

Back to Basics: Investigating, Sampling and Lab Data

DNR Remediation and Redevelopment Program July 17, 2025

Meeting Logistics

All attendees are muted

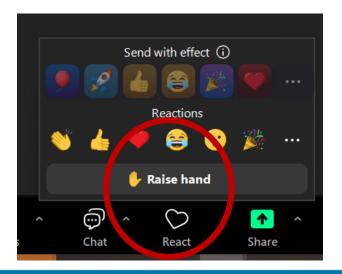
Written Comments/Questions

- Use chat and select Zoom facilitator in the "To" dropdown
- Remarks will be read out loud by facilitator



Verbal Comments/Questions

- In-Person: Raise hand and inperson moderator will help manage
- By Zoom: Select React to Raise hand to request a turn to talk (* 9 on phone)
- Please unmute when your name is called (*6 on phone)



Objectives



Understand how to complete a site investigation work plan and report



Learn important tips for completing the field investigation



Grow your understanding about working with a lab



Know where to find resources to help develop the work plan and report



Hear practical tips from RR program supervisors

Wisconsin State Legislature

HOME SENATE ASSEMBLY COMMITTEES SERVICE AGENCIES

Menu » Administrative Rules Related » Administrative Code » Department of Natural Resources (NR) » Chs. NR 700-799; Environmental Protection – Investigation and Remediation of Environmental Contamination

Chapter NR 700 (PDF:) - General Requirements

Chapter NR 702 (PDF:) - Contingency Planning For Hazardous Substance Discharge Response By State Agencies

Chapter NR 704 (PDF:) - Contingency Planning For Abandoned Container Response

Chapter NR 706 (PDF: 3) - Hazardous Substance Discharge Notification And Source Confirmation Requirements

Chapter NR 708 (PDF:) - Immediate And Interim Actions

Chapter NR 712 (PDF:) - Personnel Qualifications For Conducting Environmental Response Actions

Chapter NR 714 (PDF:) - Public Participation And Notification

Chapter NR 716 (PDF:) - Site Investigations

Chapter NR 718 (PDF: 3) - Management Of Contaminated Soil Or Solid Wastes Excavated During Response Actions

Chapter NR 720 (PDF:) - Soil Cleanup Standards

Chapter NR 722 (PDF:) - Standards For Selecting Remedial Actions

Chapter NR 724 (PDF:) - Remedial And Interim Action Design, Implementation, Operation, Maintenance And Mo

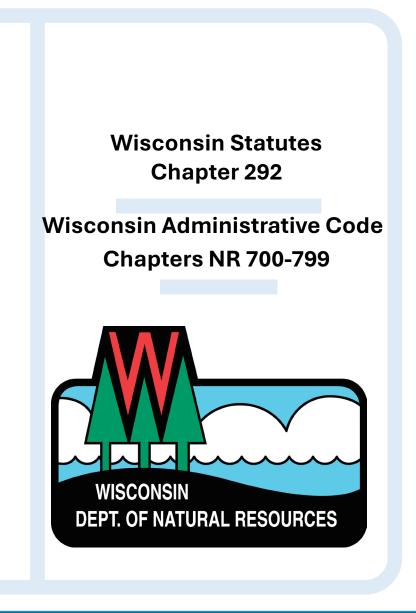
Chapter NR 725 (PDF:) - Notification Requirements For Residual Contamination And Continuing Obligations

NR 700 Process Overview

Jodie Thistle, PG RR Program

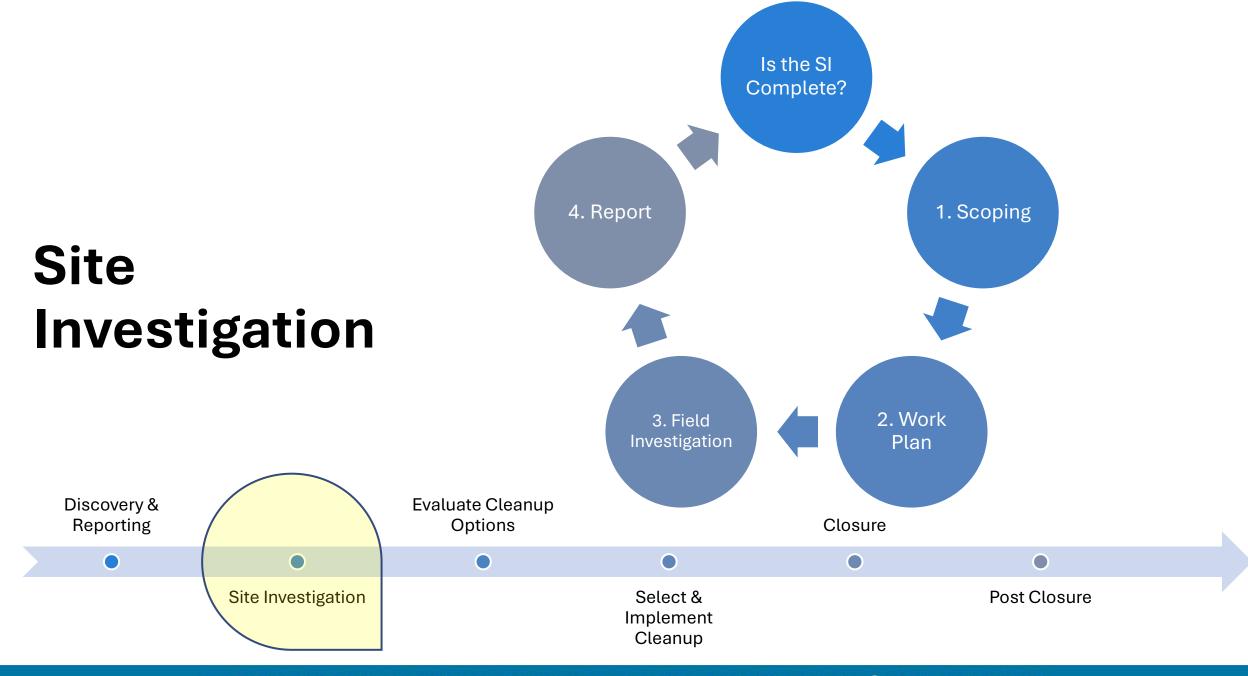
WI Regulatory Framework

- Self-implementing, responsible party follows the steps
- Timelines
- DNR approvals
- Request technical review from DNR



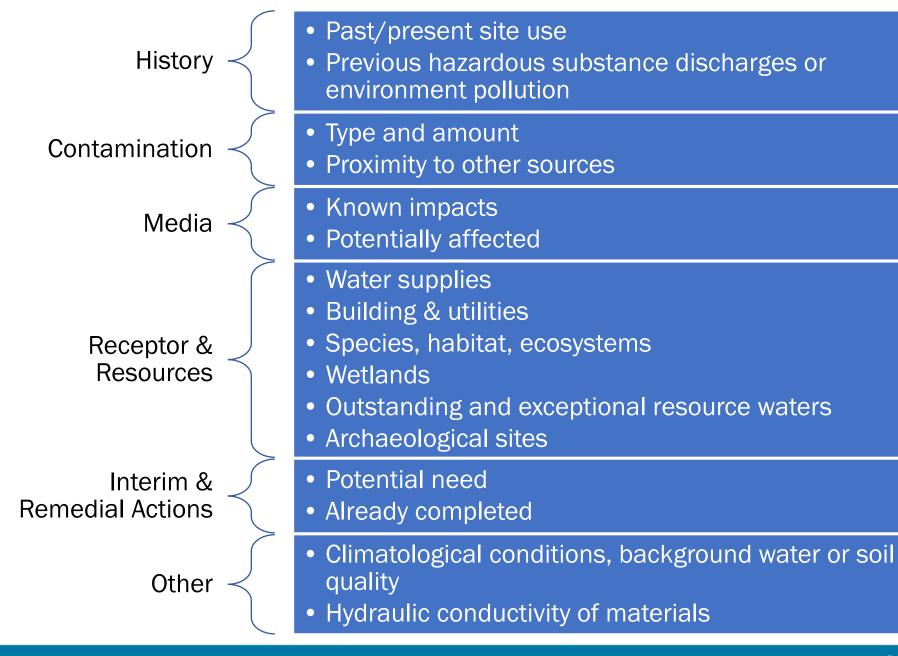
Federal Regulations

- "Superfund" Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
- Resource Conservation and Recovery Act (RCRA) Cleanup
- Toxic Substances Control Act (TSCA)



Site Investigation Basics

John Sager, DNR Grant Neitzel, DNR



Scoping Evaluation (NR 716.07)

Receptors







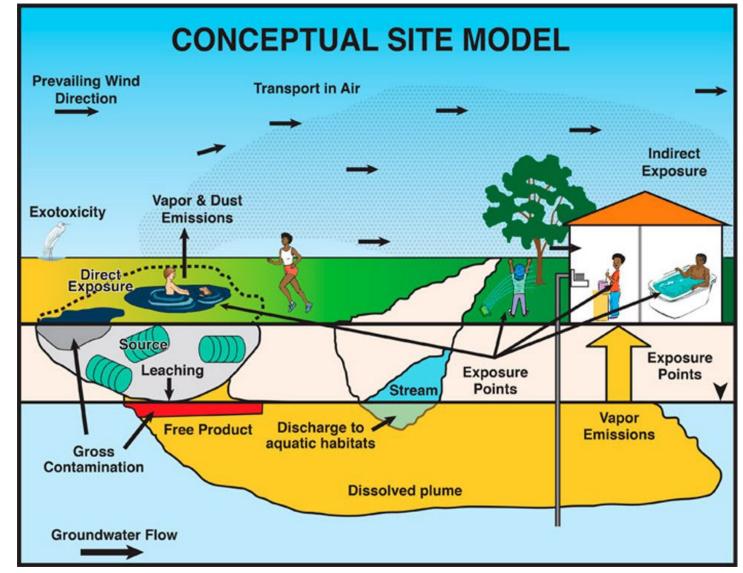












Source: *Technical Guide For Addressing Petroleum Vapor Intrusion At Leaking Underground Storage Tank Sites.* U.S. Environmental Protection Agency, Office of Underground Storage Tanks, Washington, D.C. June 2015.

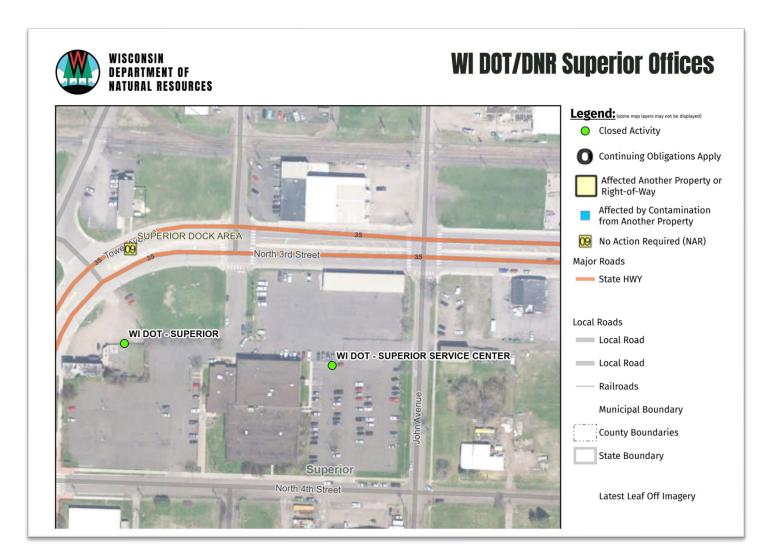
Using A Conceptual Site Model (CSM)



Feedback Loop throughout the Remedial Process

Commonly Used Resources

- Bureau for Remediation and Redevelopment Tracking System (BRRTS)
- RR Sites Map
- County GIS websites
- Local Governmental Agencies
- Site Investigation Scoping: Identifying Contaminants of Concern, DNR Publication RR-101



SITE INVESTIGATION WORK PLAN NR (716.09)



Site Info

- Contacts
- Location Maps
- Scoping Evaluation
- Operational history



Physical & Geological Setting

- Topography
- Drainage / Hydrology
- Hydrogeology
- Soils & Geology
- Pathways



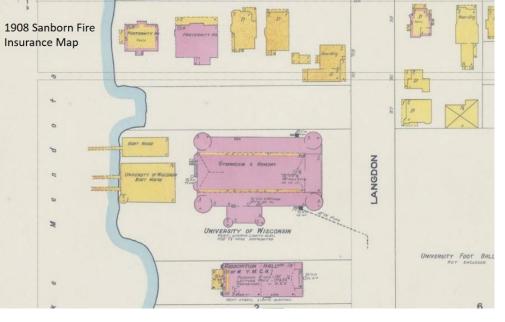
Sampling & Analysis

- Techniques
- Maps
- Methods
- Parameters
- QA/QC

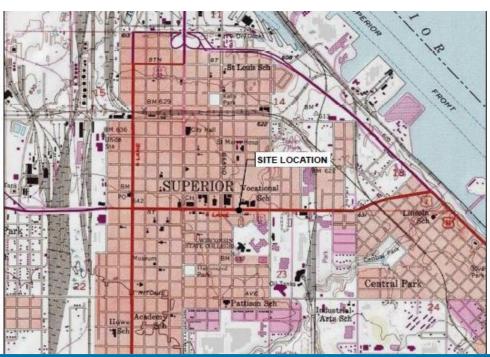


Other

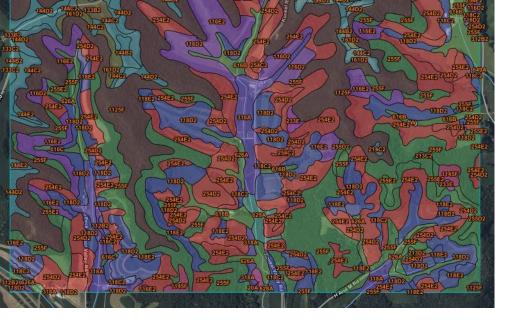
- Investigative Derived Waste
- Schedule



Site Information



- Contacts
- Location maps
- Results of scoping evaluation



Physical & Geological Setting



- Topography
- Drainage / Hydrology
- Soils & Geology
- Hydrogeology
- Pathways



Sampling & Analysis Plan



- Techniques
- Maps
- Methods
- Parameters
- QA/QC



Other Information



- Logic How and Why
- Investigative Derived Waste
- Site Management
- Schedule/Timeframes
 - Site investigation completion
 - Report development & deliverables

Site Investigation Work Plan Preparation Checklist

Clear Data Print... Save...

Note: To fill and save this form electronically, open using Adobe Reader or Acrobat soft save a copy of the file, open Adobe Reader, select File > Open and browse for the

State of Wisconsin
Department of Natural Resources
PO Box 7921, Madison WI 53707-7921
dnr.wi.gov

Site Investigation Work Plan Preparatio Wis. Admin. Code § NR 716.07

Form 4400-316 (R 04/22)

Wisconsin DNR - NR 700 Process

Receipt of Site Investigation Work Plan

Remediation and Redevelopment Program

Purpose

This guidance is offered as an optional tool to help develop and review site investigation work plans for compliance with Wi Code ch. NR 716 Site Investigation requirements. Consultants may choose to use this checklist as an outline for preparation investigation work plan. Use of this checklist is not required. Rule citations are added for clarity where applicable. The checkling to use with Wis. Admin. Code § NR 716.09 and other site investigation-related guidance. For more comprehensive site investigation, visit dnr.wi.gov and search "site investigation."

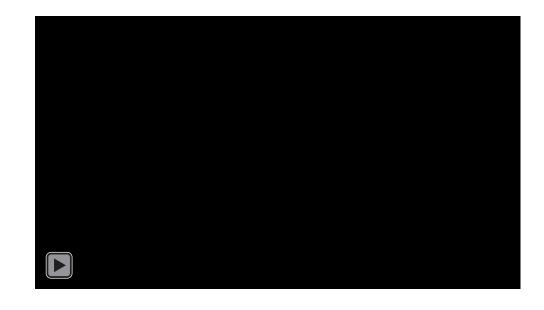
NR 716.09	9(1)	IK FIAII	Comments	Site Invest
NR 716.09(1)		Within 60 days of receipt of RP letter or other notification that a site investigation is required		_Site invest
NR 716.09(1), NR 700.11(3g)		One paper copy (if requested by the project manager)		
71	6.09(1), NR 700.11(3g)	One electronic copy		
or	9	Review fee if review by DNR is requested		
O1			Comments	
			Commonts	
	6.01	Proposed investigation will define the nature, degree and extent of contamination	Commonts	
	6.01 6.01		Commonts	

 Outlines work plan requirements for site investigation (NR 716)

Optional

Work Plan Timing (NR 716.09)

Required within 60 days of RP letter



Field Investigation (NR 716.11)

- Determine the degree and extent of contamination in ALL at media
- Must evaluate:
 - All potential migration pathways e.g., utility corridors
 - Impacts to receptors & resources
 - Rock, soil, and sediment characteristics
 - Extent of contamination in soil, saturated materials, groundwater, & air
- Off-site affected properties may need to be evaluated
- Consider collecting natural attenuation parameters
- Manage investigative derived waste (IDW) and label all containers







Site Investigation Report (NR 716.15)



Site Information



Results - Detailed Narrative



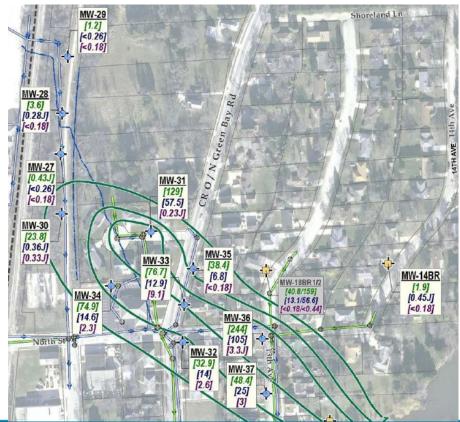
Visual Aids

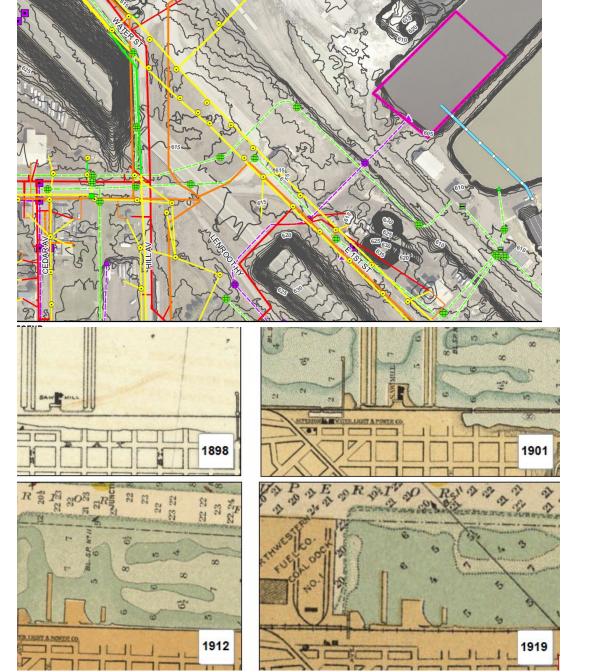


Deed and Locational Information



Conclusions & Recommendations



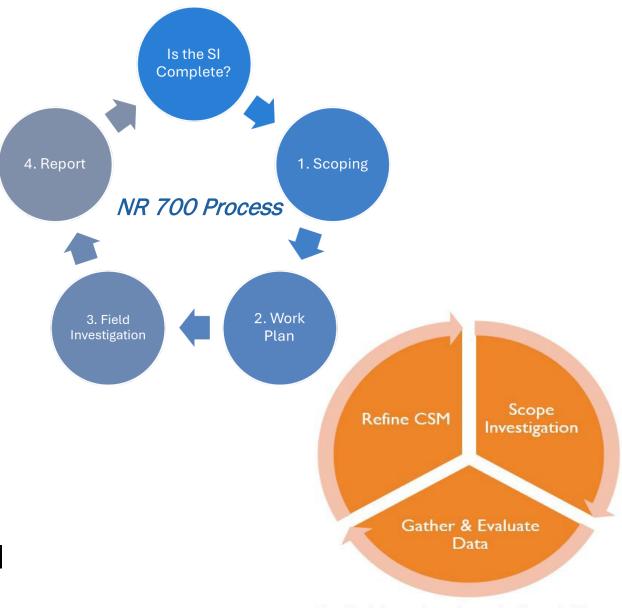


Site and Background Information

- Cover Letter
- Executive Summary
- NR712 certification requirements
- General information
- Background information
- Methods of investigation

Results

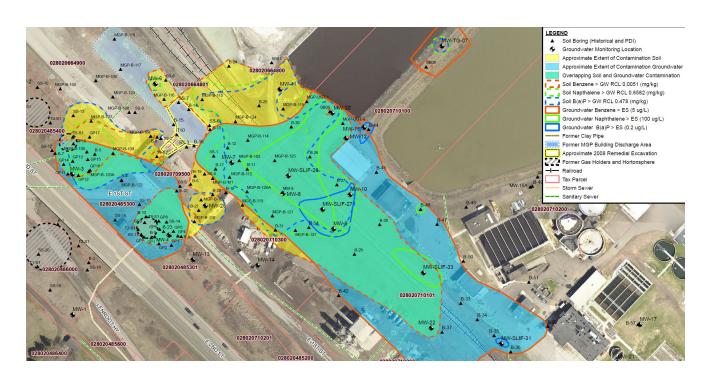
- Scoping Information
- Sequence of activities
- Data and observations
- Inconsistencies
- Groundwater characteristics
- Stratigraphy
- Contaminants and impacts
- Results interpretation
- Hydraulic conductivity
- Refine Conceptual Site Model

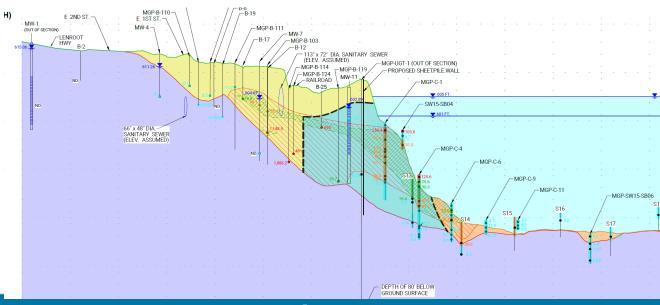


Feedback Loop throughout the Remedial Process

Visual Aids

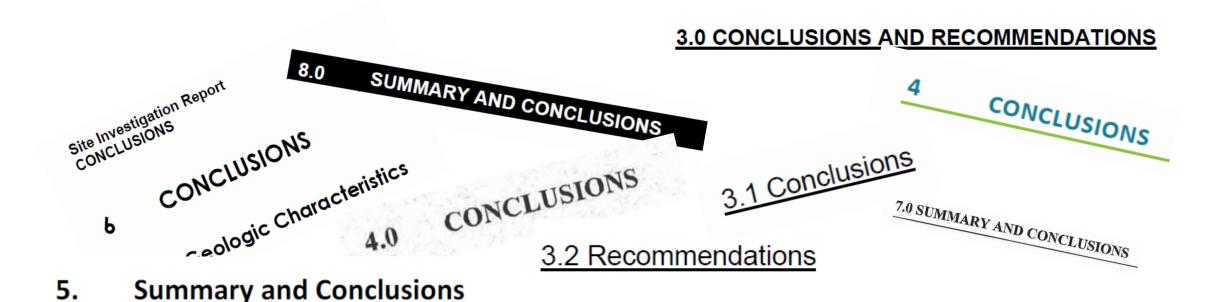
- Location Map
- Water table maps
- Potentiometric surface maps
- Isoconcentration maps
- Cross sections
- Tables
- Well and borehole documentation





Conclusions and Recommendations

- Summary of Results
- Recommendations for Further Actions



Site Investigation Report Preparation Checklist

Clear Data Print... Save...

Note: To fill and save this form electronically, open using Adobe Reader or Acrobat software: save a copy of the file, open Adobe Reader, select File > Open and browse for the file you saved.

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Site Investigation Report Preparation Checklist
Wis. Admin. Code § NR 716.15

Form 4400-317 (R 04/22)

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Wisconsin DNR - NR 700 Process

Remediation and Redevelopment Program

April 2022

Purpose

This guidance is offered as an optional tool to help develop and review site investigation reports and identifies the minimum information that should be included in the report under Wis. Admin. Code ch. NR 716. In some cases, Wis. Admin. Code chs. NR 725 and 726 requirements for case closure are provided to assist in preparation of a closure request. Consultants may choose to use this checklist as an outline for preparation of the site investigation report. Use of this checklist is not required. This checklist is meant for use with Wis. Admin. Code ch. NR 716 and site investigation-related guidance. For more comprehensive site investigation-related thin, will go and search "site investigation."

- Can help to develop a site investigation report to meet state requirements (NR 716)
- Optional

vestigation Report		Comments	Closure Form
(a)	Within 60 days after completion of the field investigations and receipt of lab data		
(b),	One paper copy (if requested by the project manager)		
(b), g)	One electronic copy (see RR-690)		

Site Investigation Report Timing (NR 716.15)

Within 60 days after completion of the field investigation and receipt of laboratory data









» TOPIC » BROWNFIELDS

SITE INVESTIGATION TOOLKIT

This toolkit is provided as a "one-stop shop" for site investigation-related resources and guidance for environmental professionals and others working with the DNR. The toolkit provides a framework for site investigation work plans and reports, and includes helpful checklists and fact sheets.

Codes and regulations	+
Planning	+
Guidance	+
Forms	+
Reports	+

Web Resources Available

Geosyntec consultants

PREPARING FOR THE FIELD: SAMPLING BEST PRACTICES

WDNR Back to Basics Learning Series
July 17, 2025

Adam Roder, PE, PG



Site Investigation Work Plan (planning!)

Conducting the Sampling (field work!)

Questions?

- A work plan / proposal / scope of work / etc. is all about PLANNING
 - NR 716 Site Investigation Work Plan (NR 716.09) requires thoroughness, but much is applicable to other forms of a proposal to a client



- What is site history?
- Identify potential contaminants of concern [see RR-101 Site Investigation Scoping]
- Develop rationale for: what (media, parameters) / where (location, depth) / why
 (suspected sources, grid pattern) / how (methodology) / who (novice, experienced staff,
 team of people) / when (expedited results, other schedule factors)
- Reminder of paid vs. unpaid SIWP submittal to WDNR
 - Paid (60 calendar day review period); unpaid (WDNR may comment via email wait 30 days unless instructed to proceed) [PUB-RR-967 NR 700 Process & Timeline Overview]

- Access agreement?
 - Pre-purchase due diligence, change in property owner, off-site property
- Media and sampling techniques
 - Conceptual site model source(s), geology, fate & transport, potential receptors, etc.
- Subcontractor team* (driller, laboratory, surveyor, private utility locator)
 - Qualified contractor list?
 - Qualifications...availability...cost...other factors
 - Subcontractor agreements, certificates of insurance
 - *More than a commodity provider...use their expertise for challenging contaminants, field conditions, etc.

- Field equipment
 - In-house vs. rentals, availability, calibration, training (Right PID bulb for the job 10.6 eV vs. 11.7 eV?)
- Utility locating
 - Digger's Hotline proper advance notice, know the rules for expired marks
 - Private utility locating understand limits of Digger's Hotline coverage
- Health & Safety Plan
 - Anticipate site hazards & mitigation steps



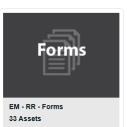
- Other things to consider when developing work plan
 - Depth to groundwater (aquifer protection double-cased piezometers)
 - Depth to bedrock
 - Historical fill (drilling obstructions?)
 - Sample integrity: **QA/QC samples** (duplicates, blanks, controls, etc.), storage on ice, delivery to laboratory (e.g., Friday sampling will lab receive samples on Saturday? Is there a hold time constraint? Holidays?)
 - Weather conditions
 - Health & safety
 - Investigation derived waste staging & disposal
- Scheduling & coordination…let's get in the field!

CONDUCTING THE SAMPLING

- Specified "ways of doing things" need to dictate field operations
 - ASTM standards USCS, split spoon sampling, Phase II ESA scoping, etc.
 - Lab sample methodologies preservatives, mass of soil requirements, hold times
 - WDNR guidance documents -<u>https://widnr.widencollective.com/portals/n3gjtfty/RRDocumentSearchPortal#993f50ae-e89d-41c8-aebe-71243f3b360b</u>

RR Document Search and Resource Options

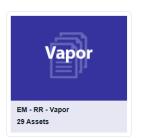












• Company standard operating procedures (SOPs) – decon, drilling operations, sample collection, soil boring logs, field notes, sampling for certain parameters (e.g., PFAS), etc.

CONDUCTING THE SAMPLING

Do field staff understand the what / where / why / how type questions?



Primary Project Details

Project Name:				
Project code / Phase(s) / Task(s) / Activity Code(s) / Required Co	mments:			
Link to Project Folder:				
Project team and subcontractor contact info up to date in THA?	O Y	○ N		
Harlish Cafety and Engineers and (UCE)				
Health, Safety, and Environment (HSE)				
Will field staff be assisting with preparation of THA/HASP?	OY	O N	O N/A	
Are pre-existing forms complete?	OY	O N	O N/A	

- Don't forget the field supplies!
 - Proposal, work plan, scope of work, access agreement
 - PPE
 - Pens, field book
 - Tape measure
 - Camera, whiteboard
 - Zip lock bags
 - PID, meters, pumps, bailers, rope, sampling equip.
 - Sample containers, preservatives, cooler, ice
 - Decon supplies
 - Buckets, IDW drums
 - Garbage bags, broom



Soil

 Hand augers, direct push (Geoprobe®), hollow stem augers (split spoons, Shelby tubes), rotosonic (air rotary / rock coring for bedrock)...test pits...high-resolution methodologies...









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Groundwater

- NR 141 permanent monitoring wells vs. small-diameter wells
 - Constituents of concern?
 - Geology / hydrogeology well development
 - Well construction materials
 - Small-diameter wells, pre-packed well screens NR 141 variance request
 - Temporary wells may be an option, but consider potential data limitations (suspended sediment, limited groundwater volume)
- Filter metals samples...but not other constituents
- Bailers or peristaltic pump (low flow) most common...other pump styles may be an option
- WDNR PUBL-DG-037 Groundwater Sampling Desk Reference
- WDNR PUBL-DG-038 Groundwater Sampling Field Manual



- Vapor (sub-slab, soil vapor, air)
 - Soil gas probes, sub-slab vapor points, indoor air
 - Passive vs. active samplers









WDNR RR-800 Vapor Intrusion Guidance (comments on current draft due July 27th)

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- Sediment & surface water
 - Sediment surface vs. depth
 - WDNR RR-0117 Contaminated Sediment Fact Sheet
 - Water surface vs. depth











- For all sampling, don't forget to fully complete the Chain of Custody forms!
- Next, the laboratory results arrive...to be continued...

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QUESTIONS?

Adam J. Roder, PE (WI, IL), PG (WI)

Principal Engineer / Geologist

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LANGAN

Back to Basics

Working with the Lab and Understanding Lab Reports

Presenters



Jeff RameyWisconsin Operations Lead



Krys TrafalskiSenior Staff Chemist

Laboratory Selection

Not all labs do the same thing the same way.



Capability & Methods



NR 149 Certification



Laboratory Location



Initial Lab Communications

Project Setup

Overcommunicate



Regulatory Action Limits and Analyte Lists



Historical Data



TAT Requirements



Special Method Requirements (Short Hold!)



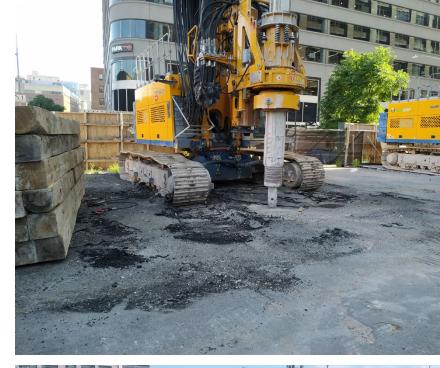
Project Scope and Schedule



Reporting Requirements and EDDs

In the field...

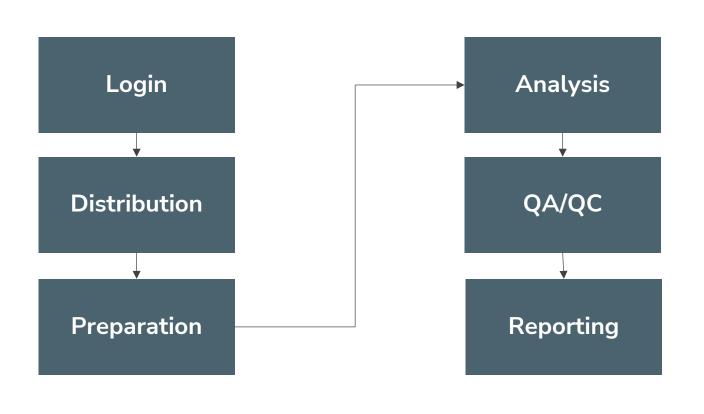
- Sampling impacts to QC
 - Collecting Samples in incorrect containers
 - Sample Preservation including ice
- Field QC What is it good for?
 - Field Duplicate
 - Field Blank
 - Equipment Blank
 - Rinsate Blank
 - Trip Blank
- Communicate field observations to the lab (HOT! Samples)





Demystifying the Lab

What happens after you drop off your samples?





Lab Reports – What to Expect

Sample Data

- Case Narrative
- Summary of results
- Surrogate Recoveries (if applicable)
- Field QC Data

Lab QC

- Method Blanks
- Blank Spikes (BS, LCS, LFB, etc.)
- MS/MSDs
- Duplicates

Instrument QC (Data Packages)

- Instrument Calibration Data
- Instrument QC (calibration checks, method-specific QC, etc.)
- Raw Data

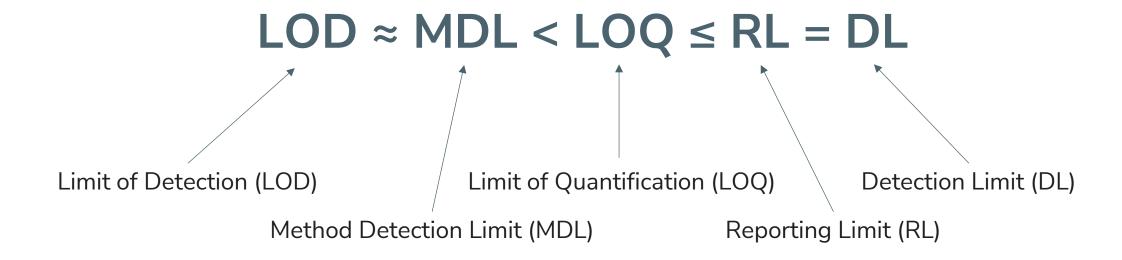




Sample Data & Reporting Limits

Seeing vs. Measuring

Reporting to the Method Detection Limit (MDL) is required in WI.



Dilutions – MDL & DL Increased!

Why did the lab dilute my sample?

Two Most Common Reasons:

- 1. One or more target analytes were beyond the calibration range of the instrument.
- 2. Reduce Non-Target Interferences

MDL & DL increase proportionally to the dilution factor

% Moisture also plays a role in increasing the MDL/DL



Laboratory Interferences

Labs use solvents and chemicals that are the targets of some analyses to prepare and analyze samples.

Common interferences:

- Methylene Chloride
- Acetone
- Hexane



High levels of non-target compounds (e.g., hydrocarbons or NAPL) can interfere with organics analysis.

High levels of dissolved solids or salts can interfere with metals analysis.

Lab Reports – Batch QC Data

Batches of up to 20 Samples

- Matrix Matched QC
 - Water Samples: Lab DI
 - Soil Samples: Sand
- Method/Lab Blanks
 - Demonstrates the preparation/extraction method is free of target analyte(s)
- Laboratory Control Samples (Spikes)
 - Demonstrates the laboratory's method precision

- Matrix Spikes
 - Demonstrates the effect of the sample matrix on the analysis
- Duplicates
 - Demonstrates the laboratory's accuracy



Qualified Results = Usable Data

A sample result reported between the MDL and RL is considered an estimated result and receives a "J" qualifier **but that's not all...**

Environmental Labs are not perfect. Things happen, mistakes occur, instruments get gunked up, and samples can be a pain.

- QC exceedances aren't always unacceptable.
- Not communicating QC exceedances to the client IS unacceptable.
 - Case Narrative
 - Qualifiers



Examples of Data Qualifiers/Flags

Commonly Used Qualifiers

- •J: A result between the MDL & RL
- B: Blank contamination
- E: Result above the calibration range
- D: Dilution
- •U: Result not detected above the RL

Labs have the freedom to use whatever characters they like as qualifiers so long as it's defined somewhere in the report.

- Eurofins: *-/+ (provides bias directionality)
- Pace (MA): Q
- York: CCVE (non-directional)
- ECCS ⊗: HC (directional)



Questions?

Comparing Soil & Groundwater Sampling Results with Standards

Jodie Thistle, DNR

Analytical methods used shall be suitable for the matrix, type of analyte, expected level of analyte, regulatory limit, and potential interferences in the samples to be tested. Wis. Admin. Code § NR 716.13.

Soil (ch. NR 720)

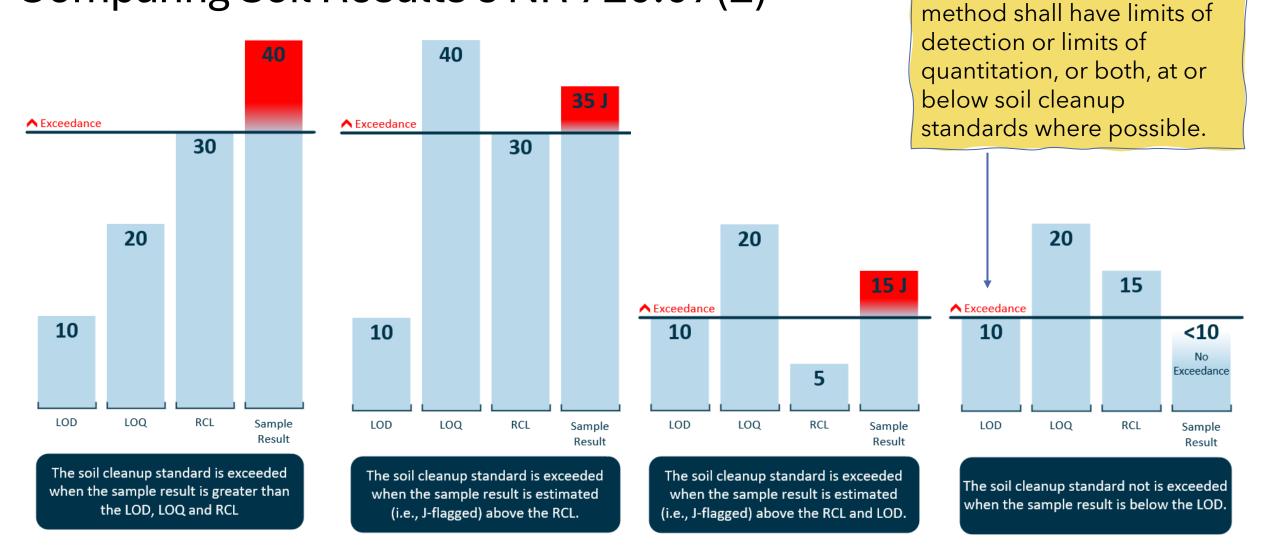
Consider the limit of detection (**LOD**), limit of quantitation (**LOQ**) and laboratory qualifier "**J**" to determine if a soil or groundwater standard is exceeded

Groundwater (ch. NR 140)

RR-0151 - Guidance: Soil Residual Contaminant Level (RCL) Spreadsheet https://widnr.widen.net/s/hkvwqpzggz

Groundwater Quality Standards:
Preventive Action Limits
Enforcement Standards
Wis. Admin. Code ch. 140

Comparing Soil Results § NR 720.07(2)



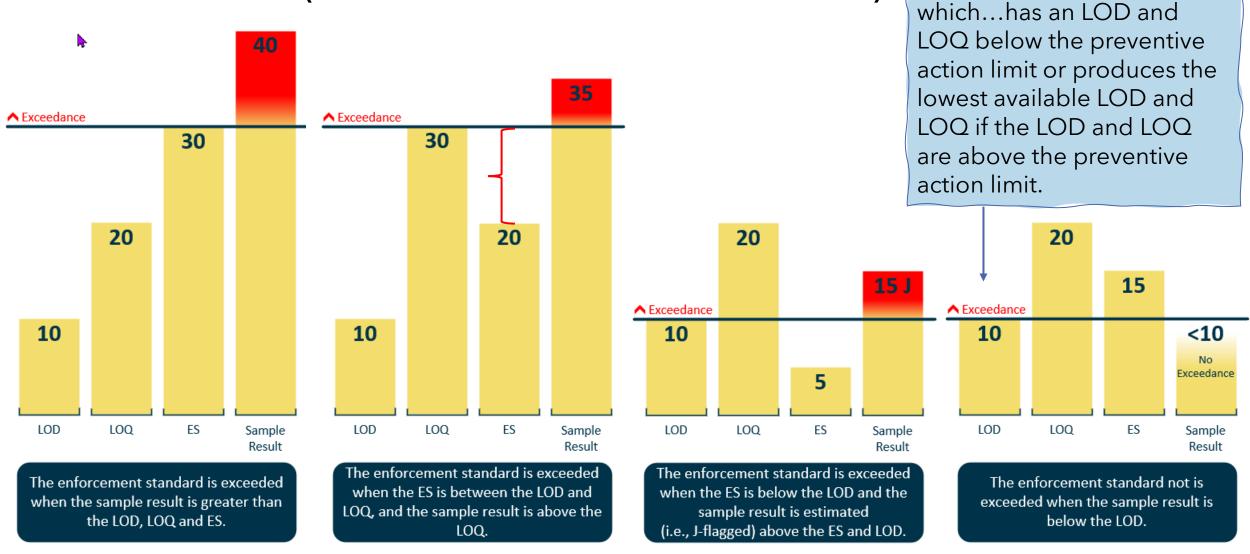
LOD = limit of detection

LOQ = limit of quantitation

RCL = residual contaminant level

An appropriate analytical

Groundwater (§§ NR 140.14 and NR 140.16)



LOD = limit of detection

LOQ = limit of quantitation

ES = enforcement standard

The laboratory shall select

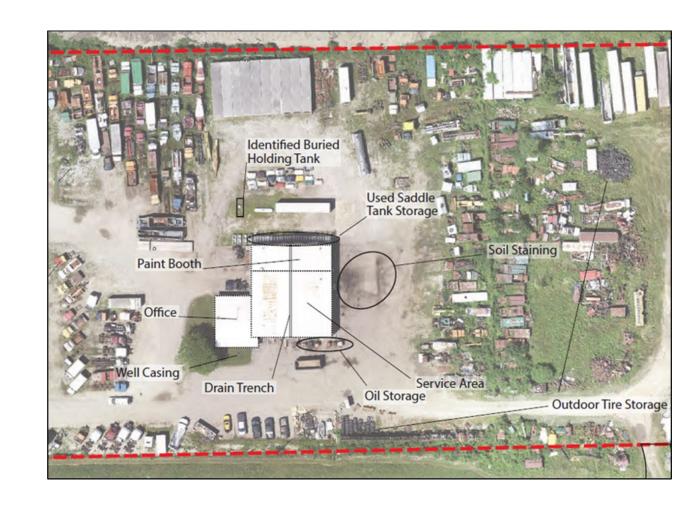
the analytical methodology

Tips, Tricks and Examples

Michele Norman, DNR

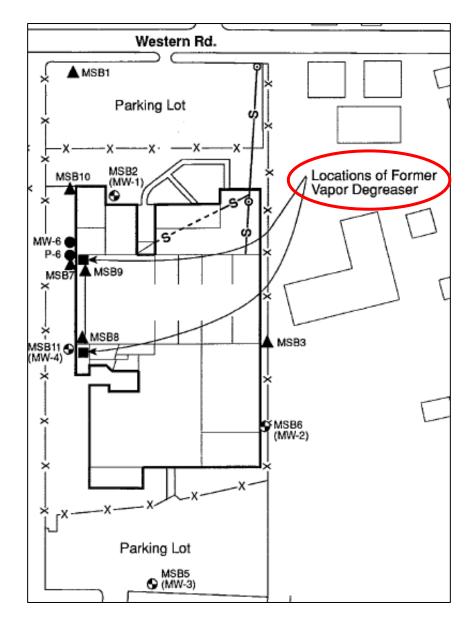
Consider the site history and operations

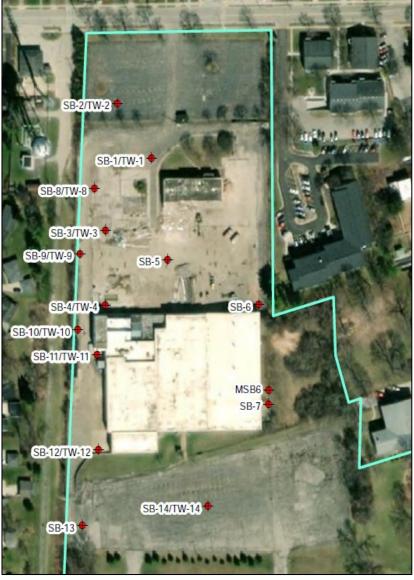
- Relation to the reported hazardous substance discharge.
- Building layout figure with current and historical uses and sub-grade features
- Building expansions and any soil/waste filling activities
- Location of added features



Example:

Figure on the left is more helpful in justifying sampling locations.





Example:

- As facilities expand, site conditions, relevant to receptors, may change.
- Note the wetland area near the parcel's center.



1970 Aerial



1980 Aerial



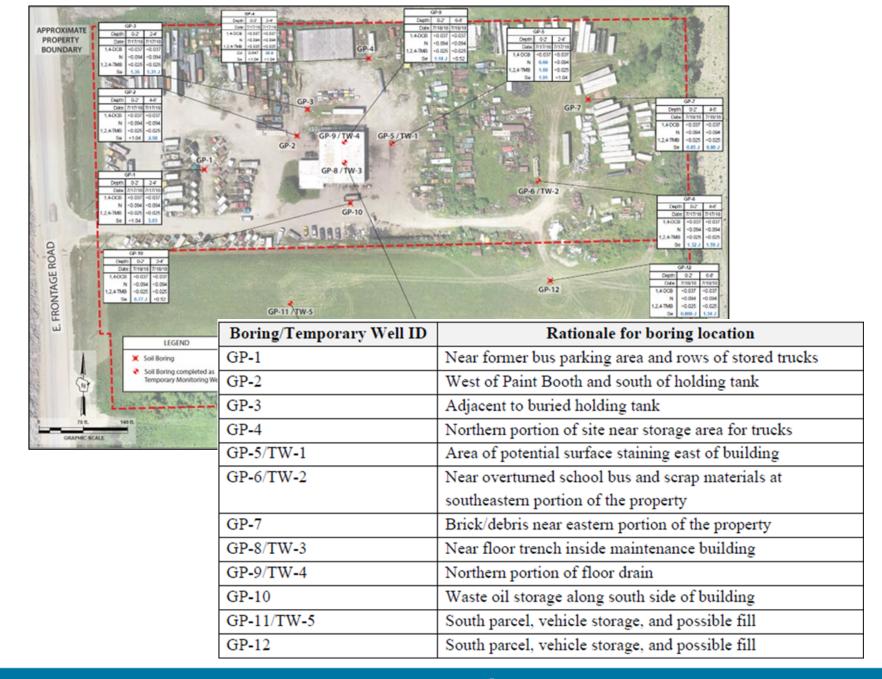
1990 Aerial

Describe Sampling Rationale

- Clarify ALL hazardous substance discharges being investigated and all potential sources.
- Justify sampling locations.
 - Sampling strategy differs for a point discharge vs. sitewide contamination.
 - o For a point discharge (e.g., UST, sump, back door), always sample in the source area.
- Provide figure(s) and table(s) with original data from Phase II ESA, TSSA report, etc.
- Scope for Emerging Contaminants

Example:

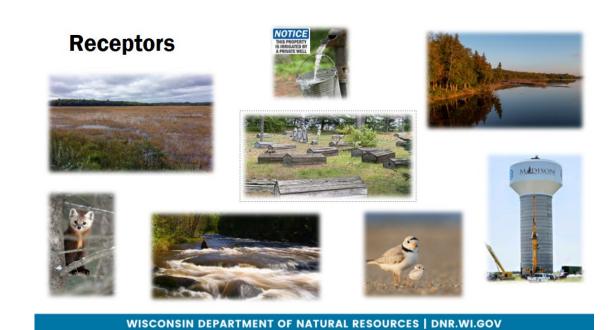
- Provide a table that explains why you are sampling where you are sampling.
- Also helpful to see a list of the analytes being sampled at each location.



Consider All Possible Receptors

 Remember: Receptors of contamination include more than just private potable wells

Vapor screening may be required



Example of Vapor Screening:

- Use recommended distances with known sampling data to evaluate if and where vapor assessment may be warranted.
- Provide figures to support evaluation.



Visual Aids are Worth their Weight in Gold







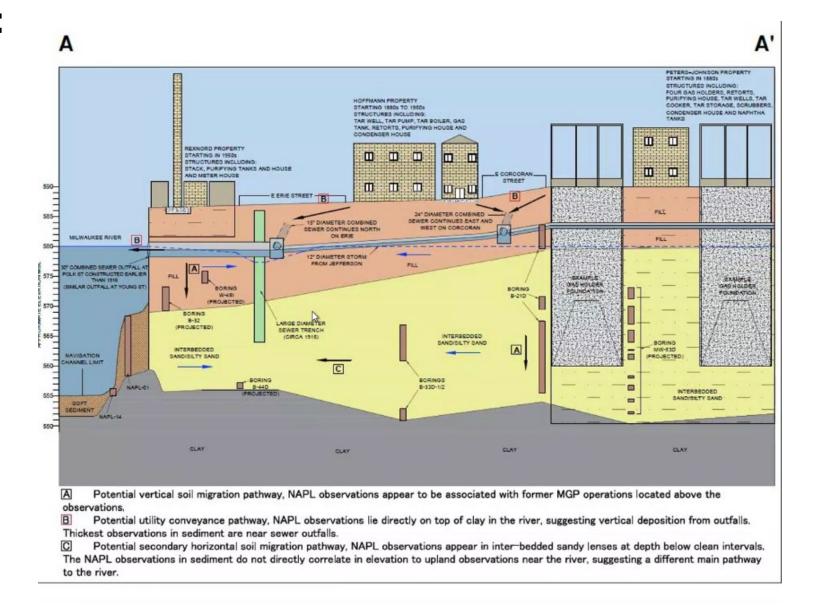
VISUAL AIDS ARE THE FASTEST WAY TO COMMUNICATE

PROVIDE ACCURATE MAPS TO SCALE

TAKE PHOTOS OF SAMPLING --BEFORE, DURING, AND AFTER

Example Cross-Section:

Include soil layers,
 migration pathways,
 building foundations.



Plan for Investigative Waste

- It's NOT okay to dispose investigative waste (e.g., drill cuttings, purge water, etc.) on the ground surface.
- Pay attention to seasonal variations freezing drums, frozen stockpiles, tarping challenged by wind/rain.
- Sample for the necessary parameters required for the selected disposal option.
- Proper labeling of waste temporarily stored on-site.



Work with Certified Analytical Laboratory

- OUse a lab certified in Wisconsin.
- Use appropriate lab methods that provide detection limits below regulatory standards.
- Include interpretations of any J-flagged data

Moderated Panel Discussion

Bill Nelson, Godfrey & Kahn



Schedule: Back to Basics Sessions

Back to Basics Training:
Investigation, Sampling and Lab
Data, July 17, 2025



October 29, 2025

- Planning for Remediation and Continuing Obligations
- Madison, Milwaukee, Oshkosh & virtual

January 23, 2026

- Applying for Closure and Maintaining Continuing Obligations
- Madison, Milwaukee, TBD & virtual

April 21, 2026

- Notifying Affected Parties and the Public
- Locations TBD

Thank you!



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CONNECT WITH US





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