LRS Training 2019

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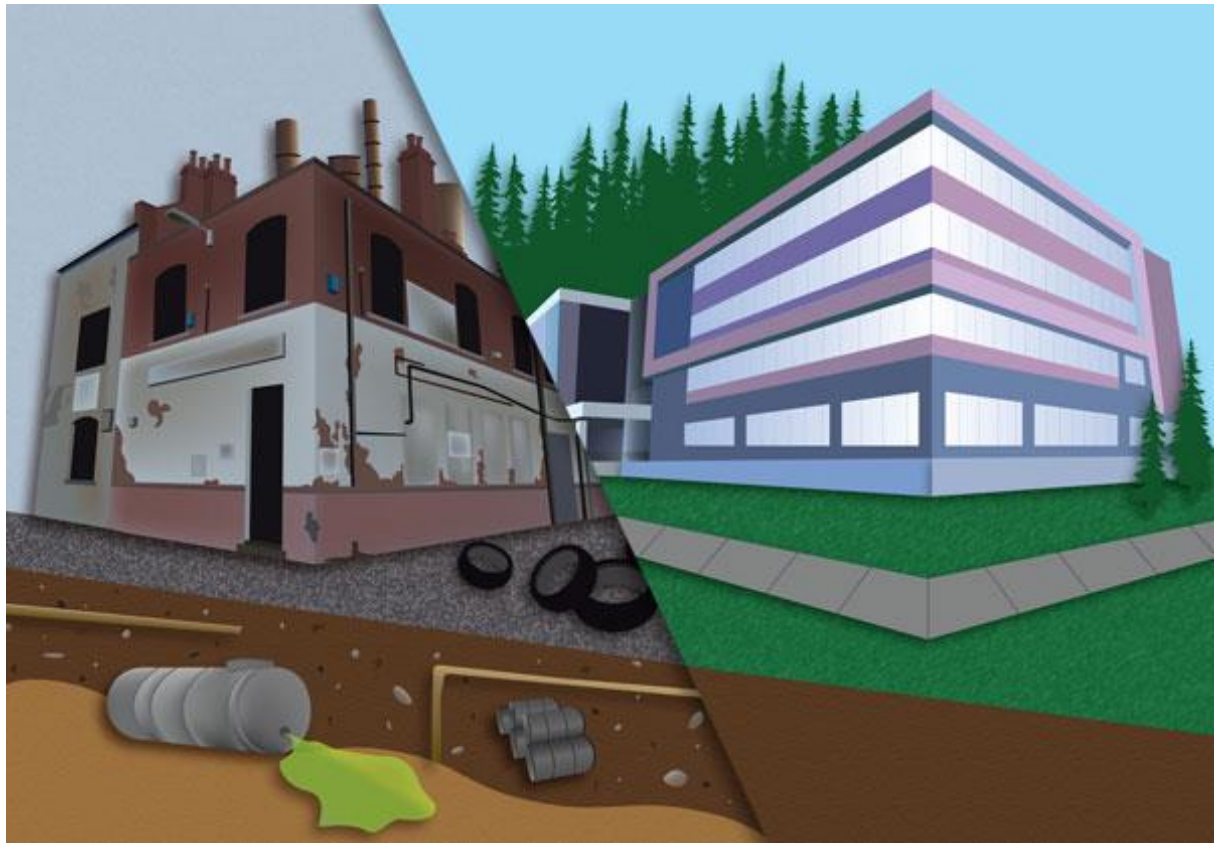


VRP Guidance Manual Changes

ORGANIZATION

1.0 Program Overview

2.0 Application and Agreement

3.0 Site Assessment

4.0 Risk Assessment

5.0 Remedy Selection and Remedial Action

6.0 Land Use Covenants

7.0 Final Report

8.0 Certificate of Completion

9.0 Reopeners

10.0 UECA-LUST Program

VRP Guidance Manual Changes

ORGANIZATION

Appendix A	Determining Background Concentrations
Appendix B	Non-Point Source Impacts to Surface Water
Appendix C	Exposure Factors & Chemical Parameters
Appendix D	Relative Absorption Factors & Bioavailability
Appendix E	LNAPL Sites Closure Policy
Appendix F	Cover and Cap Guidance
Appendix G	Rail Trail Guidance

VRP Guidance Manual Changes

ORGANIZATION

Att 1 Figures and Tables Formatting Guidance

Att 2 Site Assessment Work Plan (SAWP) Checklist

Att 3 Quality Assurance Project Plan (QAPP) Checklist

Att 4 Data Validation Report Checklist

Att 5 Checklist to Determine Applicable Remediation Standards

Att 6 VRP Decision Trees

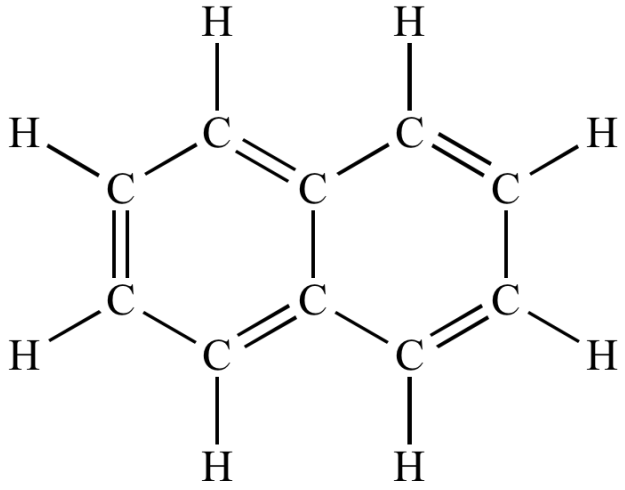
Att 7 Risk Assessment Report Format Guidance

Att 8 UECA-LUST Process Checklist

VRP Guidance Manual Changes

NEW/REVISED SECTIONS

- New Application and Agreement Sections
- Expand/Stress requirement for using the CSM throughout the VRP process
- More stringent handling of core samples for VOC analysis
- Naphthalene and Benzo(a)anthracene core samples to be managed as VOCs



VRP Guidance Manual Changes

NEW/REVISED SECTIONS

- Effects of ambient temperature on soil vapor sampling
- Default Background Soil Concentrations
- Assessment of temporal variation in groundwater quality
- Content and organization guidance for SARs
- New checklists: SAWP, QAPP, and DV Report

Source: AEG Engineers

VRP Guidance Manual Changes

NEW/REVISED SECTIONS

- Consolidated Risk Assessment Sections
- Use of Exposure Assessment: Minimize Risk Characterization
- Replaced equations to calculate the Uniform Standard with the current RSLs
- Default Exposure Factors for Recreation Scenarios
- Risk Assessment Report Format/Organization

VRP Guidance Manual Changes

NEW/REVISED SECTIONS

- Cover and Cap Guidance
- Rail Trail Guidance
- LNAPL Guidance
- Tables and Figures Formatting Guidance
- Updated Decision Trees – Added Vapor Intrusion Decision Tree

VRP Guidance Manual Changes

NEW/REVISED SECTIONS

- Migration to Groundwater Guidance
- Combined Checklists to Determine Applicable Human Health and Ecological Standards
- Determining Background Concentrations (Appendix A)
- Updated UECA-LUST guidance and process
- Removed Templates (download from the OER website)

Cover and Cap Guidance

TERMINOLOGY

- Covers and Caps are Remedies (Engineering Controls)
- Cover: Prevents direct contact exposure to contaminated media that exceeds a VRP remediation standard
- Cap: A cover that also minimizes infiltration of water into contaminated media that may cause migration of contaminants into groundwater or underlying soil

Cover and Cap Guidance

SUBMITTAL REQUIREMENTS

- Design details submitted with RAWP
- Amount of supporting data and calculations depend on complexity of the design and function
- Construction documentation submitted with RACR or FR

Cover and Cap Guidance

REGULATORY APPLICABILITY

- VRP covers and caps are generally not required to meet requirements of RCRA or TSCA
- Where RCRA or TSCA has precedent, cap system design must meet requirements of that regulatory program
- Cap systems that meet RCRA or TSCA requirements are acceptable to the VRP

Cover and Cap Guidance

COVER SYSTEMS

- Prevent exposure over the long term – Minimize ongoing maintenance
- Consider current and future land use – both on-site and off-site
- Consider the nature of the contaminants – Concentration, volatility, toxicity, etc.
- Excavation control sites require indicator layer

Source: IWTCargoguard.com

Cover and Cap Guidance

SOIL COVER – VEGETATED

- Simple – Relatively Low Cost
- Minimum 1 ft. thickness
- Placed to support vegetative growth
- Minimum slope = 5%
- Maximum slope = 2:1

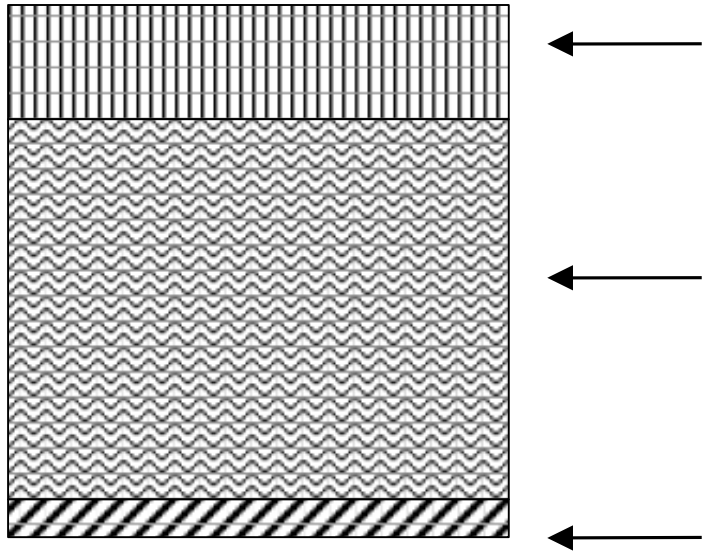
Cover and Cap Guidance

SOIL COVER – VEGETATED CONTINUED

- Protection from erosion – mats or rigid armor
- Clean source of borrow soil – off-site or undeveloped areas
- Potentially impacted soil subject to analysis
- Describe borrow source in RAWP

Cover and Cap Guidance

DEFAULT SOIL COVER



6 in. Vegetated Topsoil
(> 5% slope)

6 in. General Soil Fill

Indicator Layer (e.g., Plastic Fence or Geogrid)

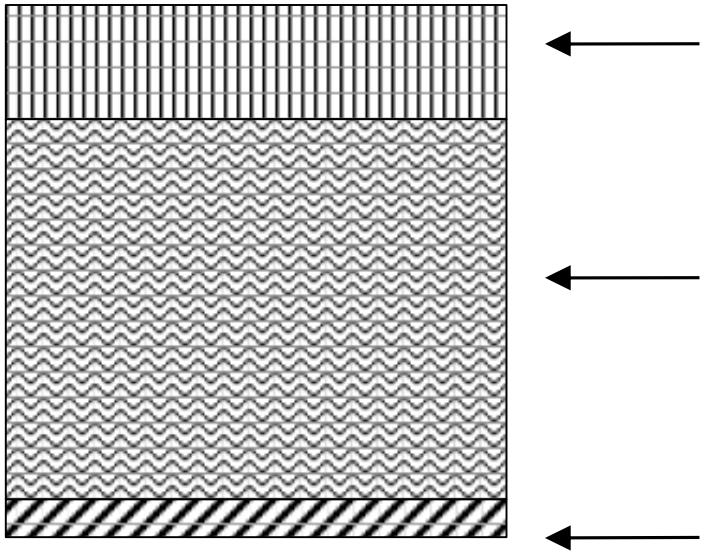
Cover and Cap Guidance

UNCONSOLIDATED COVERS – UNVEGETATED

- Soil w/Aggregate Wearing Surface
- Rubber chips, organic mulch, other landscaped areas
- Separation layers - geotextile
- Design must address anticipated use and loads
- Aggregate surface minimum slope = 2%

Cover and Cap Guidance

DEFAULT UNCONSOLIDATED COVER



6 in. Surface Material (Gravel, Mulch, Etc. at >2% slope)

6 in. General Fill (Soil, Gravel, Etc.)

Indicator Layer (e.g., Plastic Fence or Geogrid)

Cover and Cap Guidance

NEW PAVEMENT COVERS

- New Concrete or Asphalt System
- Design must address use and loads
- Pavements require adequately designed base course
- Designs must bear PE seal

Source: Ohio Paving & Construction

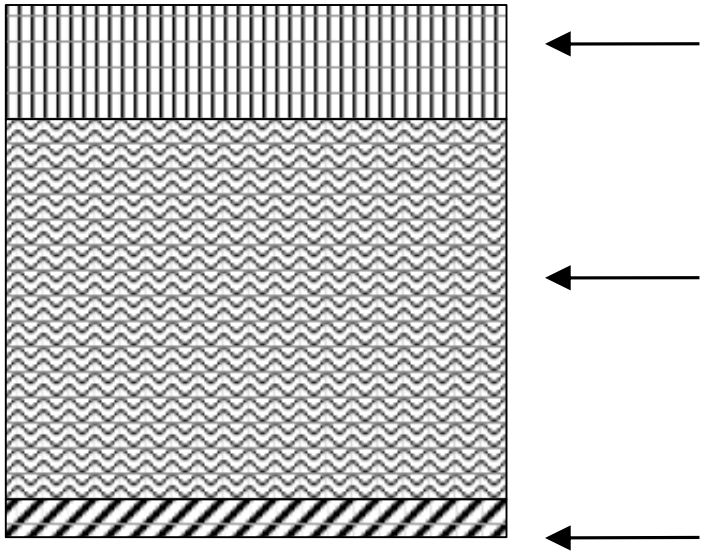
Cover and Cap Guidance

EXISTING PAVEMENT COVERS

- Good Condition – Bearing and Drainage
- Known Design Factors
- Small Areas - Low Risk Sites
- Provide supporting justification in RAWP

Cover and Cap Guidance

DEFAULT PAVEMENT COVER



Pavement Material (Asphalt, Concrete) of Design Thickness
(slope designed to drain)

Subbase Material (Aggregate) of Design Thickness

Indicator Layer (e.g., Plastic Fence or Geogrid)

Cover and Cap Guidance

RAIL TRAILS

- Special Case Cover System
- Wearing surface must support anticipated use
- Vehicle Crossings, Access Points
- Adjacent areas may utilize alternate cover types

Source: Trailsnet.com

FYI, leaves are not an effective alternate cover type!

Cover and Cap Guidance

BUILDINGS & STRUCTURES

- Building Slabs, Sidewalks, etc.
- Used in concert with other systems
- Cracked concrete to be repaired or replaced
- Vapor migration must be considered separately

Cover and Cap Guidance

LOW PERMEABILITY CAP SYSTEMS

- Required where the source of groundwater contamination is left in place (not removed)
- Ground Water Protection Act requires removal or mitigation of the source of contamination
- Waste materials such as spent foundry sand, wood treatment sludges, etc., are considered a source; Any RCRA waste is a source
- Contaminated soils resulting from typical site operations are not a source

Cover and Cap Guidance

LOW PERMEABILITY CAP SYSTEMS CONTINUED

- Minimize the infiltration of water through contaminated media to the maximum extent practicable
- Cap systems must include a hydraulic barrier layer
- Cap systems will also be acceptable for prevention of direct contact
- Durability to be considered as with cover systems

Cover and Cap Guidance

LOW PERMEABILITY CAP SYSTEMS CONTINUED

- Vegetative layers designed with adequate erosion control
- Maximum cap slope = 4:1 (interfacial stability)
- Minimum cap slope = 5% (vegetated)
- Extend 5 ft. horizontally beyond waste limits (minimum)

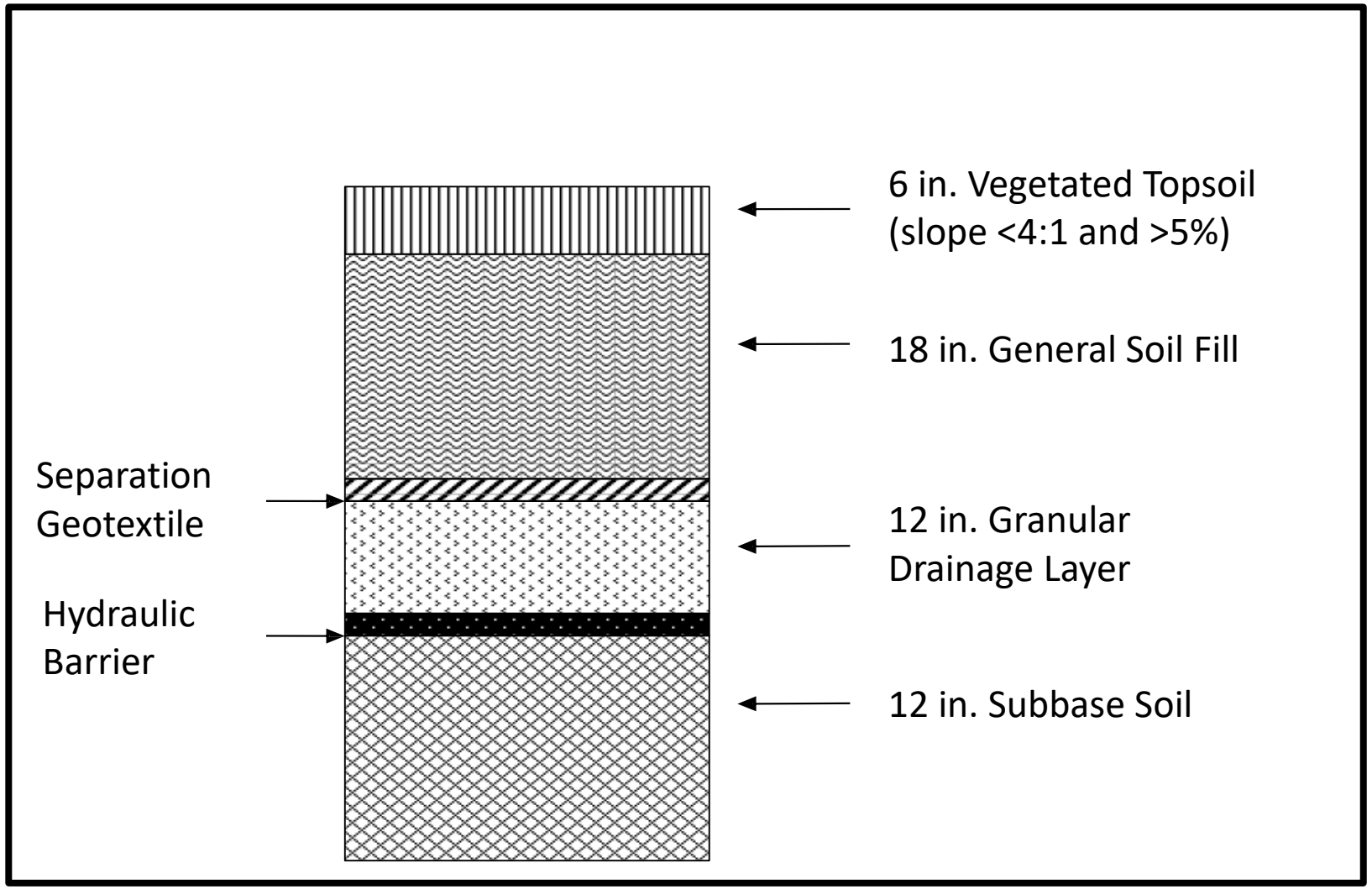
Cover and Cap Guidance

SOLID WASTE CAPS

- Caps meeting WV Solid Waste Management Rule are acceptable
- Gas collection layers generally not required
- Alternative designs certified by a PE may be proposed
  - Geosynthetic Clay Liners
  - Specialized Pavement Designs
- HELP model or other required to demonstrate equivalency

Cover and Cap Guidance

TYPICAL SOLID WASTE CAP



De Minimis Risk Assessment

AKA: EXPOSURE ASSESSMENT
Finish the Site Assessment
Update the CSM!

All potential media

Primary sources
- Surface soil
- Subsurface soil
- Groundwater

Secondary sources
- Vapor
- Surface water
- Sediment

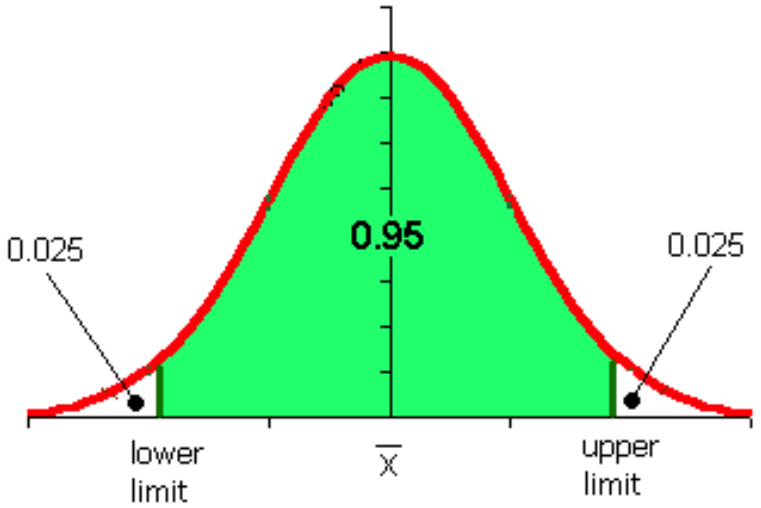
All potential receptors
- Recreators
- Residents
- Trespassers
- Commercial/Industrial
  - (Indoor & Outdoor)
- Construction/Utility
- Terrestrial ecological
- Aquatic ecological
- *Current and Future!!!*

All potential routes of exposure
- Ingestion
- Inhalation
- Dermal contact

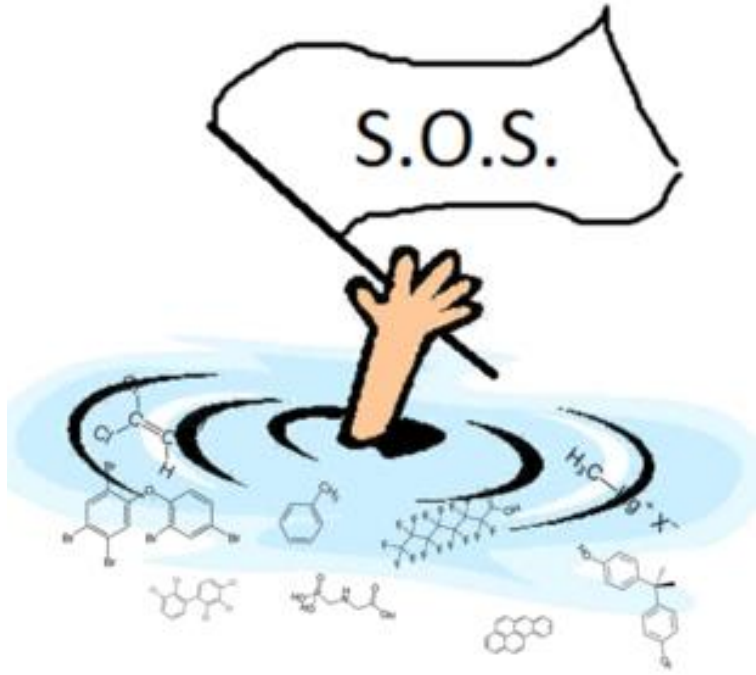
Calculate Exposure Point Concentrations (EPCs)

For each medium, the EPC will be the lower of:

- Maximum value, or
- 95% UCL calculated in current ProUCL (normal, gamma, logarithm)
  - at least 8 samples
    - surface soil
    - subsurface soil
    - sediment
  - 2 years of quarterly data, 4 years of semiannual or 8 years of annual
    - groundwater
    - surface water
  - Attach ProUCL output as an Appendix



Screen EPCs against Relevant Benchmarks



Surface Soils

Residential & Industrial De Minimis (MTG?)

Subsurface Soils

Industrial De Minimis (MTG?)

Sediment

Human: Residential & Industrial De Minimis

Eco: EPA Region 3 BTAG → Region 4 ERASG → NOAA SQuiRTs

Groundwater

Groundwater De Minimis

Surface Water

WV WQS → EPA Region 3 BTAG → Region 4 ERASG → NOAA SQuiRTs

Vapor *(attach VISL output as an Appendix)*

Residential & Industrial Groundwater VISL →

Residential & Industrial Near Source/Sub Slab VISL →

Residential & Industrial Indoor Air VISL

Complete Pathways?

If the EPCs are all below the relevant benchmarks for the CSM receptor pathways:

- No more assessment is needed
- Submit Risk Assessment Report and Final Report

If any EPC exceeds the relevant benchmark for a receptor exposure pathway:

- Pathway is considered complete

  If pathways can be severed by institutional controls or cap/cover
  - Submit combined Risk Assessment Report & Remedial Action Work Plan
  - Implement remedies → Remedial Action Completion Report

  If pathways cannot be severed by institutional controls or cap/cover
  - Proceed with a Uniform or Site-specific Risk Assessment

Considerations for De Minimis Risk Assessments

Chapter 22 Article 12 - Groundwater Protection Act
Natural Attenuation (by the VRRP Rule)

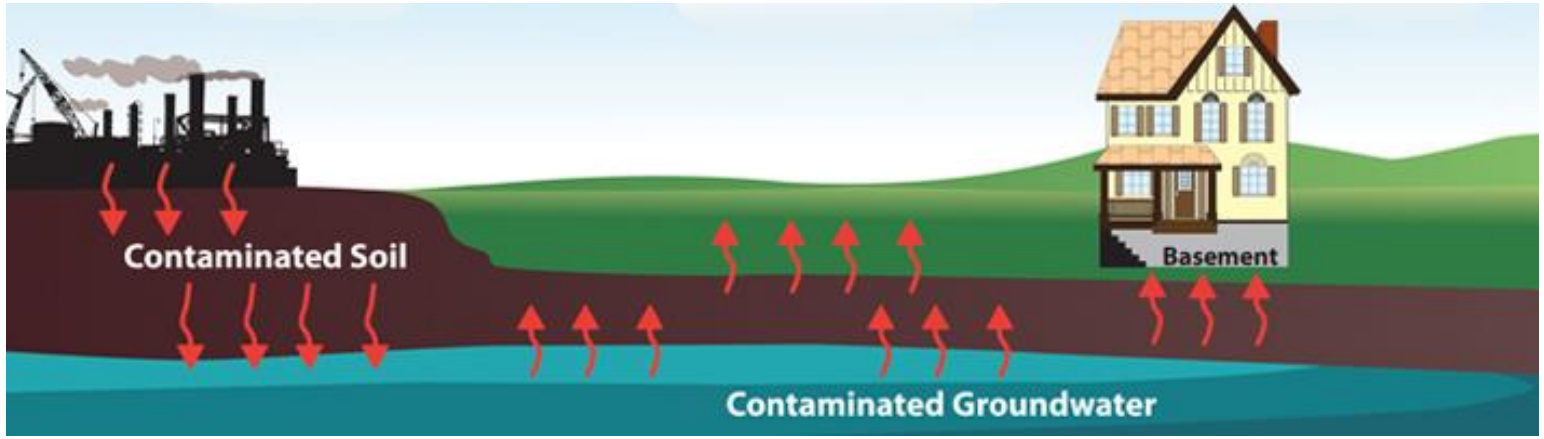
- 4 years of semiannual samples and LUC restricting GW use
- Can still get COC and monitor afterwards (Reopener?)

LNAPL Closure Policy (Transmissivity)
Off-site migration (LUC on adjacent parcel?)
Annual Inspections
Maintenance of cap/cover

Vapor Intrusion Best Practice

STEP ONE – GROUNDWATER:

1. Collect field samples
2. Analyze for VOCs and SVOCs that are Chemicals of Potential Concern (COPC)
3. Calculate EPCs (see section on De Minimis Risk Assessment)
4. Screen against the Residential and Industrial VISL values
    - ELCR = 1E-06 and HI = 1.0 for Residential
    - ELCR = 1E-05 and HI = 1.0 for Industrial
    - Can use site-specific groundwater temperature (WV default = 13°C)
    - Attach output as an Appendix



Groundwater

STEP ONE – CONTINUED:

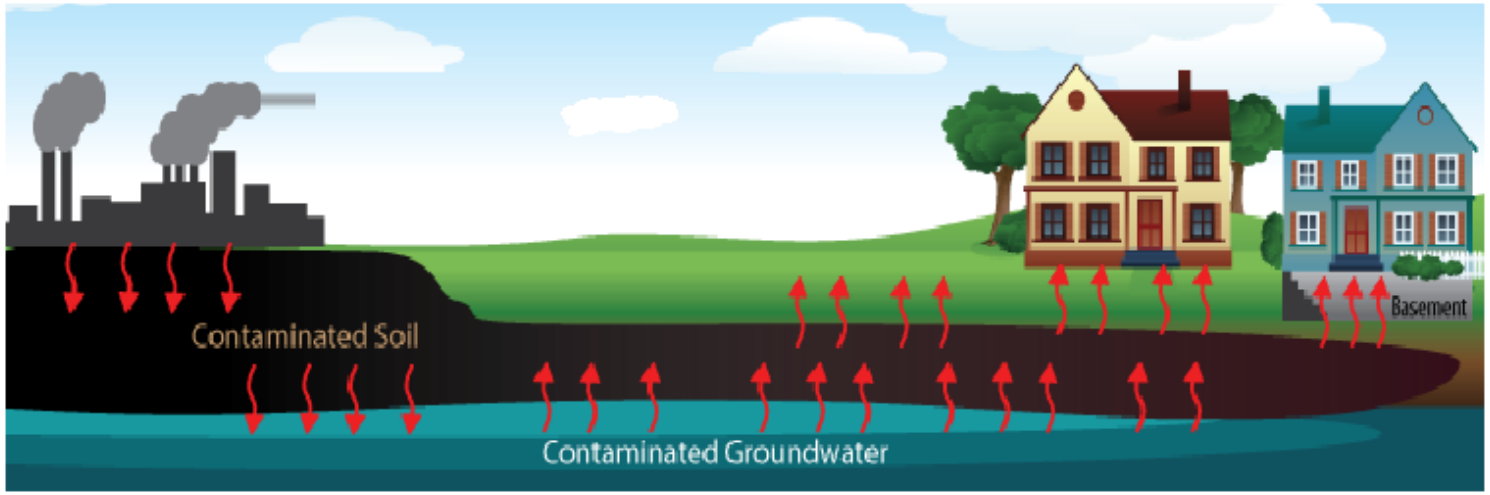
If no EPCs exceed Residential VISL → no further vapor assessment needed

If any EPC exceeds Residential VISL →

- Implement remedy for current and future residential receptors, or
- Collect Near-source/Sub-slab or Indoor Air samples

If any EPC exceeds Industrial VISL →

- Implement remedy for current and future industrial receptors, or
- Collect Near-source/Sub-slab or Indoor Air samples



Near-source / Sub-slab

STEP TWO – NEAR-SOURCE/SUB-SLAB:

1. Collect samples from Near-source wells (~5 ft bgs), and/or
2. Collect samples from Sub-slab sources in buildings
3. Calculate EPCs (see section on De Minimis Risk Assessment)
4. Screen against the Residential and Industrial VISL values (attach output)
    - ELCR = 1E-06 and HI = 1.0 for Residential
    - ELCR = 1E-05 and HI = 1.0 for Industrial

If no EPCs exceed Residential VISL → no further vapor assessment needed

If any EPC exceeds Residential VISL →

- Implement remedy for current and future residential receptors, or
- Sample Indoor Air

If any EPC exceeds Industrial VISL →

- Implement remedy for current and future industrial receptors, or
- Sample Indoor Air

Indoor Air

STEP THREE – INDOOR AIR:

1. Collect Indoor Air samples
2. Calculate EPCs (see section on De Minimis Risk Assessment)
3. Screen against the Residential and Industrial VISL values (attach output)
    - ELCR = 1E-06 and HI = 1.0 for Residential
    - ELCR = 1E-05 and HI = 1.0 for Industrial

If no EPCs exceed Residential VISL → no current vapor assessment needed

If any EPC exceeds Residential VISL →

- Implement remedy for current residential receptors

If any EPC exceeds Industrial VISL →

- Implement remedy for current industrial receptors

Use Groundwater or Near-source/Sub-slab results to screen for future buildings.

Considerations for Vapor Intrusion

Remedies can be institutional controls (e.g., vapor assessment, no basements)
Remedies can be engineered controls (e.g., vapor mitigation system)
Temperature

- Indoor Air samples should be collected during winter months
- Near-source/Sub-slab samples should be collected during warm months

Naphthalene and likely Benzo(a)anthracene (Hayes et al. 2005)

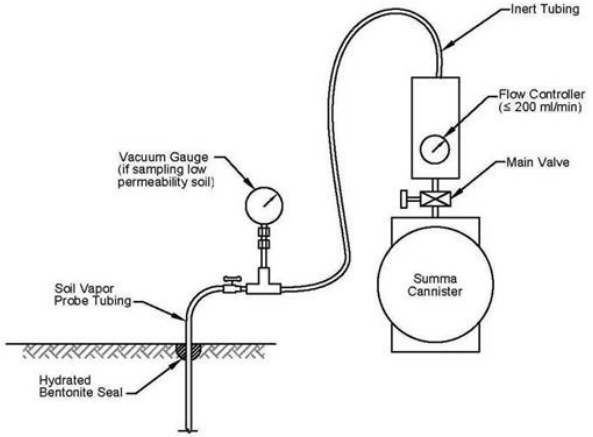
- Reduced recovery when sampled in cool ambient air temperatures (<70° F).
- If SVOCs are COPCs then sample vapor when air > 70° F.
- If SVOC vapor samples are collected when air < 70° F

  Check detection limits

  If SVOC detection limit is more than half the VISL value

  Evaluate conditions

  May collect more samples for SVOCs or remediate



Recreation Exposure Factors

Currently assume Recreators = Residents
Overly conservative exposure assumptions
Exposure Frequency (EF) = 350 days/year
Exposure Time (ET) = 24 hours/day

What about Industrial De Minimis?
Recreator ELCR = 1E-06 vs. Industrial ELCR = 1E-05
Industrial EF = 250 days/year
Industrial ET = 8 hours/day

EPA Regional Screening Levels (RSL)

RSL Calculator

Recreator equations are available

No default values for EF and ET (site-specific)

How do you get over this hurdle?

WVDEP Default Recreator Exposure Factors

Activity-specific Default EF and ET based on ~90th percentile from literature review

Recreational Activity	EF (days/year)	ET (hours/day)
Rail Trail and Other Trails	250	4.0
ATV and OHV	46	3.0
Swimming, boating, water-skiing and zip-lining	42	3.0
Horseback riding	62	3.0
Skiing, tubing and sledding	26	3.0
Fishing, hunting and wildlife-watching	50	3.0
Community parks	52	3.0
Camping	14	24
Athletic fields (e.g., soccer, football, baseball)	117	3.0

WVDEP Default Recreator Exposure Factors

General Default EF and ET

Recreational Activity	EF (days/year)	ET (hours/day)	Description
Unrestricted Recreation	250	4.0	Any recreation activity that has unrestricted public access throughout the year, including; rail trails, ATV/OHV, fishing, community parks, camping, athletic fields, wildlife-watching.
Restricted Recreation	100	3.0	Includes all recreational activities not in the ***Unrestricted Recreation*** category. Also includes ***Unrestricted Recreation*** activities that have WVDEP-approved restrictions in place, such as locked fences, natural barriers or other access controls.

Considerations for Recreation Exposure Factors

Can use either

- General Default values based on access restrictions
- Activity-specific Default values

Enter the EF and ET values into the RSL Calculator

Assume the default values for all other parameters in RSL Calculator

Run the analysis

Report the results in the Risk Assessment Report

Attach output as an Appendix

Migration to Groundwater (MTG)

MTG is meant to screen the potential for groundwater issues

THE PROCESS:

1. Collect and analyze surface and subsurface soil samples
2. Screen the maximum concentrations against the MTG De Minimis

- If no COPCs exceed the MTG De Minimis Standards
  No further assessment of groundwater is needed
- If any COPCs exceed the MTG De Minimis Standards, then
  Collect and analyze groundwater samples to determine if any exceed the Groundwater De Minimis, or
  Calculate Site-specific MTG Standards and rescreen the results
  - If any COPCs exceed the Site-specific MTG Standards
    Collect and analyze groundwater samples to determine if any exceed the Groundwater De Minimis Standards

Considerations for Migration to Groundwater

If you sample groundwater there is no need to screen against MTG De Minimis unless there is a known recent release that needs time for leaching to occur.

Concentrations > MTG De Minimis do not mean a COPC = COC for the site soils!!!

A contaminant is a COC for the site only if it exceeds one of these…

- Residential De Minimis
- Groundwater De Minimis
- Residential VISL values

Groundwater Impacts

Groundwater Protection Act 22-12-2 (b)
"…the Legislature establishes that it is the public policy of the State of West Virginia to maintain and protect the state's groundwater so as to support the present and future beneficial uses and further to maintain and protect groundwater…"

22-12-4 (b)
"…strive where practical to reduce the level of contamination over time to support drinking water use…"

22-12-5 (d)
"Groundwater regulatory agencies shall develop groundwater protection practices to prevent groundwater contamination from facilities and activities within their respective jurisdictions consistent with this article. Such practices shall include, but not be limited to, criteria related to facility design, operational management, closure, remediation and monitoring."

Groundwater Impacts

Voluntary Remediation and Redevelopment Rule 60CSR3

9.8. Remediation Measures. – The applicant may attain any of the remediation standards through one or more remediation activities that can include treatment, removal, engineering or institutional controls, and natural attenuation including, but not limited to, innovative or other demonstrated measures.

9.9.g.2. Collection of a minimum of four years of semiannual groundwater monitoring data for site-related contaminants to demonstrate the site meets conditions as specified in subdivision 9.9.b;

Sites that need a groundwater use restriction in LUC will need to comply with 9.9.g.2 – so start sampling early in the project!

Addressing Off-site Impacts in VRP

Responsible Parties vs. “Brownfield” Parties

- Responsible Parties, typical of UECA-LUST sites, must assess and remediate the entire release, including any off-site impacts
- “Brownfield” Parties, i.e., non-responsible parties, developers, prospective purchasers, etc., can limit site assessment and remediation to the parcel that was entered into the Voluntary Remediation Program

* However, the source must be controlled to prevent migration, especially to surface waters

Land Use Covenants

Reminders

- LUCs should be drafted and submitted with the Remedial Action Work Plan, and should be finalized and signed prior to submitting the Final Report
- Instruction pages for the LUC, site map, and Inspection Form
- Site map instructions include:
  - ✓ Title
  - ✓ Scale
  - ✓ North arrow
  - ✓ Legend
  - ✓ Property boundary
  - ✓ VRP site boundary
  - ✓ Specific activity and use limitation boundaries
  - ✓ Engineering control boundaries
  - ✓ 8.5x11
  - ✓ Black and white
  - ✓ Minimum 300 DPI resolution
  - ✓ No aerial or dark backgrounds or environmental sample points

Land Use Covenants

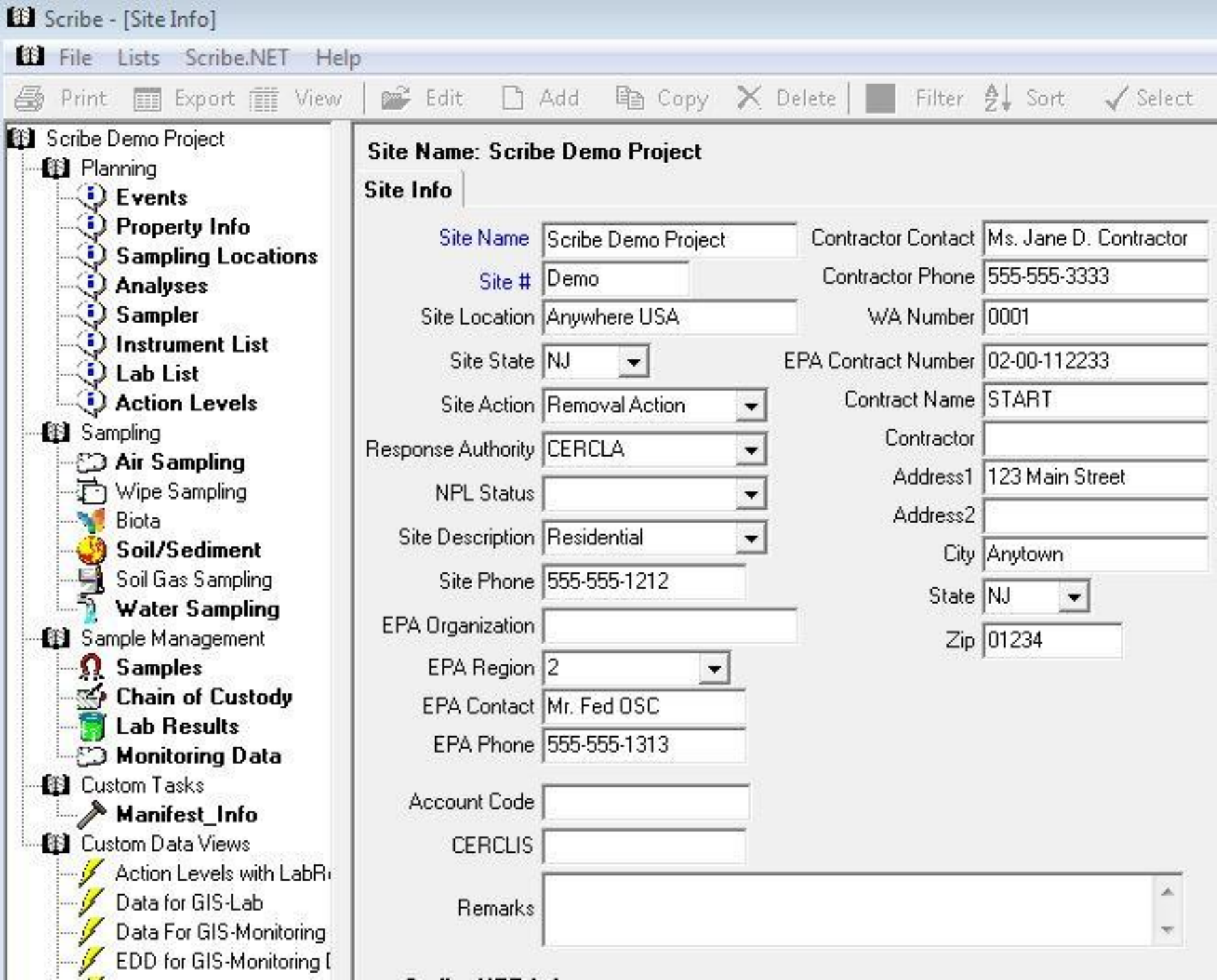
New DOH LUC

- For non-DOH applicant sites where contamination migrated into a DOH right-of-way
- Specific DOH-approved language
- DOH District Engineer will sign as a holder
- DOH LUC template not on OER's website to avoid confusion – please ask OER staff to email the DOH template

Using Scribe to Manage Data

Scribe is a software tool developed by EPA's Environmental Response Team (ERT) to assist in the process of managing environmental data. The Scribe tool captures sampling, observational, and monitoring field data. Examples of Scribe field tasks include soil sampling, water sampling, air sampling, and biota sampling. Scribe can also import Electronic Data Deliverable (EDD) files.

***OER would like to begin using Scribe for sites entering our programs and eventually import all site data into Scribe.**



Scribe Demo Project

General Reminders

Voluntary Remediation Agreement

- Have a question? Start with the VRA!
- Reports may be combined with prior project manager approval AND specified in the VRA
- Report submittal timeline updated in the VRA template – quarterly submittal deadlines no longer required; report deadlines changed to “90 days after ABC report approved”
- The Remedial Action Completion Report and Final Report can be combined

UECA-LUST Program

- UECA-LUST data validation – same as VRP data validation (stage 4 for 10% of the data used in the risk assessment for each media)
- Notice of Intent to enter the UECA-LUST Program

LRS Renewal

- 12 professional development hours every two years
- Webinars are no longer acceptable professional development hours
- Renewal form is on the OER website

Questions?

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Stop by the WVDEP booth and ask!