THE SIGMA GROUP
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July 10, 2023

Mr. Chris and Ms. Kerri Feavel
206 E. Church Street
Oakfield, WI 53065

SUBJECT: Vapor and Sump Water Sampling Results – 206 E. Church St., Oakfield, WI
Contaminant Detected **Below** DNR Screening Level

Dear Mr. Chris and Ms. Kerri Feavel,

Included are the findings of a recent investigation on your property by The Sigma Group, Inc. on behalf of the Wisconsin Department of Natural Resources (DNR).

As you are aware, this investigation was conducted because of the potential for contaminant vapors from the nearby Oakfield Properties/201 N. Main Street property to migrate through soils, accumulate beneath the foundation of your home, and possibly enter your indoor air. The contaminant of concern at the Oakfield Properties/201 N. Main Street property is trichloroethene commonly referred to as TCE. The history of this site and the potential concerns to neighboring residents were described in detail in the WDNR's original letter to you, dated April 24, 2023.

Your Test Results
On June 12, 2023, The Sigma Group, Inc. installed one sampling device into the floor of your basement and collected a soil vapor sample. Indoor air samples were also collected from the basement and first floor of your home as well as from within the headspace of the sump within the basement level of the home. The samples were collected on June 23, 2023 and submitted to the Beacon Environmental laboratory, where they underwent laboratory analysis for perchloroethylene (PCE), TCE, cis-1,2-dichloroethylene (cis-1,2-DCE), trans-1,2-dichloroethylene (cis-1,2-DCE) and vinyl chloride (VC).

In addition, a grab sample of the water within the basement sump was collected on June 12, 2023 and submitted for laboratory analysis of PCE, TCE, cis-1,2-DCE, trans-1,2-DCE and VC. The grab sump water sample was submitted to Synergy Environmental Laboratory.

The results show small amounts of TCE and cis-1,2-DCE detected in the sample collected from beneath your foundation. Although TCE and cis-1,2-DCE were detected in soil vapors beneath your basement, the level at which they were detected does not pose a threat to you or your family. This is called "a detection below screening level" and is explained within the enclosed within factsheet, *Understanding Chemical Vapor Intrusion Test Results* for more information.

The analysis detected TCE beneath your foundation at 9.51 micrograms per cubic meter (µg/m^3), which is less than 25 percent of the DNR screening level for vapor samples collected beneath the foundation of 70 µg/m^3. The analysis detected cis-1,2-DCE beneath your foundation at 11.2 µg/m^3 and the DNR screening level for vapor samples collected beneath the foundation is 1,400 µg/m^3.

The indoor air samples collected from your basement and first floor of your home, the sump headspace sample collected from your basement sump, and the sump water sample collected from your basement

sump did not contain reported concentrations of analyzed compounds greater than laboratory limits of detection.

Attached are tables summarizing the results of the samples collected from beneath your basement floor and your indoor air compared to DNR screening levels or action levels. Please see the attached fact sheet, *Understanding Chemical Vapor Intrusion Test Results* for more information.

At this time, there does not appear to be a risk of PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, and VC vapors entering your home from beneath the foundation.

Next Steps
Additional sampling needs to be conducted in order to confirm these results. The Sigma Group, Inc. will contact you to schedule another sampling visit.

Please feel free to contact Robert Hoverman of the DNR at 414-497-0896 or Robert.Hoverman@wisconsin.gov or myself at the number below if you have any questions about these results.

Sincerely,

Stephen Meer, P.E.
Senior Engineer
The Sigma Group, Inc.
414-643-4124

cc: Mr. Robert Hoverman, DNR - Robert.Hoverman@wisconsin.gov
Mr. Dave Neste, DNR - David.Neste@wisconsin.gov
Ms. Jennifer Borski, DNR - Jennifer.Borski@wisconsin.gov

Enc: Table 1, Table 2, Table 3 (Sample Results)
Fact Sheet: Understanding Chemical Vapor Intrusion Test Results (DNR Pub RR-977)

Table 1, Table 2, Table 3

(Sample Results)

Table 1
Sub-slab Vapor Analytical Data
Oakfield Properties - 206 E. Church Street, Oakfield, Wisconsin
Sigma Project No. 21801

Sample Type:		**Subslab Vapor Samples**	Residential Vapor Risk Screening Level [2] (AF=0.03)	Small Commercial Vapor Risk Screening Level [3] (AF = 0.03)	Large Commercial / Industrial Vapor Risk Screening Level [4] (AF = 0.01)
Sample Identification:		04C_SSV01_20230623			
Sample Date(s):		06/12/2023-06/23/2023			
Sampling/Analysis Method:		EPA 8260C			
Sample Duration (min.):		15620			
VOCs					
cis-1,2-Dichloroethene	µg/m^3	11.2	1,400	5,800	18,000
trans-1,2-Dichloroethene	µg/m^3	<1.46	1,400	5,800	18,000
Tetrachloroethene (PCE)	µg/m^3	<1.56	1,400	5,800	18,000
Trichloroethene (TCE)	µg/m^3	9.51	70	290	880
Vinyl Chloride	µg/m^3	<0.79	56	930	2,800

Notes:

1. Analytical units: µg/m^3 = micrograms per cubic meter

2. Residential Vapor Risk Screening Level = Risk-based concentrations based on VALs for **residential** air which has been adjusted with an **Attenuation Factor of 0.03** for the subslab vapor to ambient air pathway in a **residential** setting. VALs for residential indoor air based on WDNR publication RR-800 "Addressing Vapor Intrusion at Remediation & Redevelopment Sites in Wisconsin" (dated January 2018) which in turn references EPA Region 3 Risk-Based Concentrations for residential air [Regional Screening Level (RSL) Summary Table (TR=1E-06, HQ=1) November 2022] and residential air in January 2023 "Wisconsin Vapor Quick Look-Up Table, Indoor Air Vapor Action Levels And Vapor Risk Screening Levels" publication RR-0136. VAL adjusted to 1-in-100,000 increase in lifetime cancer risk for carcinogens per WDNR publication RR-800; VAL is not adjusted for non-carcinogens (i.e., hazard index = 1).

3. Small Commercial Vapor Risk Screening Level = Risk-based concentrations based on VALs for **small commercial** air which has been adjusted with an **Attenuation Factor of 0.03** for the subslab vapor to ambient air pathway in a **small commercial** setting. VALs for small commercial setting indoor air based on WDNR publication PUB-RR-800 "Addressing Vapor Intrusion at Remediation & Redevelopment Sites in Wisconsin" (dated January 2018) which in turn references EPA Region 3 Risk-Based Concentrations for industrial air [Regional Screening Level (RSL) Summary Table (TR=1E-06, HQ=1) November 2022] and small commercial air in January 2023 "Wisconsin Vapor Quick Look-Up Table, Indoor Air Vapor Action Levels And Vapor Risk Screening Levels" publication RR-0136. VAL adjusted to 1-in-100,000 increase in lifetime cancer risk for carcinogens per WDNR publication RR-800; VAL is not adjusted for non-carcinogens (i.e., hazard index = 1).

4. Large Commercial / Industrial Vapor Risk Screening Level = Risk-based concentrations based on VALs for **large commercial/industrial** air which has been adjusted with an **Attenuation Factor of 0.01** for the subslab vapor to ambient air pathway in a **large commercial/industrial** setting. VALs for large commerical / industrial indoor air based on WDNR publication PUB-RR-800 "Addressing Vapor Intrusion at Remediation & Redevelopment Sites in Wisconsin" (dated January 2018) which in turn references EPA Region 3 Risk-Based Concentrations for industrial air [Regional Screening Level (RSL) Summary Table (TR=1E-06, HQ=1) November 2022] and large commercial / industrial air in January 2023 "Wisconsin Vapor Quick Look-Up Table, Indoor Air Vapor Action Levels And Vapor Risk Screening Levels" publication RR-0136. VAL adjusted to 1-in-100,000 increase in lifetime cancer risk for carcinogens per WDNR publication RR-800; VAL is not adjusted for non-carcinogens (i.e., hazard index = 1).

5. NA = not analyzed

6. Exceedances:
BOLD = concentration greater than residential Vapor Risk Screening Level
[ ] = concentration greater than small commercial Vapor Risk Screening Level
{ } = concentration greater than large commercial / industrial Vapor Risk Screening Level

Data entered / updated by: CLE Date: 7/6/2023
Data checked by: SRM Date: 7/6/2023

Table 2
Ambient Indoor Air Analytical Data
Oakfield Properties - 206 E. Church St., Oakfield, Wisconsin
Sigma Project No. 21801

Sample Type:		Ambient Air Samples		Sump Headspace	VAL for Residential Indoor Air [2]	VAL for Small Commercial Indoor Air [3]	VAL for Large Commercial / Industrial Indoor Air [4]
Sample Identification:		04C_IA01_20230623	04C_IA02_20230623	04C_SUMP01_20230623			
Sample Date(s):		06/12/2023-06/23/2023	06/12/2023-06/23/2023	06/12/2023-06/23/2023			
Sampling/Analysis Method:		TO-17 (Passive)	TO-17 (Passive)	TO-17 (Passive)			
Sample Duration:		15,595	15,585	15,605			
VOCs							
cis-1,2-Dichloroethene	µg/m^3	<2.23 D2, U, D	<2.23 D2, U, D	<2.23 D2, U, D	42	180	180
trans-1,2-Dichloroethene	µg/m^3	<2.23 D2, U, D	<2.23 D2, U, D	<2.23 D2, U, D	42	180	180
Tetrachloroethene (PCE)	µg/m^3	<2.84 D2, U, D	<2.84 D2, U, D	<2.83 D2, U, D	42	180	180
Trichloroethene (TCE)	µg/m^3	<2.40 D2, U, D	<2.40 D2, U, D	<2.40 D2, U, D	2.1	8.8	8.8
Vinyl Chloride	µg/m^3	<2.79 D2, U, D	<2.79 D2, U, D	<2.78 D2, U, D	1.7	28	28

Notes:

1. Analytical units: µg/m^3 = micrograms per cubic meter

2. VAL for Residential Indoor Air = Vapor Action Level described in WDNR publication RR-800 "Addressing Vapor Intrusion at Remediation & Redevelopment Sites in Wisconsin" (dated January 2018) which in turn references EPA Region 3 Risk-Based Concentrations for **residential** air [Regional Screening Level (RSL) Summary Table (TR=1E-06, HQ=1) November 2022] and **residential** air in January 2023 "Wisconsin Vapor Quick Look-Up Table, Indoor Air Vapor Action Levels And Vapor Risk Screening Levels" publication RR-0136. VAL adjusted to 1-in-100,000 increase in lifetime cancer risk for carcinogens per WDNR publication RR-800; VAL is not adjusted for non-carcinogens (i.e., hazard index = 1).

3. VAL for Small Commercial Indoor Air = Vapor Action Level described in WDNR publication RR-800 "Addressing Vapor Intrusion at Remediation & Redevelopment Sites in Wisconsin" (dated January 2018) which in turn references EPA Region 3 Risk-Based Concentrations for **industrial** air [Regional Screening Level (RSL) Summary Table (TR=1E-06, HQ=1) November 2022] and **small commercial** air in January 2023 "Wisconsin Vapor Quick Look-Up Table, Indoor Air Vapor Action Levels And Vapor Risk Screening Levels" publication RR-0136. VAL adjusted to 1-in-100,000 increase in lifetime cancer risk for carcinogens per WDNR publication RR-800; VAL is not adjusted for non-carcinogens (i.e., hazard index = 1).

4. VAL for Large Commercial / Industrial Indoor Air = Vapor Action Level described in WDNR publication RR-800 "Addressing Vapor Intrusion at Remediation & Redevelopment Sites in Wisconsin" (dated January 2018) which in turn references EPA Region 3 Risk-Based Concentrations for **industrial** air [Regional Screening Level (RSL) Summary Table (TR=1E-06, HQ=1) November 2022] and **large commerical / industrial** air in January 2023 "Wisconsin Vapor Quick Look-Up Table, Indoor Air Vapor Action Levels And Vapor Risk Screening Levels" publication RR-0136. VAL adjusted to 1-in-100,000 increase in lifetime cancer risk for carcinogens per WDNR publication RR-800; VAL is not adjusted for non-carcinogens (i.e., hazard index = 1).

5. NA = not analyzed

6. Laboratory flags:
   D = Dilution required to report within calibration Limits
   D2 = Original analysis lost due to power failure. Recolletion tube analyzed at dilution.
   U = Analyte was not detected and is reported less than the limit of detection (LOD). The LOD has been adjusted for any dilution or concentration of the sample.

7. Exceedances:
   BOLD = concentration greater than residential Vapor Action Level
   [ ] = concentration greater than small commercial Vapor Action Level
   { } = concentration greater than large commercial / industrial Vapor Action Level

Data entered / updated by: CLE Date: 7/6/2023

Data checked by: SRM Date: 7/6/2023

Table 3

Sump Water Analytical Results

Oakfield Properties - 206 E. Church St., Oakfield, Wisconsin

Sigma Project No. 21801

Well Location:		04C_SUMPW_20230612	NR 140 ES	NR 140 PAL
Date:		6/12/23		
Water Elevation* (feet MSL):		NA		
VOCs				
1,1-Dichloroethene	µg/L	<0.43	7	0.7
cis-1,2-Dichloroethene	µg/L	<0.32	70	7
trans-1,2-Dichloroethene	µg/L	<0.5	100	20
Tetrachloroethene	µg/L	<0.47	5	0.5
Trichloroethene (TCE)	µg/L	<0.38	5	0.5
Vinyl Chloride	µg/L	<0.15	0.2	0.02

Notes:

1. NR 140 ES = Wisconsin Administrative Code, Chapter NR 140 Enforcement Standard
2. NR 140 PAL = Wisconsin Administrative Code, Chapter NR 140 Preventive Action Limit
3. NS = no standard NA = Not Analyzed
4. µg/L = micrograms per liter (equivalent to parts per billion, ppb)
5. Laboratory flags: "J" = Analyte detected between Limit of Detection and Limit of Quantitation.
6. Trip blank results: 6/12/23: All VOCs reported less than laboratory Limits of Detection.
7. Equipment blank results: 6/12/23: All VOCs reported less than laboratory Limits of Detection.
8. Exceedances: **BOLD** = Concentration greater than NR 140 ES
   ITALICS = Concentration greater than NR 140 PAL
9. Special notes: * = monitoring well screen submerged below water table
   ** = not an NR 140 ES or PAL exceedance per NR 140.14(3)(c)

Data entered / updated by: CLE

Data checked by: SRM

Date: 6/22/2023

Date: 6/22/2023

Fact Sheet: Understanding Chemical Vapor Intrusion Test Results

(DNR Pub RR-977)

Understanding Chemical Vapor Intrusion Testing Results

RR-977 October 2014

From the Lab to You

Chemical vapor samples were taken from underneath your house or building and possibly indoors as well. These samples have been tested by a certified laboratory and a report was issued. The Wisconsin Department of Natural Resources (DNR) uses these test results to determine if people in the building are being exposed to chemical vapors coming from nearby contaminated soil or groundwater, and to decide what, if any, action is needed to prevent this exposure.

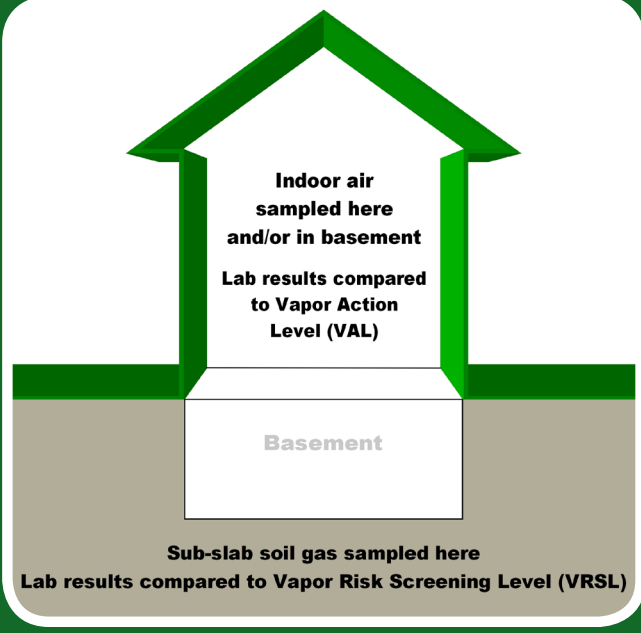
Indoor Air Testing Results

If indoor air samples were collected in your house or building, test results from the lab will be compared to the state Vapor Action Level (VAL) for chemicals of concern. The VAL is a chemical compound's numerical value that represents a health hazard risk to no more than 1 in 100,000 people during a lifetime of exposure. If test results show chemical concentrations in your air below the VAL then adverse health effects are extremely rare, even if you were to breathe the chemical at this concentration for your entire life.

Test results showing chemical concentrations in the air at or above the VAL prompt DNR to recommend that exposure to these chemical vapors be reduced. If test results show concentrations significantly above the VAL, or more than one type of chemical vapor is identified in your indoor air, the risk from exposure increases. If the concentration of any indoor chemical vapor greatly exceeds the VAL, DNR is concerned about even short-term exposure and will typically require immediate action to address the problem.

The VAL for each chemical is set by scientific research. It is protective of all people, including those who are most susceptible to adverse health effects.

If test results identify chemicals in your air that are not present in nearby soil or groundwater contamination, it is likely that these vapors are coming from some product or activity in or near your house or building. Many everyday consumer products (e.g., cleaners, solvents, polish, adhesives, lubricants, aerosols, insect repellants, etc.); combustion processes (e.g., smoking, home heating); fuels in attached garages; dry cleaned clothing or draperies; and occupant activities (e.g., craft hobbies), also release chemical vapors into the air.



The air and soil gas samples from your property are tested at a laboratory. Chemical concentrations are measured and the results are compared to state health-risk numbers.

Sub-slab Soil Gas Testing Results

Soil gas samples were collected from the ground beneath the concrete slab of your building foundation or basement. The lab measured the concentrations of various chemicals in these samples. DNR compares these measurements to the state Vapor Risk Screening Level (VRSL), which identifies the concentration of a chemical in soil gas that scientific research suggests can be a health risk if vapor enters a building. If soil gas measurements exceed the VRSL for a chemical of concern, action to reduce exposure is strongly recommended.

The VRSL is a higher number (higher chemical concentration) than the VAL because it is presumed that concrete building foundations and basement walls will prevent most soil gas from entering a building. Further, any soil gas that does enter a building through cracks, holes, sump pumps, drains, etc., will be diluted to some extent by the indoor air. So, people inside will not be breathing air that includes the full concentration of chemical vapors that exist in the ground.

Wisconsin Department of Natural Resources
P.O. Box 7921, Madison, WI 53707
dnr.wi.gov, search "Brownfields"

DNR generally relies on the test results of the sub-slab soil gas samples when determining what, if any, action should be taken related to chemical vapors coming from nearby soil or groundwater contamination. Indoor air quality is highly variable, and it is difficult to make a definitive decision about vapor intrusion based on indoor air sampling alone.

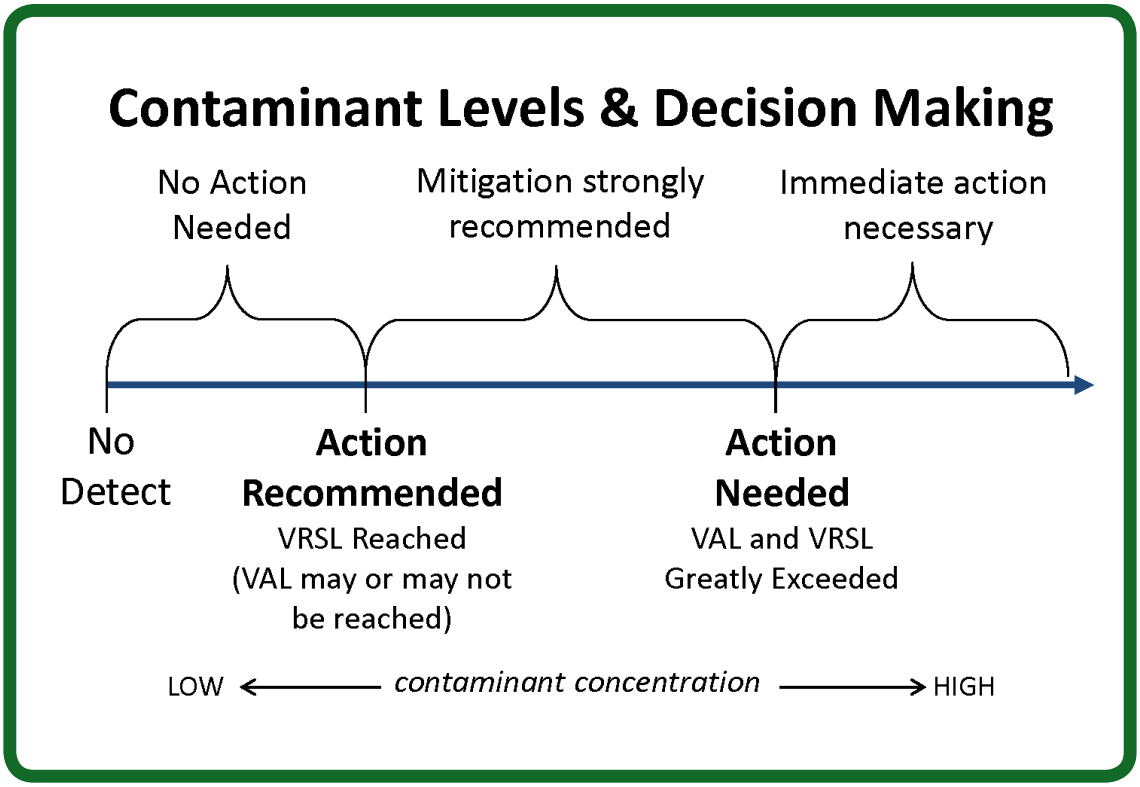
Follow-Up Actions

If your test results are less than a VAL for indoor air, or a VRSL for sub-slab soil gas, then the air in the house or building should not present a health concern. Follow-up sampling and testing may be necessary to confirm the results, but no other action is typically suggested.

When test results show soil gas chemical concentrations above a VRSL, both DNR and the Wisconsin Department of Health Services recommend that owners take action to reduce potential exposure. This typically involves installing a vapor mitigation system that vents chemical vapors from beneath your home or building to the outdoors, similar to a radon mitigation system.

If indoor air concentrations exceed a VAL, but sub-slab concentrations are less than a VRSL, then the chemical vapors are most likely coming from indoor sources. Steps should be taken by the house or building owner to identify the products and practices causing the problem and implement appropriate remedies.

If soil gas mitigation is recommended, a representative of the party who is responsible for the soil or groundwater contamination will contact you to discuss your options.



A Note about Measurement Units: The lab report may include some unfamiliar technical language. The most important point to note is whether or not the test result for a specific chemical exceeds a VAL or VRSL, which are also sometimes referred to, generically, as "screening levels."

The concentration of gaseous pollutants in air is typically described in two different ways: 1) as units of mass per volume, where µg/m3 represents micrograms of gaseous pollutant per cubic meter of ambient air; and 2) as parts per billion by volume (ppbv), where the volume of a gaseous pollutant is compared to a set volume of ambient air. These are the numbers that are compared to the VAL and VRSL.

For more information, visit **dnr.wi.gov/topic/Brownfields/Vapor.html**

This document contains information about certain state statutes and administrative rules but does not necessarily include all of the details found in the statutes and rules. Readers should consult the actual language of the statutes and rules to answer specific questions. The Wisconsin Department of Natural Resources provides equal opportunity in its employment, programs, services, and functions under an Affirmative Action Plan. If you have any questions, please write to Equal Opportunity Office, Department of Interior, Washington, D.C. 20240. This publication is available in alternative format upon request. Please call 608-267-3543 for more information.