Spring 2020 EPA Vapor Intrusion Workshop

Why (When, Where, and How) You Should Monitor Indoor Radon, Differential Temperature & Pressure During Chlorinated Vapor Intrusion Assessments

Introduction and Overview

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Monitoring Indicators, Tracers, and Surrogates (ITS) for Chlorinated Vapor Intrusion (CVI) Assessment and Mitigation - Overview

Fourth EPA workshop on ITS for VI

- Brings in temperature, pressure, and radon data for “new” sites
- New data analyses = new ideas and insights on using ITS measurements as “lines of evidence” for VI

With new and old ITS data we look at:

- Temporal variability (e.g., seasonality) at several sites
- Spatial variability (e.g., assessing large plumes – or – large buildings)
- Preferential pathways (e.g., new research in Region 9)

Monitoring Indicators, Tracers, and Surrogates (ITS) for Chlorinated Vapor Intrusion (CVI) Assessment and Mitigation – Workshop Objectives

We are seeking your experience-based input on the value of specific methodologies for using ITS values in VI assessments.

Four topic areas (for discussion at end of workshop):

1. Does the evidence support a recommendation to measure ITS during VI investigations?
2. Can ITS be applied for initial site screening, for example, to select buildings or building areas for assessment?
3. Can ITS be used to address the temporal variability of VI?
4. Does the evidence support development of peer-reviewed standard methodologies for ITS measurements and use (e.g., SW 846)?

Definition Review: Indicator

Metrics that can indicate elevated potential for chlorinated volatile organic compound (CVOC) exposures.

Think:

- An indicator in chemistry is a substance whose color varies with acidity or alkalinity.
- An indicator in biology is a species an animal or plant species that can be used to infer conditions of a particular habitat. For example amphibians are sensitive to environmental stress.

For VI temperature, differential pressure, radon presence can be indicators.

Images reprinted from: http://sciencefair.math.iit.edu/techniques/PHTesting/PHTesting.jpg
http://news.psu.edu/story/140702/2002/05/01/research/lessons-toads

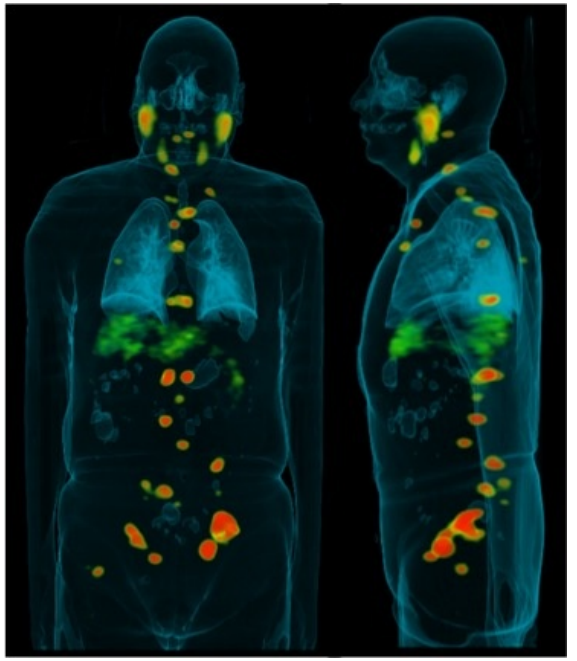
Definition Review: Tracer

Easily observable substances that move physically along with the target compounds of interest for VI

Think:

- In hydrogeology and medicine an identifiable substance, such as a dye or radioactive isotope, that can be followed through the course of a mechanical, chemical, or biological process.

For VI radon can be a tracer of processes across the slab and into the building.



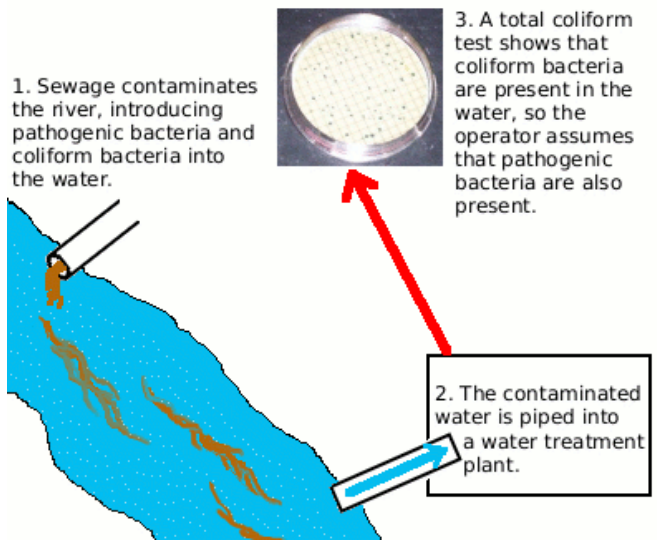
Photos reprinted from: http://newsroom.unl.edu/announce/files/file9957.png
https://meyercancer.weill.cornell.edu/news/2016-01-25/tracer-treatment-radiopharmaceuticals-home-hard-detect-cancers

Definition Review: Surrogate

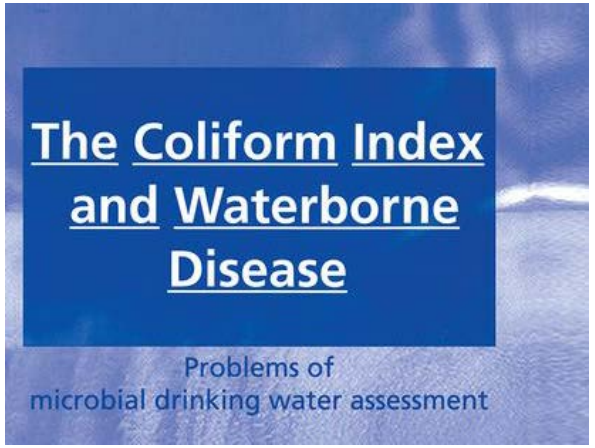
Metrics with a <u>quantitative</u> relationship to the target compound for VI, sufficiently accurate to be a substitute.

"In . . microbiology and health risk assessment, we have defined surrogates as organisms, particles, or substances *[that]* . . . allow quantification of the degree of exposure" (Sinclair, 2012)

For VI <u>radon</u> can be used a surrogate for <u>quantifying</u> the percentage of soil gas in indoor air.



Images from:
https://water.me.vccs.edu/courses/ENV295Micro/lesson9b.htm
https://images.tandf.co.uk/common/jackets/amazon/978041921/9780419218708.jpg



Sinclair, Ryan G., Joan B. Rose, Syed A. Hashsham, Charles P. Gerba, and Charles N. Haas. "Criteria for selection of surrogates used to study the fate and control of pathogens in the environment." *Applied and environmental microbiology* 78, no. 6 (2012): 1969-1977.

New EPA Fact Sheets on Measuring ITS

- EPA Fact Sheets for measuring ITS (2-4 pages, introduced in 2019 Fall Workshop):
  - *Monitoring radon as a VI tracer or surrogate*
  - *Measuring pressure as a VI indicator*
  - *Measuring temperature a VI indicator*
- *Fact sheets are being finalized (they are ready for use)*
- *Describe how to measure ITS parameters in the context of a VI investigation*
- *Include example instruments, references for further information*

https://iavi.rti.org/workshops.html

Workshop Website

For Abstract, Agenda, Bios, Acronym List, and ITS Fact Sheets:

https://iavi.rti.org/workshops.html

-or-

iavi.rti.org, click on “Workshops and Conferences”

(presentations to be available there by end of March)

Monitoring Indicators, Tracers, and Surrogates (ITS) for Vapor Intrusion (VI) Assessment and Mitigation – *Today's Speakers:*

- U.S. Environmental Protection Agency
  - Henry Schuver, Office of Resource Conservation and Recovery (ORCR)
  - Brian Schumacher, Office of Research and Development (ORD)
  - Bhooma Sundar, Region 5
  - Alana Lee, Region 9
- Jacobs
  - Chris Lutes, Loren Lund, Keri Hallberg
- Geosyntec
  - Chase Holton
- Groundswell
  - Mark Kram
- RTI International
  - A.J. Kondash, Robert Truesdale

(See full bios at: https://iavi.rti.org/workshops.html.)

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