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ENVIRONMENTAL DATA MANAGEMENT

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NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

earthsoft

Managing Soil Vapor Intrusion Data

In an Enterprise Environmental Data Management System

Chris Mickle

5/9/2018

Soil Vapor Intrusion Data Use Case

- About TRC
- Introduction to Soil Vapor Intrusion
- Data Management Requirements
- Evolution of Field Data Collection Tools
- Soil Vapor Intrusion Regulatory Limits
- Soil Vapor Intrusion Reporting Requirements
- Demonstration
- Questions / Discussion
- Acknowledgements

About the Speaker

Chris Mickle - Technical Director for Information Management of TRC's EH&S, Engineering, Construction, and Remediation practice. Chris is a project and client manager for environmental management and information solutions projects while expanding TRC's environmental data management system capabilities, streamlining the use of commercial-off-the-shelf technologies, and increasing system integration with GIS, IoT, remote sensing, and mobile platforms.

- Certified Project Manager (PMP)
- Member of the Advisory Committee on Water Information (ACWI.gov)
  - Subcommittee on Spatial Water Data
  - Emergency Spill Response Working Group
- Chair of Valid Values Best Management Practice Subcommittee for the International Conference for Environmental Data Management (ICEDM.net)
- Bachelors in Management Information Systems – Northeastern University
- Graduate Certificate in Geospatial Information Technology – N.C. State

TRC's Guiding Principles

Our Mission

We understand our clients' goals and embrace them as our own, applying creativity, experience, integrity and dedication to deliver superior solutions to the world's energy, environment and infrastructure challenges.

Our Vision

We will solve the challenges of making the Earth a better place to live – community by community and project by project.

Our Values

We commit to these values to guide our decisions and our behaviors:

Safety: We create a working environment that promotes safe performance.

Quality: We always strive for excellence in the services we provide and in the results we produce for our clients.

Integrity: We are committed to the highest ethical standards.

Creativity: We believe in looking at challenges and opportunities from new angles and in exercising our curiosity.

Accountability: We take responsibility for all of our decisions and actions.

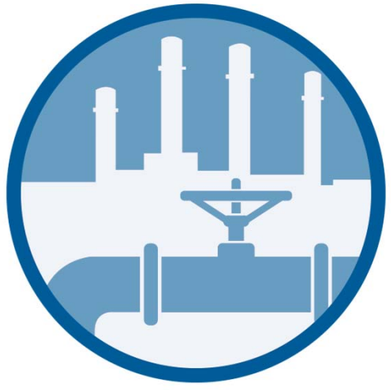
Teamwork: We work together to succeed.

Passion: We deliver superior results because we care deeply about what we do.

Company Profile

A pioneer in groundbreaking scientific and engineering developments since the 1960s, TRC is a national engineering, consulting and construction management firm providing integrated services to the power, oil and gas, environmental and infrastructure markets.

Power

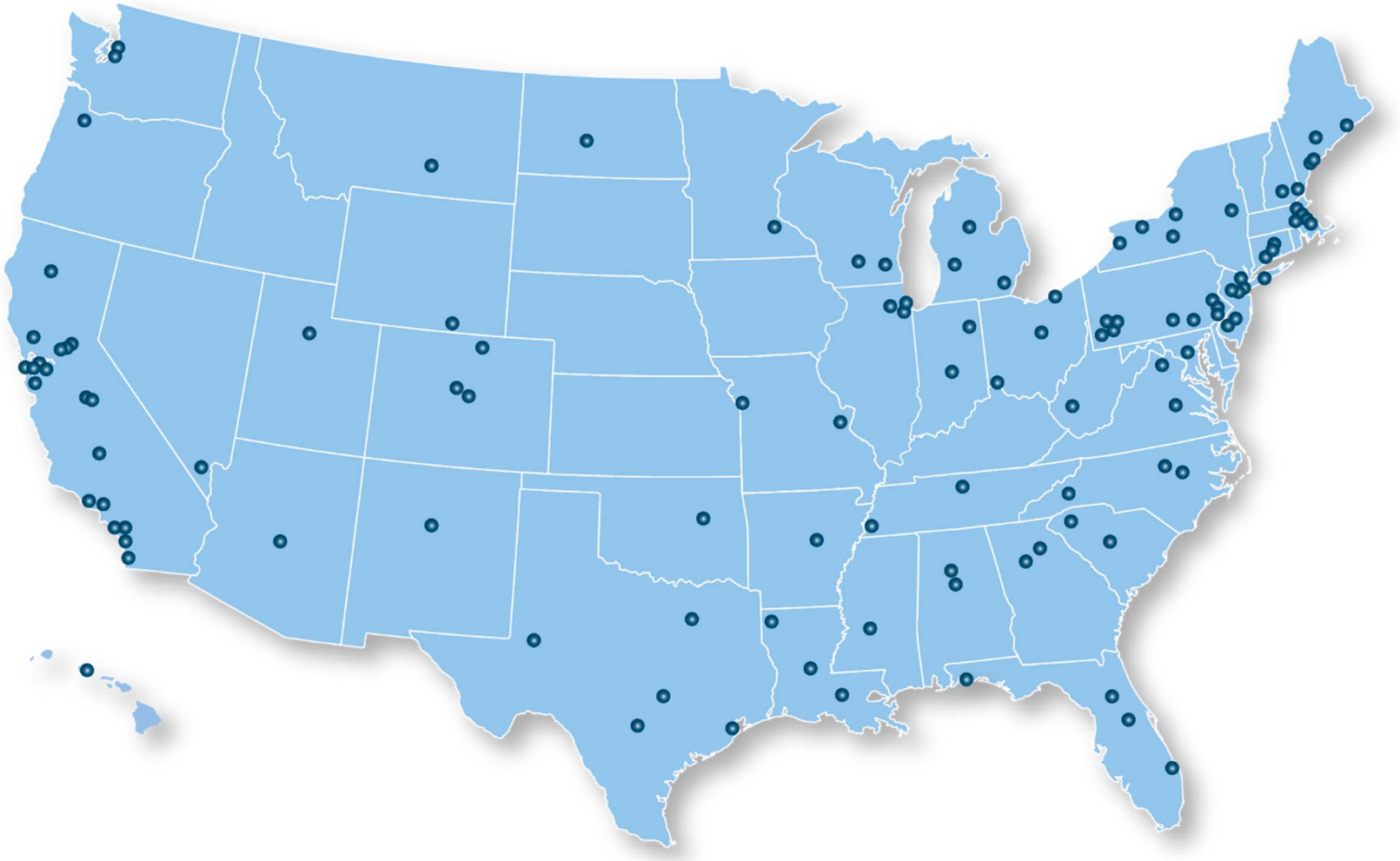


Oil & Gas

Infrastructure

Environmental

TRC Offices



- 4000+ employees
- 120+ U.S. offices; London and Shanghai office

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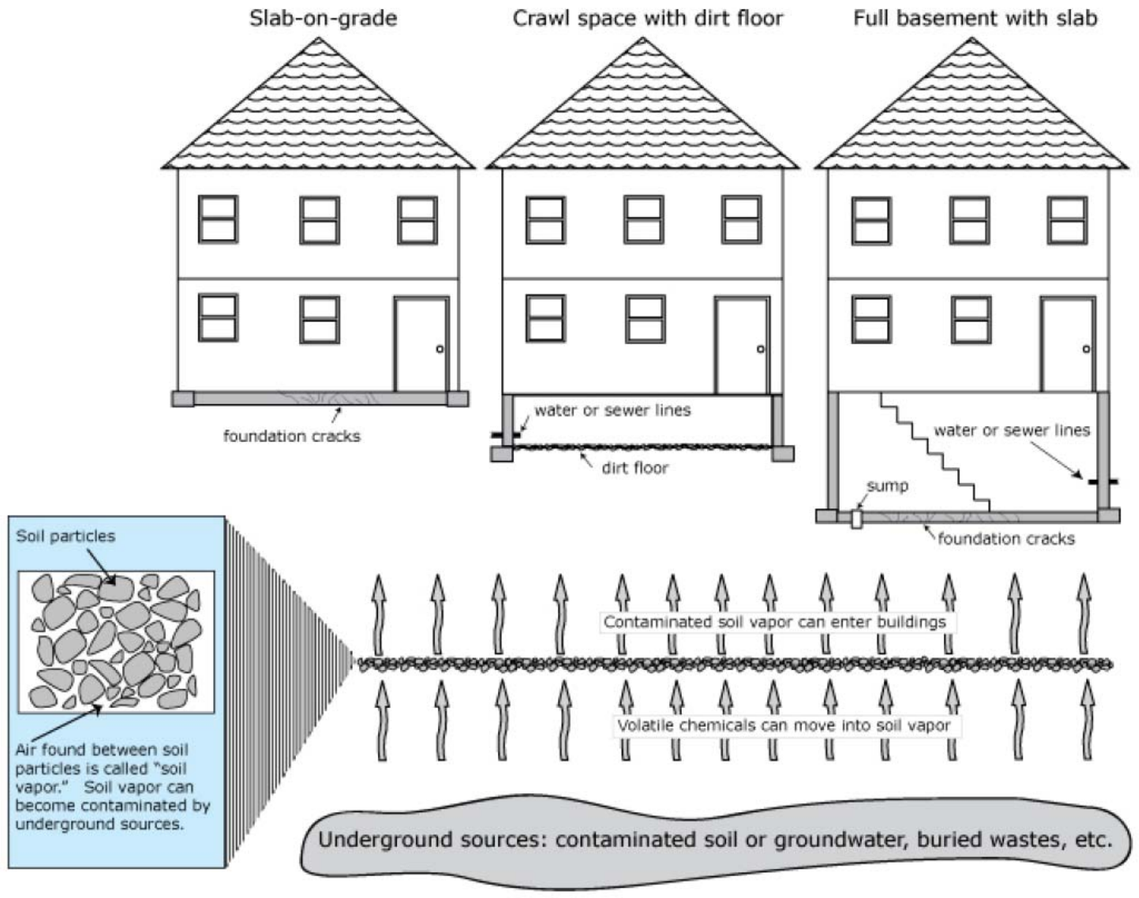
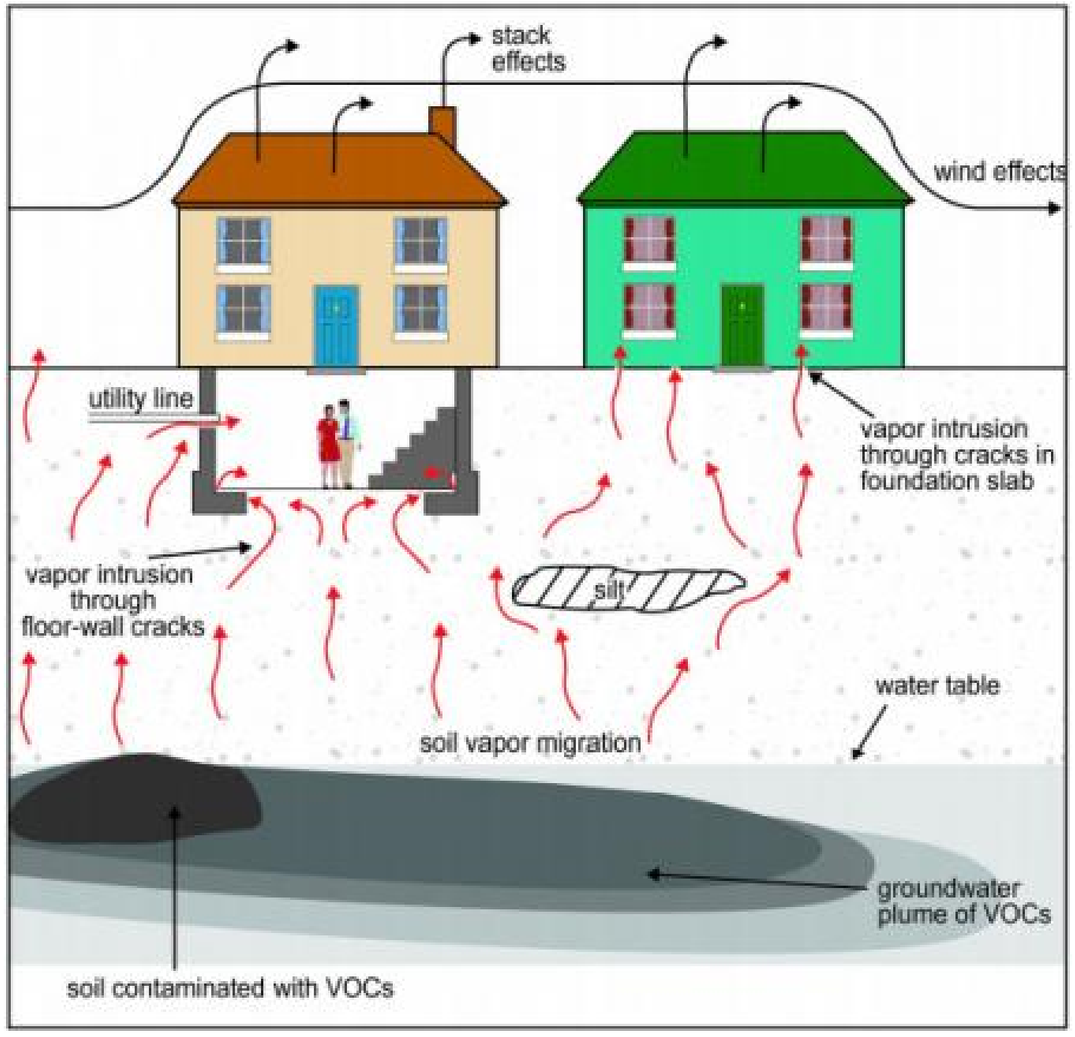
Introduction to Soil Vapor Intrusion



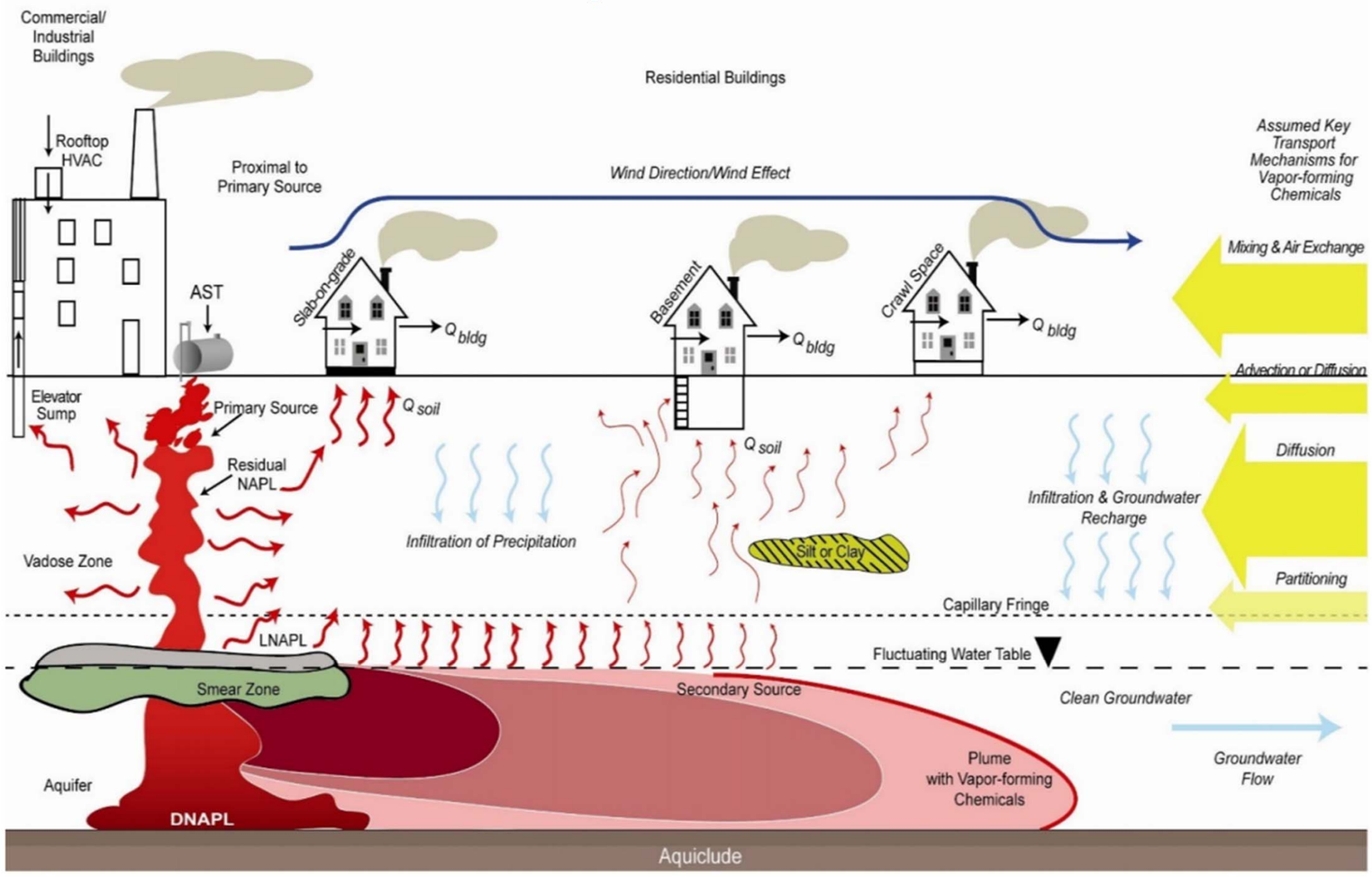
New York State Department of Health (NYSDOH) - Center for Environmental Health, Bureau of Environmental Exposure Investigation. "***Guidance for Evaluating Soil Vapor Intrusion in the State of New York***" (NYSDOH – October 2006). https://www.health.ny.gov/environmental/investigations/soil_gas/svi_guidance/

Introduction to Soil Vapor Intrusion



United States Environmental Protection Agency – "**What is Vapor Intrusion**"
https://www.epa.gov/vaporintrusion/what-vapor-intrusion

Introduction to Soil Vapor Intrusion



United States Environmental Protection Agency – Office of Solid Waste and Emergency Response. ***"Technical Guide for Assessing and Mitigating The Vapor Intrusion Pathway from Subsurface Vapor Intrusion Sources to Indoor Air"***, (OSWER Publication 9200.2-154, June 2015)
https://www.epa.gov/sites/production/files/2015-09/documents/oswer-vapor-intrusion-technical-guide-final.pdf

Data Management Requirements

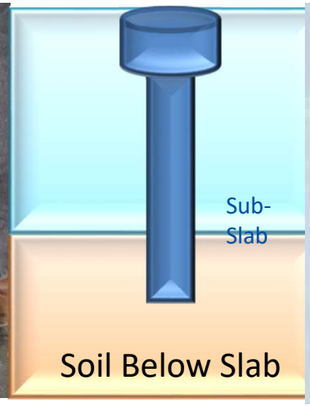
- Building Information
- Sub-slab Soil Vapor Port Installation
- Sampling Location Information
- Sampling Information
- Analytical Method and Results
- Data Validation Information

Building Information

- Area of concern or operable unit
- Occupancy Information
- Building Details
    - Building Type (residential/commercial)
    - Foundation Information
    - HVAC and appliance information
    - Factors affecting indoor air quality
    - Product inventory

Soil Vapor Port Installation

- Installation Method
- Geoprobe drilling information
- Soil boring lithology data
- Sub-slab vapor port information
  - Borehole depth
  - Teflon-lined tubing
  - Sand layer around vapor sampling implant
  - Bentonite Seal



Sampling Information

- Soil vapor port installation QA/QC
  - Helium or other gaseous tracer test for leak detection





Sampling Information

- Sub slab vapor port purge information
- Sampling equipment
  - Flow Regulator
  - Canister Type
    - Grab and passive sample canisters
    - Tedlar film and bags

Sampling Information

- Sub slab vapor port purge information
- Sampling equipment
  - Flow Regulator
  - Canister Type
    - Grab and passive sample canisters
    - Tedlar film and bags
  - Field Duplicate Information

Building Information

- Area of concern or operable unit
- Occupancy Information
- Building Details
    - Building Type (residential/commercial)
    - Foundation Information
    - HVAC and appliance information
    - Factors affecting indoor air quality
    - Product inventory

Building Information

- Penetrations on floors
- Stains from chemical spills
- Chemical containing product inventory
- Activities affecting indoor air quality

Evolution of Field Data Collection Tools

OSR – 3

NEW YORK STATE DEPARTMENT OF HEALTH
INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY
CENTER FOR ENVIRONMENTAL HEALTH

This form must be completed for each residence involved in indoor air testing.

Preparer's Name _____ Date/Time Prepared _____

Preparer's Affiliation _____ Phone No._____

Purpose of Investigation_____

1. OCCUPANT:

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

Number of Occupants/persons at this location _____ Age of Occupants _____

2. OWNER OR LANDLORD: (Check if same as occupant ___)

Interviewed: Y / N

Last Name: _____First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

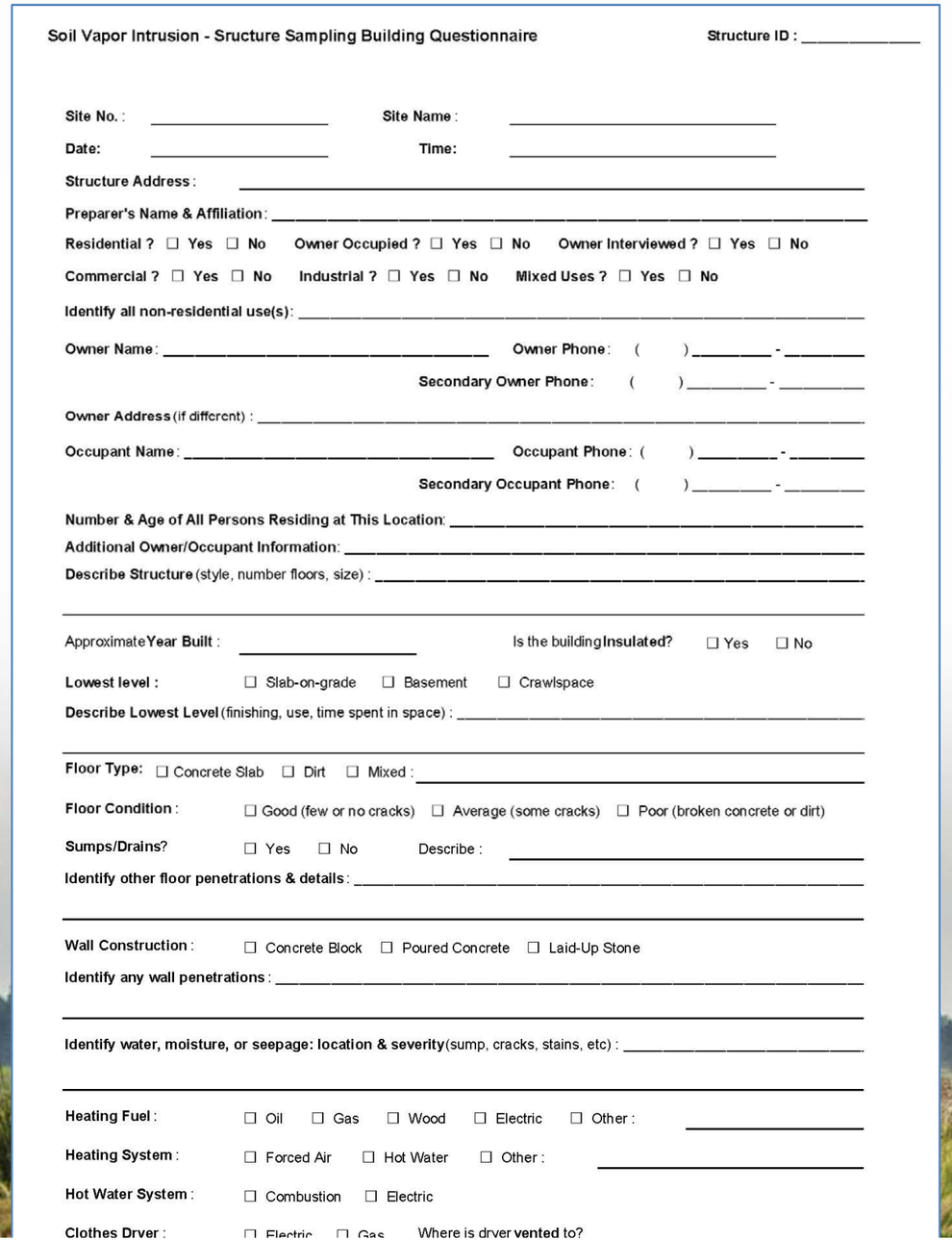
3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential	School	Commercial/Multi-use
Industrial	Church	Other: _____

- NYSDOH Indoor Air Quality Questionnaire and Building Inventory
- 2006

Evolution of Field Data Collection Tools



Soil Vapor Intrusion - Sructure Sampling Building Questionnaire

Structure ID : _____

Site No. : _____ Site Name : _____

Date: _____ Time: _____

Structure Address : _____

Preparer's Name & Affiliation : _____

Residential ? ☐ Yes ☐ No Owner Occupied ? ☐ Yes ☐ No Owner Interviewed ? ☐ Yes ☐ No

Commercial ? ☐ Yes ☐ No Industrial ? ☐ Yes ☐ No Mixed Uses ? ☐ Yes ☐ No

Identify all non-residential use(s): _____

Owner Name: _____ Owner Phone: ( ) _____ - _____

Secondary Owner Phone: ( ) _____ - _____

Owner Address (if different) : _____

Occupant Name: _____ Occupant Phone: ( ) _____ - _____

Secondary Occupant Phone: ( ) _____ - _____

Number & Age of All Persons Residing at This Location: _____

Additional Owner/Occupant Information: _____

Describe Structure (style, number floors, size) : _____

_____

Approximate Year Built : _____ Is the building Insulated? ☐ Yes ☐ No

Lowest level : ☐ Slab-on-grade ☐ Basement ☐ Crawlspace

Describe Lowest Level (finishing, use, time spent in space) : _____

_____

Floor Type: ☐ Concrete Slab ☐ Dirt ☐ Mixed : _____

Floor Condition : ☐ Good (few or no cracks) ☐ Average (some cracks) ☐ Poor (broken concrete or dirt)

Sumps/Drains? ☐ Yes ☐ No Describe : _____

Identify other floor penetrations & details : _____

_____

Wall Construction : ☐ Concrete Block ☐ Poured Concrete ☐ Laid-Up Stone

Identify any wall penetrations : _____

_____

Identify water, moisture, or seepage: location & severity (sump, cracks, stains, etc) : _____

_____

Heating Fuel : ☐ Oil ☐ Gas ☐ Wood ☐ Electric ☐ Other : _____

Heating System : ☐ Forced Air ☐ Hot Water ☐ Other : _____

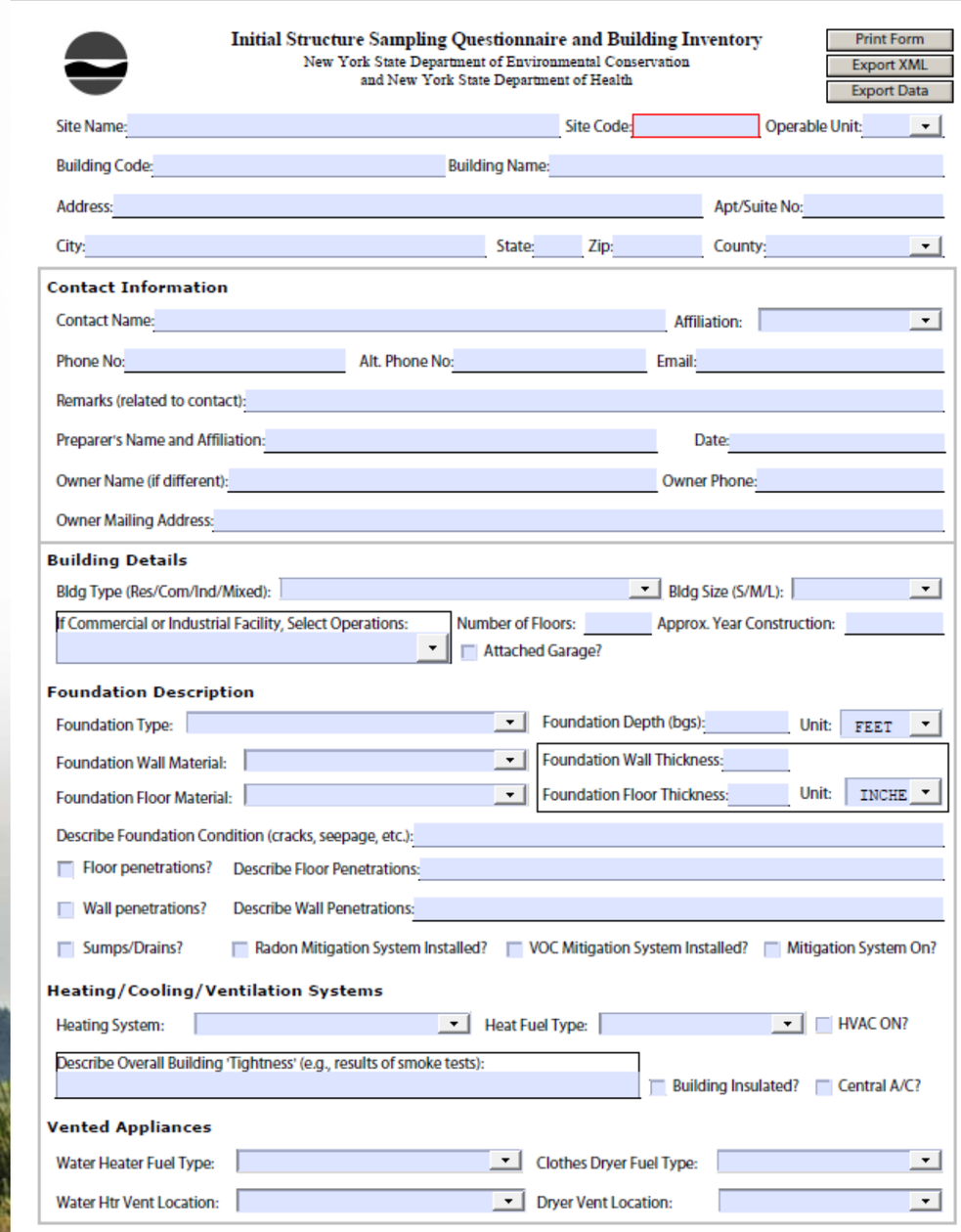
Hot Water System : ☐ Combustion ☐ Electric

Clothes Dryer : ☐ Electric ☐ Gas Where is dryer vented to?

- NYSDEC Soil Vapor Intrusion Structure Sampling Building Questionnaire
- 2009

Evolution of Field Data Collection Tools

SVI Data Workflow



Initial Structure Sampling Questionnaire and Building Inventory
New York State Department of Environmental Conservation
and New York State Department of Health

Print Form | Export XML | Export Data

Site Name: | Site Code: | Operable Unit:

Building Code: | Building Name:

Address: | Apt/Suite No:

City: | State: | Zip: | County:

Contact Information

Contact Name: | Affiliation:

Phone No: | Alt. Phone No: | Email:

Remarks (related to contact):

Preparer's Name and Affiliation: | Date:

Owner Name (if different): | Owner Phone:

Owner Mailing Address:

Building Details

Bldg Type (Res/Com/Ind/Mixed): | Bldg Size (S/M/L):

If Commercial or Industrial Facility, Select Operations: | Number of Floors: | Approx. Year Construction:

Attached Garage?

Foundation Description

Foundation Type: | Foundation Depth (bgs): | Unit: FEET

Foundation Wall Material: | Foundation Wall Thickness:

Foundation Floor Material: | Foundation Floor Thickness: | Unit: INCHE

Describe Foundation Condition (cracks, seepage, etc.):

Floor penetrations? | Describe Floor Penetrations:

Wall penetrations? | Describe Wall Penetrations:

Sumps/Drains? | Radon Mitigation System Installed? | VOC Mitigation System Installed? | Mitigation System On?

Heating/Cooling/Ventilation Systems

Heating System: | Heat Fuel Type: | HVAC ON?

Describe Overall Building 'Tightness' (e.g., results of smoke tests):

Building Insulated? | Central A/C?

Vented Appliances

Water Heater Fuel Type: | Clothes Dryer Fuel Type:

Water Htr Vent Location: | Dryer Vent Location:

- NYSDEC Updated Building Inventory Form with Fillable Fields downloadable into the NYSDEC EDD Format - 2013

Complete in field

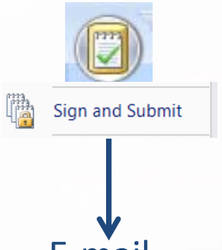
Return paper copy to office

Complete form in office

Export EDD

Save PDF

Check in EDP

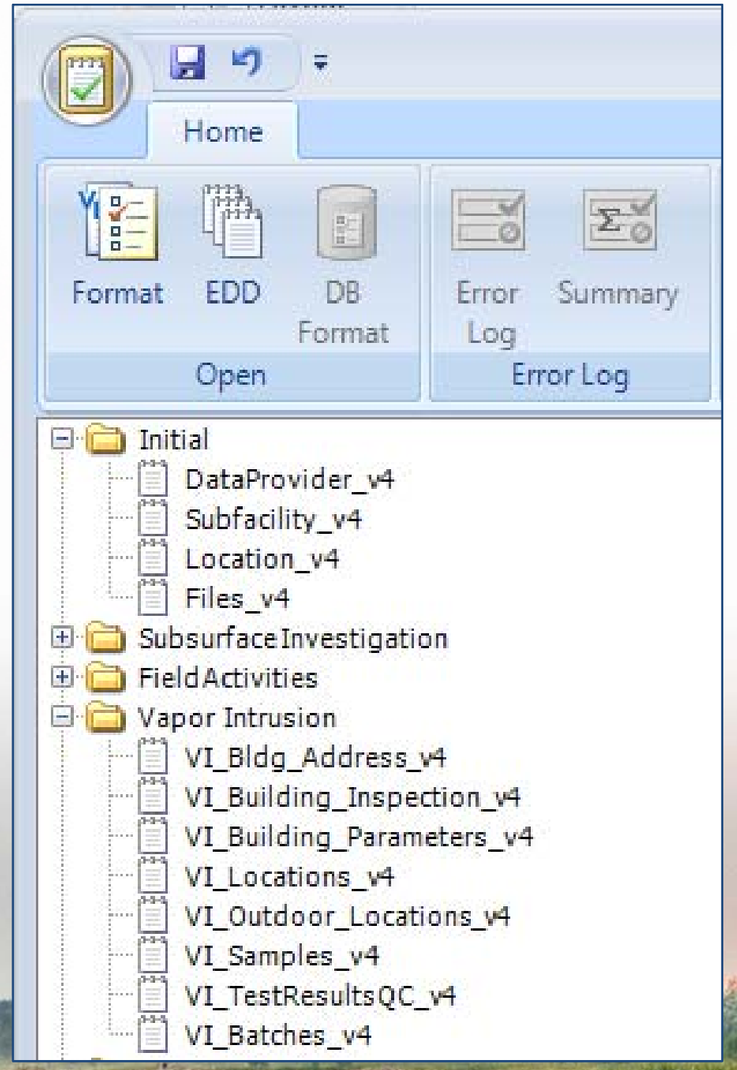


E-mail NYENVDATA

Include PDF in reports and eDocs submission

Components of the SVI EDD Format

- Vapor Intrusion EDD Group
- VI_Bldg_Address
- VI_Building_Inspection
- VI_Building_Parameters
- VI_Locations
- VI_Outdoor_Locations
- VI_Sample
- VI_TestResultsQC
- VI_Batches



Components of the SVI EDD Format

- Building Parameter Codes

PARAM_CODE	PARAM_DESC
BAROMETRIC_PRESSURE	OUTDOOR BAROMETRIC PRESSURE
NUMBER_OF_CHILDREN	ENTER THE NUMBER OF CHILDREN
PESTICIDE_USE	HAS PESTICIDES OR RODENTICIDES USED RECENTLY?
AIR_FRESHENER	IS AN AIR FRESHENER PRESENT
AIR_INFILTRATION	AIR INFILTRATION - BUILDING TIGHTNESS COMMENTS
ALTERNATE_HEAT	WHAT FUEL SOURCE IS USED FOR ALTERNATE HEATING
BASEMENT_DRY	IS BASEMENT DRY
BASEMENT_FINISHING	IS BASEMENT FINISHED
BATH_EXHAUST_FAN	DOES THE BATHROOM HAVE AN EXHAUST FAN
BLDG_INHABITED	IS BUILDING INHABITED
BLDG_QUESTION_COMP	WAS BUILDING QUESTIONAIRE COMPLETED
BLDG_QUESTION_DATE	BLDG QUESTIONNAIRE DATE
BUILDING_INSULATED	IS THE BUILDING INSULATED
CHEMICAL_ODOR	WAS A SOLVENT OR CHEMICAL ODOR PRESENT
CLEANING_PRODUCTS_YN	WERE CLEANING PRODUCTS USED RECENTLY
CLOTHES_DRYER_VENT	WHERE IS CLOTHES DRYER VENTED
COSMETIC_PRODUCTS_YN	WERE COSMETIC PRODUCTS USED RECENTLY
DRYER_FUEL_TYPE	CLOTHES DRYER FUEL TYPE
ELEVATED_READING	WAS AN ELEVATED PID READING PRESENT
FLOOR_MATERIAL	WHAT IS THE FLOOR MATERIAL OF THE LOWEST LEVEL
FNDATION_FLOOR_PEN	ARE THERE FOUNDATION FLOOR PENETRATIONS
FNDATION_WALL_PEN	ARE THERE FOUNDATION WALL PENETRATIONS
HOT_WATER_FUEL	WATER HEATER FUEL TYPE
HVAC_OPERATING	IS HVAC OPERATING
KITCHEN_EXHAUST_FAN	DOES THE KITCHEN HAVE AN EXHAUST FAN
LOWEST_LEVEL_USE	HOW IS THE LOWEST LEVEL BEING USED
MITIGATION_SYSTEM	WAS MITIGATION SYSTEM ON
NEW_CARPET	WAS NEW CARPET INSTALLED RECENTLY
NUMBER_OF_OCCUPANTS	HOW MANY OCCUPANTS LIVE IN THE BUILDING
OCCUPANT_INTERVIEWED	WAS THE OCCUPANT INTERVIEWED
OWNER_INTERVIEWED	WAS THE OWNER INTERVIEWED
OWNER_OCCUPIED	IS BUILDING OWNER OCCUPIED
PRODUCT_INV_COMPLETE	WAS THE PRODUCT INVENTORY COMPLETED
PRODUCT_INV_DATE	WHAT IS THE DATE OF THE PRODUCT INVENTORY
PRODUCTS_W_COC	PRODUCTS WITH COC PRESENT
RADON_TEST_DATE	WHEN WAS RADON TESTING DONE
RADON_TESTING	WAS PRIOR RADON TESTING DONE
RECENT_DRY_CLEANING	WAS RECENT DRY CLEANING PRESENT
RECENT_PAINTING	WAS PAINTING COMPLETED RECENTLY
SMOKING_IN_BLDG	DOES SOMEONE SMOKE IN THE BUILDING
SOLVENT_USE	WAS THERE EVIDENCE OF SOLVENTS IN USE
TEMP_OUTDOOR	OUTDOOR AIR TEMPERATURE
VAPOR_LOC_DESC	DESCRIBE ANY HOUSEHOLD ACTIVITIES THAT MAY AFFECT INDOOR AIR QUALITY
VOC_TEST_DATE	WHEN WAS VOC TESTING DONE
VOC_TESTING	WAS PRIOR VOC TESTING DONE
WATER_HEAT_VENT	WHERE IS WATER HEATER VENTED
WATER_IN_SUMP	IS THERE WATER IN THE SUMP
WEATHER_DESC	WEATHER DESCRIPTION
LAYOUT_SKETCH	Layout Sketch

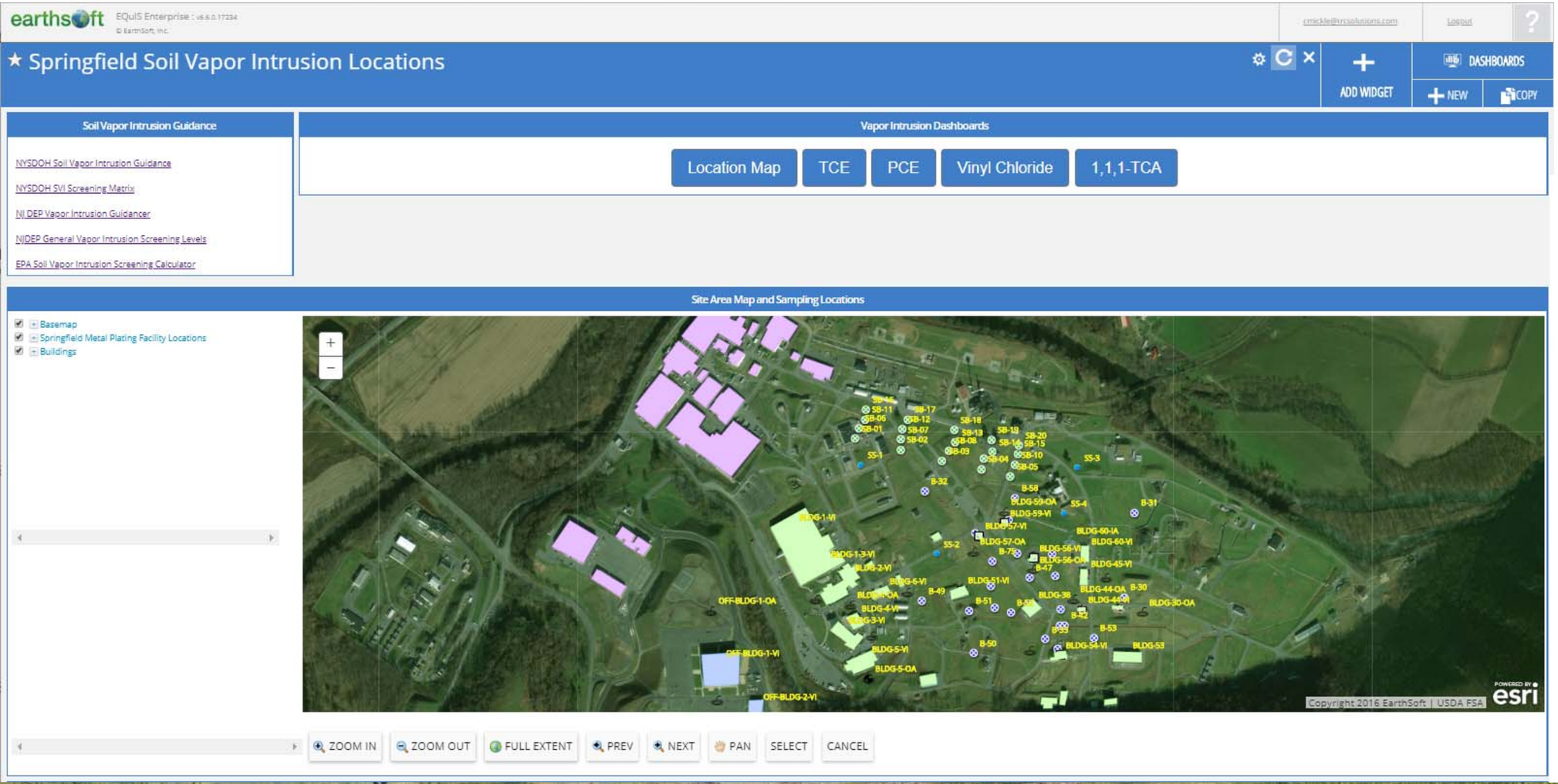
Regulatory Limits / Screening Levels

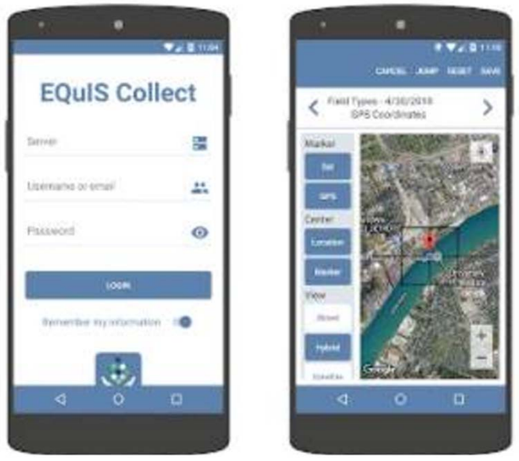
- Guidance for Evaluating Soil Vapor Intrusion in the State of New York
  - https://www.health.ny.gov/environmental/investigations/soil_gas/svi_guidance/
  - 2017 Soil Vapor / Indoor Air Matrix
- New Jersey DEP Vapor Intrusion Pathway
  - http://www.nj.gov/dep/srp/guidance/vaporintrusion/
  - http://www.nj.gov/dep/srp/guidance/vaporintrusion/vig_tables.pdf
- USEPA – Vapor Intrusion Screening Level Calculator
  - https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-level-calculator

Reporting Requirements

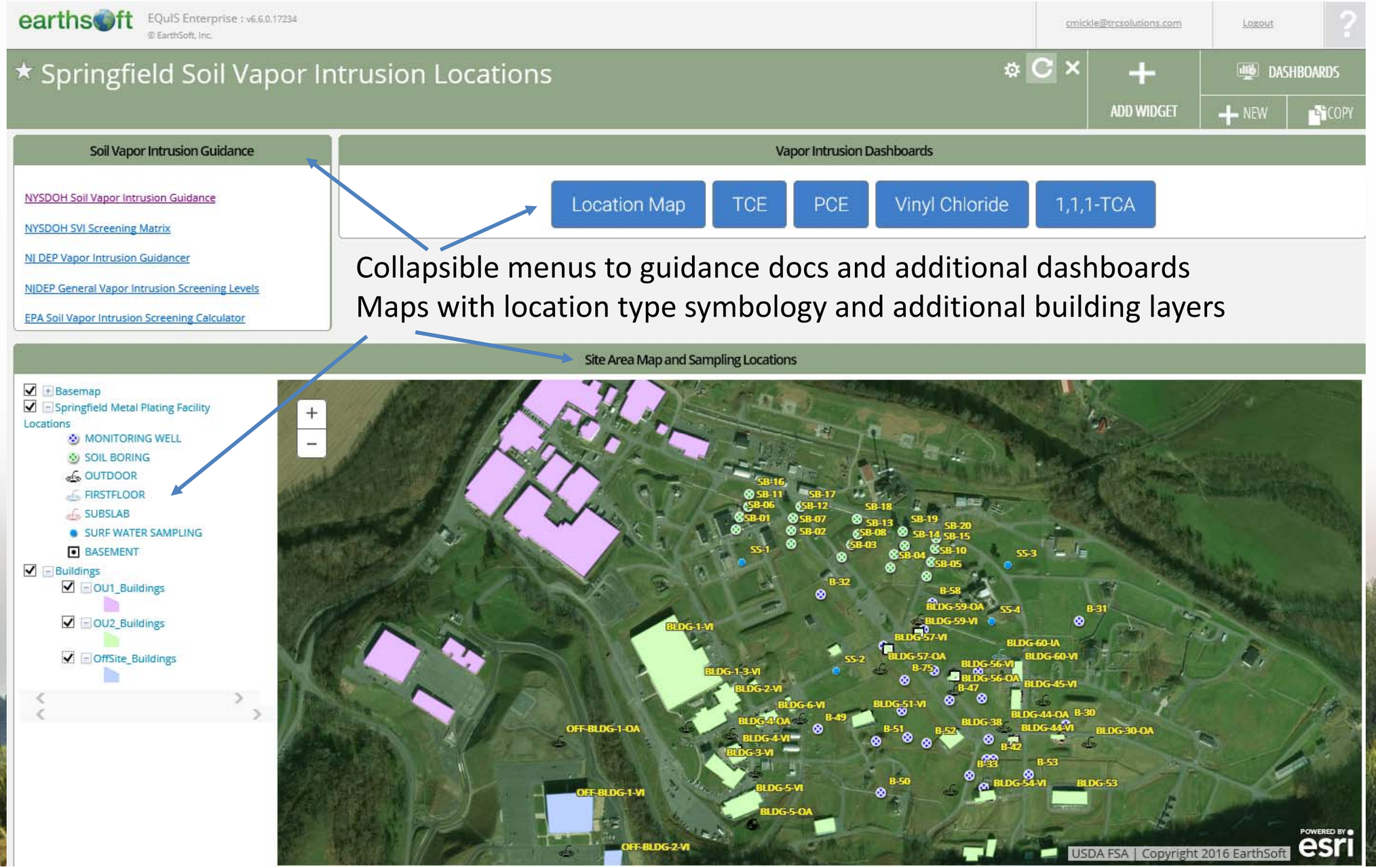
- Building Inventory Report
- Comparison of Indoor and Outdoor Samples
- Comparison of Soil Vapor and Indoor Air Samples
- Action Level Exceedance Reports

Demonstration





Location Information Dashboard



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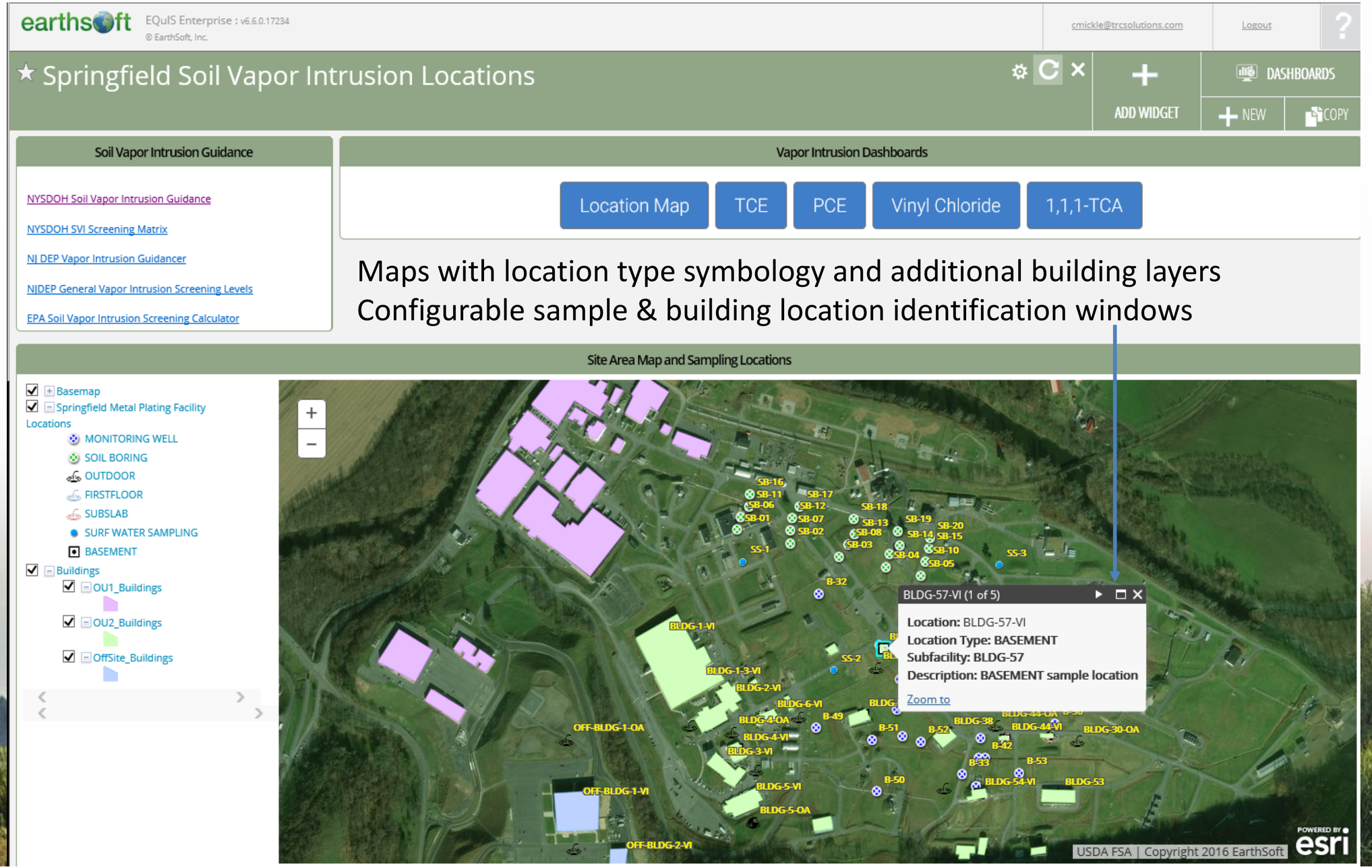

Side by Side Comparison Dashboards

Results you can rely on

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SPRINGFIELD METAL PLATING FACILITY | cmickle@trcsolutions.com | Logout

Springfield Soil Vapor Intrusion - Vinyl Chloride

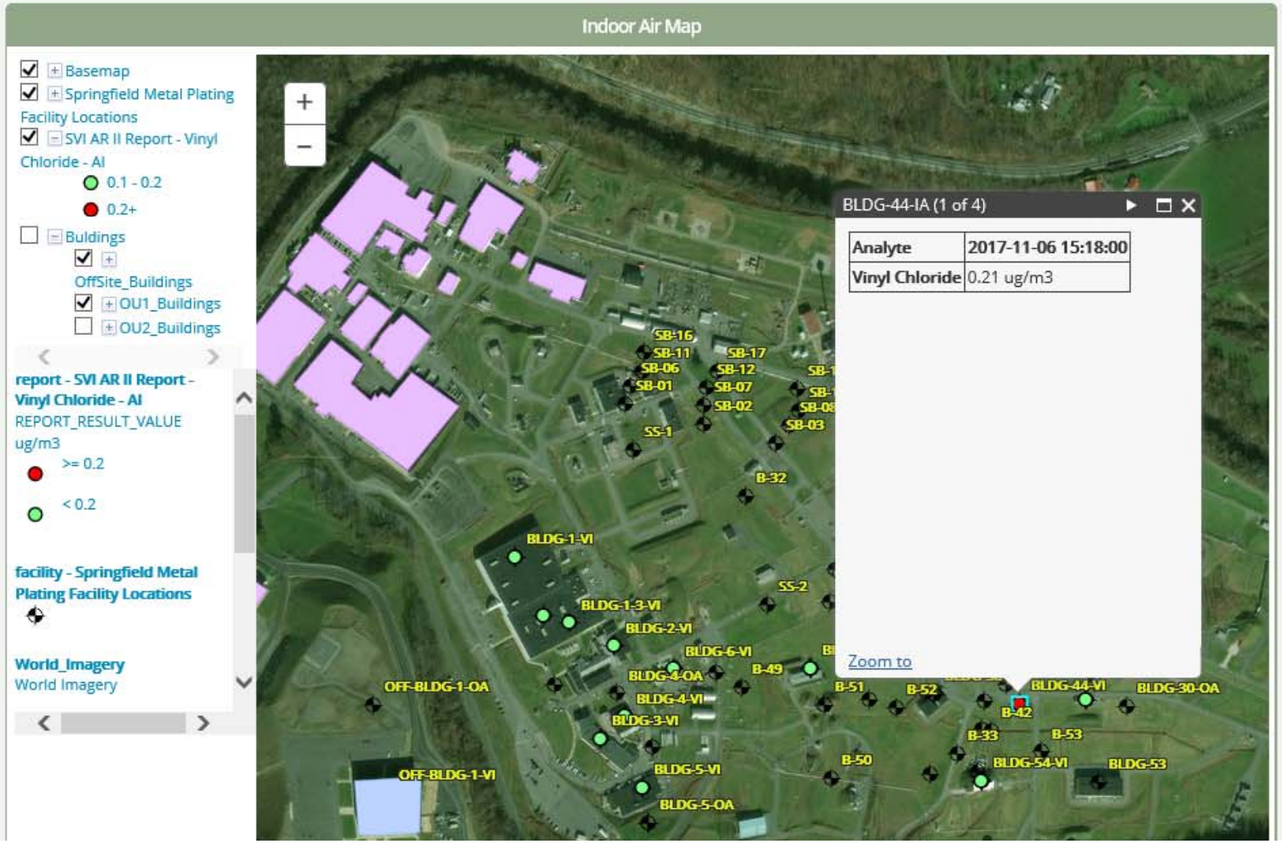
ADD WIDGET | DASHBOARDS | NEW | COPY

Vapor Intrusion Dashboards

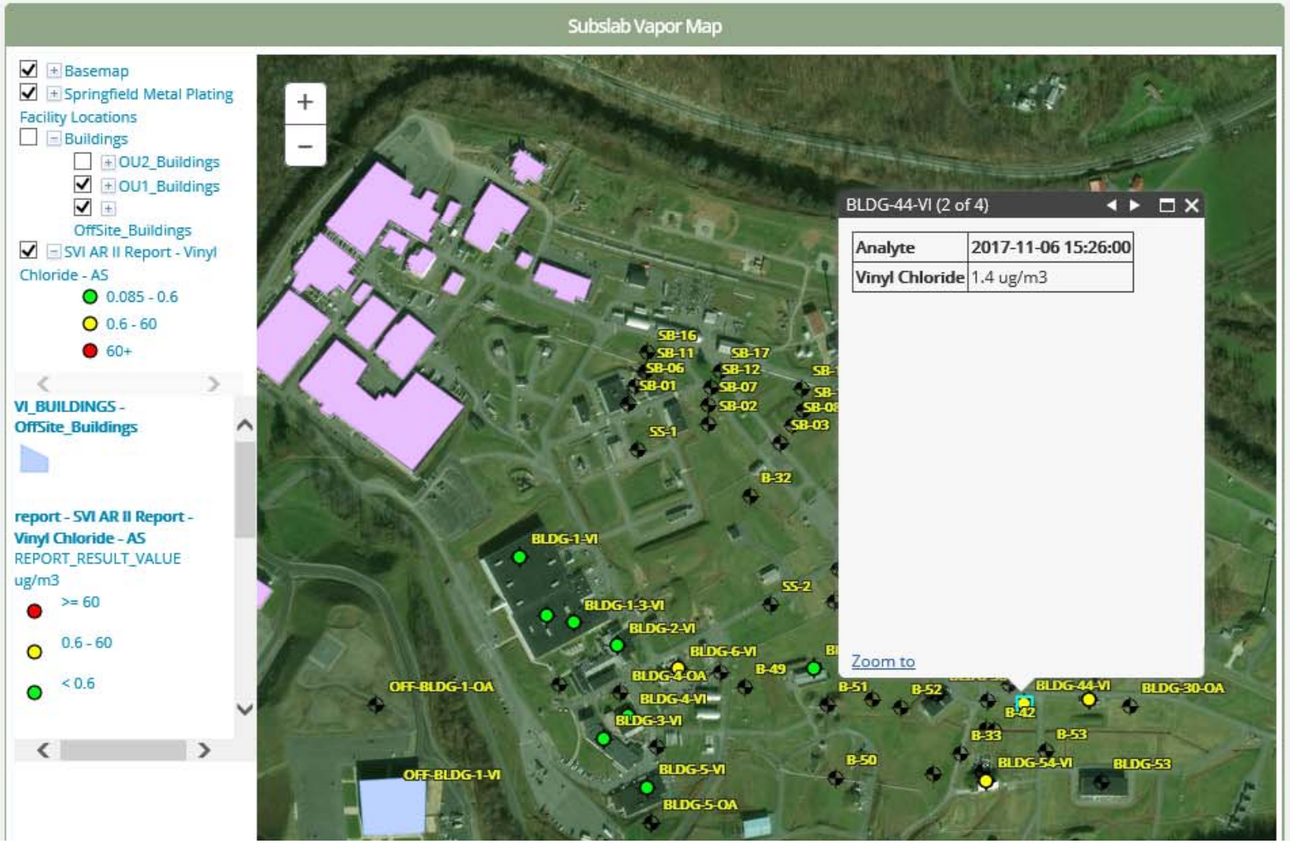
Location Map | TCE | PCE | Vinyl Chloride | 1,1,1-TCA

VINYL CHLORIDE INDOOR AND OUTDOOR AIR SAMPLE COMPARISONS

Indoor Air Map



Subslab Vapor Map



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CDM Smith

Thank you

Questions?

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