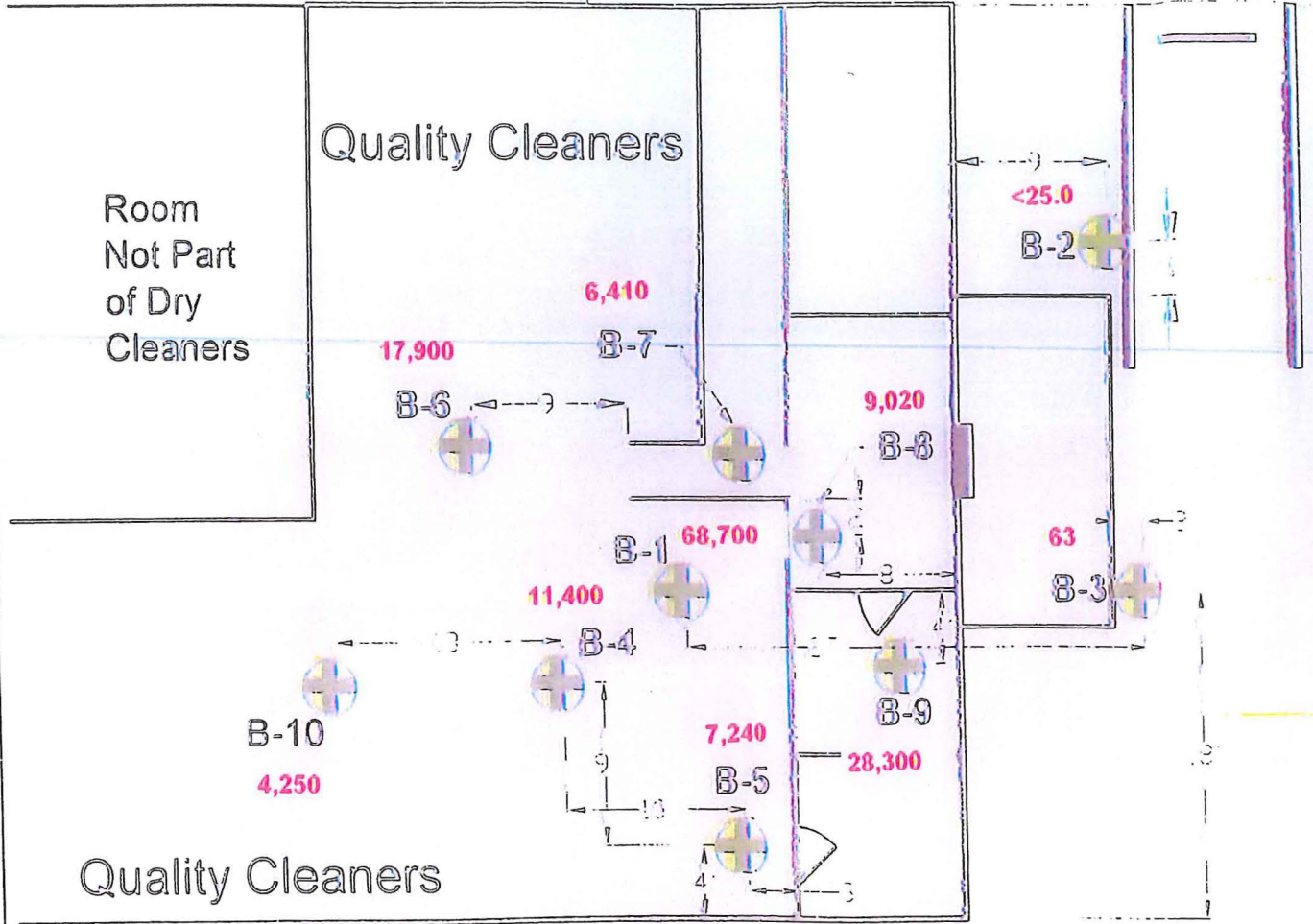
Soil Boring No.	Sample Date	Sample Depth	Tetrachloroethylene Concentration (ug/l)
B-1	February 21, 2013	2 feet	68,700
B-4	March 18, 2013	3 to 4 feet	5,070
B-6	March 18, 2013	1 foot	17,900
B-7	March 18, 2013	2 feet	6,410
B-7	March 18, 2013	4 feet	717
B-8	March 18, 2013	4 feet	9,020
B-9	March 18, 2013	1 foot	28,300
B-10	March 18, 2013	3 feet	1,090

Attachment B

Site Figure Showing PCE Concentrations in the Soil

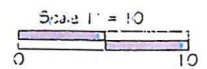
Adjacent Building

Asphalt Parking Lot



Concrete Parking Lot

11,400 = PCE Concentration in the Soil in parts-per-billion



Scale 1" = 10'
Revised by CT5
Revised 3-22-13
Project File Number 17,3735 A-1-1-1-1-1
Notes: Data on generated for field

FIGURE 3
Geoprobe Location Data

QUALITY CLEANERS
1226 11TH AVENUE
GRAFTON, WISCONSIN



Attachment C

Groundwater Quality Summary Table

Table 2
Groundwater Quality Results - VOC's

Quality Cleaners
1226-1228 11th Avenue
Grafton, Wisconsin

Sample ID	Date Sampled	Benzene	Bromo benzene	Bromo chloro methane	Bromodi chloro methane	Bromoform	Bromo methane	n- Butylbenzene	sec- Butylbenzene	tert- Butylbenzene	Carbon tetrachloride
MW-1	03/25/13	<0.41	<0.82	<0.97	<0.56	<0.94	<0.91	<0.93	<0.83	<0.97	<0.49
MW-2	03/25/13	<8.2	<16.4	<19.4	<11.2	<18.8	<18.2	<18.6	<17.8	<19.4	<9.8
NR 140 Enforcement Standard		5	NSE	NSE	0.6	4.4	10	NSE	NSE	NSE	5
<i>NR 140 Preventive Action Limit</i>		<i>0.5</i>	<i>NSE</i>	<i>NSE</i>	<i>0.06</i>	<i>0.44</i>	<i>1</i>	<i>NSE</i>	<i>NSE</i>	<i>NSE</i>	<i>0.5</i>
<p>J - The analyte has been detected between the Limit of Detection and the Limit of Quantitation and the results are estimated.</p> <p>NSE = No Standard Established</p> <p>Results in Italics are greater than NR 140 Preventive Action Limit Concentrations</p> <p>Results in Bold are greater than NR 140 Enforcement Standard Concentrations</p> <p>Results expressed in units of micrograms per liter (ug/l)</p>											

Table 2
Groundwater Quality Results - VOC's

Quality Cleaners
1226-1228 11th Avenue
Grafton, Wisconsin

Sample ID	Date Sampled	Chloro benzene	Chloroethane	Chloroform	Chloro methane	2-Chlorotoluene	4-Chlorotoluene	1,2-Dibromo-3-chloropropane	Dibromo chloro methane	1,2-Dibromethane (EDB)	Dibromo methane
MW-1	03/25/13	<0.41	<0.97	<1.3	<0.24	<0.85	<0.74	<1.7	<0.81	<0.56	<0.60
MW-2	03/25/13	<8.2	<19.4	<26.0	<4.8	<17.0	<14.8	<33.6	<16.2	<11.2	<12.0
NR 140 Enforcement Standard		NSE	400	6	3	NSE	NSE	0.2	60	0.05	NSE
<i>NR 140 Preventive Action Limit</i>		<i>NSE</i>	<i>80</i>	<i>0.6</i>	<i>0.3</i>	<i>NSE</i>	<i>NSE</i>	<i>0.02</i>	<i>6</i>	<i>0.005</i>	<i>NSE</i>
<p>J - The analyte has been detected between the Limit of Detection and the Limit of Quantitation and the results are estimated.</p> <p>NSE = No Standard Established</p> <p>Results in <i>Italics</i> are greater than NR 140 Preventive Action Limit Concentrations</p> <p>Results in Bold are greater than NR 140 Enforcement Standard Concentrations</p> <p>Results expressed in units of micrograms per liter (ug/l)</p>											

Table 2
Groundwater Quality Results - VOC's

Quality Cleaners
1226-1228 11th Avenue
Grafton, Wisconsin

Sample ID	Date Sampled	1,2-Dichloro benzene	1,3-Dichloro benzene	1,4-Dichloro benzene	Dichloro difluoro methane	1,1-Dichloro ethane	1,2-Dichloro ethane	1,1-Dichloro ethene	cis-1, 2 Dichloro-ethene	trans-1, 2 Dichloro-ethene	1,2-Dichloro propane
MW-1	03/25/13	<0.83	<0.87	<0.95	<0.99	<0.75	<0.36	<0.57	<0.83	<0.89	<0.49
MW-2	03/25/13	<16.6	<17.4	<19.0	<19.8	<15.0	<7.2	<11.4	<16.6	<17.8	<9.8
NR 140 Enforcement Standard		600	1,250	75	1,000	850	5	7	70	100	5
<i>NR 140 Preventive Action Limit</i>		<i>60</i>	<i>125</i>	<i>15</i>	<i>200</i>	<i>85</i>	<i>0.5</i>	<i>0.7</i>	<i>7</i>	<i>20</i>	<i>1</i>
<p>J - The analyte has been detected between the Limit of Detection and the Limit of Quantitation and the results are estimated.</p> <p>NSE = No Standard Established</p> <p>Results in Italics are greater than NR 140 Preventive Action Limit Concentrations</p> <p>Results in Bold are greater than NR 140 Enforcement Standard Concentrations</p> <p>Results expressed in units of micrograms per liter (ug/l)</p>											

Table 2
Groundwater Quality Results - VOC's

Quality Cleaners
1226-1228 11th Avenue
Grafton, Wisconsin

Sample ID	Date Sampled	1,3-Dichloro propene	2,2-Dichloro propane	1,1-Dichloro propene	cis-1,3-Dichloro propene	trans-1,3-Dichloro propene	Diisopropyl ether	Ethyl benzene	Hexachloro-1,3-butadiene	Isopropyl benzene (Cumene)
MW-1	03/25/13	<0.61	<0.62	<0.75	<0.20	<0.19	<0.76	<0.54	<0.67	<0.59
MW-2	03/25/13	<12.2	<12.4	<15.0	<4.0	<3.8	<15.2	<10.8	<13.4	<11.8
NR 140 Enforcement Standard		0.2	NSE	NSE	0.2	NSE	NSE	700	NSE	NSE
<i>NR 140 Preventive Action Limit</i>		<i>0.02</i>	<i>NSE</i>	<i>NSE</i>	<i>0.02</i>	<i>NSE</i>	<i>NSE</i>	<i>140</i>	<i>NSE</i>	<i>NSE</i>
		<p>J - The analyte has been detected between the Limit of Detection and the Limit of Quantitation and the results are estimated.</p> <p>NSE = No Standard Established</p> <p>Results in Italics are greater than NR 140 Preventive Action Limit Concentrations</p> <p>Results in Bold are greater than NR 140 Enforcement Standard Concentrations</p> <p>Results expressed in units of micrograms per liter (ug/l)</p>								

Table 2
Groundwater Quality Results - VOC's

Quality Cleaners
1226-1228 11th Avenue
Grafton, Wisconsin

Sample ID	Date Sampled	p-Isopropyl toluene	Methylene Chloride	Methyl-tert-butyl ether	Naphthalene	n-Propyl benzene	Styrene	1,1,1,2-Tetrachloro ethane	1,1,2,2-Tetrachloro ethane	Tetrachloro ethene
MW-1	03/25/13	<0.67	<0.43	<0.61	<0.89	<0.81	<0.86	<0.92	<0.20	32.9
MW-2	03/25/13	<13.4	<8.6	<12.2	<17.8	<16.2	<17.2	<18.4	<4.0	89.7
NR 140 Enforcement Standard		NSE	5	60	100	NSE	100	70	0.2	5
<i>NR 140 Preventive Action Limit</i>		<i>NSE</i>	<i>0.5</i>	<i>12</i>	<i>10</i>	<i>NSE</i>	<i>10</i>	<i>7</i>	<i>0.02</i>	<i>0.5</i>
		<p>J - The analyte has been detected between the Limit of Detection and the Limit of Quantitation and the results are estimated.</p> <p>NSE = No Standard Established</p> <p>Results in Italics are greater than NR 140 Preventive Action Limit Concentrations</p> <p>Results in Bold are greater than NR 140 Enforcement Standard Concentrations</p> <p>Results expressed in units of micrograms per liter (ug/l)</p>								

Table 2
Groundwater Quality Results - VOC's

Quality Cleaners
1226-1228 11th Avenue
Grafton, Wisconsin

Sample ID	Date Sampled	Toluene	1,2,3-Trichloro benzene	1,2,4-Trichloro benzene	1,1,1-Trichloro ethane	1,1,2-Trichloro ethane	Trichloro ethene	Trichloro fluoro methane	1,2,3-Trichloro propane
MW-1	03/25/13	0.67 J	<0.74	<0.97	<0.90	<0.42	<0.48	<0.79	<0.99
MW-2	03/25/13	<13.4	<14.8	<19.4	<18.0	<8.4	<9.6	<15.8	<19.8
NR 140 Enforcement Standard		1,000	NSE	70	200	5	5	NSE	60
<i>NR 140 Preventive Action Limit</i>		<i>200</i>	<i>NSE</i>	<i>14</i>	<i>40</i>	<i>0.5</i>	<i>0.5</i>	<i>NSE</i>	<i>12</i>
		<p>J - The analyte has been detected between the Limit of Detection and the Limit of Quantitation and the results are estimated.</p> <p>NSE = No Standard Established</p> <p>Results in Italics are greater than NR 140 Preventive Action Limit Concentrations</p> <p>Results in Bold are greater than NR 140 Enforcement Standard Concentrations</p> <p>Results expressed in units of micrograms per liter (ug/l)</p>							

Table 2
Groundwater Quality Results - VOC's

Quality Cleaners
1226-1228 11th Avenue
Grafton, Wisconsin

Sample ID	Date Sampled	1,2,4-Trimethyl benzene	1,3,5-Trimethyl benzene	Vinyl chloride	Total Xylenes
MW-1	03/25/13	<0.97	<0.83	<0.18	<2.63
MW-2	03/25/13	<19.4	<16.6	<3.6	<36.0
NR 140 Enforcement Standard		480		0.2	10,000
<i>NR 140 Preventive Action Limit</i>		<i>96</i>		<i>0.02</i>	<i>1,000</i>
<p>J - The analyte has been detected between the Limit of Detection and the Limit of Quantitation and the results are estimated. NSE = No Standard Established Results in <i>Italics</i> are greater than NR 140 Preventive Action Limit Concentrations Results in Bold are greater than NR 140 Enforcement Standard Concentrations Results expressed in units of micrograms per liter (ug/l)</p>					