



October 31, 2018

Reference No. 003978

Alex Bodenheimer
1901 N. 2nd Street
Wausau, Wisconsin 54403

Dear Mr. Bodenheimer:

**Re: Sub-slab and Indoor Air Sampling Results, March 27, 2018
1901 N. 2nd Street, Wausau, Wisconsin 54403**

On behalf of the Responsible Parties (RPs) for the Wausau Water Supply Superfund Site, enclosed are the results of air samples collected at your house on March 27, 2018, by GHD Services Inc. (GHD). This sampling was required by both the Wisconsin Department of Natural Resources (WDNR) and the United States Environmental Protection Agency (U.S. EPA) as confirmation of previous sampling results. As you are aware, this investigation was conducted because of the potential for contaminant vapors from the groundwater beneath your property to migrate through soils, accumulate beneath the foundation of your house, and possibly enter your indoor air. The contaminants of concern in the groundwater are tetrachloroethene (a/k/a perchloroethene, or PERC) and trichloroethene (TCE). The history of the Superfund project and the potential concerns to neighboring property owners were described in the original letter sent to you on March 13, 2017.

The results of the two previous sampling events were sent to you in letters dated May 12, 2017 and March 2, 2018. This letter provides the results of the third round of sampling on March 27, 2018. This sampling event consisted of two samples: one from beneath your basement slab and one from the indoor air of your basement living area. The air samples were submitted to TestAmerica Laboratories where they underwent laboratory analysis for four different volatile organic compounds (VOCs), including PERC, TCE, cis-1,2-dichloroethene (c12DCE), and vinyl chloride (VC).

1. Your Sub-slab Test Results

Attached is a copy of the laboratory report for the sub-slab vapor sample collected on March 27, 2018. The results show that small amounts of PERC, TCE, and c12DCE were detected in the sample taken from beneath your foundation. Although these compounds were detected in soil vapors beneath your basement, the levels at which they were detected are such that they do not pose a threat to you or your family. This is called "detections below screening levels" as explained in the enclosed fact sheet. The sub-slab results for your property are summarized in Table 1 below and the WDNR and U.S. EPA screening levels for sub-slab vapors at residential properties are included for comparison.



Table 1 Sub-slab Results and Screening Levels

	Date	Units	PERC	TCE	c12DCE	VC
1901 N. 2nd Street Sub-slab Results	3/27/18	µg/m³	140	56	68	<0.074
<i>WDNR & USEPA Residential Sub-slab Screening Levels</i>	---	µg/m ³	1,400	70	(1)	57

(1) Neither the State of Wisconsin nor the U.S. EPA have set a health standard for c12DCE in air µg/m³ – micrograms per cubic meter

2. Your Indoor Air Test Results

The indoor air results are also provided in the attached laboratory report. The results show that a small amount of PERC and TCE were detected in the indoor air sample taken from the basement of your home. These results indicate that the contaminants of concern do not pose a threat to you or your family. The indoor air results are summarized in Table 2 below and the WDNR and U.S. EPA action levels for indoor air at residential properties are included for comparison.

Table 2 Indoor Air Results and Action Levels

	Date	Units	PERC	TCE	c12DCE	VC
1901 N. 2nd Street Indoor Air Results	3/27/18	µg/m³	0.38 J	0.15 J	<0.095	<0.074
<i>WDNR & USEPA Residential Indoor Air Action Levels</i>	---	µg/m ³	42	2.1	(1)	1.7

(1) Neither the State of Wisconsin nor the U.S. EPA have set a health standard for c12DCE in air. µg/m³ – micrograms per cubic meter

Note that the “J” notations in Table 2 indicate that the reported values were estimated because they were slightly higher than the laboratory method detection limit, but less than the method reporting limit.

The results of the three sampling events conducted at your home do not indicate a risk of vapors entering your home from beneath the foundation. No additional testing of your home is proposed.



Please feel free to contact me at 651-639-0913 if you have any questions about these results. In addition, the project managers for U.S. EPA and WDNR can be reached at the phone numbers or email addresses shown below.

- Mae Willkom: WDNR, email: mwillkom@wisconsin.gov – phone: 715-839-3748
- Sheri Bianchin: U.S. EPA, email: bianchin.sheri@epa.gov – phone: 312-886-4745

Sincerely,

GHD

A handwritten signature in black ink, appearing to read "Chuck Ahrens", with a long horizontal flourish extending to the right.

Chuck Ahrens

CA/sb/7

email: charles.ahrens@ghd.com

Encl.

cc: Mae Willkom, WDNR
Sheri Bianchin, U.S. EPA
RP Group

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

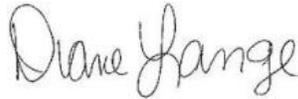
TestAmerica Job ID: 140-11144-1

Client Project/Site: Wausau Vapor Sampling

For:

GHD Services Inc.
1801 Old Highway 8 NW
Suite 114
St. Paul, Minnesota 55112

Attn: Mr. Grant Anderson



Authorized for release by:
4/11/2018 2:44:09 PM

Diana Lange, Project Management Assistant II
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Designee for

Jamie McKinney, Senior Project Manager
(865)291-3000
jamie.mckinney@testamericainc.com

LINKS

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Definitions/Glossary

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-11144-1

Qualifiers

Air - GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-11144-1

Job ID: 140-11144-1

Laboratory: TestAmerica Knoxville

Narrative

Job Narrative
140-11144-1

Comments

No additional comments.

Receipt

The samples were received on 4/2/2018 9:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Air - GC/MS VOA

Method(s) TO 15 LL, TO-14A, TO-15: This report includes canister certification data for the batch certified and/or individually certified canisters used to collect samples as well as for any canisters used for dilution of those samples. All of the canisters used for sample collection or sample dilution for this job were certified to be clean to the levels listed on the results page. Please note that results for individually certified canisters that were not used for sample collection or sample dilution may also be included in the report because these canisters were in the same cleaning batch as the canisters used for this project. Since these canisters were not used for this job, the results have no bearing on the sample results.

Method(s) TO 15 LL, TO-15: EPA methods TO-14A and TO-15 specify the use of humidified "zero air" as the blank reagent for canister cleaning, instrument calibration and sample analysis. Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of "zero air" by TestAmerica Knoxville.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Client Sample Results

Client: GHD Services Inc.
 Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-11144-1

Client Sample ID: SS-180328-RA-06

Lab Sample ID: 140-11144-6

Date Collected: 03/28/18 18:36

Matrix: Air

Date Received: 04/02/18 09:15

1901 N. 2nd St. S.S.

Sample Container: Summa Canister 1L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	17		0.80	0.24	ppb v/v			04/05/18 20:58	1
Tetrachloroethene	21		0.80	0.16	ppb v/v			04/05/18 20:58	1
Trichloroethene	10		0.40	0.14	ppb v/v			04/05/18 20:58	1
Vinyl chloride	ND		0.40	0.29	ppb v/v			04/05/18 20:58	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	68		3.2	0.95	ug/m3			04/05/18 20:58	1
Tetrachloroethene	140		5.4	1.1	ug/m3			04/05/18 20:58	1
Trichloroethene	56		2.1	0.75	ug/m3			04/05/18 20:58	1
Vinyl chloride	ND		1.0	0.74	ug/m3			04/05/18 20:58	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		60 - 140					04/05/18 20:58	1

Client Sample ID: IA-180327-RA-06

Lab Sample ID: 140-11144-12

Date Collected: 03/27/18 18:25

1901 N. 2nd St. I.A.

Matrix: Air

Date Received: 04/02/18 09:15

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.080	0.024	ppb v/v			04/05/18 02:23	1
Tetrachloroethene	0.056	J	0.080	0.016	ppb v/v			04/05/18 02:23	1
Trichloroethene	0.028	J	0.040	0.014	ppb v/v			04/05/18 02:23	1
Vinyl chloride	ND		0.040	0.029	ppb v/v			04/05/18 02:23	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.32	0.095	ug/m3			04/05/18 02:23	1
Tetrachloroethene	0.38	J	0.54	0.11	ug/m3			04/05/18 02:23	1
Trichloroethene	0.15	J	0.21	0.075	ug/m3			04/05/18 02:23	1
Vinyl chloride	ND		0.10	0.074	ug/m3			04/05/18 02:23	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		60 - 140					04/05/18 02:23	1



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.

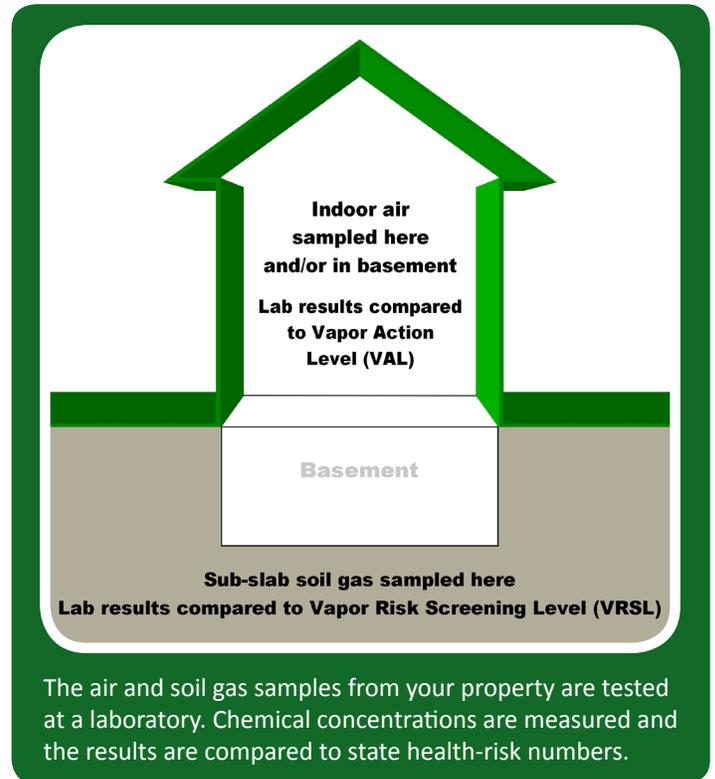
Indoor Air Testing Results

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

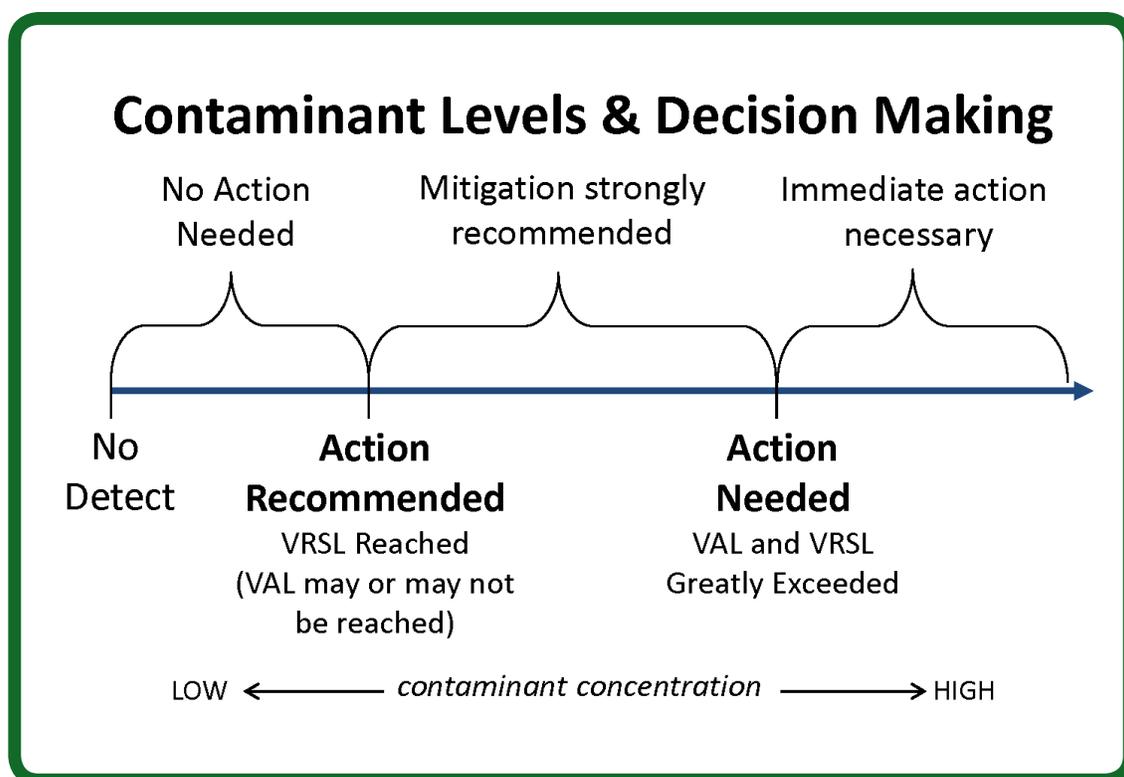
If your test results are less than a VAL for indoor air, or a VRSL for sub-slab soil gas, then the air in the house or building should not present a health concern. Follow-up sampling and testing may be necessary to confirm the results, but no other action is typically suggested.

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 $\mu\text{g}/\text{m}^3$ 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



October 31, 2018

Reference No. 003978

Cha Hang
or Current Resident
1905 N. 2nd St.
Wausau, Wisconsin 54403

Dear Mr. Hang:

**Re: Sub-slab and Indoor Air Sampling Results, March 28, 2018
1905 N. 2nd Street, Wausau, Wisconsin 54403**

On behalf of the Responsible Parties (RPs) for the Wausau Water Supply Superfund Site, enclosed are the results of air samples collected at your house on March 28, 2018, by GHD Services Inc. (GHD). This sampling was required by both the Wisconsin Department of Natural Resources (WDNR) and the United States Environmental Protection Agency (U.S. EPA) as confirmation of previous sampling results. As you are aware, this investigation was conducted because of the potential for contaminant vapors from the groundwater beneath your property to migrate through soils, accumulate beneath the foundation of your house, and possibly enter your indoor air. The contaminants of concern in the groundwater are tetrachloroethene (a/k/a perchloroethene, or PERC) and trichloroethene (TCE). The history of the Superfund project and the potential concerns to neighboring property owners were described in the original letter sent to you on March 13, 2017.

The results of the previous sampling event were sent to you in a letter dated March 2, 2018. This letter provides the results of the second round of sampling on March 28, 2018. This sampling event consisted of two samples: one from beneath your basement slab and one from the indoor air of your main living area. The air samples were submitted to TestAmerica Laboratories where they underwent laboratory analysis for four different volatile organic compounds (VOCs), including PERC, TCE, cis-1,2-dichloroethene (c12DCE), and vinyl chloride (VC).

1. Your Sub-slab Test Results

Attached is a copy of the laboratory report for the sub-slab vapor sample collected on March 28, 2018. The results show that three VOCs (PERC, TCE, and c12DCE) were detected in the sample taken from beneath your foundation. The reported concentrations for PERC and c12DCE were below their respective screening levels, indicating that the levels at which they were detected do not pose a threat to you or your family. This is called "detections below screening levels" as explained in the enclosed fact sheet. The reported sub-slab concentration for TCE was slightly above its screening level, which indicated that there was potential for TCE to enter your indoor air at a concentration that could exceed the indoor air action level for TCE. In this case, since a sample was collected from your indoor air, we were able to confirm that TCE is not above the indoor air action level. This is described further in Section 2 below. The sub-slab results for your property are summarized in Table 1 below and the WDNR /U.S. EPA screening levels for sub-slab vapors at a residential property are included for comparison. Although c12DCE was detected in



the sub-slab sample, there is no health standard or screening level for c12DCE. VC was not detected in the sub-slab sample.

Table 1 Sub-slab Results and Screening Levels

	Date	Units	PERC	TCE	c12DCE	VC
1905 N. 2nd Street Sub-slab Results	3/28/18	µg/m³	220	84	3.2	<0.074
<i>WDNR & USEPA Residential Sub-slab Screening Levels</i>	---	µg/m ³	1,400	70	(1)	57

(1) Neither the State of Wisconsin nor the U.S. EPA have set a health standard for c12DCE in air.
µg/m³ – micrograms per cubic meter

2. Your Indoor Air Test Results

The indoor air results are also provided in the attached laboratory report. As summarized in Table 2 below, a very low concentration of PERC was detected in the indoor air of the main level of your home. The concentration was far below the action level for indoor air. These action levels are threshold concentrations that are protective of human health over long term exposure. Since the concentrations were below the action levels, the air on the main floor of your house does not pose a health threat to you or your family.

Studies have shown that PERC concentrations at the level shown in Table 2 are common in many homes in the United States due to the presence of common products such as adhesives, lubricants, and cleaning solutions. Typically, samples collected during the winter heating season represent the worst-case scenario and potential VOC concentrations in indoor air would be lower during other times of the year.

Table 2 Indoor Air Results and Action Levels

	Date	Units	PERC	TCE	c12DCE	VC
1905 N. 2nd Street Indoor Air Results	3/28/18	µg/m³	0.11 J	<0.075	<0.095	<0.074
<i>WDNR/USEPA Residential Indoor Air Action Levels</i>	---	µg/m ³	42	2.1	(1)	1.7

(1) Neither the State of Wisconsin nor the U.S. EPA have set a health standard for c12DCE in air.
µg/m³ – micrograms per cubic meter



Note that the “J” notation in Table 2 indicates that the reported value was estimated because it was slightly higher than the laboratory method detection limit, but less than the method reporting limit.

The results of the two sampling events conducted at your home do not indicate a risk of vapors entering your home from beneath the foundation. Thus, no additional testing of your home is proposed.

Please feel free to contact me at 651-639-0913 if you have any questions about these results. In addition, the project managers for U.S. EPA and WDNR can be reached at the phone numbers or email addresses shown below.

- Mae Willkom: WDNR, email: mwillkom@wisconsin.gov – phone: 715-839-3748
- Sheri Bianchin: U.S. EPA, email: bianchin.sheri@epa.gov – phone: 312-886-4745

Sincerely,

GHD

A handwritten signature in black ink, appearing to read "Chuck Ahrens".

Chuck Ahrens

CA/sb/7

email: charles.ahrens@ghd.com

Encl.

cc: Mae Willkom, WDNR
Sheri Bianchin, U.S. EPA
RP Group

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

TestAmerica Job ID: 140-11144-1

Client Project/Site: Wausau Vapor Sampling

For:

GHD Services Inc.
1801 Old Highway 8 NW
Suite 114
St. Paul, Minnesota 55112

Attn: Mr. Grant Anderson



Authorized for release by:
4/11/2018 2:44:09 PM

Diana Lange, Project Management Assistant II
diane.lange@testamericainc.com

Designee for

Jamie McKinney, Senior Project Manager
(865)291-3000
jamie.mckinney@testamericainc.com

LINKS

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Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-11144-1

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Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
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LOD	Limit of Detection (DoD/DOE)
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TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-11144-1

Job ID: 140-11144-1

Laboratory: TestAmerica Knoxville

Narrative

Job Narrative
140-11144-1

Comments

No additional comments.

Receipt

The samples were received on 4/2/2018 9:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Air - GC/MS VOA

Method(s) TO 15 LL, TO-14A, TO-15: This report includes canister certification data for the batch certified and/or individually certified canisters used to collect samples as well as for any canisters used for dilution of those samples. All of the canisters used for sample collection or sample dilution for this job were certified to be clean to the levels listed on the results page. Please note that results for individually certified canisters that were not used for sample collection or sample dilution may also be included in the report because these canisters were in the same cleaning batch as the canisters used for this project. Since these canisters were not used for this job, the results have no bearing on the sample results.

Method(s) TO 15 LL, TO-15: EPA methods TO-14A and TO-15 specify the use of humidified "zero air" as the blank reagent for canister cleaning, instrument calibration and sample analysis. Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of "zero air" by TestAmerica Knoxville.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Client Sample ID: SS-180328-RA-05

Lab Sample ID: 140-11144-5

Date Collected: 03/28/18 13:45

Matrix: Air

Date Received: 04/02/18 09:15

1905 N. 2nd St. S.S.

Sample Container: Summa Canister 1L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.80		0.80	0.24	ppb v/v			04/05/18 20:16	1
Tetrachloroethene	33		0.80	0.16	ppb v/v			04/05/18 20:16	1
Trichloroethene	16		0.40	0.14	ppb v/v			04/05/18 20:16	1
Vinyl chloride	ND		0.40	0.29	ppb v/v			04/05/18 20:16	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	3.2		3.2	0.95	ug/m3			04/05/18 20:16	1
Tetrachloroethene	220		5.4	1.1	ug/m3			04/05/18 20:16	1
Trichloroethene	84		2.1	0.75	ug/m3			04/05/18 20:16	1
Vinyl chloride	ND		1.0	0.74	ug/m3			04/05/18 20:16	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		60 - 140					04/05/18 20:16	1

Client Sample ID: IA-180328-RA-07

Lab Sample ID: 140-11144-13

Date Collected: 03/28/18 12:06

1905 N. 2nd St. I.A.

Matrix: Air

Date Received: 04/02/18 09:15

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.080	0.024	ppb v/v			04/05/18 03:08	1
Tetrachloroethene	0.016	J	0.080	0.016	ppb v/v			04/05/18 03:08	1
Trichloroethene	ND		0.040	0.014	ppb v/v			04/05/18 03:08	1
Vinyl chloride	ND		0.040	0.029	ppb v/v			04/05/18 03:08	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.32	0.095	ug/m3			04/05/18 03:08	1
Tetrachloroethene	0.11	J	0.54	0.11	ug/m3			04/05/18 03:08	1
Trichloroethene	ND		0.21	0.075	ug/m3			04/05/18 03:08	1
Vinyl chloride	ND		0.10	0.074	ug/m3			04/05/18 03:08	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		60 - 140					04/05/18 03:08	1



Understanding Chemical Vapor Intrusion Testing Results

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.

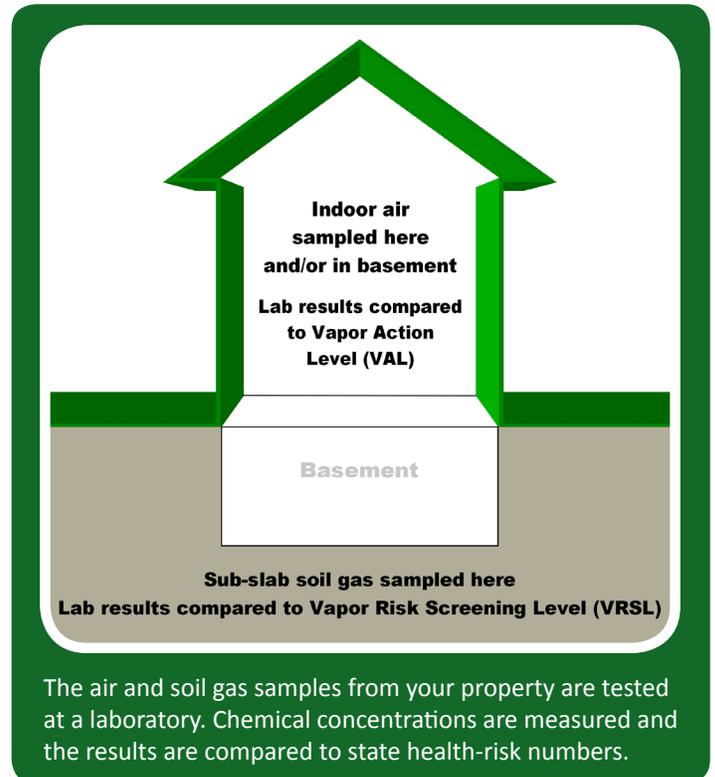
Indoor Air Testing Results

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.



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

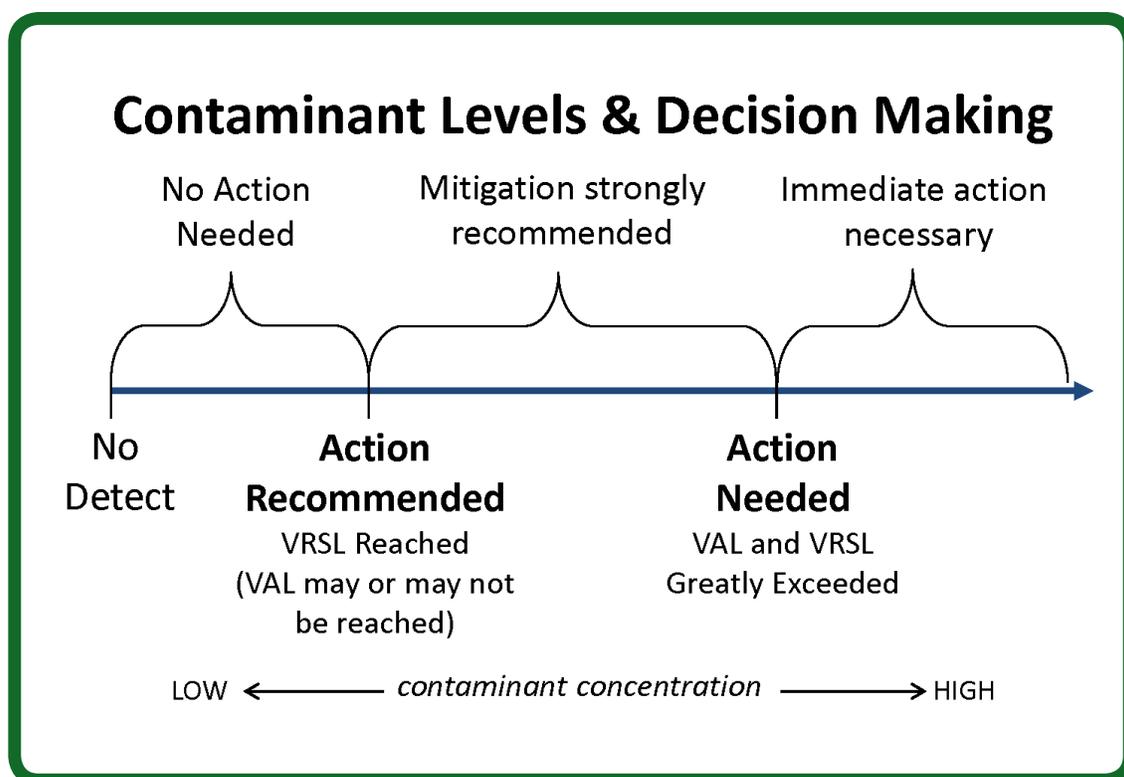
If your test results are less than a VAL for indoor air, or a VRSL for sub-slab soil gas, then the air in the house or building should not present a health concern. Follow-up sampling and testing may be necessary to confirm the results, but no other action is typically suggested.

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 $\mu\text{g}/\text{m}^3$ 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



October 31, 2018

Reference No. 003978

Marilynn M. Steffen
or Current Resident
2108 N. 3rd Street
Wausau, Wisconsin 54403

Dear Ms. Steffen:

Re: Sub-slab and Indoor Air Sampling Results – March 27, 2018

On behalf of the Responsible Parties (RPs) for the Wausau Water Supply Superfund Site, enclosed are the results of soil vapor investigations on your property by GHD Services Inc. (GHD). This sampling was required by both the Wisconsin Department of Natural Resources (WDNR) and the United States Environmental Protection Agency (U.S. EPA).

As you are aware, this investigation was conducted because of the potential for contaminant vapors from the groundwater beneath your property to migrate through soils, accumulate beneath the foundation of your home, and possibly enter your indoor air. The contaminants of concern in the groundwater are tetrachloroethene (a/k/a perchloroethene, or PERC) and trichloroethene (TCE). The history of this site and the potential concerns to neighboring residents were described in the original letter sent to your home.

On March 27, 2018, GHD installed a sampling device into the floor of your foundation and collected a soil vapor sample. In addition, an indoor air sample was collected on the main floor of your home. The samples were submitted to TestAmerica Laboratories where they underwent laboratory analysis for four different volatile organic compounds (VOCs), including PERC, TCE, cis-1,2-dichloroethylene (c12DCE), and vinyl chloride (VC).

1. Your Sub-slab Test Results

Attached is a copy of the laboratory report for your sub-slab air sample. The results show that three VOCs (PERC, TCE, and c12DCE) were detected in the sample taken from beneath your foundation. The reported concentration for PERC was below its respective screening level, indicating that the level at which it was detected does not pose a threat to you or your family. This is called “detections below screening levels” as explained in the enclosed fact sheet. The reported sub-slab concentration for TCE was above its screening level, which indicated that there is potential for TCE to enter your indoor air at a concentration that could exceed the indoor air action level for TCE. In this case, since a sample was collected from your indoor air, we were able to confirm that TCE is not above the indoor air action level. This is described further in Section 2 below. The sub-slab results for your property are summarized in Table 1 below and the WDNR/U.S. EPA screening levels for sub-slab vapors at a residential property are included for comparison. Although c12DCE was detected in the sub-slab sample, there is no health standard or screening level for c12DCE. VC was not detected in the sub-slab sample.



Table 1 - Sub-slab Results and Wisconsin Screening Levels

	Date	Units	PERC	TCE	c12DCE	VC
2108 N. 3rd Street Sub-slab Results	3/27/18	µg/m3	370	120	42	<0.074
<i>WDNR/USEPA Residential Sub-slab Screening Levels</i>	---	<i>µg/m3</i>	<i>1,400</i>	<i>70</i>	<i>(1)</i>	<i>57</i>

(1) Neither the State of Wisconsin nor the U.S. EPA have set a health standard for c12DCE in air.
µg/m3 – micrograms per cubic meter

2. Your Indoor Air Test Results

The indoor air results are also provided in the attached laboratory report. As summarized in Table 2 below, PERC, TCE, and c12DCE were detected in the indoor air of the main level of your home. All reported concentrations were below their respective action levels for indoor air. These action levels are threshold concentrations that are protective of human health over long-term exposure. Since the concentrations were below the action levels, it does not appear that the air on the main floor of your house poses a health threat to you or your family at this time.

Studies have shown that TCE and PERC concentrations at the levels shown in Table 2 are common in many homes in the United States due to the presence of common products such as adhesives, lubricants, and cleaning solutions. Typically, samples collected during the winter heating season represent the worst-case scenario and potential VOC concentrations in indoor air would be lower during other times of the year.

Table 2 - Indoor Air Results and Wisconsin Action Levels

	Date	Units	PERC	TCE	c12DCE	VC
2108 N. 3rd Street Indoor Air – Main Level	3/27/18	µg/m3	2.1	0.83	0.16	<0.074
<i>Wisconsin & USEPA Residential Indoor Air Action Levels</i>	---	<i>µg/m3</i>	<i>42</i>	<i>2.1</i>	<i>---(1)</i>	<i>1.7</i>

(1) Neither the State of Wisconsin nor the U.S. EPA have set a health standard for c12DCE in air.
µg/m3 – micrograms per cubic meter.



3. Next Steps

Although the March 2018 sampling event indicates that there does not appear to be a risk due to vapors in your indoor air, WDNR and U.S. EPA have requested that we collect an additional sample to confirm these results. GHD will contact you to schedule a sampling visit during the winter of 2018-2019.

Please feel free to contact me at 651-639-0913 or e-mail charles.ahrens@ghd.com if you have any questions about these results. In addition, the project managers for U.S. EPA and WDNR can be reached at the phone numbers or e-mail addresses shown below.

- Mae Willkom: WDNR, email: mae.willkom@wisconsin.gov – phone: 715-839-3748.
- Sheri Bianchin, U.S. EPA, email: bianchin.sheri@epa.gov – phone: 312-886-4745

Sincerely,

GHD

A handwritten signature in black ink, appearing to read "Chuck Ahrens", written in a cursive style.

Chuck Ahrens

CA/sb/7

email: charles.ahrens@ghd.com

Encl.

cc: Mae Willkom, WDNR
Sheri Bianchin, U.S. EPA
RP Group

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

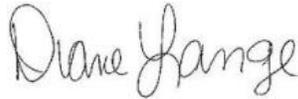
ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

TestAmerica Job ID: 140-11144-1
Client Project/Site: Wausau Vapor Sampling

For:
GHD Services Inc.
1801 Old Highway 8 NW
Suite 114
St. Paul, Minnesota 55112

Attn: Mr. Grant Anderson



Authorized for release by:
4/11/2018 2:44:09 PM

Diana Lange, Project Management Assistant II
diane.lange@testamericainc.com

Designee for

Jamie McKinney, Senior Project Manager
(865)291-3000
jamie.mckinney@testamericainc.com

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Definitions/Glossary

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-11144-1

Qualifiers

Air - GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-11144-1

Job ID: 140-11144-1

Laboratory: TestAmerica Knoxville

Narrative

Job Narrative
140-11144-1

Comments

No additional comments.

Receipt

The samples were received on 4/2/2018 9:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Air - GC/MS VOA

Method(s) TO 15 LL, TO-14A, TO-15: This report includes canister certification data for the batch certified and/or individually certified canisters used to collect samples as well as for any canisters used for dilution of those samples. All of the canisters used for sample collection or sample dilution for this job were certified to be clean to the levels listed on the results page. Please note that results for individually certified canisters that were not used for sample collection or sample dilution may also be included in the report because these canisters were in the same cleaning batch as the canisters used for this project. Since these canisters were not used for this job, the results have no bearing on the sample results.

Method(s) TO 15 LL, TO-15: EPA methods TO-14A and TO-15 specify the use of humidified "zero air" as the blank reagent for canister cleaning, instrument calibration and sample analysis. Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of "zero air" by TestAmerica Knoxville.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Client Sample ID: SS-180327-RA-02

Lab Sample ID: 140-11144-2

Date Collected: 03/27/18 15:12

Matrix: Air

Date Received: 04/02/18 09:15

2108 N. 3rd St. S.S.

Sample Container: Summa Canister 1L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	10		0.80	0.24	ppb v/v			04/05/18 17:22	1
Tetrachloroethene	55		0.80	0.16	ppb v/v			04/05/18 17:22	1
Trichloroethene	22		0.40	0.14	ppb v/v			04/05/18 17:22	1
Vinyl chloride	ND		0.40	0.29	ppb v/v			04/05/18 17:22	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	42		3.2	0.95	ug/m3			04/05/18 17:22	1
Tetrachloroethene	370		5.4	1.1	ug/m3			04/05/18 17:22	1
Trichloroethene	120		2.1	0.75	ug/m3			04/05/18 17:22	1
Vinyl chloride	ND		1.0	0.74	ug/m3			04/05/18 17:22	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		60 - 140		04/05/18 17:22	1

Client Sample Results

TestAmerica Job ID: 140-11144-1

Client Sample ID: IA-180327-RA-03

Lab Sample ID: 140-11144-9

Date Collected: 03/27/18 09:30

Date Received: 04/02/18 09:15

Sample Container: Summa Canister 6L

2108 N. 3rd St. I.A.

Matrix: Air

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.041	J	0.080	0.024	ppb v/v			04/05/18 00:07	1.54
Tetrachloroethene	0.31		0.080	0.016	ppb v/v			04/05/18 00:07	1.54
Trichloroethene	0.15		0.040	0.014	ppb v/v			04/05/18 00:07	1.54
Vinyl chloride	ND		0.040	0.029	ppb v/v			04/05/18 00:07	1.54
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.16	J	0.32	0.095	ug/m3			04/05/18 00:07	1.54
Tetrachloroethene	2.1		0.54	0.11	ug/m3			04/05/18 00:07	1.54
Trichloroethene	0.83		0.21	0.075	ug/m3			04/05/18 00:07	1.54
Vinyl chloride	ND		0.10	0.074	ug/m3			04/05/18 00:07	1.54
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		60 - 140					04/05/18 00:07	1.54



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.

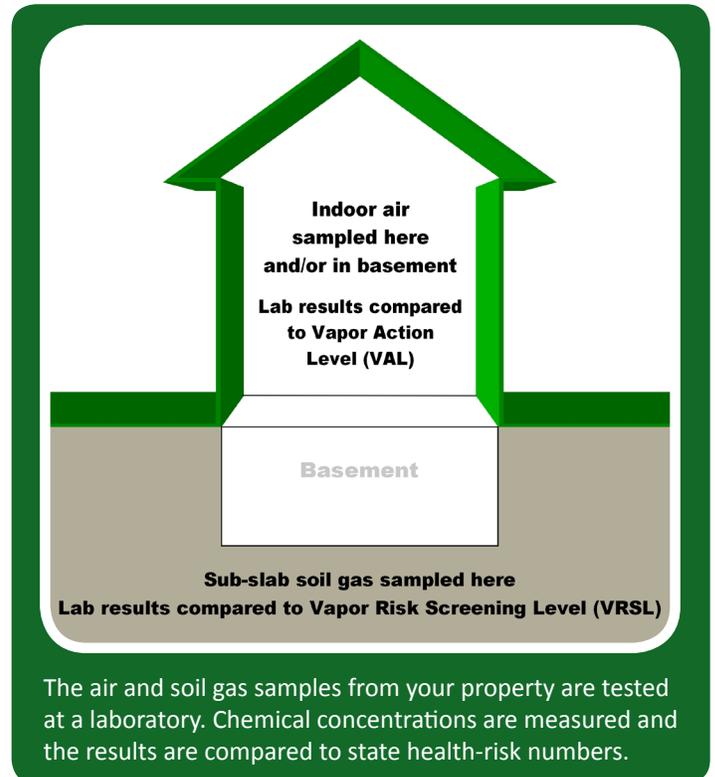
Indoor Air Testing Results

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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.

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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

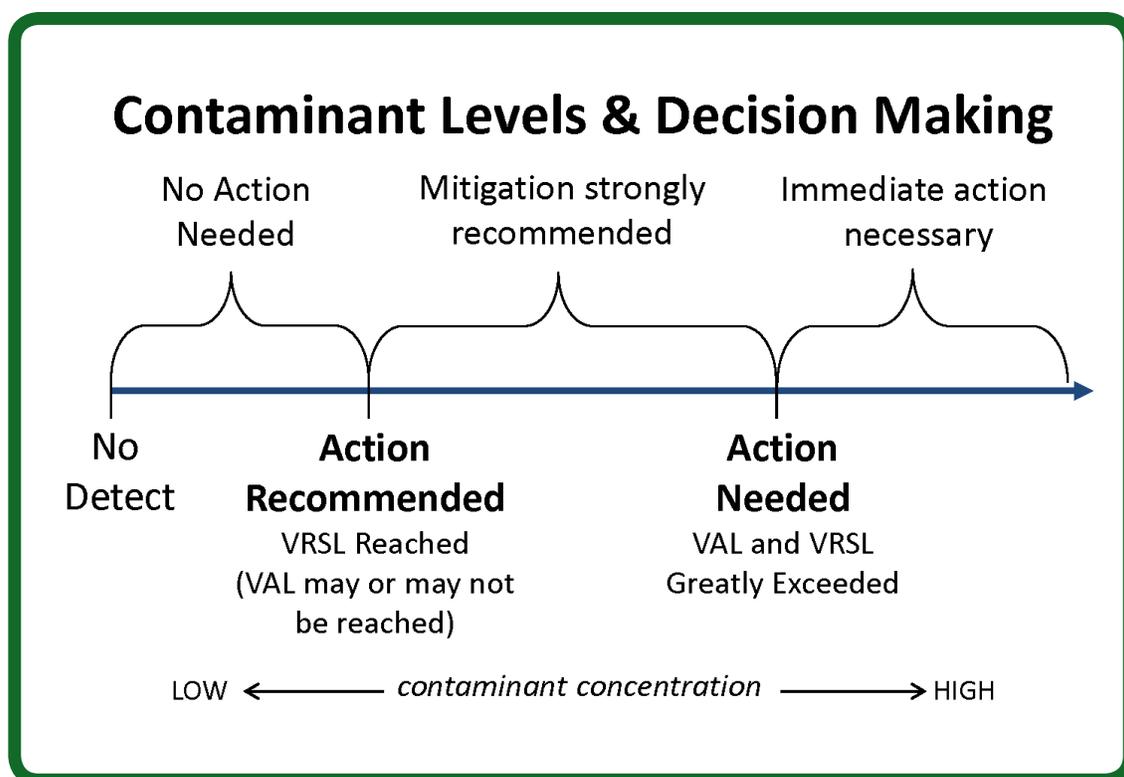
If your test results are less than a VAL for indoor air, or a VRSL for sub-slab soil gas, then the air in the house or building should not present a health concern. Follow-up sampling and testing may be necessary to confirm the results, but no other action is typically suggested.

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 $\mu\text{g}/\text{m}^3$ 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



October 31, 2018

Reference No. 003978

Jill and Gregory Viergutz
Or Current Resident
1915 N. 2nd Street
Wausau, Wisconsin 54403

Dear Mr. and Ms. Viergutz:

**Re: Sub-slab and Indoor Air Sampling Results, March 27, 2018
1915 N. 2nd Street, Wausau, Wisconsin 54403**

On behalf of the Responsible Parties (RPs) for the Wausau Water Supply Superfund Site, enclosed are the results of air samples collected at your house on March 27, 2018, by GHD Services Inc. (GHD). This sampling was required by both the Wisconsin Department of Natural Resources (WDNR) and the United States Environmental Protection Agency (U.S. EPA) as confirmation of previous sampling results. As you are aware, this investigation was conducted because of the potential for contaminant vapors from the groundwater beneath your property to migrate through soils, accumulate beneath the foundation of your house, and possibly enter your indoor air. The contaminants of concern in the groundwater are tetrachloroethene (a/k/a perchloroethene, or PERC) and trichloroethene (TCE). The history of the Superfund project and the potential concerns to neighboring property owners were described in the original letter sent to you on March 13, 2017.

The results of the two previous sampling events were sent to you in letters dated May 11, 2017 and March 2, 2018. This letter provides the results of the third round of sampling on March 27, 2018. This sampling event consisted of two samples: one from beneath your basement slab and one from the indoor air of your main living area. The air samples were submitted to TestAmerica Laboratories where they underwent laboratory analysis for four different volatile organic compounds (VOCs), including PERC, TCE, cis-1,2-dichloroethene (c12DCE), and vinyl chloride (VC).

1. Your Sub-slab Test Results

Attached is a copy of the laboratory report for your sub-slab vapor sample. The results show that small amounts of PERC and TCE were detected in the sample taken from beneath your foundation. Although these compounds were detected in soil vapors beneath your basement, the levels at which they were detected are such that they do not pose a threat to you or your family. This is called “detections below screening levels” as explained in the enclosed fact sheet. The sub-slab results for your property are summarized in Table 1 below and the WDNR/U.S. EPA screening levels for sub-slab vapors at residential properties are included for comparison.



Table 1 Sub-slab Results and Screening Levels

	Date	Units	PERC	TCE	c12DCE	VC
1915 N. 2nd Street Sub-slab Results	3/27/18	µg/m ³	65	42	<0.095	<0.074
<i>WDNR/USEPA Residential Sub-slab Screening Levels</i>	---	µg/m ³	1,400	70	---- (1)	57

(1) Neither the State of Wisconsin nor the U.S. EPA have set a health standard for c12DCE in air.
µg/m³ – micrograms per cubic meter

2. Your Indoor Air Test Results

The indoor air results are also provided in the attached laboratory report. The results show that very low concentrations of PERC, TCE, and c12DCE were detected in the sample taken from the main level of your home. These results indicate that the contaminants of concern do not pose a threat to you or your family. The indoor air results are summarized in Table 2 below and the WDNR/U.S. EPA action levels for indoor air at residential properties are included for comparison.

Studies have shown that PERC and TCE concentrations at the levels shown in Table 2 are common in many homes in the United States due to the presence of common products such as adhesives, lubricants, and cleaning solutions. In addition, samples collected during the winter heating season represent the worst-case scenario and potential VOC concentrations in indoor air would typically be lower during other times of the year.

Table 2 Indoor Air Results and Action Levels

	Date	Units	PERC	TCE	c12DCE	VC
1915 N. 2nd Street Indoor Air Results	3/27/18	µg/m ³	0.65	0.52	0.099 J	<0.074
<i>WDNR/USEPA Residential Indoor Air Action Levels</i>	---	µg/m ³	42	2.1	---- (1)	1.7

(1) Neither the State of Wisconsin nor the U.S. EPA have set a health standard for c12DCE in air.
µg/m³ – micrograms per cubic meter

Note that the “J” notation in Table 2 indicates that the reported value was estimated because it was slightly higher than the laboratory method detection limit, but less than the method reporting limit.



The results of the three sampling events conducted at your home do not indicate a risk of vapors entering your home from beneath the foundation. Thus, no additional testing of your home is proposed.

Please feel free to contact me at 651-639-0913 if you have any questions about these results. In addition, the project managers for U.S. EPA and WDNR can be reached at the phone numbers or email addresses shown below.

- Mae Willkom: WDNR, email: – phone: 715-839-3748
- Sheri Bianchin: U.S. EPA, email: bianchin.sheri@epa.gov – phone: 312-886-4745

Sincerely,

GHD

A handwritten signature in black ink, appearing to read "Chuck Ahrens", written in a cursive style.

Chuck Ahrens

email: charles.ahrens@ghd.com

CA/sb/7

Encl.

cc: Mae Willkom, DNR
Sheri Bianchin, U.S. EPA
RP Group

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

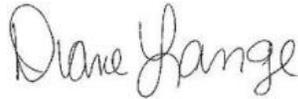
TestAmerica Job ID: 140-11144-1

Client Project/Site: Wausau Vapor Sampling

For:

GHD Services Inc.
1801 Old Highway 8 NW
Suite 114
St. Paul, Minnesota 55112

Attn: Mr. Grant Anderson



Authorized for release by:
4/11/2018 2:44:09 PM

Diana Lange, Project Management Assistant II
diane.lange@testamericainc.com

Designee for

Jamie McKinney, Senior Project Manager
(865)291-3000
jamie.mckinney@testamericainc.com

LINKS

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Definitions/Glossary

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-11144-1

Qualifiers

Air - GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-11144-1

Job ID: 140-11144-1

Laboratory: TestAmerica Knoxville

Narrative

Job Narrative
140-11144-1

Comments

No additional comments.

Receipt

The samples were received on 4/2/2018 9:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Air - GC/MS VOA

Method(s) TO 15 LL, TO-14A, TO-15: This report includes canister certification data for the batch certified and/or individually certified canisters used to collect samples as well as for any canisters used for dilution of those samples. All of the canisters used for sample collection or sample dilution for this job were certified to be clean to the levels listed on the results page. Please note that results for individually certified canisters that were not used for sample collection or sample dilution may also be included in the report because these canisters were in the same cleaning batch as the canisters used for this project. Since these canisters were not used for this job, the results have no bearing on the sample results.

Method(s) TO 15 LL, TO-15: EPA methods TO-14A and TO-15 specify the use of humidified "zero air" as the blank reagent for canister cleaning, instrument calibration and sample analysis. Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of "zero air" by TestAmerica Knoxville.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Client Sample ID: IA-180327-RA-05

Date Collected: 03/27/18 13:55

Date Received: 04/02/18 09:15

Sample Container: Summa Canister 6L

Lab Sample ID: 140-11144-11

Matrix: Air

1915 N. 2nd St. IA

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.025	J	0.080	0.024	ppb v/v			04/05/18 01:37	1
Tetrachloroethene	0.096		0.080	0.016	ppb v/v			04/05/18 01:37	1
Trichloroethene	0.097		0.040	0.014	ppb v/v			04/05/18 01:37	1
Vinyl chloride	ND		0.040	0.029	ppb v/v			04/05/18 01:37	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.099	J	0.32	0.095	ug/m3			04/05/18 01:37	1

TestAmerica Knoxville

Client Sample Results

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-11144-1

Client Sample ID: IA-180327-RA-05

1915 IA cont'd.

Lab Sample ID: 140-11144-11

Date Collected: 03/27/18 13:55

Matrix: Air

Date Received: 04/02/18 09:15

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	0.65		0.54	0.11	ug/m3			04/05/18 01:37	1
Trichloroethene	0.52		0.21	0.075	ug/m3			04/05/18 01:37	1
Vinyl chloride	ND		0.10	0.074	ug/m3			04/05/18 01:37	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		60 - 140					04/05/18 01:37	1

Client Sample ID: IA-180327-RA-05

Client Sample ID: SS-180327-RA-04

Lab Sample ID: 140-11144-4

Date Collected: 03/27/18 17:17

Matrix: Air

Date Received: 04/02/18 09:15

1915 N. 2nd St. S.S.

Sample Container: Summa Canister 1L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.80	0.24	ppb v/v			04/05/18 19:32	1
Tetrachloroethene	9.6		0.80	0.16	ppb v/v			04/05/18 19:32	1
Trichloroethene	7.8		0.40	0.14	ppb v/v			04/05/18 19:32	1
Vinyl chloride	ND		0.40	0.29	ppb v/v			04/05/18 19:32	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		3.2	0.95	ug/m3			04/05/18 19:32	1
Tetrachloroethene	65		5.4	1.1	ug/m3			04/05/18 19:32	1
Trichloroethene	42		2.1	0.75	ug/m3			04/05/18 19:32	1
Vinyl chloride	ND		1.0	0.74	ug/m3			04/05/18 19:32	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		60 - 140		04/05/18 19:32	1



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.

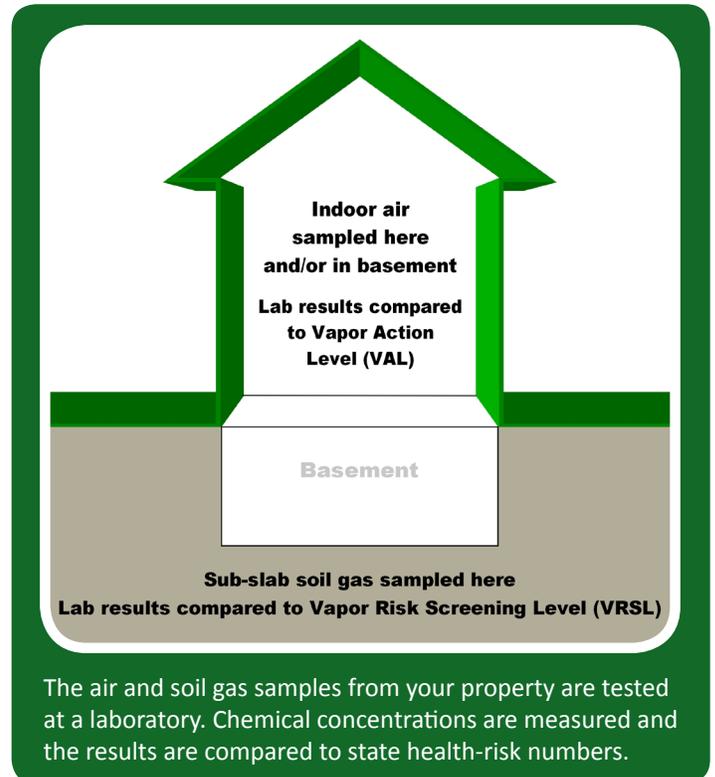
Indoor Air Testing Results

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.



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

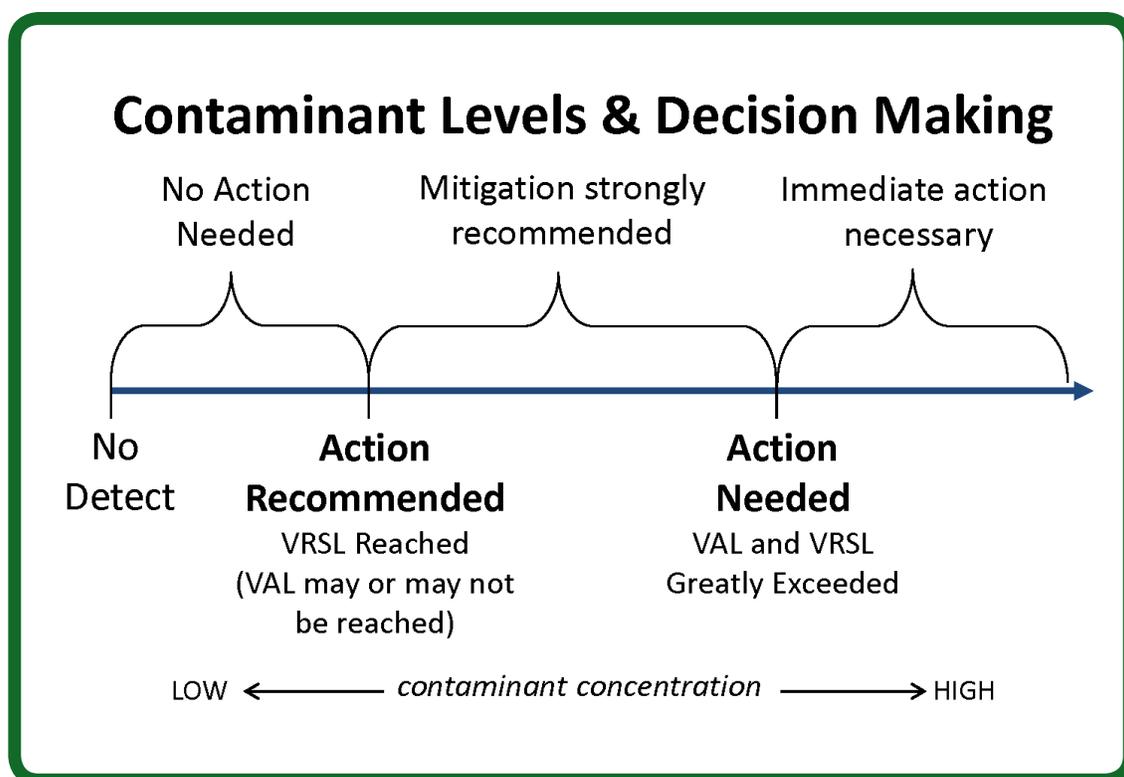
If your test results are less than a VAL for indoor air, or a VRSL for sub-slab soil gas, then the air in the house or building should not present a health concern. Follow-up sampling and testing may be necessary to confirm the results, but no other action is typically suggested.

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 $\mu\text{g}/\text{m}^3$ 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



October 31, 2018

Reference No. 003978

Brian Westberg
1909 N. 2nd St.
Wausau, Wisconsin 54403

Dear Mr. Westberg:

**Re: Sub-slab and Indoor Air Sampling Results, March 27, 2018
1909 N. 2nd Street, Wausau, Wisconsin 54403**

On behalf of the Responsible Parties (RPs) for the Wausau Water Supply Superfund Site, enclosed are the results of air samples collected at your house on March 27, 2018, by GHD Services Inc. (GHD). This sampling was required by both the Wisconsin Department of Natural Resources (WDNR) and the United States Environmental Protection Agency (U.S. EPA) as confirmation of previous sampling results. As you are aware, this investigation was conducted because of the potential for contaminant vapors from the groundwater beneath your property to migrate through soils, accumulate beneath the foundation of your house, and possibly enter your indoor air. The contaminants of concern in the groundwater are tetrachloroethene (a/k/a perchloroethene, or PERC) and trichloroethene (TCE). The history of the Superfund project and the potential concerns to neighboring property owners were described in the original letter sent to you on March 13, 2017.

The results of the two previous sampling events were sent to you in a letter dated March 2, 2018. This letter provides the results of the third round of sampling on March 27, 2018. This sampling event consisted of two samples: one from beneath your basement slab and one from the indoor air of your main living area. The air samples were submitted to TestAmerica Laboratories where they underwent laboratory analysis for four different volatile organic compounds (VOCs), including PERC, TCE, cis-1,2-dichloroethene (c12DCE), and vinyl chloride (VC).

1. Your Sub-slab Test Results

Attached is a copy of the laboratory report for your sub-slab vapor sample. The results show that small amounts of PERC and TCE were detected in the sample taken from beneath your foundation. Although these compounds were detected in soil vapors beneath your basement, the levels at which they were detected are such that they do not pose a threat to you or your family. This is called “detections below screening levels” as explained in the enclosed fact sheet. The sub-slab results for your property are summarized in Table 1 below and the WDNR/U.S. EPA screening levels for sub-slab vapors at residential properties are included for comparison.



Table 1 Sub-slab Results and Screening Levels

	Date	Units	PERC	TCE	c12-DCE	VC
1909 N. 2nd Street Sub-slab Results	3/27/18	µg/m³	100	8.6	<0.095	<0.074
<i>WDNR/USEPA Residential Sub-slab Screening Levels</i>	---	<i>µg/m³</i>	<i>1,400</i>	<i>70</i>	<i>---- (1)</i>	<i>57</i>

(1) Neither the State of Wisconsin nor the U.S. EPA have set a health standard for c12DCE in air.
µg/m³ – micrograms per cubic meter

2. Your Indoor Air Test Results

The indoor air results are also provided in the attached laboratory report. The results show that a small amount of PERC and TCE were detected in the indoor air sample taken from the ground floor of your home. These results indicate that the contaminants of concern do not pose a threat to you or your family. The indoor air results are summarized in Table 2 below and the WDNR/U.S. EPA action levels for indoor air at residential properties are included for comparison. Studies have shown that TCE and PERC concentrations at the levels shown in Table 2 are common in many homes in the United States due to the presence of common products such as adhesives, lubricants, and cleaning solutions. Typically, samples collected during the winter heating season represent the worst-case scenario and potential VOC concentrations in indoor air would be lower during other times of the year.

Table 2 Indoor Air Results and Action Levels

	Date	Units	PERC	TCE	c12DCE	VC
1909 N. 2nd Street Indoor Air Results	3/27/18	µg/m³	0.31 J	0.20	<0.095	<0.074
<i>WDNR/USEPA Residential Indoor Air Action Levels</i>	---	<i>µg/m³</i>	<i>42</i>	<i>2.1</i>	<i>---- (1)</i>	<i>1.7</i>

(1) Neither the State of Wisconsin nor the U.S. EPA have set a health standard for c12DCE in air.
µg/m³ – micrograms per cubic meter

Note that the “J” notation in Table 2 indicates that the reported value was estimated because it was slightly higher than the laboratory method detection limit, but less than the method reporting limit.



The results of the three sampling events conducted at your home do not indicate a risk of vapors entering your home from beneath the foundation. No additional testing of your home is proposed.

Please feel free to contact me at 651-639-0913 if you have any questions about these results. In addition, the project managers for U.S. EPA and WDNR can be reached at the phone numbers or email addresses shown below.

- Mae Willkom: WDNR, email: – phone: 715-839-3748
- Sheri Bianchin: U.S. EPA, email: bianchin.sheri@epa.gov – phone: 312-886-4745

Sincerely,

GHD

A handwritten signature in black ink, appearing to read "Chuck Ahrens", written in a cursive style.

Chuck Ahrens

CA/sb/7

Encl.

cc: Mae Willkom, DNR
Sheri Bianchin, U.S. EPA
RP Group

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

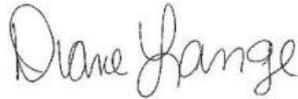
ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

TestAmerica Job ID: 140-11144-1
Client Project/Site: Wausau Vapor Sampling

For:
GHD Services Inc.
1801 Old Highway 8 NW
Suite 114
St. Paul, Minnesota 55112

Attn: Mr. Grant Anderson



Authorized for release by:
4/11/2018 2:44:09 PM

Diana Lange, Project Management Assistant II
diane.lange@testamericainc.com

Designee for

Jamie McKinney, Senior Project Manager
(865)291-3000
jamie.mckinney@testamericainc.com

LINKS

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results through
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Definitions/Glossary

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-11144-1

Qualifiers

Air - GC/MS VOA

Qualifier	Qualifier Description
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Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
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RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-11144-1

Job ID: 140-11144-1

Laboratory: TestAmerica Knoxville

Narrative

Job Narrative
140-11144-1

Comments

No additional comments.

Receipt

The samples were received on 4/2/2018 9:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Air - GC/MS VOA

Method(s) TO 15 LL, TO-14A, TO-15: This report includes canister certification data for the batch certified and/or individually certified canisters used to collect samples as well as for any canisters used for dilution of those samples. All of the canisters used for sample collection or sample dilution for this job were certified to be clean to the levels listed on the results page. Please note that results for individually certified canisters that were not used for sample collection or sample dilution may also be included in the report because these canisters were in the same cleaning batch as the canisters used for this project. Since these canisters were not used for this job, the results have no bearing on the sample results.

Method(s) TO 15 LL, TO-15: EPA methods TO-14A and TO-15 specify the use of humidified "zero air" as the blank reagent for canister cleaning, instrument calibration and sample analysis. Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of "zero air" by TestAmerica Knoxville.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Client Sample ID: SS-180327-RA-03

Date Collected: 03/27/18 16:39

Date Received: 04/02/18 09:15

Sample Container: Summa Canister 1L

Lab Sample ID: 140-11144-3

Matrix: Air

1909 N. 2nd St. S.S.

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.80	0.24	ppb v/v			04/05/18 18:48	1
Tetrachloroethene	15		0.80	0.16	ppb v/v			04/05/18 18:48	1
Trichloroethene	1.6		0.40	0.14	ppb v/v			04/05/18 18:48	1
Vinyl chloride	ND		0.40	0.29	ppb v/v			04/05/18 18:48	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		3.2	0.95	ug/m3			04/05/18 18:48	1
Tetrachloroethene	100		5.4	1.1	ug/m3			04/05/18 18:48	1
Trichloroethene	8.6		2.1	0.75	ug/m3			04/05/18 18:48	1

TestAmerica Knoxville

Client Sample Results

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-11144-1

Client Sample ID: SS-180327-RA-03

Lab Sample ID: 140-11144-3

Date Collected: 03/27/18 16:39

1909 N. 2nd St. S.S. cont'd.

Matrix: Air

Date Received: 04/02/18 09:15

Sample Container: Summa Canister 1L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	ND		1.0	0.74	ug/m3			04/05/18 18:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		60 - 140					04/05/18 18:48	1

Client Sample ID: IA-180327-RA-04

Date Collected: 03/27/18 15:45

Date Received: 04/02/18 09:15

Sample Container: Summa Canister 6L

Lab Sample ID: 140-11144-10

Matrix: Air

1909 N. 2nd St. IA

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.080	0.024	ppb v/v			04/05/18 00:53	1
Tetrachloroethene	0.046	J	0.080	0.016	ppb v/v			04/05/18 00:53	1
Trichloroethene	0.037	J	0.040	0.014	ppb v/v			04/05/18 00:53	1
Vinyl chloride	ND		0.040	0.029	ppb v/v			04/05/18 00:53	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.32	0.095	ug/m3			04/05/18 00:53	1
Tetrachloroethene	0.31	J	0.54	0.11	ug/m3			04/05/18 00:53	1
Trichloroethene	0.20	J	0.21	0.075	ug/m3			04/05/18 00:53	1
Vinyl chloride	ND		0.10	0.074	ug/m3			04/05/18 00:53	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		60 - 140		04/05/18 00:53	1



Understanding Chemical Vapor Intrusion Testing Results

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.

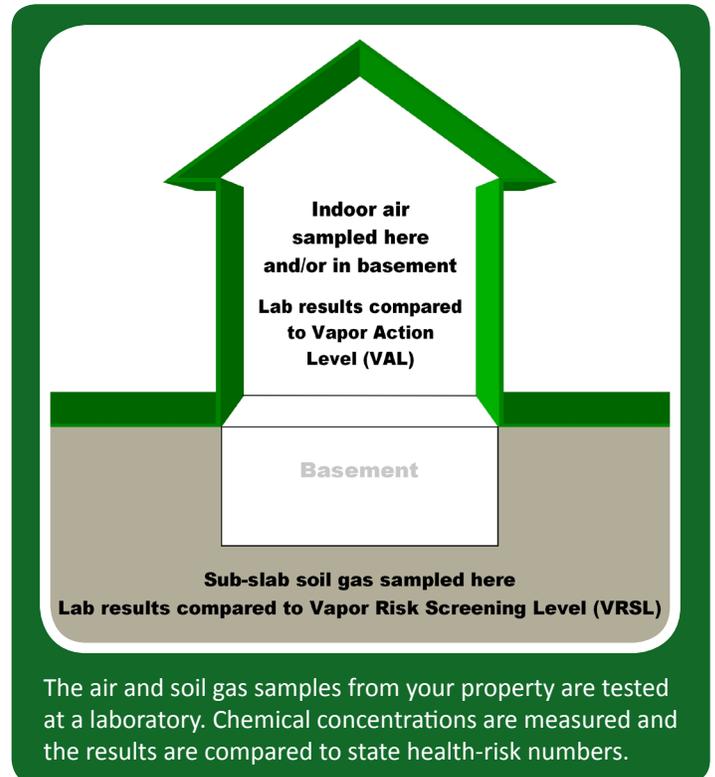
Indoor Air Testing Results

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.



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.



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

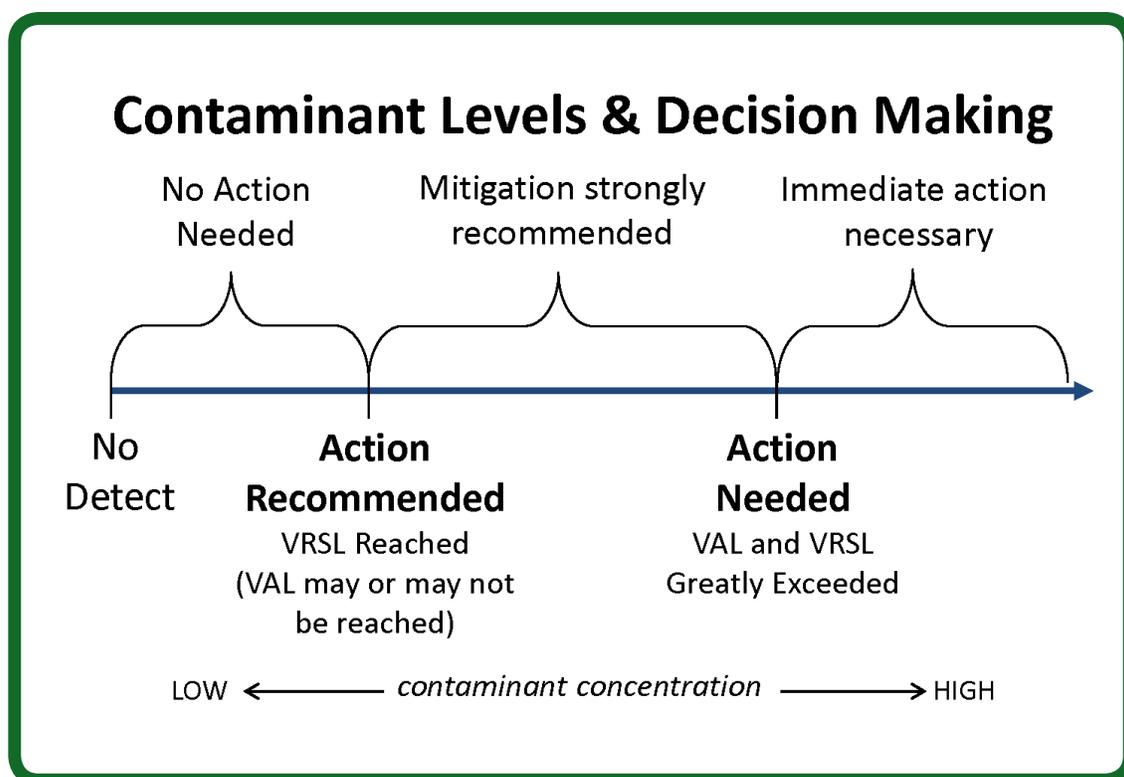
If your test results are less than a VAL for indoor air, or a VRSL for sub-slab soil gas, then the air in the house or building should not present a health concern. Follow-up sampling and testing may be necessary to confirm the results, but no other action is typically suggested.

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 $\mu\text{g}/\text{m}^3$ 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