



February 15, 2024

Robert Bach
JB Properties 8, LLC
P2 Development Company LLC
524 Technology Way
Saukville, WI 53080
Via Electronic Mail Only to robert3bach@gmail.com

Subject: Response to Vapor Sample Results
Mercury Marine Plant No. 1 FMR
N49 W6337 Western Road, Cedarburg, WI
BRRTS #: 02-46-588930; FID #: 246004770

Dear Robert Bach:

On February 9, 2024, the Wisconsin Department of Natural Resources (DNR) received vapor sampling results and a sample location map via email from your environmental consultant, Kapur, Inc. The results included sub-slab vapor and indoor air sampling data that were collected at the above referenced site between September 20, 2023, and November 30, 2023. The sub-slab vapor and indoor air samples were collected from multiple newly constructed residential buildings located on the site. It is the DNR's understanding the buildings are not currently occupied, and occupancy is scheduled beginning March 2024.

The sample results were not submitted with a fee for DNR review, however the DNR is providing a response due to concerns regarding the sample results and the schedule for building occupancy.

Trichloroethene (TCE) was detected in sub-slab vapors at concentrations exceeding the residential vapor risk screening level (VRSL) at multiple residential buildings located on the site. Based on conversations with Kapur, passive vapor mitigation systems were incorporated into all on-site residential buildings during construction due to the presence of soil, groundwater, and soil vapor contamination at the site. Excavation of contaminated soil was reportedly conducted in late 2022 and early 2023, before construction of the on-site residential buildings.

Inhalation of chemicals, including TCE, has the potential to cause negative health effects. The potential for negative health effects caused by the inhalation of chemicals depends on multiple factors, including the type of chemical, the concentration of the chemical in the air, and the length of exposure. There is some evidence that exposure to TCE while pregnant may result in heart defects during fetal development. Additional information regarding the potential health effects associated with exposure to TCE can be found at the Wisconsin Department of Health Services (DHS) website (<https://www.dhs.wisconsin.gov/chemical/trichloroethylene.htm>) and the enclosed DHS document: TCE in the Air.

The enclosed letter from DHS to the DNR, dated March 25, 2021, provides recommendations to reduce the risks associated with exposure to TCE. Review this document for guidance as you act to interrupt the vapor migration pathway, reduce the concentration of contaminants in the indoor air, and prevent exceedances of the applicable vapor action levels (VALs) in indoor air.

DNR Comments

The comments below are based on the information that has been submitted to date. A report documenting current site conditions, sub-slab vapor and indoor air sample methodology and results, conclusions, and recommendations has not been submitted to the DNR.

1. Wis. Admin. Code § NR 708.11(1)(b) states that the DNR may require the use of a vapor mitigation system, or other engineering control, when vapor concentrations beneath a slab, foundation, or building exceed a VRSL.

The vapor mitigation systems on-site are currently passive. The DNR requests that the vapor mitigation systems be activated in all buildings where VRSL exceedances have been identified. After activation of the vapor mitigation systems, conduct vapor mitigation system commissioning activities including indoor air sampling and pressure field extension testing to demonstrate the vapor mitigation systems are operating effectively.

2. Additional sub-slab vapor and indoor air sampling is necessary at buildings without active vapor mitigation systems. Alternatively, it is acceptable to activate the vapor mitigation systems and complete commissioning activities to demonstrate the vapor mitigation systems are operating effectively.
3. Conduct the vapor mitigation system commissioning activities and additional vapor sampling requested above before occupancy to demonstrate that vapor intrusion is not a risk to human health at the site.
4. The indoor air samples reported to date were collected over a duration of 30 minutes, which is not appropriate for indoor air sampling. The DNR recommends using passive vapor sampling devices to collect indoor air samples over a duration of 5-14 days. Work with the lab to ensure 1) selection of an appropriate passive sampling device and 2) reporting limits are below residential VALs.
5. Perform a vapor intrusion screening assessment to determine if vapor sampling is warranted at additional buildings located on or off-site. Site-specific information such as contaminant type, concentrations, preferential pathways, and distances from receptors should be considered in the screening assessment. Guidance regarding the performance of vapor intrusion screening assessments can be found in the DNR document: Addressing Vapor Intrusion at Remediation and Redevelopment Sites in Wisconsin (RR-800).
6. Documentation of the interim/remedial actions implemented at the site has not been submitted to the DNR. Provide an interim/remedial action report that documents the excavation activities conducted at the site and provides details regarding the construction of the existing vapor mitigation systems per Wis. Admin. Code ch. NR 724.
7. The site investigation has not been approved by the DNR. Additional action is required to complete the site investigation per Wis. Admin Code ch. NR 716.
8. The results of the site investigation should be evaluated to determine whether additional interim or remedial action is warranted per Wis. Admin. Code chs. NR 722, 724.
9. The sub-slab vapor and indoor air samples were not submitted to the DNR within 10 business days of receiving the sample results. As a reminder, Wis. Admin. Code § NR 716.14 requires submittal of sample results within 10 business days of receiving the sample results.

Next Steps

Within 15 days of the date of this letter, by March 1, 2024, provide your plans to complete the actions requested above and ensure that vapor intrusion is not a risk to current and future occupants of the contamination site.

This letter is not intended as an exhaustive list of all actions needed to comply with the requirements of Wis. Admin. Code chs. NR 700-754. Additional action may be necessary to complete the site investigation, remediate the site to the extent practicable, and achieve case closure. Wis. Admin. Rules chs. NR 700-799 offer multiple options to complete environmental site investigations and remediation. Your environmental consultant can help identify the best approach that also meets your needs. DNR staff can provide fee-based technical assistance reviews, response letters and meetings to help move sites to closure.

If you have any questions regarding this letter or would like to discuss the letter, please contact me, as the DNR project manager, at (414) 704-4348 or by email at connor.mulcahy@wisconsin.gov.

Sincerely,



Connor P. Mulcahy
Hydrogeologist – Southeast Region
Remediation & Redevelopment Program

Enclosures: DHS document “TCE in the Air” (P-02480, 10/2020)
Letter from DHS to the DNR, dated March 25, 2021 – “DHS response to Request for Assistance:
Actions for Trichloroethylene at Acute Risk Levels”

cc: Travis Peterson, Kapur, Inc. – tpeterson@kapurinc.com

TCE in the Air

Trichloroethylene (TCE) health effects and actions you can take to protect your home's air

TCE is a man-made chemical used to clean metal in some factories and is found in some household items like paint, spot removers, and varnishes. If spilled, it can stay in the ground for a long time.

Why should I care?

- It can enter your home through cracks in the floor or walls of your basement, and other openings.
- It evaporates quickly and breathing the vapors is not healthy.
- It can cause cancer if you breathe it over a long period of time.

Who has more risk?

Babies whose mother's breathe in TCE while pregnant can have:

- Lower birth weights
- Heart defects
- Nervous or immune system problems

What if TCE is in my community?

If there is a known concern, environmental health professionals will ask to check your home to make sure there is no TCE inside.

They need your permission to drill in your basement and test.

If they find high levels of TCE, they will suggest that you have a special system installed to fix the problem.

Do I have to pay?

The people responsible for the spill will probably have to pay for the testing and any repairs that have to be made.

A "sub-slab mitigation" system moves air from below to outside the house.



What else can I do?

- Wear protective gloves if you use products with TCE (like paint remover).
- Use only small amounts of products containing TCE.
- Use the chemical in well-ventilated areas.
- Do not stay in the room for long periods of time if you can smell the chemical while using it or after using it.

Where can I learn more?

- [Vapor Intrusion 101 \(video\)](https://www.youtube.com/watch?v=izo0QKqCToU):
www.youtube.com/watch?v=izo0QKqCToU
- [Vapor Intrusion Investigation — Information Sheet for Neighbors](https://dnr.wi.gov/files/PDF/pubs/rr/RR067.pdf):
<https://dnr.wi.gov/files/PDF/pubs/rr/RR067.pdf>
- [Why Test for Vapor Intrusion?](https://dnr.wi.gov/files/PDF/pubs/rr/RR953.pdf):
<https://dnr.wi.gov/files/PDF/pubs/rr/RR953.pdf>
- [Mitigation: Protection from Vapor Intrusion](https://dnr.wi.gov/files/PDF/pubs/rr/RR094.pdf):
<https://dnr.wi.gov/files/PDF/pubs/rr/RR094.pdf>



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March 25, 2021

Christine Haag
Program Director
Remediation and Redevelopment Program
Wisconsin Department of Natural Resources
101 S. Webster Street, P.O. Box 7921
Madison, WI 53707-7921

Subject: DHS response to Request for Assistance: Actions for Trichloroethylene at Acute Risk Levels

Dear Ms. Haag:

The Wisconsin Department of Health Services (DHS) received your letter dated October 18, 2019 requesting clarification on the definition of acute risk and timeline justifications for responding to various scenarios where the acute risk is related to volatile organic compounds (VOCs) and vapor intrusion (VI).

This request for clarification is intended to augment a December 7, 2017 DHS letter to the Wisconsin Department of Natural Resources (DNR) providing recommendations for when immediate action is needed in response to written comments on proposed revisions to the RR-800 document. Specifically, DHS concurred with DNR's position that immediate action is justified when indoor air is found to be present at three (3) times the indoor air vapor action level (VAL) or sub-slab vapor risk screening level (VRSL) for a non-carcinogen or ten (10) times the VAL or VRSL for a carcinogen. In addition, DHS supported the DNR's position that immediate action be taken when trichloroethylene (TCE) is present in indoor air above the VAL and when women of child-bearing age are present.

DHS response:

DHS clarification statements defining acute risk and justifying timelines for responding to acute risk follow for each of the DNR scenarios presented in the request letter:

1. Clarification from DHS that acute risk necessitates immediate action as defined in s. NR 700.03(28), Wis. Admin. Code.

To reinforce the finding in the December 7, 2017 letter, DHS is in agreement that DNR's immediate action as defined in s. NR 700.03(28), Wis. Admin. Code is warranted when acute risk is observed as discussed in DNR's Vapor Intrusion Guidance RR800 (2018). For all contaminants with the exception of trichloroethylene (TCE) when women of childbearing years (age 15 to 44) are present, acute risk is defined as indoor air concentrations that are three times over the vapor action limit (VAL) for non-carcinogens

or ten times over the VAL for carcinogens. For TCE where people who are or may become pregnant occupy a dwelling, acute risk is defined as indoor air concentrations that are equal to or over the VAL ($HI \geq 1$). These immediate action guidelines are in agreement with EPA guidance. The following statement is from the EPA OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air (EPA 2015): “Although the indoor air concentrations may vary temporally, an appropriate exposure concentration estimate (e.g., time-integrated or time-averaged indoor air concentration measurement in an occupied space) that exceeds the health-protective concentration levels for acute or short-term exposure (i.e., generally considered to be a hazard quotient (HQ) greater than one for an acute or short-term exposure period) indicates vapor concentrations that are generally considered to pose an unacceptable human health risk.”

2. Clarification from DHS that trichloroethylene (TCE) present in indoor air above the applicable VAL qualifies as an acute risk to women of child-bearing years.

DNR basis its VAL and VRSL values on EPA regional screening levels (RSLs) for indoor air. These values are developed using reference concentrations (RfCs) from EPA's toxicological assessments developed for its Integrated Risk Information System (IRIS). The non-cancer chronic inhalation RfC of 2×10^{-3} mg/m³ in EPA's toxicological assessment for TCE (2011) is based upon two rodent drinking water exposure studies. One study (Kiel et al., 2009) reported an immunotoxic effect of TCE presenting as a reduced thymus weight in female mice. The other study reported an increased incidence of fetal cardiac malformations (Johnson et al., 2003). The cardiac malformation developmental endpoint drives the concern over short term exposure to TCE. Although some limitations were reported with the Johnson et al. study (2003), the cardiac malformations finding has been confirmed by several reviews since, including the EPA Office of Solid Waste and Emergency Response (2014), ATSDR (2014), the Massachusetts Department of Environmental Protection (MADEP, 2014), a group of EPA researchers (Makris et al, 2016), and the North Carolina Department of Environmental Quality (NC DEQ, 2018). These reviews found that a two- to three-fold increase in congenital heart defects were observed in multiple animal studies and that the most frequently observed heart defects were also reported in humans exposed to TCE-containing VOCs in several epidemiological studies (Brender et al. 2014, Dawson et al. 1993). These reviews also found that mechanistic support exists with studies in avian and mammalian cells demonstrating that TCE exposure alters processes that are critical to normal valve and septum formation. Although a recent EPA TSCA Risk Evaluation for TCE (2019) used the immunotoxic end point and not the fetal cardiac malformation end point for their risk determinations, the EPA Science Advisory Committee on Chemicals (SACC) was split on whether to use the fetal heart malformations endpoint for risk consideration and the TSCA Risk Evaluation was not allowed to consider epidemiological evidence or the effects of TCE exposure from air, contaminated waste sites, groundwater used for drinking water, and food in their evaluation.

The EPA identifies that a single exposure at any of several developmental stages may be sufficient to produce an adverse developmental effect (EPA, 1991). In humans, the cardiac system is the second to develop following fertilization, with cardiac development beginning at approximately 3 weeks following implantation. Substantial cardiac system development continues through 8 to 9 weeks post implantation, with the most sensitive period of cardiac development occurring in 3 to 6 weeks (Smart and Hodgson, 2018). These critical fetal heart development windows occur during a time period when an individual may not yet know they are pregnant. Rapid actions should be taken to minimize the potential for TCE exposures during these timeframes (EPA 2014, EPA Region V, 2020).

3. Health-based recommended responses including the definition of critical exposure windows with scientific justification to help inform DNR determination of time lines for immediate (s. NR 700.03(28), Wis. Admin. Code) and interim (s. NR 700.03(29), Wis. Admin. Code) actions in the following scenarios:

a. TCE is present beyond the envelope of a building at or above the applicable Vapor Risk Screening Level (VRSL);

DHS recommends an evaluation of the demographics for the building. If persons of childbearing years occupy the dwelling, indoor air samples should have a quick turnaround time (24 to 72 hours, EPA Region 9, 2014). Women in the sensitive demographic should be consulted about the potential TCE developmental toxicity risk so they may make informed decisions in terms of staying in the dwelling during the timeframe of the indoor air assessment. DHS or local health can assist with this consultation. If the indoor air TCE sample result exceeds the VAL, DHS recommends interim action (carbon filter unit) and rapid installation of sub-slab depressurization system within two weeks. If the indoor air TCE sample result is less than the VAL, mitigate and monitor indoor air in interim to ensure exposure is not occurring and move toward installation of a mitigation system within 4 to 8 weeks, depending upon the building's complexity and need for system design.

b. Non-carcinogenic compounds are present beyond the envelope of a building at or above three (3) times the applicable VRSL;

The U.S. EPA defines a reference concentration (RfC) as an estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure of a chemical to the human population through inhalation (including sensitive subpopulations), that is likely to be without an appreciable risk of deleterious effects during a lifetime (IRIS Glossary, 2020). When a non-carcinogenic VOC is three times above the applicable VRSL, the risk of that VOC being present in indoor air at levels that can cause an adverse health effect is high enough to warrant urgent action including indoor air sampling with 24 to 72 hour turnaround time and mitigation within 4 to 8 weeks, or sooner where indoor air sampling results indicates a VAL exceedance.

- c. Carcinogenic compounds are present beyond the envelope of a building at or above ten (10) times the applicable VRSL;**

VRSLs are established in Wisconsin with a 10^{-5} cancer risk. When a carcinogenic compound is present in indoor air at or above ten times the applicable VRSL, the cancer risk exceeds 10^{-4} cancer risk. The risk of cancer occurrences from continuous exposure is therefore high enough to warrant the installation of a mitigation system within 4 to 8 weeks, depending upon the building's complexity and need for system design.

- d. TCE is present in indoor air below the applicable VAL**

Review sub-slab results when available. If sub-slab TCE data is also below VRSL, additional assessment should take place with normal laboratory turnaround time to confirm results are below action levels. If women of childbearing years occupy the building, an additional sampling round should take place as soon as feasible to ensure levels above VAL/VRSL is not present.

- e. Non-carcinogenic compounds are present in indoor air between the applicable VAL and three (3) times the applicable VAL;**

Move toward mitigation system installation within 4 to 8 weeks, depending upon complexity and need for system design. Perform indoor air sampling to confirm mitigation system is effective.

- f. Carcinogenic compounds are present in indoor air between the applicable VAL and ten (10) times the applicable VAL;**

Move toward mitigation with a recommended timeframe of 4 to 8 weeks, depending upon complexity and need for system design. Perform indoor air sampling to confirm mitigation system is effective.

- g. TCE is present in indoor air at or above the applicable VAL;**

DHS recommends an evaluation of the demographics for the building. If women of childbearing years occupy the building, implement interim actions such as carbon filtration units to interrupt the TCE exposure. Move toward installation of a mitigation system within two weeks. Women in the sensitive demographic should be consulted about the potential TCE developmental toxicity risk so they may make informed decisions in terms of staying in the dwelling during the timeframe of the indoor air assessment.

- h. Non-carcinogenic compounds are present in indoor air at or above three (3) times the applicable VAL;**

The U.S. EPA defines a reference concentration (RfC) as an estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure of a chemical to the human population through inhalation (including sensitive subpopulations), that is likely to be without an appreciable risk of deleterious effects during a lifetime (IRIS Glossary, 2020). When a non-carcinogenic VOC is three times above the applicable VAL, the risk of adverse health effects occurring from continuous exposure is high enough to warrant the installation of a mitigation system within 4 to 8 weeks, depending upon the building's complexity and need for system design. Depending upon how far above the VAL the concentration is, more urgent actions may be needed, and the local health officer should be consulted for potential abatement orders, placarding, and temporary relocation of occupants per Section 254 Wis. Admin. Code.

i. Carcinogenic compounds are present in indoor air at or above ten (10) times the applicable VAL.

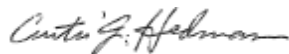
When a carcinogenic compound is present in indoor air at or above ten times the applicable VAL, the cancer risk exceeds 10^{-4} cancer risk. The risk of cancer occurrences from continuous exposure is therefore high enough to warrant the installation of a mitigation system within 4 to 8 weeks, depending upon the building's complexity and need for system design. Depending upon how far above the VAL the concentration is, more urgent actions may be needed, and the local health officer should be consulted for potential abatement orders, placarding, and temporary relocation of occupants per Section 254 Wis. Admin. Code.

4. Health-based recommendations for when sampling indoor air at commercial or industrial businesses is necessary in light of the recent Department of Defense study on sewers and utility tunnels as preferential pathways (*Sewers and Utility Tunnels as Preferential Pathways for Volatile Organic Compound Migration into Buildings: Risk Factors And Investigation Protocol*, ESTCP Project ER-201505).

DHS agrees with the finding in the DoD study that indoor air should be part of the VI assessment where evidence of preferential pathways might be feasible. This evidence may include detection of VOCs in sewer lines or utility corridors. Recent experience has shown instances where indoor air levels are found at high levels due to preferential pathway contamination through open sumps, openings in foundations, and poorly sealed conduits. DHS also recommends sampling indoor air when environmental sampling (groundwater, soil, or soil gas) indicates that indoor air action levels could be exceeded. When TCE is the contaminant of concern, indoor air should always be evaluated to assist with the risk assessment and be able to interrupt exposures as soon as possible to sensitive populations to prevent the known reproductive/developmental endpoint. When commercial or industrial businesses are users of the VOCs being studied, those chemicals may need to be temporarily removed prior to the indoor air assessment, where feasible.

Thank you for the opportunity to provide feedback on this topic. Please contact me at (608) 266-6677, or curtis.hedman@wisconsin.gov if you have any follow up questions or comments about this response.

Sincerely,



Curtis Hedman, Ph.D.
Toxicologist
Bureau of Environmental and Occupational Health

Cc: Jennifer Borski, Vapor Intrusion Team Leader, DNR R&R Program
Judy Fassbender, NR Program Manager, DNR R&R Program
Roy Irving, Chief, DHS Hazard Assessment Section, BEOH
Mark Werner, Chief, DHS BEOH

Enc: Summary of DHS response to Request for Assistance: Actions for Trichloroethylene at Acute Risk Levels

References:

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Enclosure: Summary of DHS response to Request for Assistance: Actions for Trichloroethylene at Acute Risk Levels

DNR Ask	DHS Response	Supporting Reference(s)
<p>1) Clarification from DHS that acute risk necessitates immediate action as defined in s. NR 700.03(28), Wis. Admin. Code.</p>	<p>A) Immediate action as defined in NR 700.03(28) warranted if: for compounds except TCE = 3x VAL, or 10x VAL carcinogens; TCE w/ women age 15-44 = VAL</p>	<p>A) December 7, 2017 DHS letter and EPA OSWER Tech Guide (2015)</p>
<p>2) Clarification from DHS that trichloroethylene (TCE) present in indoor air above the applicable VAL qualifies as an acute risk to women of child-bearing years</p>	<p>A) VALs&VRSLs based on EPA RSLs B) RSL for TCE is based on immunotox. and fetal cardiac development endpoints C) findings confirmed by reviews D) also consistent with epi study findings E) single exposure during development can have harmful effect F) critical development window 3 to 6 weeks G) rapid action warranted for TCE > RSL</p>	<p>A) EPA tox assessment TCE (2011) B) Kiel et al. (2009) Johnson et al. (2003) C) EPA OSWER (2014), ATSDR (2014), MADEP (2014), Makris et al (2016), NC DEQ (2018) D) Brender et al. (2014), Dawson et al. (1993) E) EPA (1991) F) Smart and Hodgson (2018) G) EPA 2014, EPA Region V (2020)</p>
<p>3) Health-based recommended responses including the definition of critical exposure windows with scientific justification to help inform DNR determination of time lines for immediate (s. NR 700.03(28), Wis. Admin. Code) and interim (s. NR 700.03(29), Wis. Admin. Code) actions in the following scenarios:</p>		
<p>a) TCE is present beyond the envelope of a building at or above the applicable Vapor Risk Screening Level (VRSL)</p>	<p>A) evaluate demographics in building B) sample indoor air with 24-72 hour TAT C) consult w/ women 15-44 about TCE D) if TCE >VAL, carbon filtration w/in 48 hours and sub-slab system w/in 2 weeks E) if TCE <VAL, perform another indoor air sample and sub-slab system w/in 4-8 weeks</p>	<p>B) EPA Region 9, (2014) WI DNR RR800 (2018), EPA Reg V (2020)</p>
<p>b) Non-carcinogenic compounds are present beyond the envelope of a building at or above three (3) times the applicable VRSL</p>	<p>A) RfC is estimate, ca. order of magnitude, of concentration w/o harm over lifetime B) >3x that level cuts significantly into that safety factor C) indoor air sampling with 24-72 hour TAT D) sub-slab system w/in 4-8 weeks if >VAL</p>	<p>C) EPA Region 9, (2014) WI DNR RR800 (2018), EPA Reg V (2020)</p>
<p>c) Carcinogenic compounds are</p>	<p>A) VRSLs est. w/ 10⁻⁵ cancer risk</p>	<p>WI DNR RR800 (2018), EPA Reg. V (2020)</p>

Enclosure: Summary of DHS response to Request for Assistance: Actions for Trichloroethylene at Acute Risk Levels

<p>present beyond the envelope of a building at or above ten (10) times the applicable VRSL</p>	<p>B) >10x that exceeds 10^{-4} cancer risk C) sub-slab system w/in 4-8 weeks if >10x VRSL</p>	
<p>d) TCE is present in indoor air below the applicable VAL</p>	<p>A) verify TCE in sub-slab is not >VRSL B) If TCE also <VRSL; one more sampling event C) do follow up samples soon as possible if women age 15-44 live in building</p>	<p>WI DNR RR800 (2018), EPA Reg. V (2020)</p>
<p>e) Non-carcinogenic compounds are present in indoor air between the applicable VAL and three (3) times the applicable VAL</p>	<p>A) sub-slab system w/in 4-8 weeks B) sample to confirm system is effective</p>	<p>WI DNR RR800 (2018), EPA Reg. V (2020)</p>
<p>f) Carcinogenic compounds are present in indoor air between the applicable VAL and ten (10) times the applicable VAL</p>	<p>A) sub-slab system w/in 4-8 weeks B) sample to confirm system is effective</p>	<p>WI DNR RR800 (2018), EPA Reg. V (2020)</p>
<p>g) TCE is present in indoor air at or above the applicable VAL</p>	<p>A) evaluate demographics in building B) consult w/ women 15-44 about TCE C) carbon filtration w/in 48 hours and sub-slab system w/in 2 weeks</p>	<p>WI DNR RR800 (2018), EPA Reg. V (2020)</p>
<p>h) Non-carcinogenic compounds are present in indoor air at or above three (3) times the applicable VAL</p>	<p>A) RfC is estimate, ca. order of magnitude, of concentration w/o harm over lifetime B) >3x that level cuts significantly into that safety factor C) sub-slab system w/in 4-8 weeks D) if >>VAL, consult health officer for actions available under Section 254 WI Administrative Code</p>	<p>WI DNR RR800 (2018), EPA Reg. V (2020)</p>
<p>i) Carcinogenic compounds are present in indoor air at or above ten (10)</p>	<p>A) VRSLs est. w/ 10^{-5} cancer risk B) >10x that exceeds 10^{-4} cancer risk C) sub-slab system w/in 4-8 weeks</p>	<p>WI DNR RR800 (2018), EPA Reg. V (2020)</p>

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<p>times the applicable VAL</p>	<p>D) if >>VAL, consult health officer for actions available under Section 254 WI Administrative Code</p>	
<p>4) Health-based recommendations for when sampling indoor air at commercial or industrial businesses is necessary in light of the recent Department of Defense study on sewers and utility tunnels as preferential pathways (<i>Sewers and Utility Tunnels as Preferential Pathways for Volatile Organic Compound Migration into Buildings: Risk Factors And Investigation Protocol</i>, ESTCP Project ER-201505)</p>	<p>A) DHS agrees with DOD study findings B) DHS recommends sampling indoor air when soil gas results suggest indoor air levels may be exceeded C) Indoor air should always be assessed where TCE is contaminant of concern due to acute reproductive endpoint D) when assessing indoor air in commercial buildings, may need to relocate COCs that are used in production during sampling</p>	<p>US DOD ESTCP Project ER-201505 (2018)</p>