The Remediation Standard Regulations

Connecticut Department of Energy
and Environmental Protection
and
Environmental Professionals Organization
of Connecticut, Inc.

Remediation Standard Regulations - Introduction

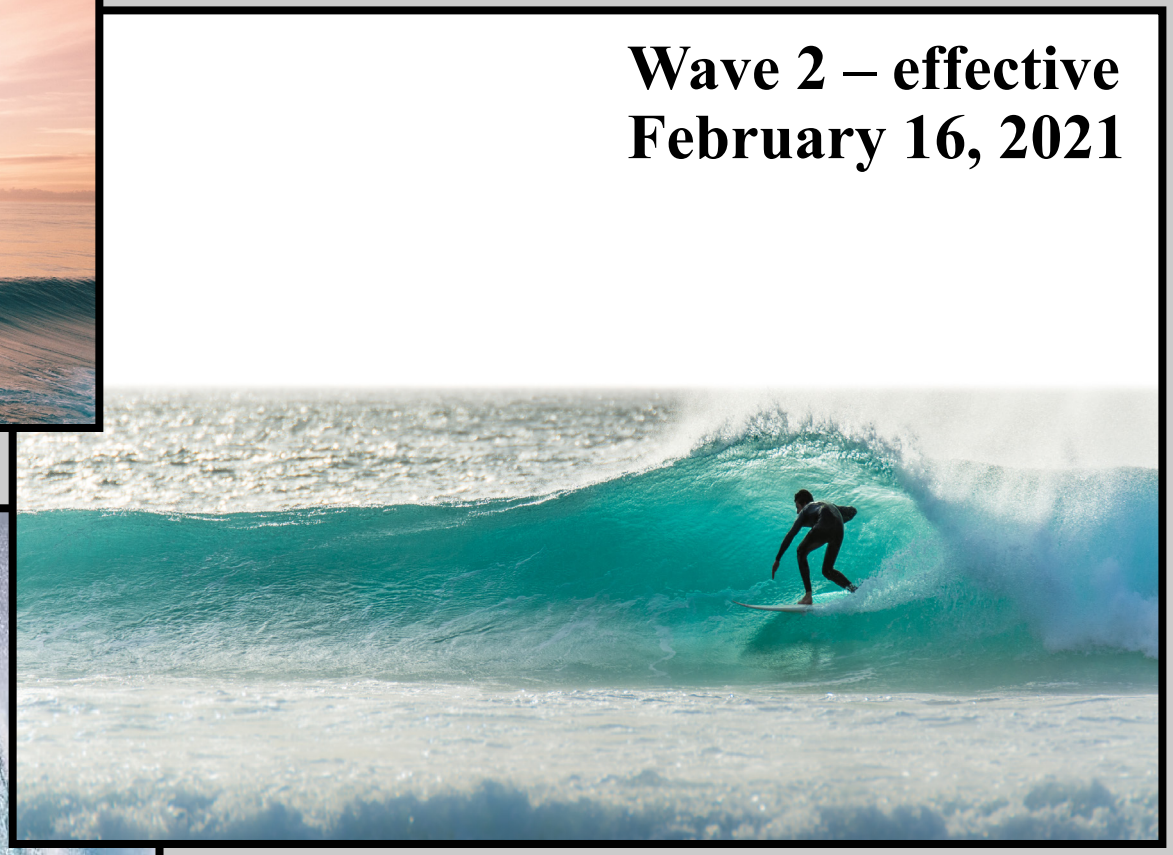
DEEP Disclaimer

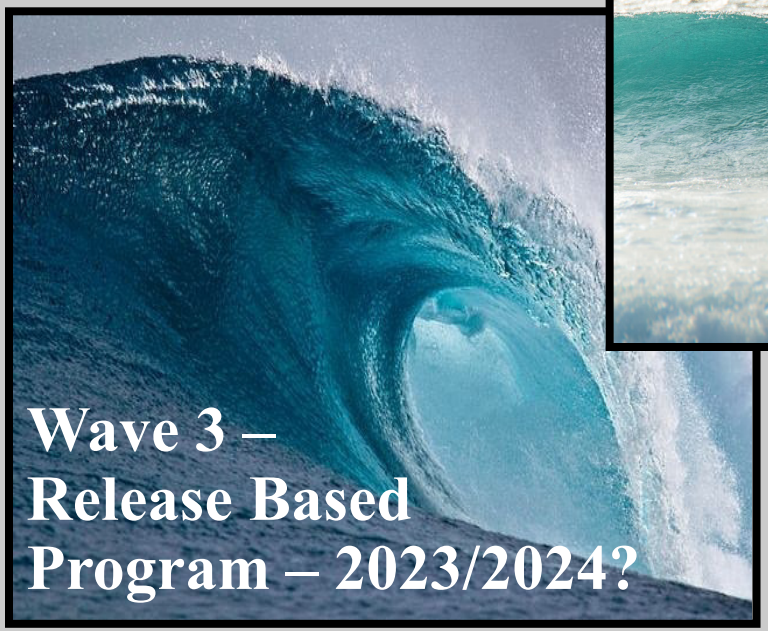
The following presentation was performed by the Remediation Division of the Connecticut Department of Energy and Environmental Protection in March 2023 for the Environmental Professionals of Connecticut (EPOC). The presentation is intended to be an overview of the Remediation Standard Regulation (RSRs), section 22a-133k-1 through 22a-133k-3, and 22a-133q-1 of the Regulations of Connecticut State Agencies, which became effective on January 30, 1996 and revised in June 27, 2013 and February 16, 2021. This overview is designed to answer general questions and provide basic information. You should refer to the appropriate statute or regulation for specific language. It is your responsibility to comply with all applicable laws. The information contained in this presentation is intended only to acquaint you with the Remediation Standard Regulations and does not constitute the Department's interpretation of the applicable laws.

The Remediation Standard Regulations (RSRs)/Environmental Use Restrictions (EURs)

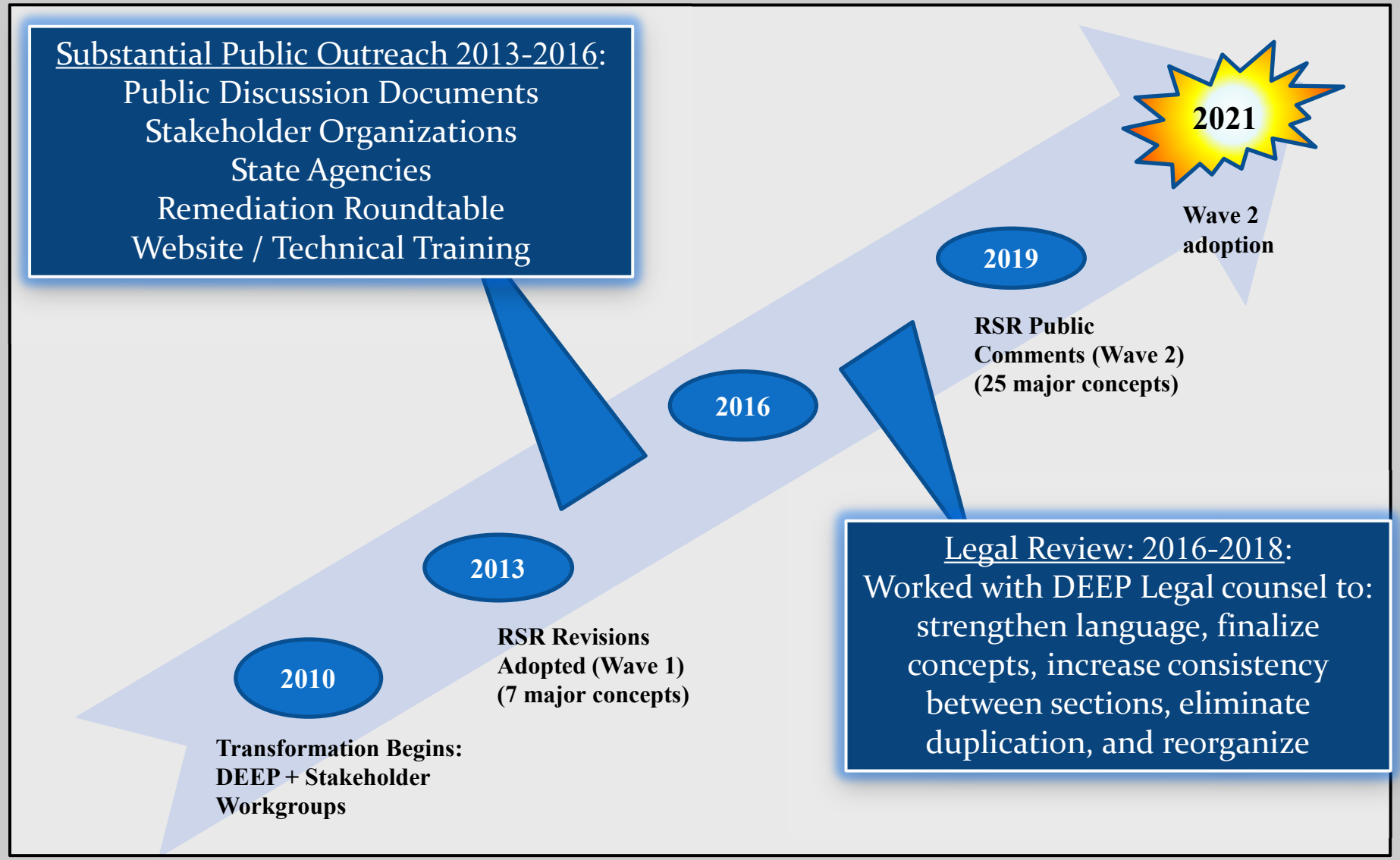
- Sections 22a-133k-1 through -3 of the Regulations of Connecticut State Agencies (RCSA)
- RCSA Section 22a-133q-1 through -9
- On DEEP website (https://portal.ct.gov/DEEP)

History of the RSRs





RSR Revision Timeline

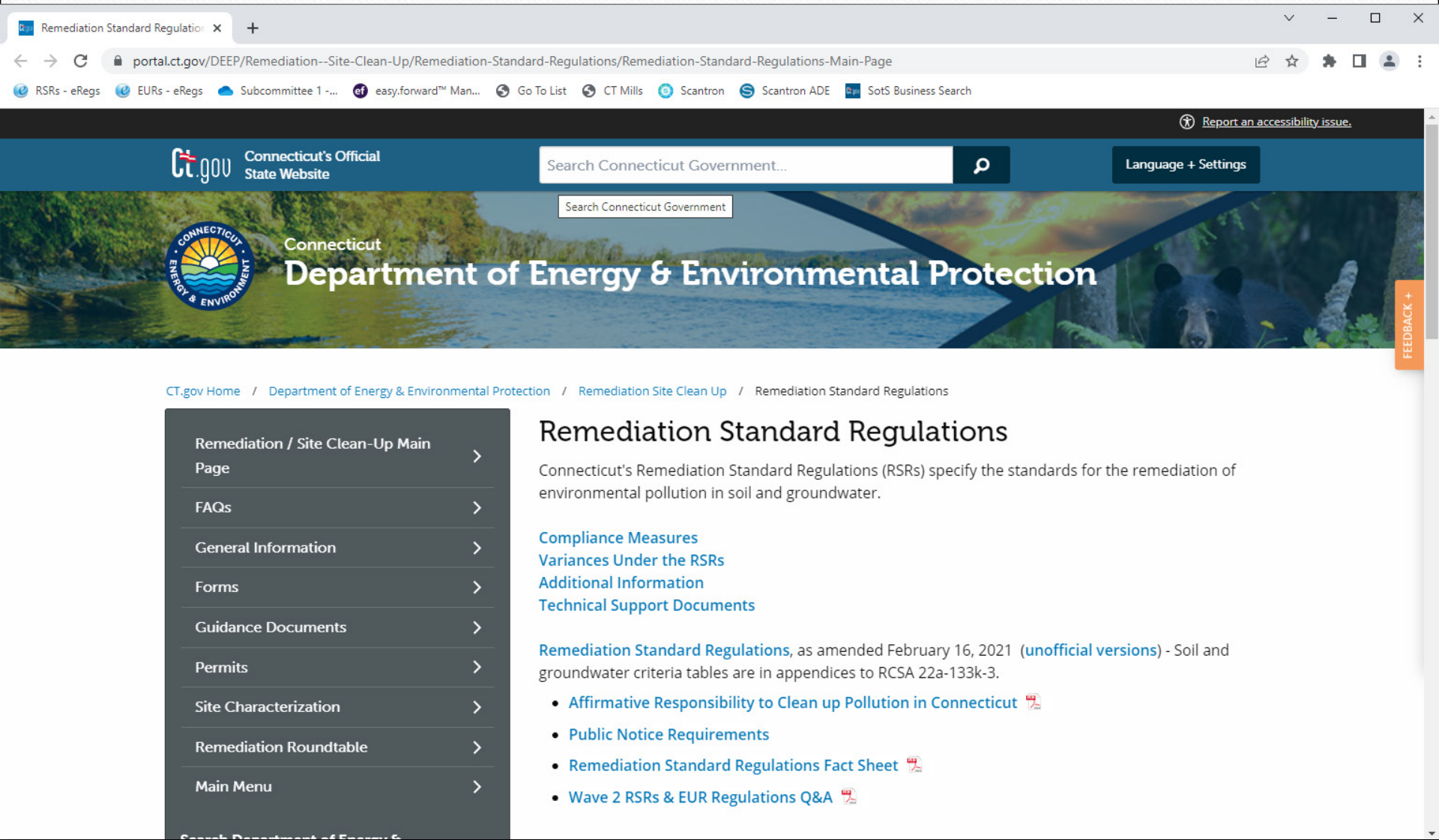


Future – Release Based Program

Reminders of the Past into Promise of the Future

CURRENT REGIME		FUTURE REFORM
Slow Framework Deters Investment Interest		Proven, Release-Based Model is More Efficient
Overuses DEEP Resources		You Find It, You Spill It, You Clean It
Exempts Certain Properties From Oversight		Tiered Approach Tailors to Risk Level of Release
Stagnant Properties Do Not Help Environment		Increases Economic and Environmental Value

The RSRs (link to regulations)



Website Versions of RSRs

Additional Information

Remediation Standard Regulations Course (October 2020) - PowerPoint presentation developed for EPOC's RSR course

Red-line/[Blue-line] Version of the RSRs - contains deleted/moved language in bracketed blue text and added/moved language in underlined red text. This version of the Revised RSRs is unofficial and made available for the convenience of the reader.

RSRs with Indents - text of the RSRs with subsections and subparagraphs indented for readability. This version of the RSRs is unofficial and made available for the convenience of the reader.

Alternative version are to highlight alterations made to the existing regulation, and is for informational purposes only. Any conflict between this document and the official text of the proposed amendments entered into the State's E-Regulations system shall be resolved by referring to the official version.

	100 feet		
T	Daily discharge duration	0.5	day
Q_{plume}	Average daily discharge of the subject groundwater plume: $Q_{plume} = KiA$	calculated	ft^3/sec *
K	Hydraulic conductivity	as measured	ft/day
i	Hydraulic gradient	as measured	ft/ft
A	Area of discharge: A = h * w	as measured	ft^2
h	Thickness of groundwater plume at watercourse discharge area	as measured	ft
w	Width of groundwater plume at watercourse discharge area	as measured	ft

* *The units for Q_{plume} should be "ft^3/day".*

Pre-Wave 2
Section 22a-133k-2(a) Soil Criteria

Unless otherwise specified in sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies, polluted soil at a release area shall be remediated to a concentration which meets (1) (A) the direct exposure criteria set forth in subsection (b) of this section or alternative direct exposure criteria established in accordance with subdivision subdivision (7) of subsection (d) of this section; and (B) the pollutant mobility criteria [set forth in subsection (c) of this section or alternative pollutant mobility criteria established in accordance with, subdivision 22a-133k-2(d) or of subsection (d) of this section]; or (2) the background concentration for soil the background concentration for soil provided notice must be has been submitted to the Commissioner which notice shall be submitted on a form furnished by the Commissioner shall include a brief description of the subject release area and of the general characteristics of soils in the vicinity of such release area; a map showing the location of such release area, and based on reasonable inquiry, of other release areas in the vicinity thereof, and of all soil samples taken for the purpose of characterizing background concentration for soil; the results of all laboratory analyses of such samples, and the background concentration for soil.

Wave 2
Section 22a-133k-2(a) Soil Criteria

Unless otherwise specified in the RSRs, polluted soil at a release area shall be remediated so that the concentration of a substance in such soil is equal to or less than:

(1) The direct exposure criteria and the pollutant mobility criteria; or

(2) The background concentration for soil.

Common Acronyms

- AOC – Area of Concern
- **APS** – Additional Polluting Substance
- BRL/BDL – Below Reporting Limit/Below Detection Limit
- CFR – Code of Federal Regulations
- CGS – Connecticut General Statutes
- COC – Contaminant /Chemical/Constituent of Concern
- **CSM** – Conceptual Site Model
- **DEC** – Direct Exposure Criteria
- DPH – Department of Public Health
- EC – Engineered Control
- ETPH – Extractable Total Petroleum Hydrocarbons
- **EUR** – Environmental Use Restriction (ELUR and NAUL)
- **GWPC** – Groundwater Protection Criteria

Common Acronyms

- LRL – Laboratory Reporting Limit
- NAPL – Non-Aqueous Phase Liquid (LNAPL - Light and DNAPL - Dense)
- **NAUL** – Notice and Activity Use Limitation
- ND – Non-Detect
- PCB – Polychlorinated Biphenyls
- RCSA - Regulations of Connecticut State Agencies
- SCGD – Site Characterization Guidance Document
- SPLP/TCLP – Synthetic Precipitation Leaching Procedure/Toxicity Characteristic Leaching Procedure
- **SWPC** – Surface Water Protection Criteria
- TPH – Total Petroleum Hydrocarbons
- UST/AST –Underground Storage Tank/Above ground Storage Tank
- **VolC** – Volatilization Criteria
- **WQS** – Water Quality Standards

Structure

- General Provisions - 22a-133k-1
  - Definitions - 22a-133k-1(a)
  - Applicability - 22a-133k-1(b) thru -1(i)
- Soil Remediation Standards - 22a-133k-2
- Groundwater Remediation Standards - 22a-133k-3
- Environmental Use Restrictions - 22a-133q-1 thru -9

Structure

Section	22a-133k-**3**
Subsection	22a-133k-3**(a)**
Subdivision	22a-133k-3(a)**(1)**
Subparagraph	22a-133k-3(a)(1)**(A)**
Clause	22a-133k-3(a)(1)(A)**(i)**
Subclause	22a-133k-3(a)(1)(A)(i)**(I)**

Importance of the Definitions

- Where you find key terms that determine applicability of a provision:

Is a playground residential?

Does maximum extent prudent include cost?

What is a pesticide (22a-47w)?

What is considered a public roadway?

22a-133k-1(a)

Key Definitions - NEW

- Application of Pesticides
  - Intended purpose
- Background Concentration
  - Soil and water combined
  - Validated CSM
- Conceptual Site Model
  - Representative
- Demarcation Layer
  - Brightly-colored (snow fencing)

22a-133k-1(a)

Key Definitions - NEW cont'd

- Diminishing State Groundwater Plume
  - Validated CSM
  - Not migrating
  - Decreasing in concentration
- Environmental Use Restriction or EUR
  - Includes both ELUR and NAUL
- Groundwater Criteria
  - Includes SWPC, WQC, VolC, GWPC and background

22a-133k-1(a)

Definitions - NEW cont'd

- Hardscape
  - Used in EC to prevent soil contact
- Immobilization or Immobilize
  - Used in EC for PMC/NAPL
- Maximum Extent Practicable/Prudent
  - Prudent was already a definition (although not "maximum extent"), but practicable wasn't
  - Practicable - does not consider cost
  - Prudent - does consider cost

22a-133k-1(a)

Key Definitions - NEW cont'd

- Monitored Natural Attenuation
  - Representative GW monitoring
  - GW concentrations decreasing
- Naturally Occurring
  - Clarifies background definition
- Pesticide
- Polluted Material
  - Soil mixed with coal ash, wood ash, coal fragments…

22a-133k-1(a)

Key Definitions - NEW cont'd

- Public Roadway
  - Existing road to use Public Roadway Variance
- Public Water Supply Distribution System
  - Necessary for Alt. GWPC
- Subject Area
  - EUR term
  - Area with restrictions

22a-133k-1(a)

Key Definitions - NEW cont'd

- TI Zone
  - GW plume area exceeding criteria
- Volatile Organic Substance
- Volatile Petroleum Substance
  - Subset of "VOSs" that are handled differently in VolC
- Water Quality Criteria (22a-426)

22a-133k-1(a)

Key Definitions - Amended

- Environmentally Isolated Soil
  - Implementation language moved to PMC section
- Inaccessible Soil
  - Asphalt (3 inch) (no change)
  - Reinforced concrete (4 inch)
  - 2 times metals (in definition since 2013)

Definitions - Amended cont'd

- Non-aqueous Phase Liquid or NAPL
  - DNAPL term deleted
- Polluted Fill
  - Removed sediment (to clarify it is soil when placed)
- Residential Activity
  - A place where people live or play
  - For college, only dorms apply (not whole campus)
  - Hospitals are only Residential for VolC (not DEC)

22a-133k-1(a)

Definitions - Amended cont'd

- Sediment
  - Material in a watercourse (22a-38)
- Soil
  - Geologic material or sediment placed on dry land
- Technically Impracticable
  - Flipped definition from practicable

Criteria Definitions Amended

- All criteria definitions were modified to represent:
  - Default criteria in Appendices,
  - Alternative criteria, or
  - Additional polluting substance
- This language change allows for all three criteria types to be applicable unless otherwise stated

22a-133k-1(a)

General Applicability

The RSRs apply to any action taken to remediate polluted soil or a groundwater plume emanating from a release area, provided the action is either:

1. Required by a regulation, statute, or order of the Commissioner pursuant to Chapter 445, 446k, or Section 22a-208a(c)(2) of the Connecticut General Statutes (CGS), or
2. LEP actions required to be taken pursuant to the property transfer program and voluntary cleanup provisions of Sec's. 22a-134a, 22a-133x, or 22a-133y of the CGS.

22a-133k-1(b)(1)(A)

General Applicability

The RSRs do not apply to:

- Naturally occurring substances

  or

- Pollution from groundwater discharge permit in accordance with 22a-430

22a-133k-1(b)(1)(B)

General Applicability

- Affirmative Responsibility to Clean up Pollution in CT
  - Stemmed from Wave 2 draft language
  - RSRs required endpoints for all cleanups
  - Provides case law
- Said for years - Complying with RSRs will avoid having to do work over in the future

Characterization

- Proper characterization during investigation and remediation necessary to apply RSRs correctly
- Compliance based on representative sampling of a release
- Conceptual site model is key
  - Site Characterization Guidance Document (**SCGD**) or other prevailing guidelines

22a-133k-1(b)(2)

Representativeness of Sampling Program

- Sampling program used in the decision making process must be representative of the conditions in the environment
- Therefore, it is expected that all COCs have been identified and their distribution and variability in the environment have been determined

What is Representative

- Understanding of release mechanism
- Full delineation of release area
  - Horizontal and vertical extents
- All COCs investigated
  - Substances react differently in the environment
- Degree and extent of groundwater plume understood

Other Requirements

- Complying with RSRs does not automatically mean compliance with other federal, state or local requirements, for example:
  - 40 CFR Part 761 (TSCA - PCBs)
  - RCSA 22a-449(d)-101 et seq. (UST Regulations)
- No further remediation is required if the commissioner already approved the remediation

22a-133k-1(b)(3)

Purpose of RSRs

- Establish soil and water clean-up levels that protect human health
- Protect the environment in a manner consistent with the state's Water Quality Standards
- *RSRs define clean-up endpoints, not why, how, or when to reach the endpoints*

Time Frames

- Time frames for commissioner approval not established in RSRs
- Can request estimated time frame for any commissioner approval
- Estimated reviews is based:
  - Staff resources
  - Complexity of request
  - Environmental or economic significance

22a-133k-1(c)

Clean up Time Frame

What time frame is required?

- RSRs do not set a time frame for achieving clean-up criteria
- Time frames set by implementing mechanisms such as property transfer, enforcement action, RCRA corrective action, UST regulations, etc.
- Commissioner can expedite time frame to be protective, if needed

Public Participation

- Public Notice is not required for emergency or unplanned time-critical remedial actions
- Standardize all public notice requirements
  - Certain federal regs require different requirements and timeframes (RCRA 45 days)
- Attempt to be more transparent on remedial activities

22a-133k-1(d)

Public Notice

- Submit notice to Commissioner, elected official and local health
- Publish in newspaper
- **And** either:
  - Mail letter of notice to neighbors, or
  - Maintain sign at site for 30 days

22a-133k-1(d)(1)(A)

Public Notice Information

- Name/Address of parcel owner and RP
- Address of parcel
- Rem ID #
- Nature of release
- Point of contact information for comments
- Comment submittal open for 30 days
- Description of remediation with schedule

22a-133k-1(d)(1)(B)

Comment Received

No

- Wait 30 days
- Remediation commence

Yes

- Wait 30 days
- Within 60 days submit to Commissioner a comment summary and responses document (RD)

Commissioner has 4 options:

- RP sends RD to commenters
- Commissioner can modify RD and then RP sends to commenters
- Hold public meeting then RP needs to generate a secondary RD
- Determine remediation proposed not acceptable or additional measures needed

22a-133k-1(d)(2)

Supplemental Notice

- Additional Public Notice is required if
  - Substantial change from original public notice (could include variance, EUR, EC, or TI not previously provided)

    OR
  - Remediation not substantially initiated within 3 years

22a-133k-1(d)(3)

Environmental Use Restrictions (EUR)

- EUR* means both ELUR and Notice of Activity Use Limitation (NAUL)
- New section lists where a ELUR and NAUL can be used in the RSRs
  - An ELUR can always be used
  - NAUL need to be used in accordance with 22a-133o

* *When RSRs say ELUR only a ELUR can be used*

NAUL

- Allowable NAULs limited to the 5 restrictions in NAUL statute – 22a-133o

1) Preventing residential activity
2) Inaccessible soil less than 10x DEC
3) Engineered control less than 10x DEC
4) Environmentally isolated soil less than 10x PMC or less than 10 cubic yards, or
5) Prescribed by Commissioner:

WSPF, Vapor Mitigation System, etc.

22a-133k-1(e)

Environmental Use Restrictions (EUR)

- EUR need to be in effect
  - Time of verification
  - When required by commissioner
  - Special time specific to 22a-133y
- EUR only deemed in effect after recording on land records
- EUR with multiple restrictions may be approved and schedule extension for combining EURs can be requested

22a-133k-1(e)(3) – (5)

Financial Assurance (FA)

- Required for Engineered Controls (EC) or Technical Impracticability (TI)
- Maintained for as long as variance is needed
- Covers cost to maintain RSR compliance
- **20%** of **30-year** operation/maintenance/repair costs
  - Adjusted every 5 years for inflation
  - Most FA include the cost of 2 repaving events

22a-133k-1(f)

Financial Assurance (FA)

- Types of instruments
  - Trust Agreement or Trust Fund
  - Irrevocable Standby Letter of Credit
  - Payment or Funds in Cash
  - Certificate of Insurance
- Instrument language must be identical as prescribed by Commissioner
- Exemptions for:
  - Municipalities, state or federal government
  - FA of less than $10,000 for entire parcel

22a-133k-1(f)

Use of Prescribed Forms

- All approval request, variances, FA, EUR, and notices shall be submitted on Form Prescribed by Commissioner
- "Notices" within RSR means provided at the time of verification (using Verification Form)
- Currently only APS and EUR have dedicated forms
- EURs are uploaded as Word Docs w/ embedded transmittal form
- All other submittals (including APS) should use e-doc transmittal form with request/notice

22a-133k-1(g)

Requirements for Analytical Data
(former Matrix Interference Section)

- All analytical data must be scientifically valid and defensible
- Commissioner may post guidelines to be used to ensure the above (Reasonable Confidence Protocols/RCPs)
- If other method is used, such method shall be documented for review & evaluation

22a-133k-1(h)(1)

Requirements for Analytical Data cont'd

Laboratory reporting limits (LRLs) shall:

- Be established at a concentration below applicable criteria (unless matrix interference or instrument limitations prevent it)
- Not be artificially raised or lowered
- Be equivalent to the lowest standard used or a low-standard specified in an RCP method or otherwise approved

22a-133k-1(h)(2)

Requirements for Analytical Data cont'd

Matrix interference and instrument limitations shall be dealt with by:

- Using additional procedures to get below RSRs:
  - SW-846 or other EPA-approved Methods
  - Commissioner approved methods
- If above doesn't work, submit a report detailing measures taken which will then be used to determine if compliance may be demonstrated by remediating to the elevated LRL

22a-133k-1(h)(3)&(4)

Transition Period for Volatilization Criteria

- Pre-Wave 2 compliance options
  - Required to remediate plume at 15’ (instead of 30’)
  - Remediate to former Appendix E volatilization criteria

ONLY IF:

- Remediation initiated and RAP submitted prior to **2/16/2021**

AND:

- Remediation of VOCs completed by **2/16/2023**
- Verification by **2/16/2026** or earlier (if required)

22a-133k-1(i)

Other Transitions

- What about previous Commissioner approvals prior to 2/16/21?

- What about a verification submitted after February 16, 2021? With which regulations must compliance be verified?

Other Transitions

- What about previous approval by Commissioner prior to 2/16/21?
  - Previous approvals are still valid and can be used for compliance with RSRs
- What about a verification submitted after February 16, 2021, with which regulations must compliance be verified?
  - A verification submitted after 2/16/21, must verify compliance with the newly adopted amendments.
  - An exception is when the verification relies on a request, or variance, previously approved by the Commissioner under the prior regulations, or when a complete ELUR application was submitted prior to 2/16/21.

Wave 2 RSR & EUR Q&A

- Living document
- Based on phone calls, emails, roundtable questions….

Department of Energy & Environmental Prote
Remediation Division

Wave 2 RSRs & EUR Regulations Q&A
February 4, 2022

Presented below are the Department's responses to submitted Wave 2 RSR and EUR Regulations questions.

RSR Section 1. General Provisions

22a-133k-1(a)(5) – "Background Concentration"

Q: The subject of this phrase of the definition is unclear: …the concentration of a substance detected is "minimally affected by human influences"… Does this mean that the substance detected was caused by human influences or that human influences are not likely to affect the concentrations detected?

A: The phrase "minimally affected by human influences" is meant to allow for non-point source concentrations (such as mercury from Mid-west power plants) to be considered part of the background concentration. This concept was added to the RSRs to better align with the Water Quality Standards (WQS) which defines "natural" as "the biological, chemical and physical conditions and communities that occur within the environment which are unaffected or minimally affected by human influences."

Q: Does the VolC transition include the soil vapor volatilization criteria (SVVC)? (02/04/22)

A: No, the VolC transition only includes the former 15' VolC applicability depth for all substances and the former groundwater volatilization criteria (GWVC). The SVVC was not included in the transition due to its proximity to potential receptors, which represents an increased risk to human health vs. the GWVC. Also, the GWVC is the actual criteria while the SVVC only represents an optional alternative means of demonstrating compliance where there is a structure over the groundwater plume with volatile organic substances.

Q: For the Alternative SWPC calculated in accordance with 22a-133k-3(b)(1)(A), how is the Q99 calculated? (02/04/22)

A: Use the following steps to calculate the Q99:

- Go to https://streamstats.usgs.gov/ss/ and search "Connecticut"
- Select the appropriate state or regional study area (likely "Connecticut")
- Zoom in to plume discharge location, select "Delineate", and choose the discharge location
- Wait for delineation of basin and then select "Continue"
- Select "Flow-Duration Statistics" as the "Scenario" and then select "Continue"
- Under "Build a Report", select "Continue" and the reports will be generated. The "99 Percent Duration" at the bottom of the report will be the Q99.

Please be advised that the units will be in ft^3/s which might need to be converted to ft^3/day.

Guidance Documents

- Represent an approach DEEP finds acceptable and their use may expedite review and approval
- Developed by consensus of DEEP and stakeholders
- Other approaches may be acceptable
- DEEP recognizes that technology evolves

Existing Guidance Documents

- Guidance for Collecting and Preserving Soil and Sediment Samples for Laboratory Determination of Volatile Organic Compounds
- Laboratory Quality Assurance Quality Control Reasonable Confidence Protocols
- Laboratory Quality Control Assurance and Quality Control, Data Quality Assessment and Data Usability Evaluation Guidance Document

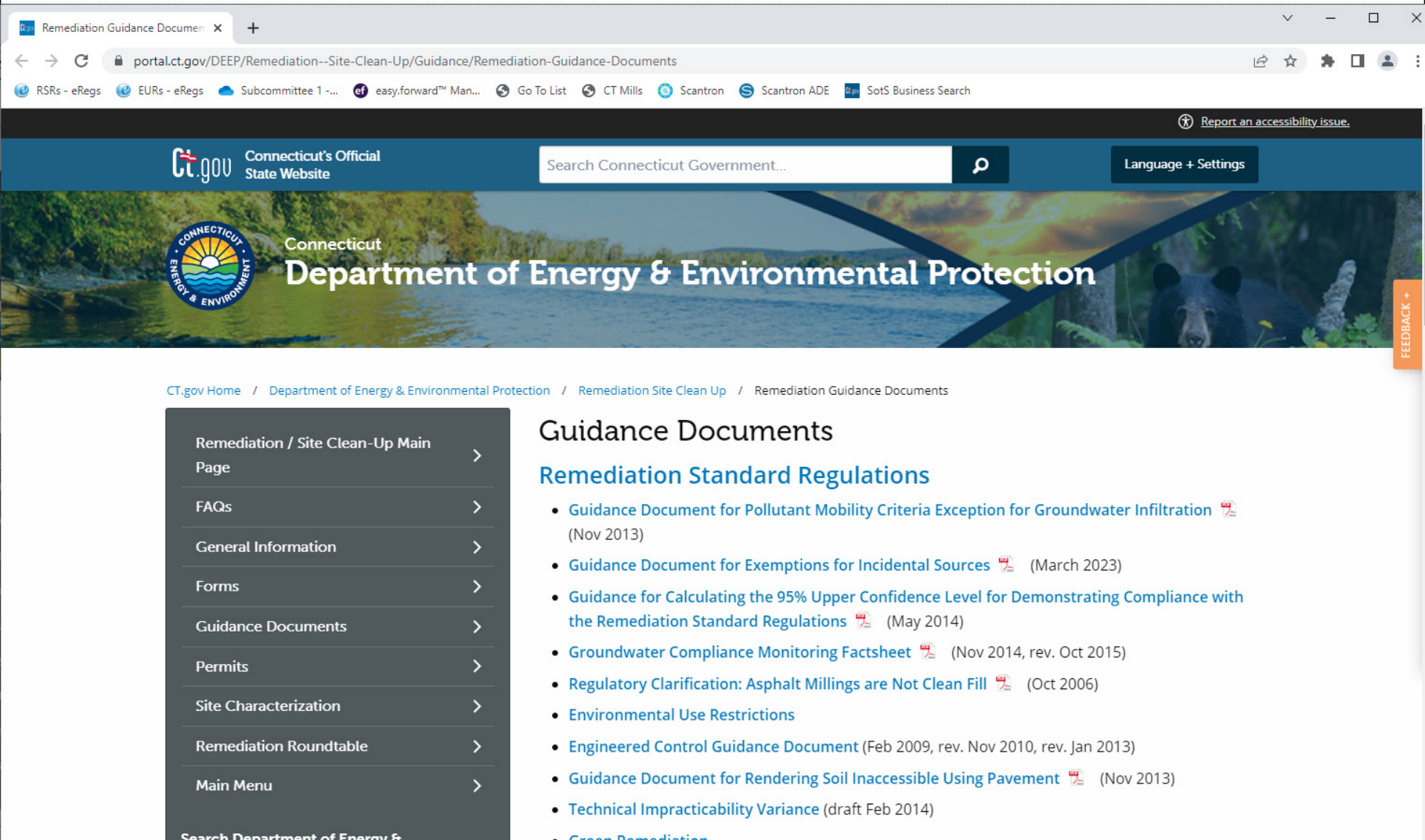
Existing Guidance Documents

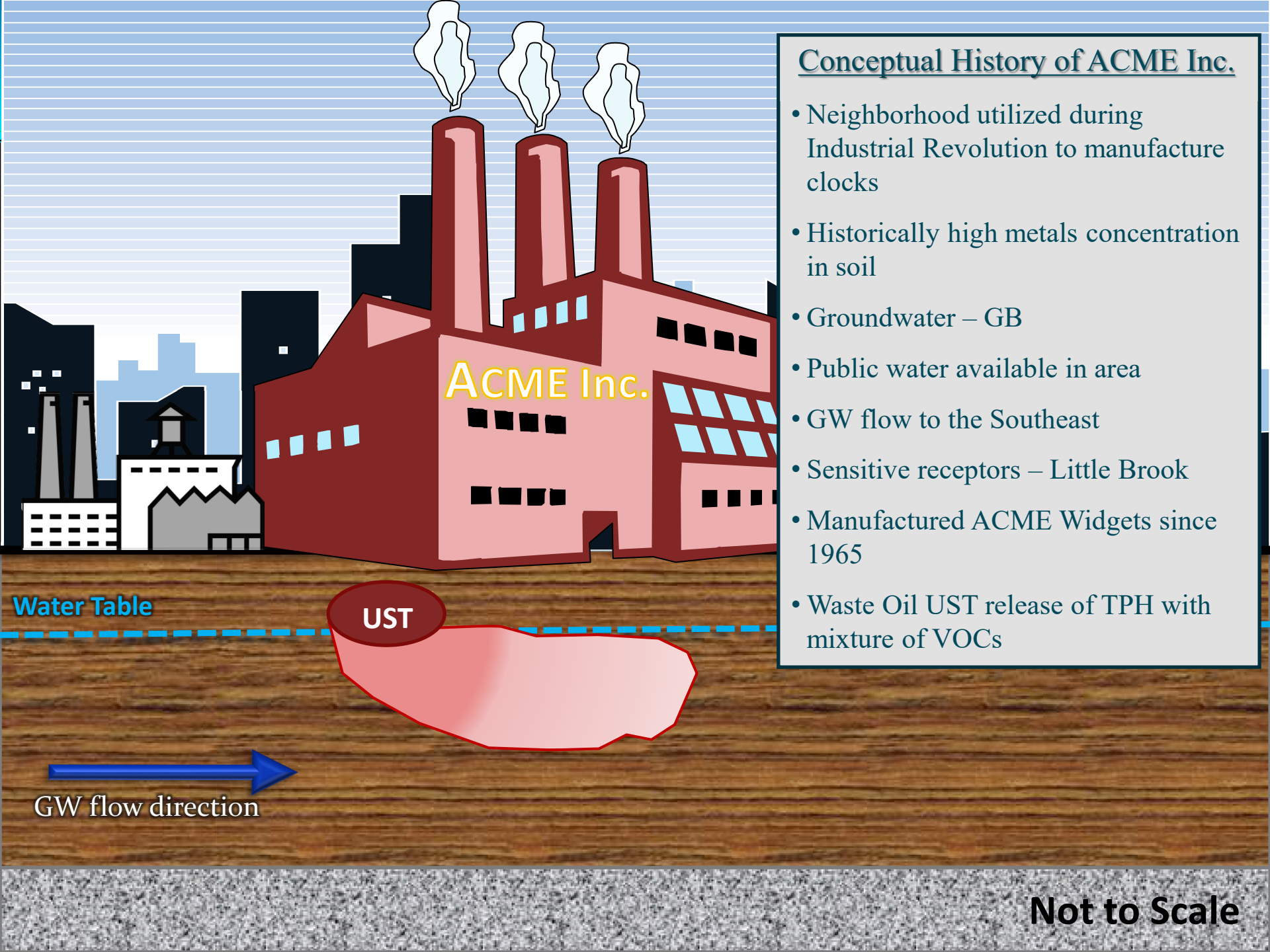
- Site Characterization Guidance Document
- Engineered Control Guidance Document
- Verification Report Guidance Document (Updated Dec 1, 2013)
- Water Supply Well Receptor Guidance Document
- Use of Filters for Groundwater Sampling Technical Memorandum and Guidance
- Targeted Brownfield Remedy Guidance Document

"Newer" Guidance Documents

- Guidance for Calculating the 95% Upper Confidence Level for Demonstrating Compliance with the Remediation Standard Regulations
- Guidance for Applying Technical Impracticability of Groundwater Remediation Variance Pursuant to the Remediation Standard Regulations [DRAFT]
- RSR Wave 1 Update Guidance:
  - Rendering Soil Inaccessible Using Pavement
  - Pollutant Mobility Criteria Exemption for Groundwater Infiltration
  - Exemptions for Incidental Sources
- Groundwater Compliance Monitoring Requirements - Fact Sheet revised October 1, 2015

Existing Guidance Documents





Conceptual History of ACME Inc.

- Neighborhood utilized during Industrial Revolution to manufacture clocks
- Historically high metals concentration in soil
- Groundwater – GB
- Public water available in area
- GW flow to the Southeast
- Sensitive receptors – Little Brook
- Manufactured ACME Widgets since 1965
- Waste Oil UST release of TPH with mixture of VOCs

Land Use Type

- 2 major land use types that dictate the appropriate remedial goal

Land Use Type

- Residential [22a-133k-(1)(a)(76)]
  - any activity occurring at: (A) a place intended for **people to live**, including, but not limited to, a residence, dwelling, house, apartment, condominium, nursing home, or dormitory; (B) a pre-**school**, primary school, secondary school, day care center, playground, or **outdoor recreational area**; or (C) a hospital, solely for the purposes of compliance with volatilization criteria

- Industrial/Commercial (I/C) [22a-133k-(1)(a)(40)]
  - any activity related to the commercial production, distribution, manufacture or sale of goods, services, or any other activity which is **not a residential activity**

Groundwater Classification

- 2 major classification for groundwater that dictate the appropriate remedial goal

Groundwater Classification

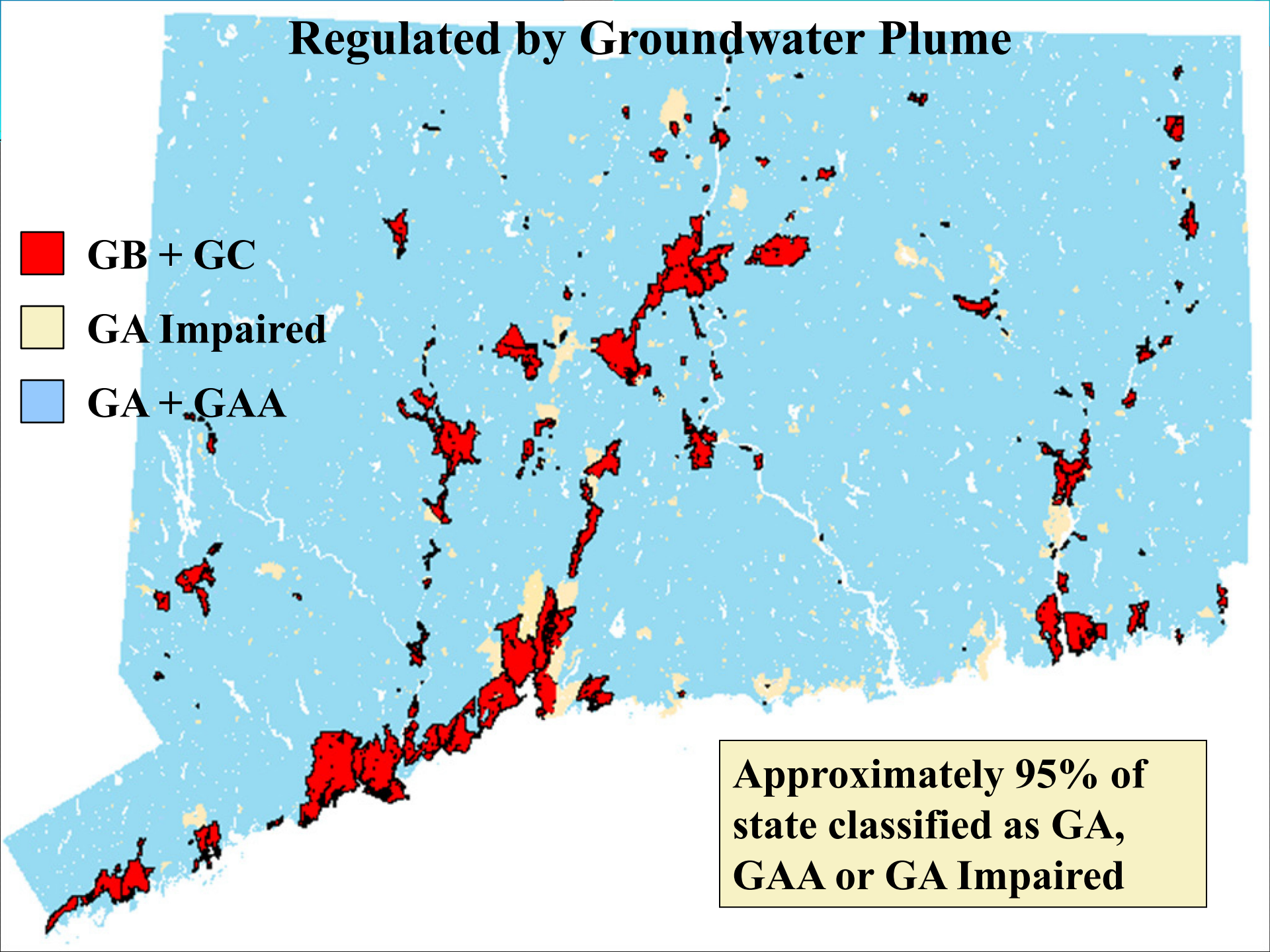
- GA (also includes GA-impaired and GAA)
  - Restore to natural quality
  - Expected to be able to drink
- GB (also includes GC)
  - Potentially Impacted
  - No risk to public health
  - Protect existing use

Industrial
Commercial

- Classifications based on the Connecticut Water Quality Standards

- "Classification" means the designation of the proposed uses of surface and ground waters with alphabetic characters which does not signify existing water quality.

Regulated by Groundwater Plume

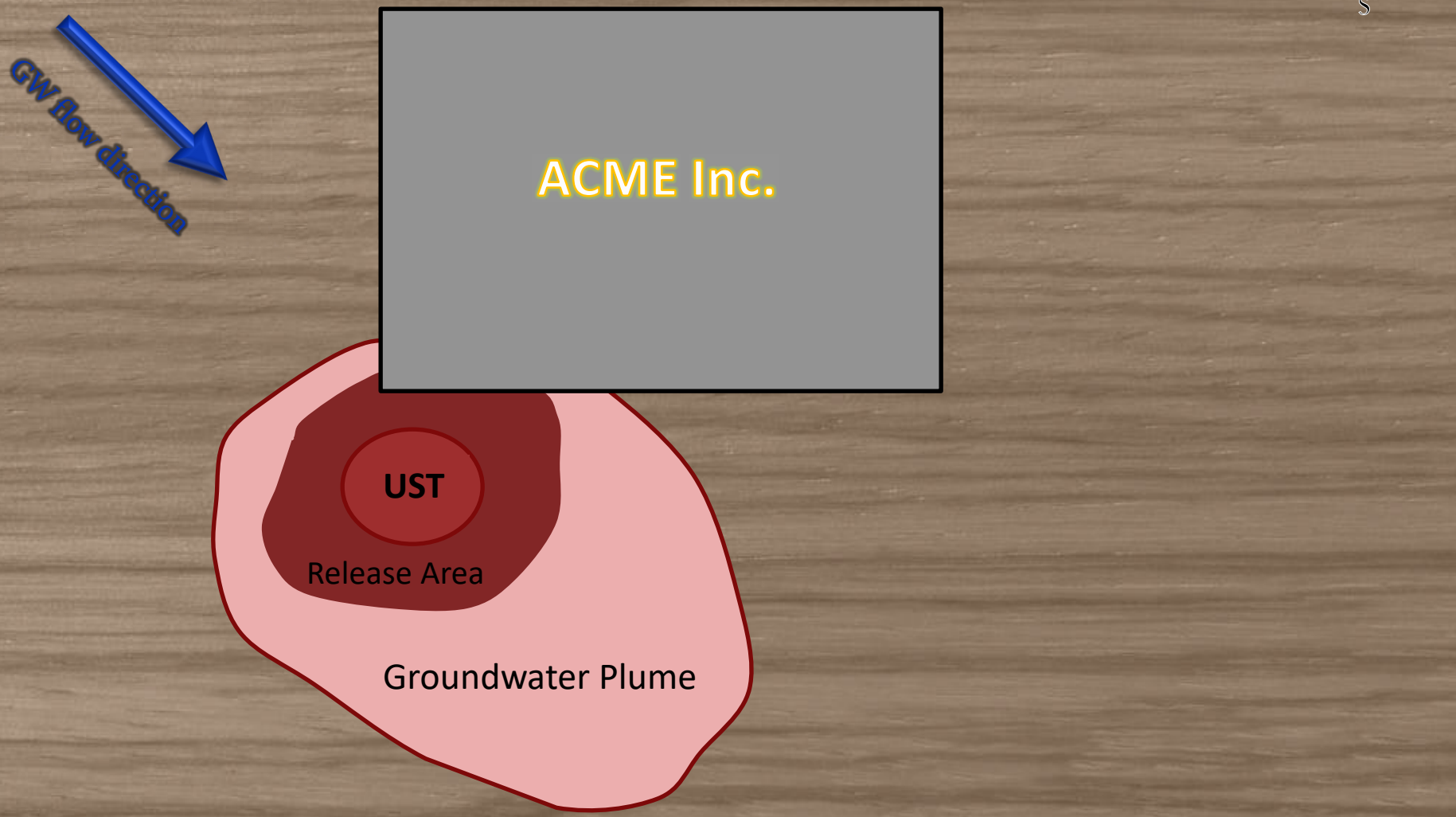


Soil Criteria
General Concepts

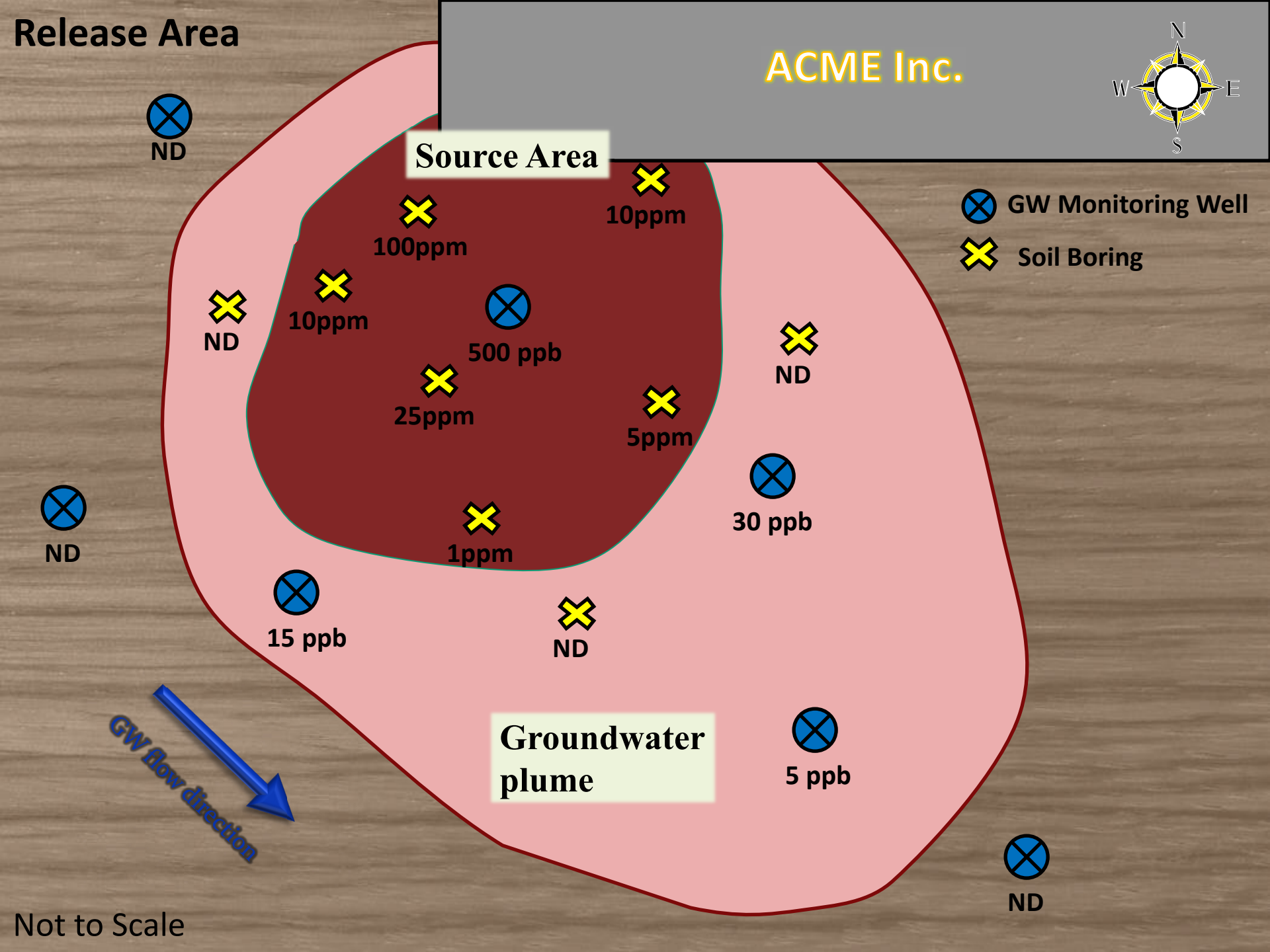
Soil Remediation Standards
Important Concepts

- Regulated by ***release area***
- Regulated by ***substance***
- **"Release area" defined by extent of polluted soil (where detected at all, not just where > criteria)**

Release Area



Not to Scale


Release Area
ACME Inc.
N
W
E
S
GW Monitoring Well
Soil Boring
Source Area
ND
10ppm
100ppm
10ppm
ND
500 ppb
25ppm
5ppm
ND
ND
30 ppb
1ppm
15 ppb
ND
Groundwater plume
5 ppb
GW flow direction
ND
Not to Scale

Soil Remediation Standards
Important Concepts (cont'd)

- Baseline criteria
- Additional Polluting Substances (APS)
- Options & Alternatives
  - Based on different human exposure assumptions or hydrologic conditions
- Environmental Use Restrictions (EUR)

Soil Remediation Standards
Important Concepts (cont'd)

- Exceptions (different criteria goal)
- Exemptions (criteria don't apply)
- Variances (criteria don't apply w/ ongoing obligations)
- Exceptions, Exemptions, and Variances are based on preventing or controlling exposures

Soil Criteria

Polluted soil at a release area shall be remediated to a concentration that meets either:

- **Direct Exposure Criteria**
  - dependent on land use

&

- **Pollutant Mobility Criteria**
  - dependent on groundwater classification

OR

- **Background**
  - concentration that naturally occurs in soil
  - dependent on local (not regional) sampling data

22a-133k-2(a)(1)&(2)

Direct Exposure Criteria

Direct Exposure Criteria (DEC)

Purpose - minimize health risk from direct contact and ingestion of soil

Apply - to polluted soil within 15' of the surface (regardless of the location of the water table in relation to the ground surface)

22a-133k-2(b)(3)(A)

Default Direct Exposure Criteria

- ***Residential Criteria***
  - Applies to Residential *and* I/C properties
  - If an I/C property, can choose I/C option on next slide instead

Criteria listed in Appendix A

22a-133k-2(b)(1)

Optional Direct Exposure Criteria

- ***Industrial/Commercial (I/C) Criteria***
  - Alternative to Residential criteria
  - Site will not be used for residential purposes
  - ***EUR recorded by owner*** (prohibit residential activity and limit access to workers or temporary visitors)
  - Zoning will be considered (is use appropriate)

I/C Criteria also listed in Appendix A

22a-133k-2(b)(2)(A)

Direct Exposure Criteria

Exemption - **Inaccessible Soil**

- More than four feet below ground surface
- More than two feet below 3-inch thick paved surface or 4-inch thick reinforced concrete
- Beneath an existing building
- Beneath an other permanent structure (w/ written notice provided to the Commissioner)

22a-133k-1(a)(39)

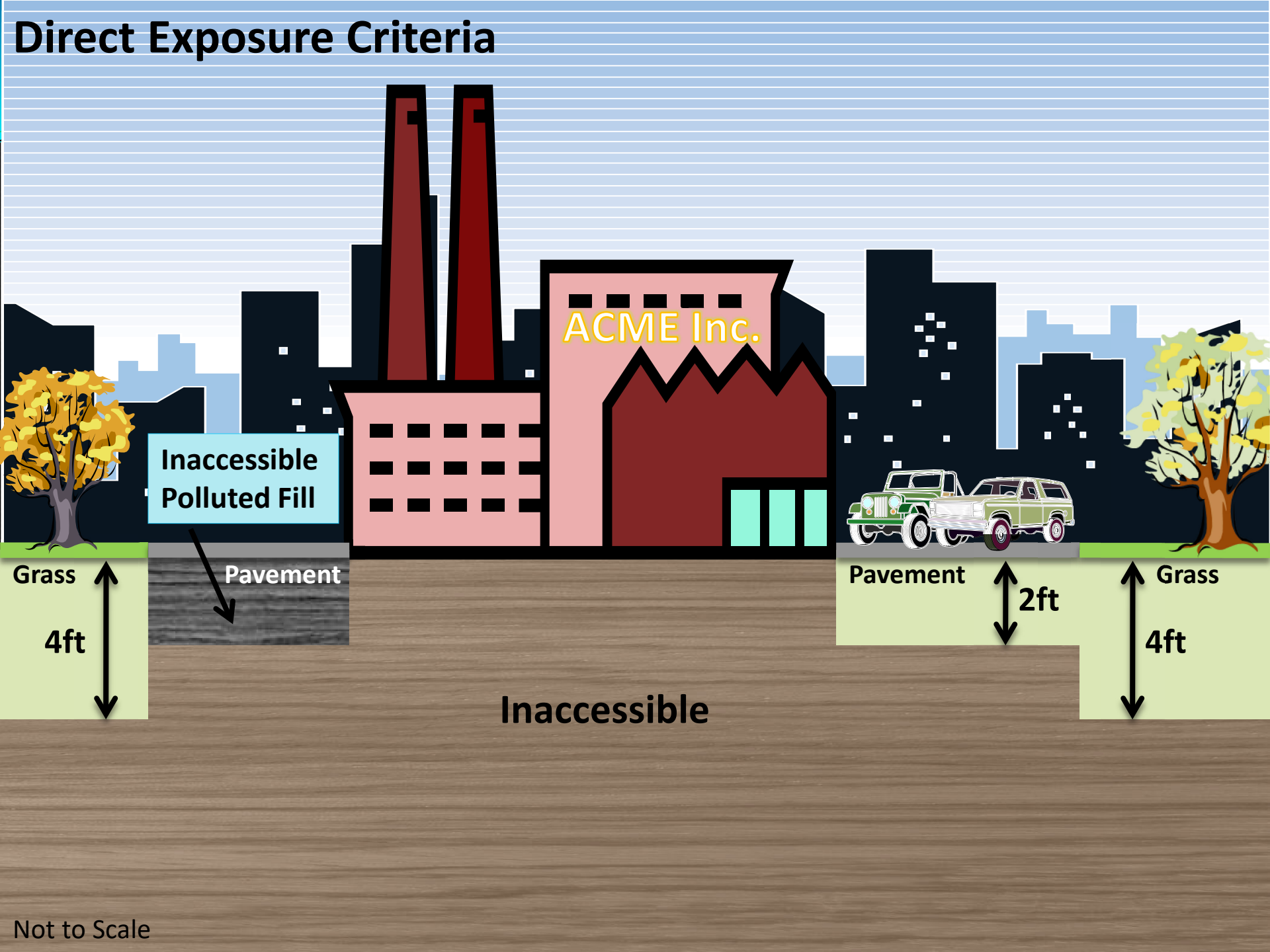
Direct Exposure Criteria

Exemption - Inaccessible Soil Cont'd

- Polluted fill directly beneath 3-inch thick paved surface or 4-inch thick reinforced concrete is considered inaccessible, as long as such fill is:
  - Polluted only by SVOCs or Petroleum Hydrocarbons that are normal constituents of asphalt; and/or
  - Polluted by metals in concentrations not in excess of 2x the applicable DEC
- So 2' of clean fill not needed when the above criteria are met – Guidance on DEEP Website

22a-133k-1(a)(39)

Direct Exposure Criteria



Direct Exposure Criteria

Inaccessible Soil - EUR

- An Environmental Use Restriction must be recorded for Inaccessible Soil exemption
- EUR must require:
  - Inaccessible soil will not be disturbed
  - Any soil being used to render soil inaccessible will be maintained/replaced
  - Any overlying pavement or concrete will be maintained in good condition
  - Any overlying building or other permanent structure will not be demolished or removed

22a-133k-2(b)(3)(B)

Direct Exposure Criteria

Exemption – Incidental Sources

Soil polluted with metals, petroleum hydrocarbons, and SVOCs does not need to be remediated to the DEC, provided such pollution is due to:

- The normal operation of motor vehicles (which cannot include refueling, repair, or maintenance of motor vehicles); or
- Normal paving and maintenance of asphalt, providing that such pavement has been maintained for its intended purpose

Guidance available on DEEP Website

22a-133k-2(b)(5)

Direct Exposure Criteria

Exemption – Pesticides

Soil polluted with pesticides as a result of the "application of pesticides" does not need to be remediated to the DEC, if the pesticides are due to the "application of pesticides" and:

- Residential requirements

  or

- Industrial/Commercial requirements

(covered on next couple of slides)

22a-133k-2(b)(6)

Direct Exposure Criteria

Exemption – Pesticides cont'd

Residential requirements:

- Protective measures are developed, implemented, and maintained - at a minimum:
  - Blending top one foot of soil to meet DEC (except around existing mature trees);
  - Covering with pavement, hardscape, buildings, or permanent structures; or
  - Growing dense/vexatious vegetation on steep slopes; and
- EUR recorded that shall identify the nature and extent of pesticides above Residential DEC and requires measures used from choices above

22a-133k-2(b)(6)(A)

Direct Exposure Criteria

Exemption – Pesticides cont'd

Industrial/Commercial requirements:

- Soil management plan shall be developed, implemented, and maintained which shall ensure:
  - Any soil exceeding I/C DEC shall not be exposed; and
  - Any such soil is managed, restored, or disposed of in a manner that is protective of human health & environment; except
  - Such plan does not need to apply to soil currently used for raising crops where pesticides are being used; and
- EUR recorded that shall prohibit residential use and require compliance with soil management plan

22a-133k-2(b)(6)(B)

Direct Exposure Criteria

Additional Polluting Substances

- For substances for which a DEC does not exist, one must be developed
- Formulas are in Appendix G
- Process will be discussed in a later part of the presentation

22a-133k-2(b)(7)

Direct Exposure Criteria

Alternative Criteria and Alternative Method of Determining Compliance

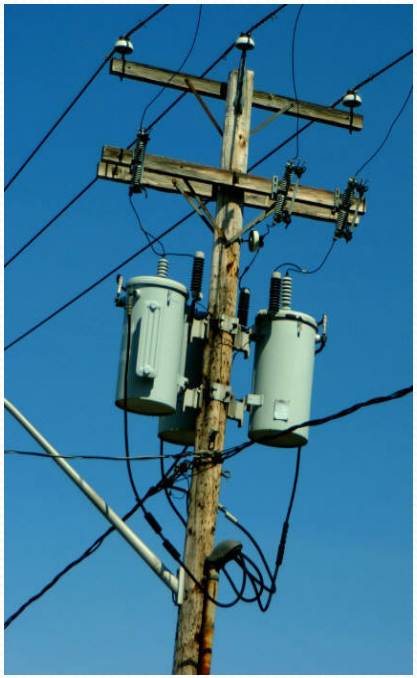
- Submit risk assessment for Commissioner's approval (will include DPH in the review process)
- Need to demonstrate protectiveness of human health & environment, so both:
  - For one substance
    - Risk of 10^{-6} (for carcinogens)
    - Hazard Index of 1 (for non-carcinogens)
  - For multiple (10 or more) substances
    - Cumulative risk of 10^{-5}
    - Cumulative Hazard Index of 1
- Commissioner may require recording of an EUR w/ conditions

22a-133k-2(d)(2)

Direct Exposure Criteria

PCBs

- Residential DEC = 1 ppm
- I/C DEC for "outdoor electrical substation" or "other restricted non-substation access location" = 10 ppm
- "Outdoor electrical substation" and "other restricted access non-substation" location" = as defined in 40 CFR 761.123 (not the same as other I/C)
- ELUR required (prohibit residential activity and require compliance with provisions of 40 CFR 761.123)



22a-133k-2(b)(2)(B)

Inaccessible Soil Exemption

PCBs

- Only substance with a criteria for inaccessible soil
  - Inaccessible criteria (ELUR required) = 10 ppm
    - "Other restricted access non-substation location" = 25 ppm
    - "Outdoor electrical substation" = 25 ppm
      - "Outdoor electrical substation" with label or notice in accordance with 40 CFR 761.125(c)(2) = 50 ppm

22a-133k-2(b)(4)(B)

Inaccessible Soil Exemption cont'd

PCBs

- ELUR requires the following:
  - Inaccessible soil will not be disturbed
  - ***No residential activity***
  - Any soil being used to render soil inaccessible will be maintained/replaced
  - Any overlying pavement or concrete will be maintained in good condition
  - Any overlying building or other permanent structure will not be demolished or removed

22a-133k-2(b)(4)(A)

Applying the DEC - Less than 10 Samples

All samples must be equal to or less than the applicable criteria

22a-133k-2(e)(1)(A)

Applying the DEC - 10 or More Samples

- All samples must be equal to or less than applicable criteria

or

- The 95% UCL of the arithmetic mean of all samples is equal to or less than applicable criteria

22a-133k-2(e)(1)(A)&(B)

Direct Exposure Recap

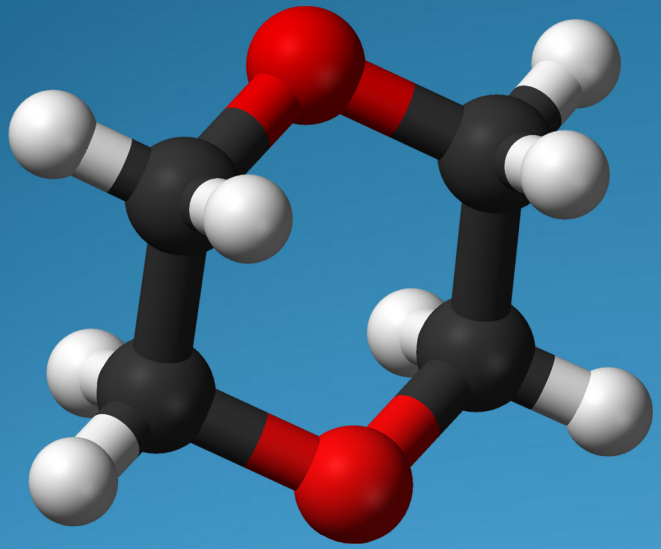
- **Baseline**
  - Appendix A or Naturally Occurring Background (provide notice)
  - Additional Polluting Substances (needs approval)
- **Exceptions**
  - Industrial Criteria (with EUR – also in Appendix A)
  - Alternative Criteria (needs approval)

Direct Exposure Recap cont'd

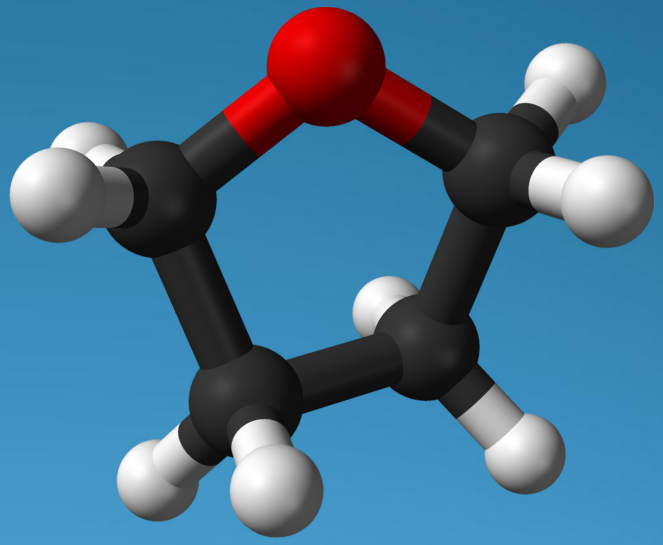
- **Exemptions**
  - Incidental Sources (LEP-implemented)
  - Inaccessible Soil (with EUR)
  - Pesticides (conditional with EUR)

- **Variances (to be discussed later)**
  - Engineered Control (with EUR/Financial Assurance)
  - Public Roadways (needs approval)

Additional Polluting Substances



1,4-Dioxane



Tetrahydrofuran

Additional Polluting Substances

- RSRs have cleanup criteria for 88 substances
- If a substance has been detected on site and is not one of the 88 substances, a numeric criterion must be requested and approved by the Commissioner (APS)
- This applies to Direct Exposure Criteria (DEC), Pollutant Mobility Criteria (PMC), Groundwater Protection Criteria (GWPC), Surface Water Protection Criteria (SWPC), and Volatilization Criteria (VolC)

22a-133k-2(b)(7),-2(c)(6),-3(i)(1),-3(i)(2),-3(i)(3)

Additional Polluting Substances

- DEEP has two options for requesting criteria for APS
- Fast-Track option = Fast turnaround (approximately 1 week)
- Calculated option = Slower turnaround (more detailed review needed)
- Details and forms available on APS/Alt Criteria Webpage

Additional Polluting Substances

Fast-Track Option

- DEEP has optional published numeric criteria for 128 substances that are available for expedited review and approval on a site-specific basis
- Form on DEEP website
- Approximately one week turnaround
- Upload to DEEP's SFT portal

Fast-Track Form

Department of Energy & Environmental Protection
Bureau of Water Protection and Land Reuse
Remediation Division
79 Elm Street, Hartford, CT 06106-5127
(860) 424-3705 www.ct.gov/deep/remediation

REQUEST FOR APPROVAL OF CRITERIA FOR ADDITIONAL POLLUTING SUBSTANCES

In accordance with Sections 22a-133k-1 through k-3 of the Regulations of Connecticut State Agencies (RSRs)

Complete this form to request the Commissioner's approval to use the Department's optional, pre-evaluated numeric criteria for Additional Polluting Substances at the site identified on this form.

If this request is for an anticipated Property Transfer Act Form I, II, or IV filing, the approval will be conditional on the submittal of such filing **within one year** of the date of this approval. This approval automatically expires if that filing is not submitted within one year.

In all other cases, the approval **expires eight years** from the date approved unless otherwise extended by the Commissioner in writing, or unless a Verification, Interim Verification, or Final Remedial Action Report (for DEEP-lead sites only) is submitted within eight years.

All sections of this form must be completed, as applicable.

Check the box to indicate the program for which this form is being submitted:

- ☐ Connecticut General Statutes (CGS) section 22a-134a(a)-(e), Property Transfer Program
- ☐ CGS section 22a-133x, Voluntary Remediation Program
- ☐ CGS section 22a-133y, Voluntary Remediation Program
- ☐ Other (specify) _____

Site Identification → → **RemID#:** _____

Name of Site: _____

Street Address: _____

City/Town: _____ → State: CT → Zip Code: _____

Groundwater Classification: _____

Contact Information

Certifying Party (if Property Transfer): _____ → ☐ N/A

Person submitting Request: _____ → Title: _____

Business Name: _____ → E-mail Address: _____

Mailing Address: _____

City/Town: _____ → → State: __ → Zip Code: _____

Business Phone: ___-___-____ → Ext. _____ → → Email: _____

Page Break

Check the box indicating the criteria for which approval is requested. Selection of criteria must correspond with the groundwater classification of the site. The criteria below are only valid and effective if DEEP issues a written approval for use at a specific property.

Substances	Res DEC (mg/kg)[a]	I/C DEC (mg/kg)[a]	GA PMC (mg/kg)[a]	GB PMC (mg/kg)[a]	RSVVC (ppmv)[b]	I/CSVVC (ppmv)[b]	RSVVC (mg/m³)[b]	I/CSVVC (mg/m³)[b]	GWPC (µg/L)[a]	SWPC (µg/L)[b]	RGWVC (µg/L)[b]	I/CGWVC (µg/L)[b]
Acenaphthene[a]	1,000 ☐	2,500 ☐	8.4 ☐	84 ☐	13 ☐	110 ☐	83 ☐	690 ☐	420 ☐	150 ☐	30,500 ☐	50,000 ☐
Acetone[a]	☐	☐	☐	☐	☐	☐	☐	☐	☐	10,000 ☐	☐	☐
Acetonitrile[a]	340 ☐	1,000 ☐	0.70 ☐	7.0 ☐	14 ☐	140 ☐	24 ☐	240 ☐	35 ☐	10,000 ☐	37,100 ☐	50,000 ☐
Acrolein[a]	34 ☐	1,000 ☐	0.20 ☐	2.0 ☐	0.003 ☐	0.035 ☐	0.008 ☐	0.081 ☐	10 ☐	30 ☐	4.0 ☐	50 ☐
Alachor[a]	☐	☐	☐	☐	☐	☐	☐	☐	☐	450 ☐	☐	☐
Aldicarb[a]	☐	☐	☐	☐	☐	☐	☐	☐	☐	9.4 ☐	☐	☐
Aldrin[a]	0.04 ☐	0.34 ☐	0.002 ☐	0.01 ☐	☐	☐	☐	☐	0.05 ☐	0.05 ☐	☐	☐
Aniline[a]	110 ☐	1,000 ☐	0.20 ☐	1.2 ☐	☐	☐	☐	☐	6.1 ☐	41 ☐	☐	☐
Atrazine[a]	☐	☐	☐	☐	☐	☐	☐	☐	☐	15 ☐	☐	☐
Benzidine[a]	0.20 ☐	0.20 ☐	0.20 ☐	1.0 ☐	☐	☐	☐	☐	5.0 ☐	5.0 ☐	☐	☐
Benzo(g,h,i)perylene[a]	8.4 ☐	78 ☐	1 ☐	1 ☐	☐	☐	☐	☐	0.48 ☐	150 ☐	☐	☐
Benzoic acid[a]	1,000 ☐	2,500 ☐	20 ☐	200 ☐	☐	☐	☐	☐	1,000 ☐	9,000 ☐	☐	☐
Bis(2-chloroethoxy)methane[a]	200 ☐	2,500 ☐	0.42 ☐	4.2 ☐	☐	☐	☐	☐	21 ☐	10,000 ☐	☐	☐
Bromodichloromethane[a]	18 ☐	170 ☐	0.02 ☐	0.21 ☐	0.002 ☐	0.046 ☐	0.012 ☐	0.31 ☐	1.0 ☐	510 ☐	1.1 ☐	35 ☐
Bromomethane[a]	34 ☐	1,000 ☐	0.07 ☐	0.70 ☐	0.51 ☐	5.2 ☐	2 ☐	20 ☐	3.5 ☐	180 ☐	83 ☐	1,100 ☐
2-Butanone (MEK)[a]	☐	☐	☐	☐	☐	☐	☐	☐	☐	10,000 ☐	☐	☐
Butylbenzene, n-[a]	500 ☐	1,000 ☐	7.0 ☐	70 ☐	13 ☐	130 ☐	69 ☐	690 ☐	350 ☐	10,000 ☐	1,600 ☐	21,800 ☐
Butylbenzene, sec-[a]	500 ☐	1,000 ☐	7.0 ☐	70 ☐	13 ☐	130 ☐	69 ☐	690 ☐	350 ☐	10,000 ☐	1,500 ☐	20,100 ☐
Butylbenzene, tert-[a]	500 ☐	1,000 ☐	7.0 ☐	70 ☐	13 ☐	130 ☐	69 ☐	690 ☐	350 ☐	10,000 ☐	1,900 ☐	25,300 ☐
Butylbenzyl phthlate[a]	☐	☐	☐	☐	☐	☐	☐	☐	☐	230 ☐	☐	☐
Carbazole[a]	31 ☐	290 ☐	0.20 ☐	1.0 ☐	☐	☐	☐	☐	5.0 ☐	55 ☐	☐	☐

Direct Exposure Criteria

Calculated Criteria

- Criteria different than DEEP calculated criteria (Fast-Track) can be requested for different site-specific exposure assumptions
- These APS/alternative criteria requests will require documentation of the calculations and rationale for the site-specific exposure assumptions
- They also will require a more thorough review (this includes consultation with DPH) and therefore will take more time to process

Direct Exposure Criteria
APS Calculated Option

- Proposed criteria can be calculated
- Risk of 10^{-6} (for carcinogens)
- Hazard Index of 1 (for non-carcinogens)
- Commissioner will consider proposed criteria and any other relevant information

22a-133k-2(b)(7)

Pollutant Mobility Criteria Additional Polluting Substances

- For substances for which a PMC does not exist, one must be developed
- Must be protective of groundwater
- As described with DEC, two options are available: Fast-Track or calculated criteria

22a-133k-2(c)(6)

Groundwater Protection Criteria Additional Polluting Substances

- For substances for which a GWPC does not exist, one must be developed
- Same two options are available: Fast-Track or calculated criteria
- The calculated criteria option will include DPH as part of the review (Fast-Track already reviewed by DPH)

22a-133k-3(i)(1)

Surface Water Protection Criteria Additional Polluting Substances

- For substances for which a SWPC does not exist, one must be developed
- Must be protective of surface waters
- Same two options are available: Fast-Track or calculated criteria

22a-133k-3(i)(2)

Volatilization Criteria
Additional Polluting Substances

- Same two options as for all of the other criteria:
  - Fast-Track, or
  - Calculated criteria

- The calculated criteria will include DPH as part of the review and will require the use of current toxicology information and exposure pathway assumptions

22a-133k-3(i)(3)

Additional/Alternative Criteria

EPH/VPH/APH

- EPH/VPH/APH on separate Fast-Track form
- Form developed in 2012 to request approval of methodology and associated criteria
  - APS criteria if used instead of ETPH
  - Alternative criteria/demonstration of compliance if used when ETPH above criteria
- Risk based criteria to evaluate petroleum releases
- Expedited review and approval process
- EPH/VPH/APH Form available on DEEP website

Alternative I/C DEC for Polycyclic Aromatic Hydrocarbons (PAHs)

- IRIS provided an update to the cancer slope factor (CSF) for benzo(a)pyrene
- Based on that update, DEEP/DPH calculated alternative criteria using the updated CSF
- List of alternative I/C DEC must be used "in whole"
- Expedited review and approval process

Alternative I/C DEC for Polycyclic Aromatic Hydrocarbons (PAHs) cont'd

Additional and Alternative Criteria	
Substance	**I/C DEC (mg/kg)**
Acenaphthylene	2,500
Anthracene	2,500
Benzo(a)anthracene	57
Benzo(a)pyrene	5.7
Benzo(b)fluoranthene	57
Benzo(k)fluoranthene	57
Fluoranthene	2,500
Fluorene	2,500
Naphthalene	2,500
Phenanthrene	2,500
Pyrene	2,500
Acenapthene	2,500
Benzo(e)pyrene	2,500
Bis(2-chloroethyl)ether	5.2
Bis(2-chloroisopropyl)ether	2,500
Bis(2-ethylhexyl)phthalate	409
Bromoform	724
Butyl Benzyl Phthalate	2,500
2-chlorophenol	2,500
Dibenz(a,h)anthracene	5.7
Dibromochloromethane	68
2,4-dichlorophenol	2,500
Di-n-butyl phthalate	2,500
Di-n-octyl phthalate	2,500
Hexachlorobenzene	3.6
Hexachloroethane	143
Pentachlorophenol	14.3
Perylene	2,500
Phenol	2,500

Electronic Document Transmittal Form

- Fast-Track and calculated APS/alternative criteria request(s) must use the Electronic Document Transmittal Form. The form and directions on how to upload documents can be found on DEEP's website.

Transmittal of Documents (ct.gov)

22a-133k-1(g)

Pollutant Mobility Criteria

Pollutant Mobility Criteria
Purpose

- GA - to prevent *any* pollution of the groundwater
- GB - to prevent unacceptable *further degradation* of the groundwater

Pollutant Mobility Criteria

- Applies to polluted soil above the seasonal *low* water table in GA areas
- Applies to polluted soil above the seasonal *high* water table in GB areas
- EXCEPT it applies to polluted soil above the seasonal *high* water table in GA areas if:
  - Remediation is not technically practicable (burden of proof required at verification) *or*
  - Remediation would not result in permanent elimination of source (also requires burden of proof at verification)

22a-133k-2(c)(1)(A)&(B)

Pollutant Mobility Criteria

Baseline - VOCs, SVOCs, & TPH

- Mass analysis compared to appropriate pollutant mobility criteria (mg/kg)
- Appendix B to RSRs
- See 2006 guidance on VOC sample collection (defines level of care expected during collection of VOC samples for comparison with the RSRs)

22a-133k-2(c)(1)(A)(i)

Pollutant Mobility Criteria

Baseline - Inorganics and PCBs

- TCLP/SPLP analysis (mg/L) compared to appropriate pollutant mobility criteria
- Mass value (mg/kg) divided by 20 (converted to mg/L) compared to appropriate PMC
- Also in Appendix B to RSRs

NOTE: Leachate PCB analysis not required if PCB total concentration is below 1 mg/kg

22a-133k-2(c)(1)(A)(ii)

Pollutant Mobility Criteria
Option for GA Area

May use TCLP/SPLP analysis compared to groundwater protection criteria (GWPC) in Appendix C

22a-133k-2(c)(2)(A)

Pollutant Mobility Criteria

Option for GA Area (except PCBs or ETPH)

- TCLP/SPLP compared to 10x GWPC, or
- TCLP/SPLP compared to GWPC x approved dilution or dilution/attenuation factor, or
- Mass compared to 10x PMC, or
- Mass compared to PMC x approved dilution or dilution/attenuation factor, **if**
  - No NAPL
  - Water table at least 15 feet above bedrock
  - Downward vertical flow less than horizontal flow **and**
  - 1 of 3 scenarios exist

22a-133k-2(c)(2)(B)&(C)

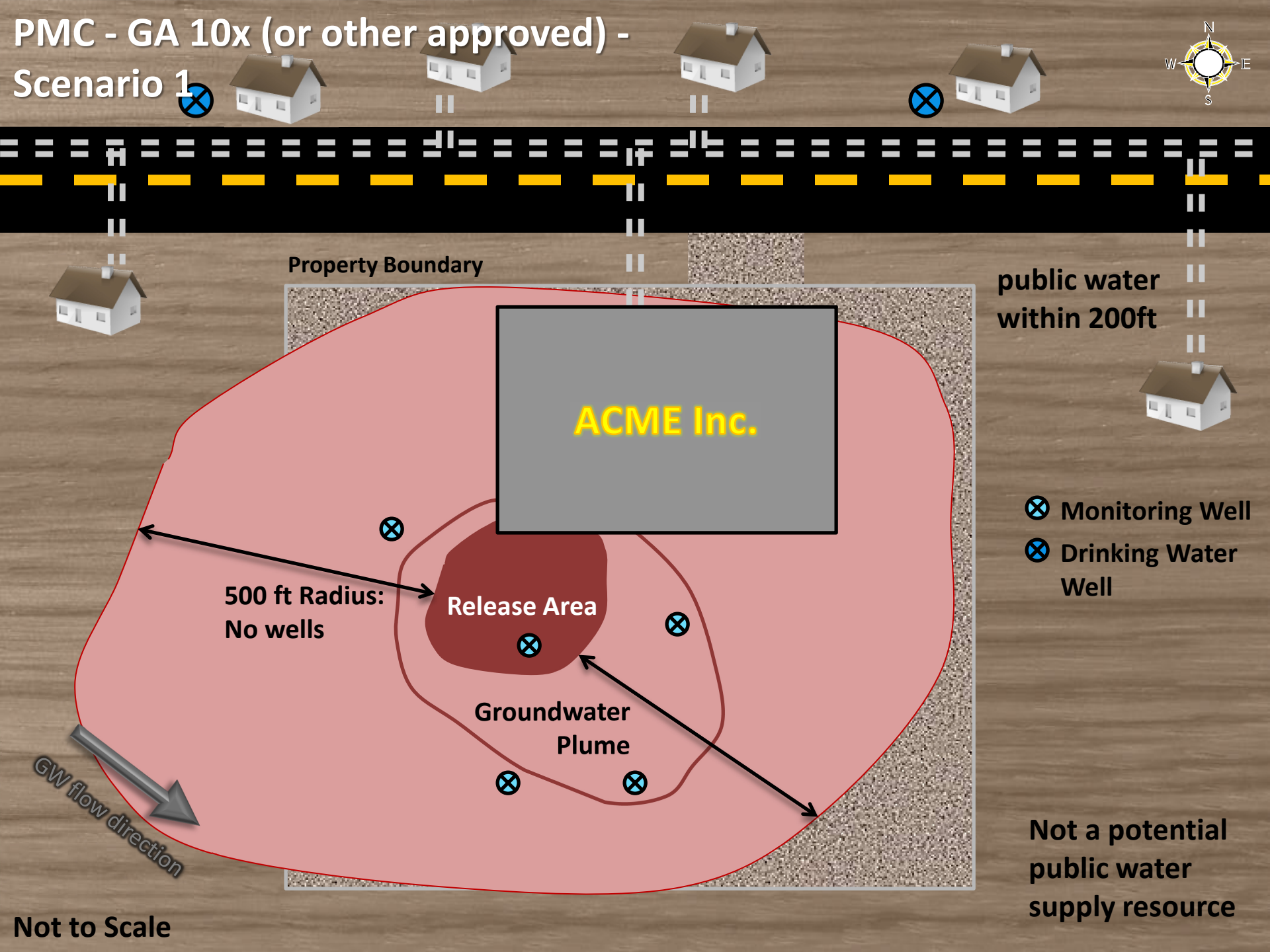
Pollutant Mobility Criteria

GA 10x (or other approved) - *Scenario 1*

- Public water supply available within 200 feet of the subject parcel, all adjacent parcels, and any parcels within the areal extent of the groundwater plume caused by the subject release area
- Groundwater within the plume not used for drinking
- No supply wells within 500 feet of release area
- Not a potential public water supply resource

22a-133k-2(c)(2)(D)(i)

PMC - GA 10x (or other approved) - Scenario 1



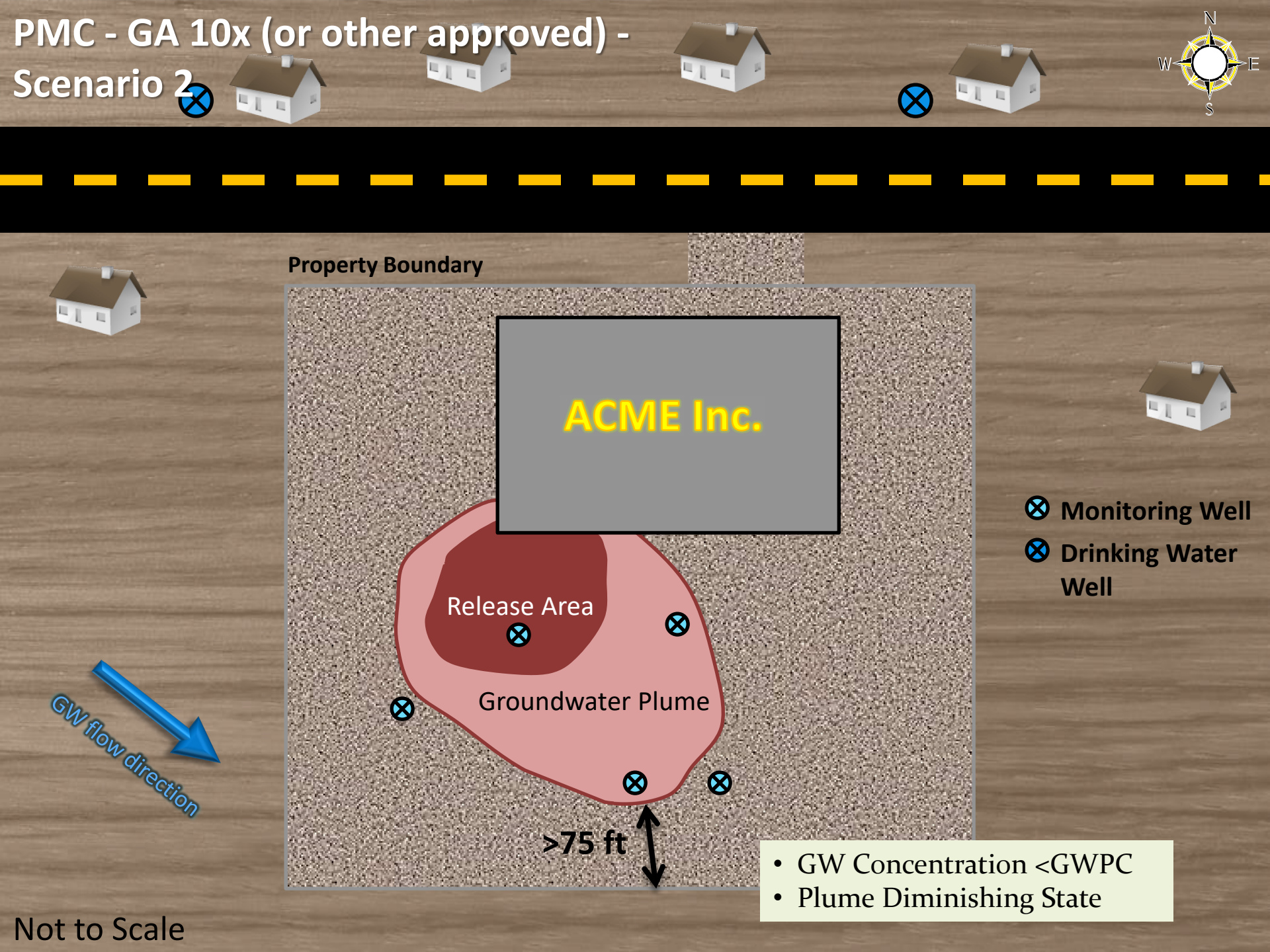
Pollutant Mobility Criteria

GA 10x (or other approved) - Scenario 2

- Concentration of plume within 75 feet of the downgradient property line below GWPC
- Diminishing-state plume

22a-133k-2(c)(2)(D)(ii)(I)

PMC - GA 10x (or other approved) - Scenario 2



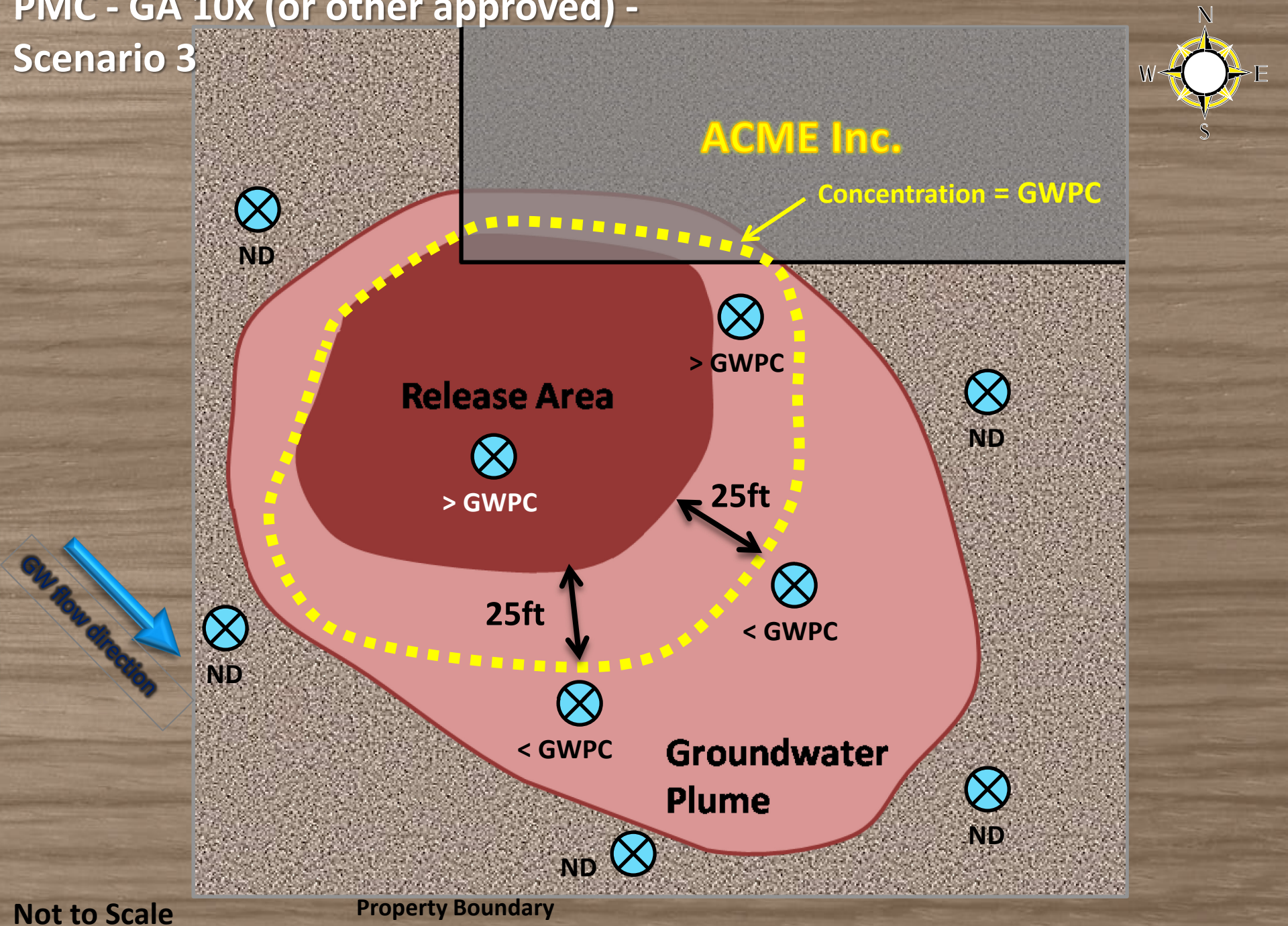
Pollutant Mobility Criteria

GA 10x (or other approved) - Scenario 3

- Concentration of plume 25 feet downgradient of the release area is below GWPC
- Must be on the same parcel

22a-133k-2(c)(2)(D)(ii)(II)

PMC - GA 10x (or other approved) - Scenario 3



Not to Scale

Pollutant Mobility Criteria
Option for GA Area (except PCBs or ETPH)

- This option requires Notice to the Commissioner (providing all of the details demonstrating the applicability of the option)

- Verification Form/Report can be used to provide the required notice

22a-133k-2(c)(2)(E)

Pollutant Mobility Criteria
Option for GB Area

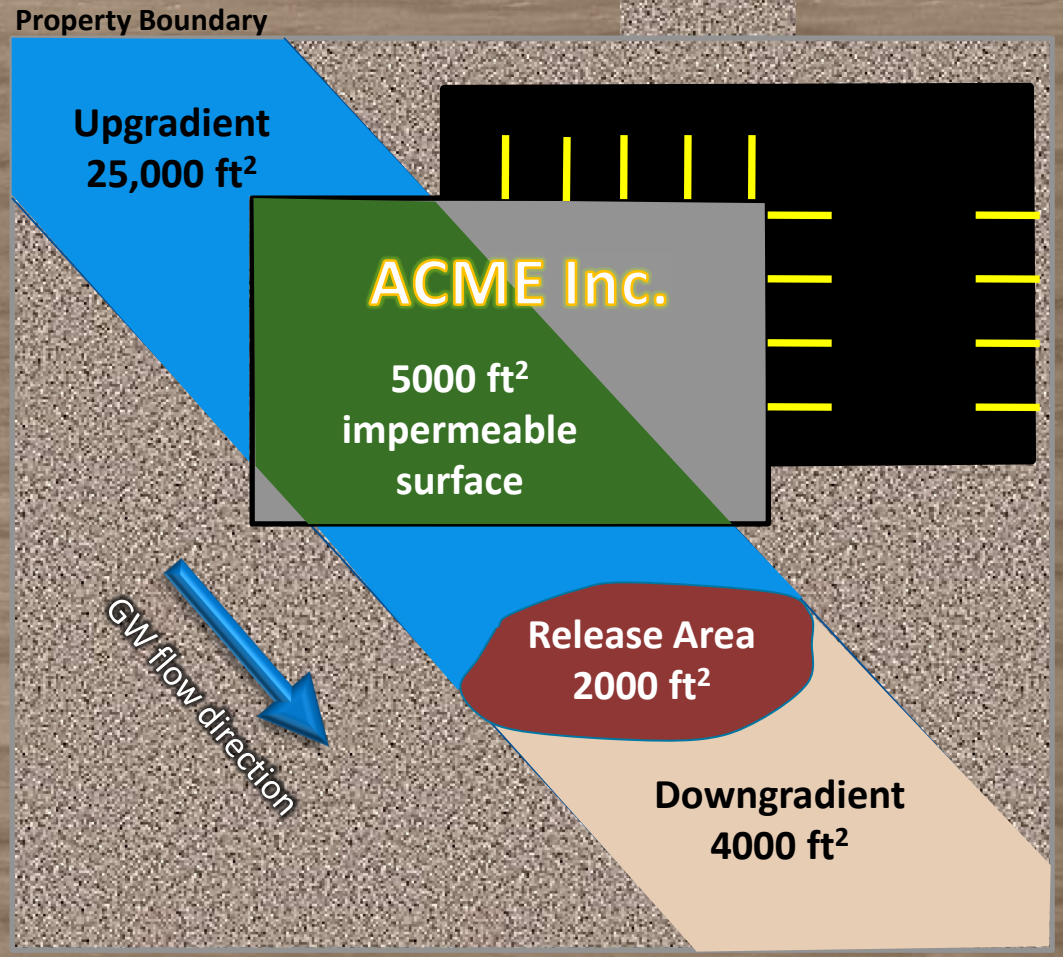
In a GB area, provided that no NAPL is present -

TCLP or SPLP compared to GWPC times:

- 10
- Ratio of the summation of the on-site areas up and downgradient of the release area to the release area (≤500) "Ratio Method"
- Approved alternative dilution or dilution/attenuation factor

22a-133k-2(c)(3)(A)

GB Aquifer Dilution Factor Based on Upgradient & Downgradient Areas



Since Building is impermeable the effective upgradient area is

$25{,}000\ ft^2 - 5{,}000\ ft^2 = 20{,}000\ ft^2$

$(20{,}000\ ft^2 + 4000\ ft^2)/2000\ ft^2 = 12$

Aquifer Dilution Factor = 12
Acceptable Ratio <500

Not to Scale

Pollutant Mobility Criteria

Option for GB Area (Release-specific Dilution)

In a GB area, TCLP or SPLP analysis compared to GWPC times a DF or Mass analysis compared to GA PMC times a DF:

- $DF = (1 + Kid/IL)(1-F_{adj})$
- Provided that:
  - No NAPL
  - Water table at least 15 feet above bedrock
  - Downward vertical flow less than horizontal flow
  - Background concentration less than GWPC
- Notice provided (can be Verification Form/Report)

22a-133k-2(c)(3)(B)

$DF = (1 + Kid/IL)(1-F_{adj})$

DF = site specific dilution factor

K = hydraulic conductivity

i = horizontal gradient

d = aquifer mixing zone (3' specified or release-specific calculated)

I = infiltration rate (specified in table)

L = length of release area parallel to flow

F_{adj} = background concentration for groundwater divided by the GWPC

22a-133k-2(c)(3)(B)

Determining the Presence of NAPL

Presence of NAPL in soil is determined using the following formula:

$$C_{NAP} = (S/2\rho_b)(K_d\rho_b + \theta_w + H'\theta_a)$$

where:

- C_{NAP} = concentration at or above which NAPL is present
- S = effective solubility
- ρ_b = dry soil bulk density
- K_d = soil-water partition coefficient (calculated as $K_{OC} * f_{OC}$)
- K_{OC} = soil organic carbon-water partition coefficient
- f_{OC} = fraction organic carbon of soil
- θ_w = water-filled soil porosity (L_{water}/L_{soil})
- θ_a = air-filled soil porosity (L_{air}/L_{soil})
- H' = Henry's law constant (dimensionless)

22a-133k-2(c)(4)

Determining the Presence of NAPL cont'd

An alternative to the formula in (A) may be approved by the Commissioner based on:

- Guidance, standard, or industrial code by
- Regulatory agency, governmental advisory group, or recognized professional organization (ITRC LNAPLs/DNAPLs)

Request in accordance with 22a-133k-1(g) including any information deemed necessary and conditions may be specified as part of an approval

22a-133k-2(c)(4)(B)

Pollutant Mobility Criteria

Exemption for *Environmentally Isolated Soil*

- Beneath existing building or other structure approved by the Commissioner

  Note - Building includes roof and structural walls

  Other structure examples - bridge abutment, large AST, wastewater clarifier, etc.

- Other conditions on next slide:

22a-133k-2(c)(5)(A)

Pollutant Mobility Criteria

Exemption for *Environmentally Isolated Soil* cont'd

Must meet the following conditions:

- Not a continuing source of pollution (i.e. no NAPL present)
- Not polluted w/ VOCs in excess of the GA PMC (or if polluted with VOCs, they have been reduced or immobilized to the maximum extent prudent)
- Above seasonal high water table (does not come in contact with the overburden aquifer)
- Requires the recordation of an EUR

22a-133k-1(a)(20) and 22a-133k-2(c)(5)(A)

Pollutant Mobility Criteria

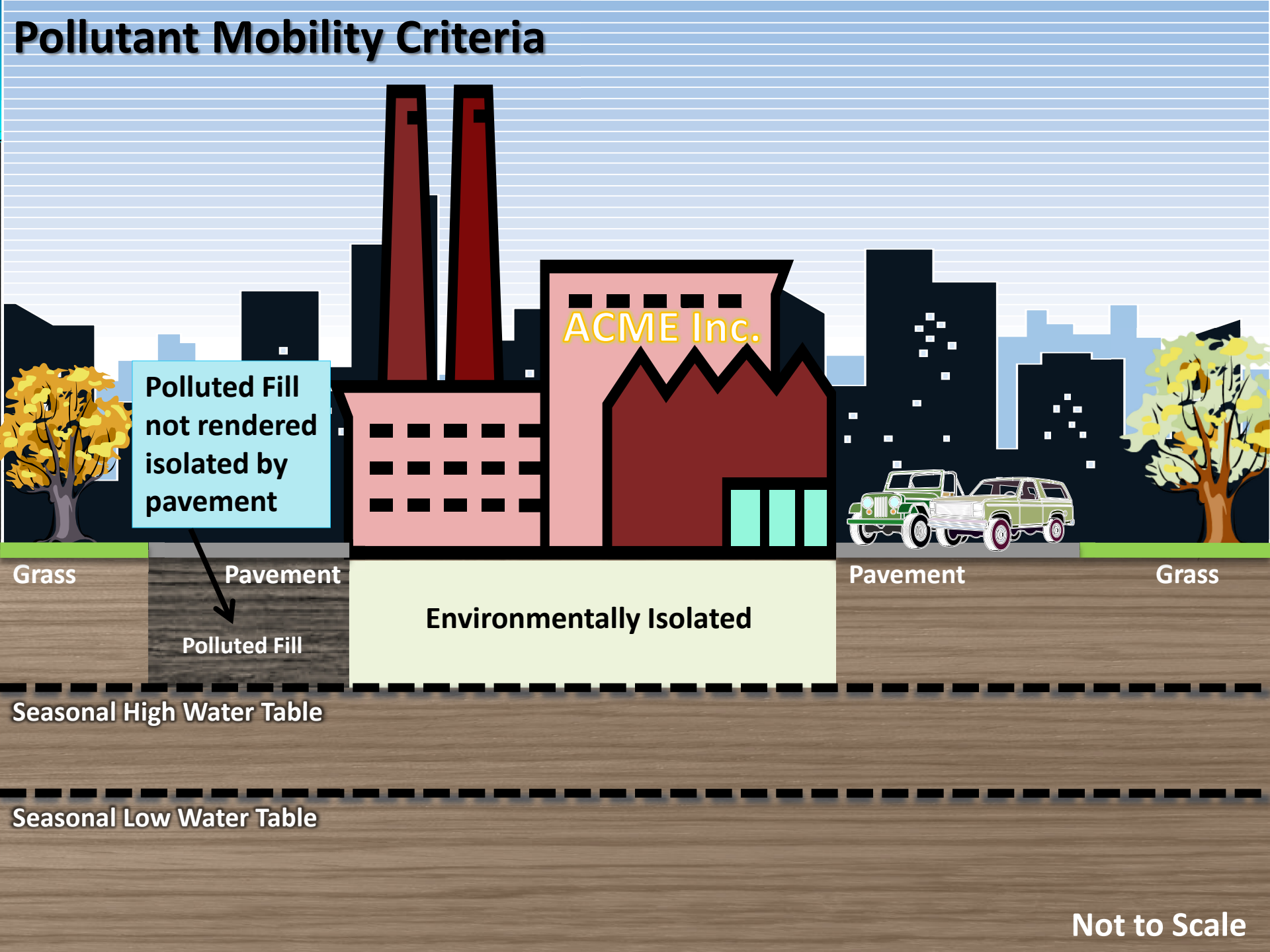
Exemption for *Environmentally Isolated Soil* cont'd

EUR will have the following restrictions:

- Prohibit the infiltration of liquid into such soil
- Require that soil is not a continuing source of pollution
- Require that VOCs be remediated to maximum extent prudent (if applicable)
- Prohibit removal of any building (consisting of roof & structural walls)
- Prohibit removal of any "other permanent structure"

22a-133k-1(a)(20) and 22a-133k-2(c)(5)(A)

Pollutant Mobility Criteria



Pollutant Mobility Criteria

Exemption for Polluted Material

PMC does not apply to "polluted material" solely polluted with coal ash, wood ash, coal fragments, coal slag, coal clinkers, asphalt paving fragments, or any combination, provided:

- (conditions on next slide)

22a-133k-2(c)(5)(B)

Pollutant Mobility Criteria

Exemption for Polluted Material cont'd

Conditions:

- VOCs not present above applicable PMC;
- meets direct exposure criteria;
- meets Soil Vapor VolC (or mitigated) if beneath a building, permanent structure, or an EC;
- the water supply is and will not be affected;
- public water available within 200 feet; and
- if used as fill, was not placed illegally.

22a-133k-2(c)(5)(B)

Pollutant Mobility Criteria

Exemption for Polluted Material cont'd

Exemption only applies to the polluted material and does not apply to any releases into the polluted material (those still need to be addressed before using the PMC exemption)

22a-133k-2(c)(5)(B)

Pollutant Mobility Criteria

Exemption for Infiltration

Substances in soil, other than VOCs, are not required to be remediated to the PMC, if:

- 80% of the **mass** of substances remaining at the release area has been subject to infiltration (not obstructed by anthropogenic features) for at least five years, **and**

(NOTE: Further Guidance available on DEEP Website)

22a-133k-2(c)(5)(C)

Pollutant Mobility Criteria

Exemption for Groundwater Infiltration Cont'd (GA Area / APA / Drinking Water)

Groundwater compliance monitoring:

- Must meet GWPC and SWPC
- Must be collected in locations most likely to be contaminated
  - Groundwater sample locations must be representative of the plume and the plume must be in a "diminishing state"

22a-133k-2(c)(5)

Pollutant Mobility Criteria

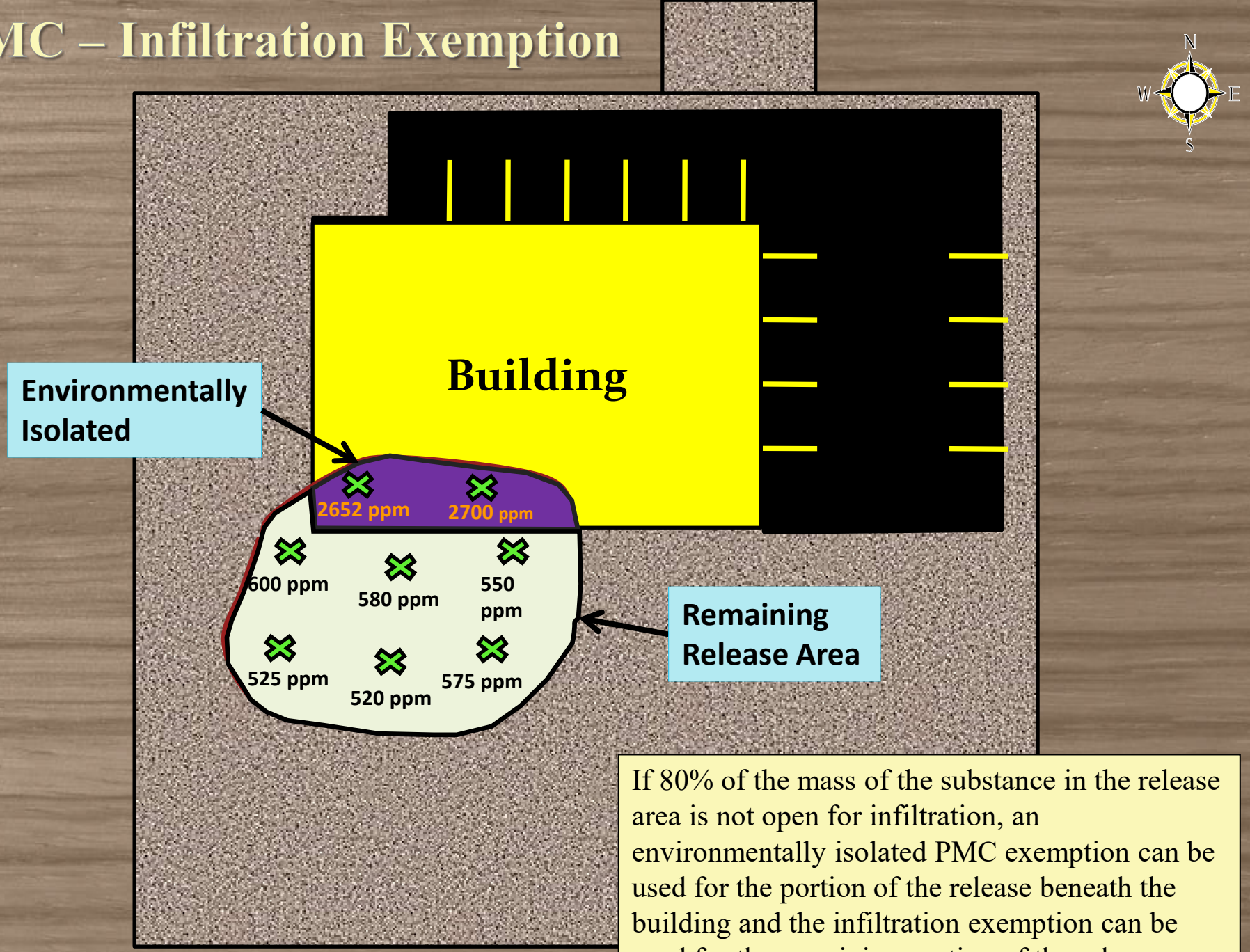
Exemption for Groundwater Infiltration Cont'd (GB Area)

Groundwater compliance monitoring:

- Must meet SWPC
- Must be collected in locations most likely to be contaminated
  - Groundwater sample locations must be representative of the plume and the plume must be in a "diminishing state"

22a-133k-2(c)(5)

PMC – Infiltration Exemption



If 80% of the mass of the substance in the release area is not open for infiltration, an environmentally isolated PMC exemption can be used for the portion of the release beneath the building and the infiltration exemption can be used for the remaining portion of the release area.

Not to Scale

Pollutant Mobility Criteria

Exemption for Incidental Sources

Soil polluted with metals, petroleum hydrocarbons, and SVOCs does not need to be remediated to the PMC, provided such pollution is due to:

- The normal operation of motor vehicles (which cannot include refueling, repair, or maintenance of motor vehicles); or
- Normal paving and maintenance of asphalt, providing that such pavement has been maintained for its intended purpose

Guidance available on DEEP Website

22a-133k-2(c)(5)(D)

Pollutant Mobility Criteria Exemption for Pesticides

Soil polluted with pesticides is not required to be remediated to the PMC, if:

- Pesticides are present solely as the result of the normal "application of pesticides";
- Compliance with the DEC for the pesticide has been achieved (includes using DEC pesticide exemption)
- Compliance with the GW criteria for the pesticide has been achieved (includes using the GW criteria pesticide exemption)

22a-133k-2(c)(5)(E)

Pollutant Mobility Criteria Additional Polluting Substances

- For substances for which a PMC does not exist, one must be developed
- Formulas are in Appendix G
- Process was discussed in an earlier part of the presentation

22a-133k-2(c)(6)

Alternative Pollutant Mobility Criteria

- Alternative pollutant mobility criteria
- Alternative means of demonstrating compliance
- Alternative Dilution Factor or Dilution Attenuation Factor

22a-133k-2(d)(3)

Alternative Pollutant Mobility Criteria Information Required in a Request

A request for alternative PMC shall include:

- Detailed description of other releases
- Assessment as to whether:
  - Other release may affect subject release
  - Subject release may affect other release
- Any other information required by provision being requested (see next slides)

22a-133k-2(d)(1)

Alternative PMC for GA Areas

Request for approval of alternative PMC, alternative demonstration of compliance, or alternative dilution/dilution attenuation factor must demonstrate that release area will not degrade groundwater (exceed the GWPC) and/or prevent attainment of applicable groundwater remediation standards

22a-133k-2(d)(3)(A)&(B)

Alternative PMC for GB Areas

Request for approval of alternative PMC, alternative demonstration of compliance, or alternative dilution/dilution attenuation factor must demonstrate that groundwater at nearest downgradient property line will not exceed the GWPC

22a-133k-2(d)(3)(A)&(B)

Alternative PMC Condition for Approval

Alternative groundwater criteria shall not be used for the same substance for which an alternative PMC or alternative dilution or dilution attenuation factor has been requested

22a-133k-2(d)(3)(C)

LEP Calculation of Alternative PMC

Allows alternative release-specific PMC to be calculated for 87 of the substances (not ETPH)

Provided that:

- Shall not exceed 1,000 mg/kg (in GA area) or 10,000 mg/kg (in GB Area)
- GW compliance monitoring demonstrates no exceedance of promulgated GW criteria

22a-133k-2(d)(4)

LEP Calculation of Alt. PMC cont'd

Uses a partitioning formula (Appendix H):

$$\text{Alt. PMC} = \text{GWC} \times \text{DF}\left(\text{K}_\text{d} + \frac{(\theta_\text{w} + \theta_\text{a}\text{H}')}{\rho_\text{b}}\right)$$

where:

- Alt. PMC = calculated alternative criteria (mg/kg)
- GWC = GW criteria goal (lowest of default applicable GW criteria)
- ρ_b = dry soil bulk density
- K_d = soil-water partition coefficient (calculated as $K_{OC} * f_{OC}$)
- K_{OC} = soil organic carbon-water partition coefficient
- f_{OC} = fraction organic carbon of soil
- θ_w = water-filled soil porosity (L_{water}/L_{soil})
- θ_a = air-filled soil porosity (L_{air}/L_{soil})
- H' = Henry's law constant (dimensionless)

22a-133k-2(d)(4)

LEP Calculation of Alternative PMC cont'd

- Substance-specific parameters provided
- Default site parameters provided
- Site-specific parameters can be used, if desired (requires sampling)

- Notice to be provided (can be at verification)

22a-133k-2(d)(4)

Application of Pollutant Mobility Criteria

- Sampling needs to be representative of release area
- Two scenarios:
  - Less than 10 samples
  - 10 or more samples

22a-133k-2(e)(2)

Compliance w/ the PMC - Less than 10 Samples

All samples must be equal to or less than the applicable criteria

22a-133k-2(e)(2)(A)

Compliance w/ the PMC - 10 or More Samples

- All samples must be equal to or less than applicable criteria

or

- The 95% UCL of the arithmetic mean of all samples is equal to or less than applicable criteria

22a-133k-2(e)(2)(A)&(B)

PMC Recap

- **Baseline Criteria**
  - Appendix B or Background (provide notice)
  - (c)(6) Additional Polluting Substances (needs approval)

PMC Recap cont'd

- **Options**
  - (c)(2) Additional Dilution Factors (GA) (LEP-implemented)
    - Including (c)(2)(A) Comparison with GWPC (GA)
  - (c)(3) Additional Dilution Factors (GB) (LEP-implemented)

PMC Recap cont'd

- **Exemptions**
  - (c)(5)(A) Environmentally Isolated Soil (needs EUR)
  - (c)(5)(B) Polluted Material (LEP-implemented)
  - (c)(5)(C) Groundwater Infiltration (LEP-implemented)
  - (c)(5)(D) Incidental Sources (vehicles/parking lot) (LEP-implemented)
  - (c)(5)(E) Pesticides (LEP-implemented)

PMC Recap cont'd

- **Alternatives**
  - (d)(3)(A) Alternative Criteria and/or Alternative Demonstration of Compliance (GA and GB) (needs approval)
  - (d)(3)(B) Alternative Dilution or Attenuation Factors (GA and GB) (needs approval)
  - (d)(4) LEP-Calculated Alternative PMC

PMC Recap cont'd

- **Variances (to be discussed later)**
  - (f)(1) Widespread Polluted Fill (LEP-implemented/needs approval versions – both w/ EUR)
  - (f)(2) Engineered Control (needs approval and EUR/Financial Assurance)
  - (f)(3) Public Roadways (needs approval)

Background

Cleanup to Background

- Documentation needed at the time of verification, which includes:
  - Description of subject area & soil characteristics
  - Map of subject release area, other release areas in the vicinity, and all soil samples collected for the purpose of determining background
  - Laboratory results of such samples
  - Demonstration of compliance with Background

22a-133k-2(a)(2)

Compliance with Background

- Requires that a representative sampling program is used to demonstrate the background concentration for soil that is:
  - Of similar texture & composition
  - Collected from nearest location practicable outside the subject release area
  - Not affected by another release of the same substance or a release that is having an effect on the concentrations of the same substance

22a-133k-2(e)(3)(A)

Compliance with Background cont'd

- Compliance can be demonstrated by:
  - All samples at release area equal to or less than the determined background concentration
  - A statistical comparison of the background concentrations to the concentrations from the subject release area results in a statistically significant similarity

ITRC Soil Background and Risk Assessment Guidance

22a-133k-2(e)(3)(B)&(C)

95% Upper Confidence Level

Upper Confidence Level

"Ninety-five percent upper confidence level of the arithmetic mean" is defined as a value that, when repeatedly calculated for randomly drawn subsets of size *n* from a population, equals or exceeds the population arithmetic mean ninety-five percent of the time.

22a-133k-1(a)(52)

Upper Confidence Level

- Provides a conservative estimate that is protective of potential receptors
- Accounts for uncertainties within data set
- The greater the number of samples collected, the more confidence that the 95% UCL will not underestimate the true mean of the data set (and the closer the 95% UCL will be to the true mean)

Calculating the 95% UCL

- Guidance documents for calculating the UCL
  - Guidance for Calculating the 95% Upper Confidence Level for Demonstrating Compliance with the Remediation Standard Regulations
  - Supplemental Guidance to RAGS: Calculating the Concentration Term
- Use EPA or other software to calculate the UCL
  - ProUCL (current version 5.2 - NEW)

95% UCL - Number of Samples

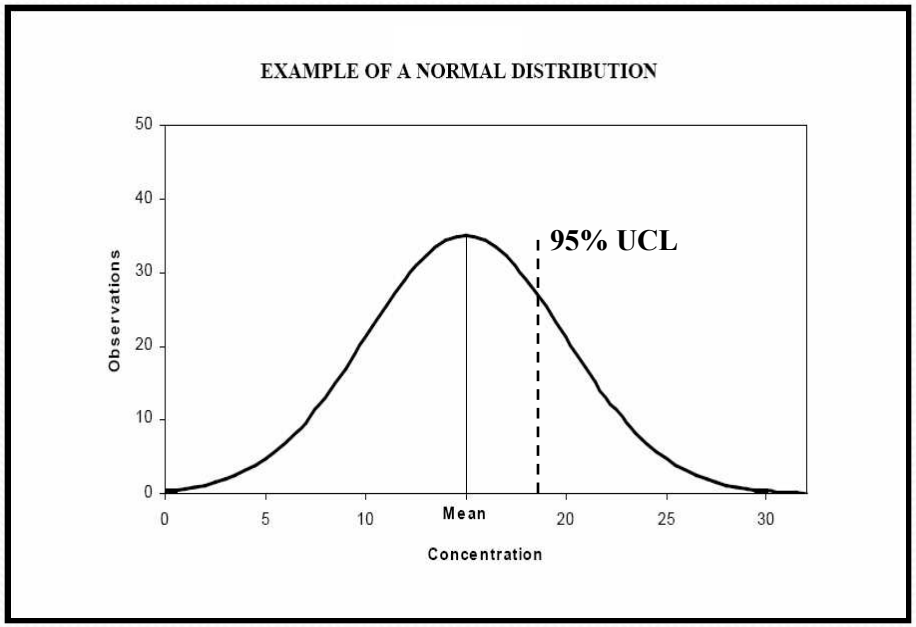
- *Collect sufficient number of discrete samples (not ND) to adequately characterize each release area*
- EPA Guidance (1992)
  - <10 samples per area of concern provide poor estimates of mean
  - 10-20 samples per area of concern provide somewhat better estimates of the mean
  - 20+ samples per area of concern provide fairly consistent estimates of mean

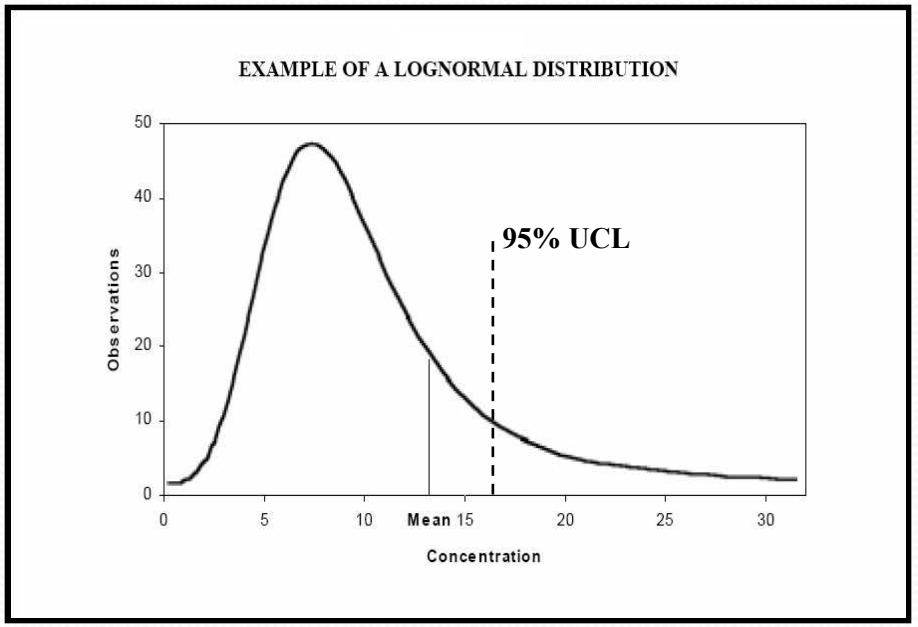
Data Distributions

- Data distribution
  - Environmental data is commonly Lognormal
  - ProUCL tests for Normal, Lognormal, and Gamma Distributions
- Use different 95% UCL calculation methods for different distributions:
  - Normal, Lognormal, and Gamma distributions have different calculation methods
  - ProUCL also has Non-parametric (no known distribution) methods

Data Distributions cont'd

- Normal vs. Lognormal data distribution



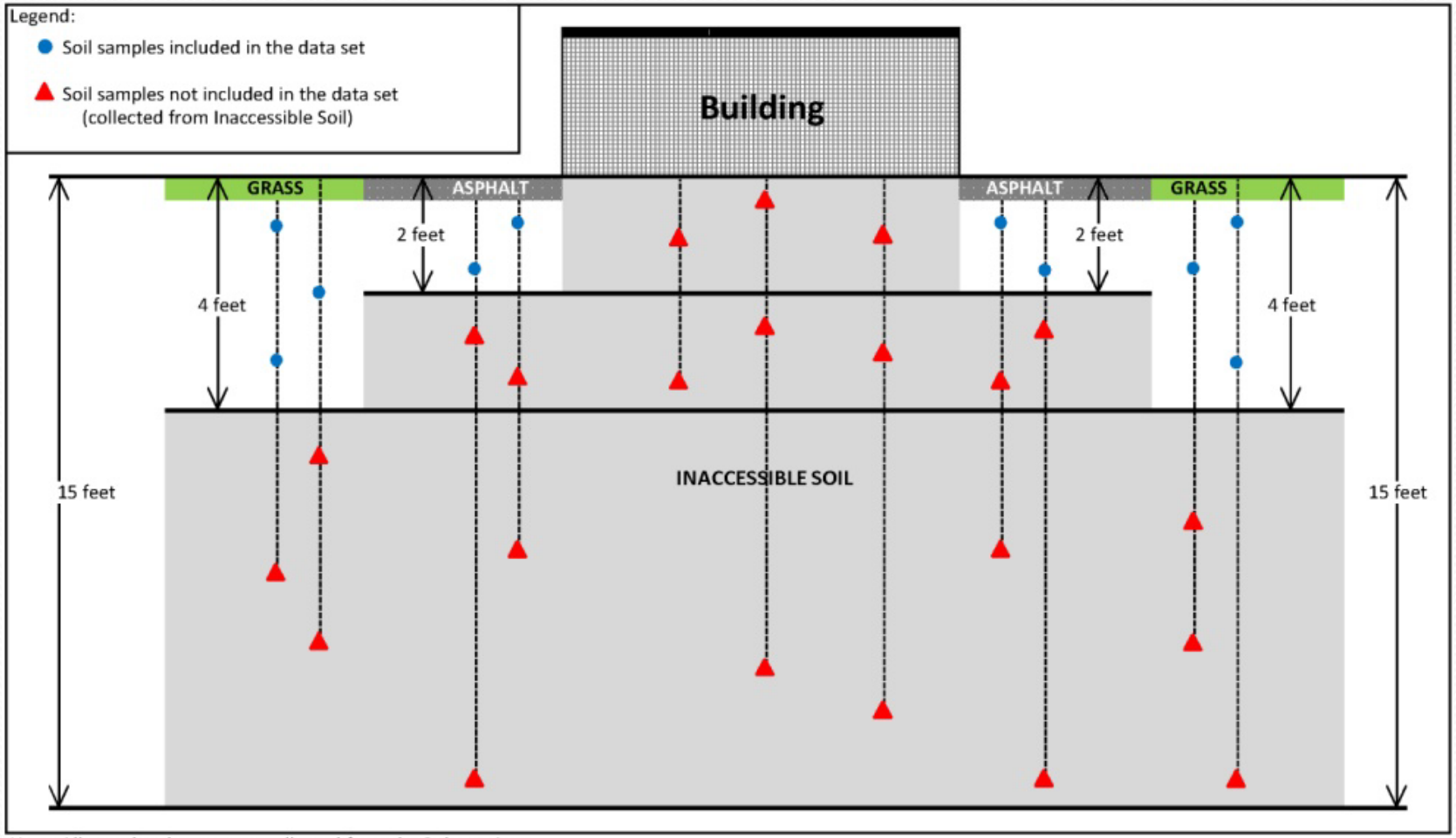


95% UCL – Handling NDs

- Appropriateness of the use of the NDs in the data set needs to be evaluated:
  - Delineate or Within Release Area?
  - Other lines of evidence?
- Proper estimation method needs to be used:
  - Normal, Lognormal, and Gamma Distributions - Regression on Order Statistics (ROS Method)
  - Non-parametric Distributions - Kaplan-Meier (KM Method)
  - ½ Detection Limit no longer recommended

95% UCL Data Set Applicability

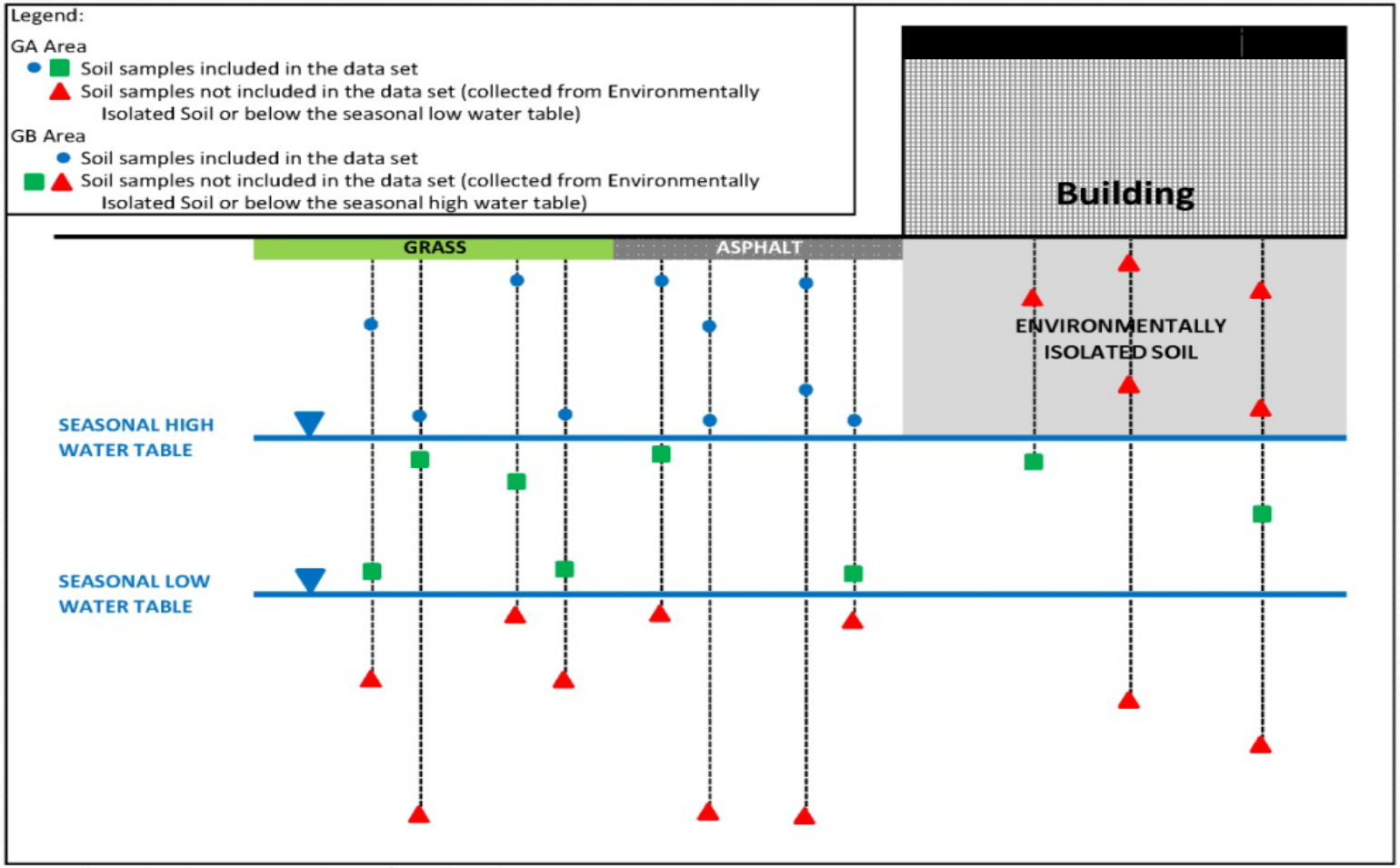
Release Area Sample Selection for DEC 95% UCL Calculation When Applying the Inaccessible Soil Exception



Note: All samples shown were collected from the Release Area

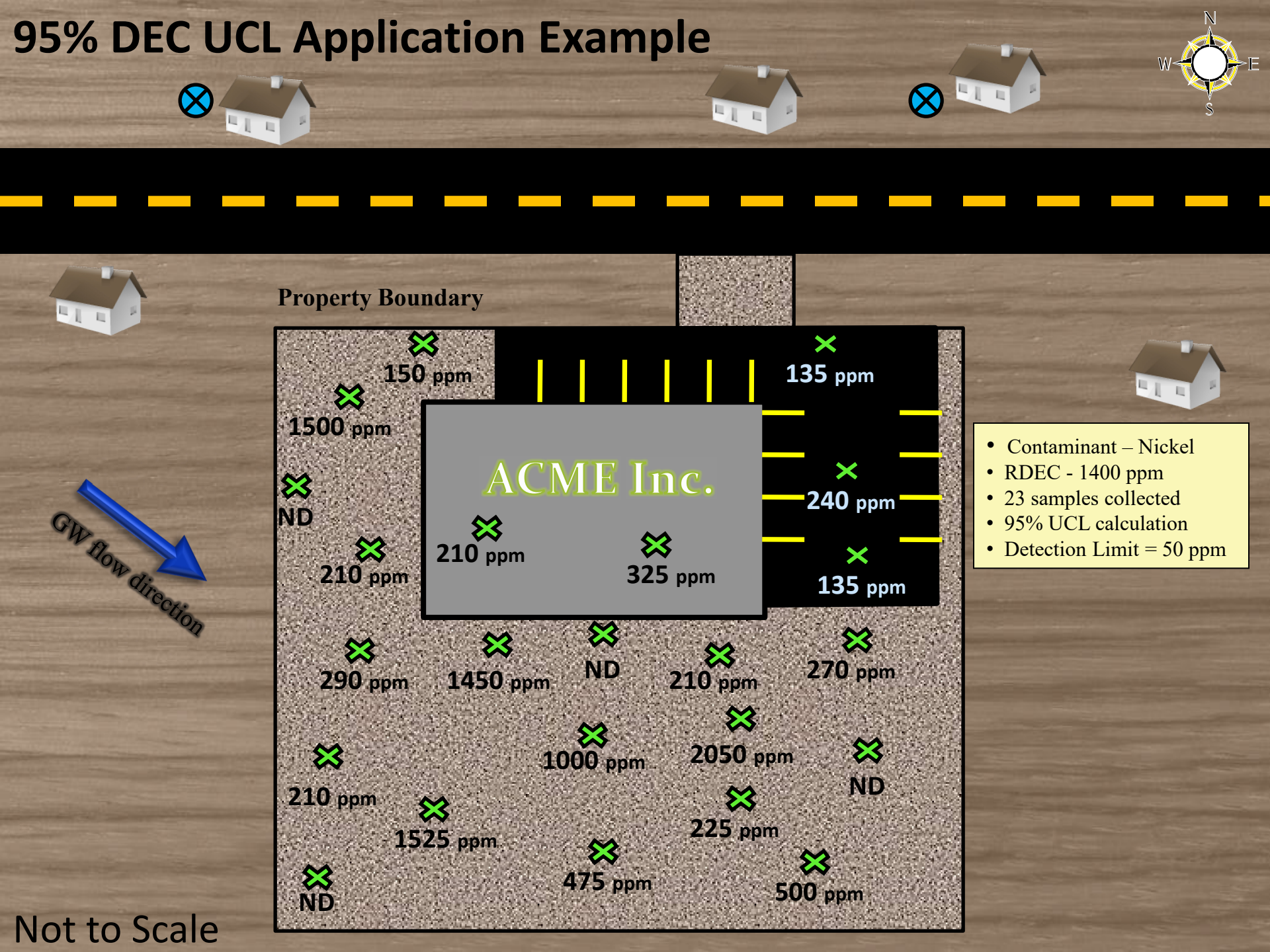
95% UCL Data Set Applicability

Release Area Sample Selection for PMC 95% UCL Calculation When Applying the Environmentally Isolated Soil Exception



Note: All samples shown were collected from the Release Area

95% DEC UCL Application Example



- Contaminant – Nickel
- RDEC - 1400 ppm
- 23 samples collected
- 95% UCL calculation
- Detection Limit = 50 ppm

95% UCL Data Sets

- Important to consider the representativeness of the data set – does the sampled distribution match the distribution in the ground?
- Assessment should be made to determine if the sampling program had the potential to bias and "skew" the sampled data set
- Just because you have enough samples to complete characterization does not mean that the data set is appropriate for use when estimating the 95% UCL – more samples may be needed

Variances from Soil Criteria

(Widespread Polluted Fill, Engineered Control, and Public Roadway)

WIDESPREAD Polluted Fill
Variance from PMC

WSPF variance comes in two types:

- LEP-certified (coastal and larger WSPF areas)
- Commissioner Approval (all other situations)

22a-133k-2(f)(1)

Variance from PMC - Eligibility
WIDESPREAD Polluted Fill

PMC does not apply to WSPF, if:

- Geographically extensive (regional condition - not just site)
- Meets Direct Exposure Criteria
- Will not affect drinking water supply
- Placement was not prohibited by law
- No VOCs at concentrations over applicable PMC
- Any releases to fill have been remediated

22a-133k-2(f)(1)(A)

Variance from PMC (LEP-certified) **WIDESPREAD Polluted Fill**

LEP-certified requirements for WSPF variance - PMC does not apply, if WSPF:

- Extends over an area larger than 10 acres
- Is located within the coastal boundary as defined in CGS 22a-94(b)
- Is in GB area
- Is not located in drainage basin of Class A stream

22a-133k-2(f)(1)(B)

Variance from PMC (LEP-certified) **WIDESPREAD Polluted Fill**

LEP-certified requirements for WSPF variance continued - PMC does not apply, if WSPF:

- Is in compliance with groundwater standards
- Is not hazardous waste
- Owner did not place fill and has no relationship with entity that placed fill (unless government agency)

Requires notice of the use of variance to be submitted to Commissioner (can be at time of verification)

22a-133k-2(f)(1)(B)

Variance from PMC (Comm. Approval) **WIDESPREAD polluted fill**

Information to include with variance request:

- Public water available
- Cost comparison (variance vs. remediation)
- The degree that fill exceeds PMC
- Extent of fill below water table
- 3-D extent of fill and % of fill on parcel
- Owner did not place fill and has no relationship with entity that placed fill

22a-133k-2(f)(1)(C)

Variance from PMC
WIDESPREAD Polluted Fill

Actions required for maintaining WSPF variance:

- Both LEP-certified and Commissioner approval versions require recording an EUR
- Such EUR shall prohibit any movement or reuse of fill in a manner that does not comply with the RSRs

22a-133k-2(f)(1)(D)

Variance from PMC (and/or DEC)
Engineered Control of Polluted Soil

Definition:

"Engineered control" means any physical barrier, system, technology or method that prevent exposure to polluted soil, or minimizes migration of liquids or vapor through such soil and complies with the other requirements specified in section 22a-133k-2(f)(2) of the RSRs.

22a-133k-1(a)(18)

Variance from PMC (and/or DEC)
Engineered Control (Eligibility)

Variance from PMC (and DEC) can be requested if:

- Commissioner authorized disposal
- Remediation of substance not technically practicable
- Commissioner determines that the removal creates unacceptable risk to human health
- For an LEP-certified EC (DEC Only), the LEP has determined that the cost of remediating is significantly greater than the EC
- For a Commissioner approved EC, the Commissioner determines that the EC is acceptable because the cost of removal outweighs risk to human health and the environment if the engineered control fails and the cost of remediating is significantly greater

22a-133k-2(f)(2)(A)

Variance from DEC

LEP-certified Engineered Control

- Must meet the eligibility requirements in 22a-133-k-2(f)(2)(A)
- PCBs cannot be present in concentrations exceeding the Residential DEC
- Soil consolidated under an EC cannot exceed 4’ above pre-consolidated elevation
- Measures are in place to ensure effectiveness of EC will be maintained, including semi-annual inspections and repairs
- An EUR is or will be in effect for the subject area
- Public notice was posted
- Financial assurance, if required, is in place

22a-133k-2(f)(2)(B)

Variance from DEC

LEP-certified Engineered Control Types

- **Shallow-rooted vegetation, mulch, or gravel** - minimum of 12" of material underlain by a demarcation layer, unless lawn is pre-existing for 3 years or more
- **Shrubbery** - minimum of 18" of material underlain by a demarcation layer, unless there is pre-existing mature shrubbery
- **Trees** - minimum of 18" of material extending horizontally to equivalent of mature tree crown, underlain by a demarcation layer, unless pre-existing trees are present

22a-133k-2(f)(2)(B)

Variance from DEC

LEP-certified Engineered Control Types

- **Non-paved hardscape** - P.E. signs and seals plans and specs; minimal maintenance for 15 years; minimum of 9" of combined sub-base and hardscape underlain by a demarcation layer, unless hardscape is pre-existing
- **Paved** - P.E. signs and seals plans and specs; minimal maintenance for 15 years; minimum of 2.5" of bituminous concrete underlain by a minimum of 6" of sub-base; 4" of reinforced concrete; paved surfaces less than 5' wide or 500 ft^2 must be underlain with a demarcation layer, unless paving is pre-existing

22a-133k-2(f)(2)(B)

Variance from DEC

LEP-certified Engineered Control Types

- **Ground mounted solar array** - Concrete ballast anchor to be underlain by 1' of material and a demarcation layer; all remaining infrastructure underlain by a minimum of 2' of material and a demarcation layer

22a-133k-2(f)(2)(B)

Variance from PMC (and/or DEC)
(Commissioner Approval EC Request)

A request for Commissioner Approval shall include:

- Specifications signed & sealed by a PE:
  - Minimize maintenance
  - Promote Drainage
  - Minimize erosion and other damage
  - Accommodate settling and subsidence
- Maintenance measures:
  - Ensure continued effectiveness
  - Measures to prevent storm damage
  - Inspections
  - Repairs to correct any damage (60 days or as soon as possible)

22a-133k-2(f)(2)(C)

Variance from PMC (and/or DEC)
(Commissioner Approval EC Request)

A request for Commissioner Approval shall include:

- An EUR is or will be in effect which:
  - Prohibits any activity that could disturb EC
  - Requires compliance with regulations and any other conditions imposed by the approval
- Copy of public notice
- Calculation of financial assurance
- Acknowledgement/consent of property owner

22a-133k-2(f)(2)(C)

Variance from PMC (and/or DEC)
(Commissioner Approval EC Requirements)

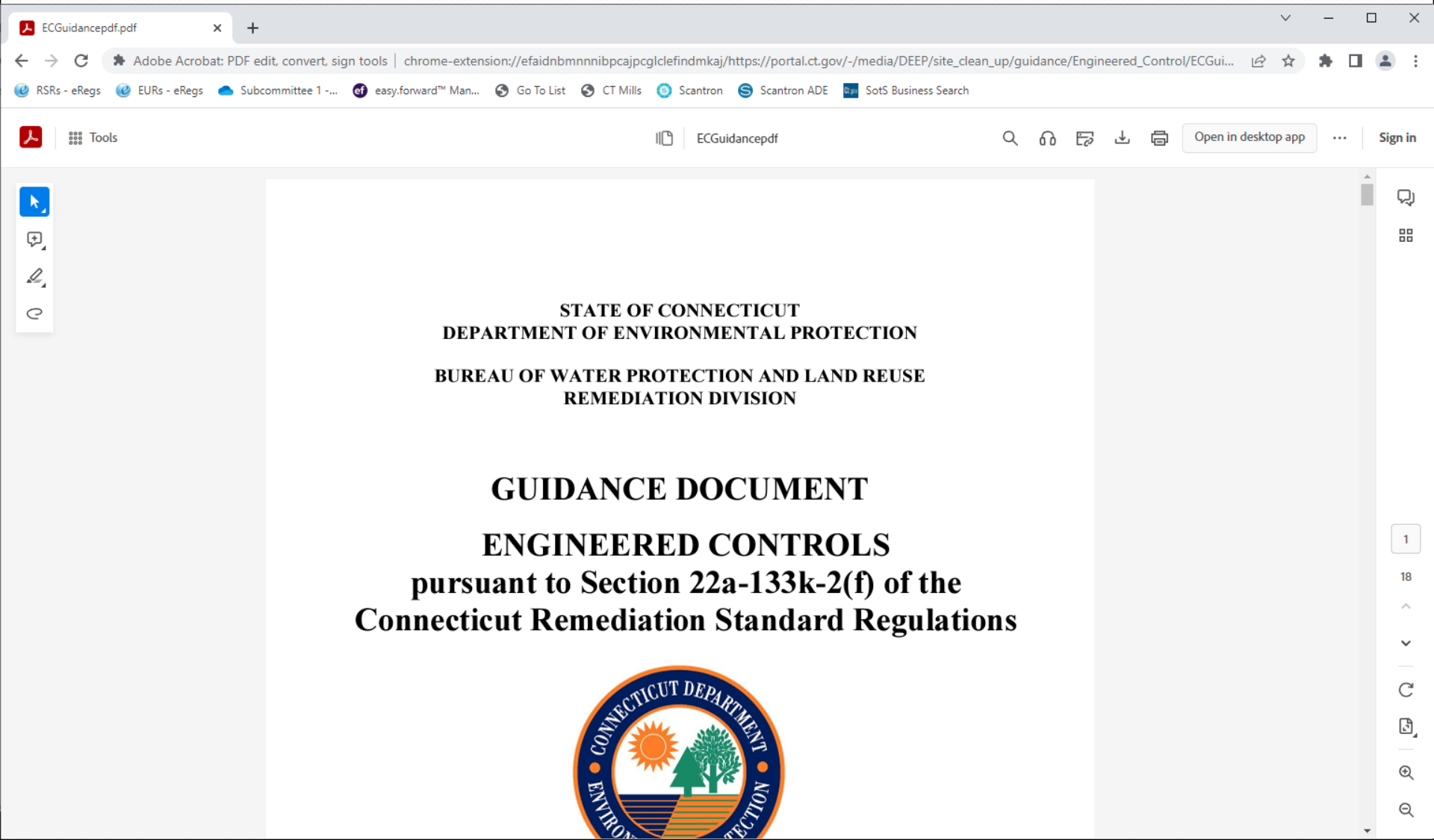
An Engineered Control must accomplish the following performance standards:

- Physically isolate polluted soil
- Minimize infiltration - permeability < 10^{-6} cm/sec (PMC only)
- Plan for monitoring groundwater to ensure that any substances migrating will be detected (PMC only)
- If soil under the EC contains VOCs, ensure that vapors will not cause a VI issue by controlling the vapor pathway (PMC only)
- For immobilization, reduce migration of contaminants - < 10^{-6} cm/sec or other permeability approved by the Commissioner
- For paved surfaces/hardscape, have at least a 15-year lifespan

22a-133k-2(f)(2)(C)

Engineered Control Guidance (Under Revision)

available on DEEP Website



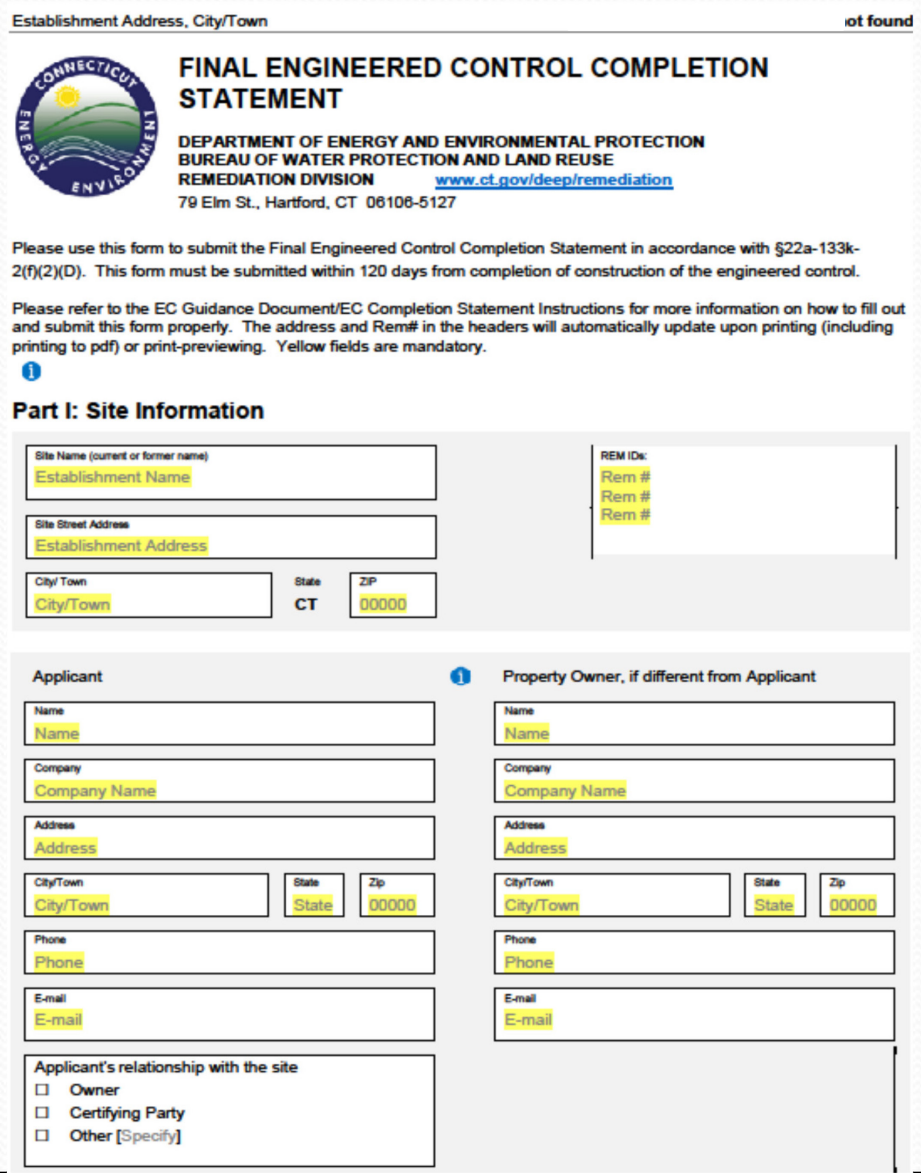
Variance from PMC (and/or DEC)
Engineered Control (Required Actions)

Actions required to maintain an EC (both LEP-certified and Commissioner approved) include:

- Submission of a Final Engineered Control Completion Statement within 120 days of completion of the EC
- Establishment of financial assurance mechanism within 120 days of completion of the EC
- Submission of request for EUR within 180 days of completion of the EC (unless extension is approved by the Commissioner in accordance with 22a-133k-1(e)(5))

22a-133k-2(f)(2)(D)

Engineered Control Variance Completion Statement



Establishment Address, City/Town ot found

FINAL ENGINEERED CONTROL COMPLETION STATEMENT

DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION
BUREAU OF WATER PROTECTION AND LAND REUSE
REMEDIATION DIVISION www.ct.gov/deep/remediation
79 Elm St., Hartford, CT 06106-5127

Please use this form to submit the Final Engineered Control Completion Statement in accordance with §22a-133k-2(f)(2)(D). This form must be submitted within 120 days from completion of construction of the engineered control.

Please refer to the EC Guidance Document/EC Completion Statement Instructions for more information on how to fill out and submit this form properly. The address and Rem# in the headers will automatically update upon printing (including printing to pdf) or print-previewing. Yellow fields are mandatory.

Part I: Site Information

Site Name (current or former name): Establishment Name

Site Street Address: Establishment Address

City/ Town: City/Town | State: CT | ZIP: 00000

REM IDs: Rem # Rem # Rem #

Applicant

Name: Name
Company: Company Name
Address: Address
City/Town: City/Town | State: State | Zip: 00000
Phone: Phone
E-mail: E-mail

Applicant's relationship with the site
- ☐ Owner
- ☐ Certifying Party
- ☐ Other [Specify]

Property Owner, if different from Applicant

Name: Name
Company: Company Name
Address: Address
City/Town: City/Town | State: State | Zip: 00000
Phone: Phone
E-mail: E-mail

22a-133k-2(f)(2)(D)

Variance from PMC (and/or DEC)
Engineered Control

- As part of an approval, the Commissioner may include any additional measurements deemed appropriate to protect human health and the environment
- Nothing in the approval shall preclude the Commissioner from taking any actions deemed necessary to protect human health and the environment should an approved EC fail

22a-133k-2(f)(2)(E)

Public Roadway Variance

A variance from the DEC, PMC, or both may be granted by the Commissioner for polluted soil under an existing public roadway:

"Public roadway" means any portion of a federal, state, town, or other public highway, including, but not limited to, road, street, parkway, limited access highway, boulevard, or avenue paved with bituminous concrete or concrete, under the control of the federal government, the state or any political subdivision of the state, any quasi-governmental entity or municipal economic development agency or entity created or operating under the Connecticut General Statutes, that is dedicated, appropriated, or open to the movement of vehicles or pedestrians, including appurtenant sidewalks, medians, and shoulders, but excluding landscaped or grassy areas beyond the outer edge of the travel way.

22a-133k-2(f)(3)(A)&(B) & 22a-133k-1(a)(68)

Public Roadway Variance cont'd

Requests must include a written statement from the owner of the roadway that acknowledges:

- Owner's understanding and consent of the variance requested
- That polluted soil beneath the public roadway remains subject to the RSRs and any conditions imposed in the approval of the variance
- If the roadway is ever proposed to be removed, at least 90-day notice will be provided along with the proposed plan for investigation and remediation (for review & approval)

22a-133k-2(f)(3)(A)

Public Roadway Variance cont'd

- Any approval will be based on:
  - The above requirements have been satisfied
  - Removal of the polluted soil is neither feasible or prudent
  - The granting of the variance will not endanger public health or the environment
- As part of any approval, the Commissioner may include any conditions deemed necessary to be protective

22a-133k-2(f)(3)(C)&(D)

Non-aqueous Phase Liquid (NAPL)

NAPL Baseline

- Light NAPL (LNAPL) and Dense NAPL (DNAPL) both must be removed to the maximum extent practicable

- Maximum extent practicable means that cost not a consideration (does the technology exist?)

22a-133k-2(g)(1) & 22a-133k-1(a)(47)

NAPL Variance

Commissioner may approve a variance from the requirement to remove NAPL (both LNAPL & DNAPL) to the maximum extent practicable (so to the maximum extent prudent, which considers cost):

- Request shall be submitted in accordance with 22a-133k-1(g)
- Shall also include acknowledgement and consent of owner of NAPL release area

22a-133k-2(g)(2) & 22a-133k-1(a)(48)

NAPL Variance cont'd

Request shall demonstrate:

- There is no migration of NAPL
- If NAPL contains PCBs, that they comply with 40 CFR Part 761
- Compliance with all applicable groundwater criteria
- Soil vapor compliance (or mitigation) for any building above the NAPL

22a-133k-2(g)(3)(A)

NAPL Variance cont'd

Variance will require an ELUR, which shall:

- Except for ongoing remediation, prohibit disturbance and exposure of the NAPL
- Prohibit construction of a building over such NAPL if there is NAPL containing volatile organic substances at or above the seasonal low water table
- Require compliance with the info on the previous slide - subparagraph (A)

22a-133k-2(g)(3)(B)

NAPL Variance Tip

NAPL Variance is for leaving NAPL in place and requires a demonstration that compliance with all groundwater criteria has been achieved…

This doesn't mean that soil criteria does not need to be met:

- DEC – demonstrate compliance or use an exemption/variance (likely Inaccessible Soil/EC)
- PMC – likely below high water table (but will need to demonstrate compliance or use exemption/variance - likely Environmentally Isolated/EC if PMC applies)

NAPL from LUST Sites

- This NAPL variance shall not apply to NAPL that is subject to RCSA 22a-449(d)-106 et seq. (UST Regs)
- Any such NAPL shall remain subject to RCSA 22a-449(d)-106 et seq.

This means that NAPL may be compliant with the RSRs (with variance) but still need further work to comply with UST Regs (due to CFR requirements)

22a-133k-2(g)(4)

Polluted Soil Reuse

Reuse of excavated polluted soil depends on category

22a-133k-2(h)

Hazardous Waste

Treatment, storage, disposal, and transportation of soil which is hazardous waste must be done in accordance with Hazardous Waste Management Regulations and RCRA

22a-133k-2(h)(1)

Special Waste

- Commissioner may authorize polluted soil which is not a hazardous waste to be disposed of as a special waste under the Solid Waste Regulations
- Obtain Special Waste Disposal Authorization if material falls in this category (not likely, but possible)

22a-133k-2(h)(2)

Reuse Rules for Polluted Soil

Polluted soil which falls into one of the following categories (next few slides) may be reused, as long as such soil:

- Complies with all requirements of the RSRs
- Is not placed below the water table
- Is not placed in an area subject to erosion
- Complies with all of the requirements specific to the category

22a-133k-2(h)(3)

Reuse Rules for Polluted Soil
(Same Parcel - Below Criteria)

Polluted soil may be reused on the same parcel with notice, as long as such soil:

- Is equal to or less than applicable promulgated/APS DEC & PMC
- Is reused only where there is a release, if greater than the GA PMC in a GB Area (anti-degradation)
- Is not placed under a building, if such soil contains volatile organic substances other than volatile petroleum substances
- Does not contain PCBs

22a-133k-2(h)(3)(A)

Reuse Rules for Polluted Soil
(Same/Adjacent Parcel - Above Criteria)

Polluted soil exceeding DEC/PMC may be reused on the same parcel (notice), an abutting parcel (approval), or on a different parcel affected by the same release (approval), as long as such soil:

- Is rendered inaccessible or environmentally isolated; or is under an engineered control
- Is only placed beneath a building that has been mitigated, if such soil contains volatile organic substances other than volatile petroleum substances
- If polluted with PCBs, Commissioner approval needed

22a-133k-2(h)(3)(B)

Reuse Rules for Polluted Soil
(Any Other Parcel – Below Criteria)

Polluted soil may be reused on the any other parcel with approval, as long as such soil:

- Is equal to or less than applicable promulgated/APS DEC & PMC
- Is reused only where there is a release of similar substances
- Does not exceed 4 feet above the pre-remedial grade
  - Can be up to 10 feet provided that the additional depth is required for redevelopment purposes

22a-133k-2(h)(3)(C)

Reuse Rules for Polluted Soil Cont'd

Prior to the reuse, a notice or request (as needed) shall be submitted in accordance with 22a-133k-1(g) and such notice or request shall also contain:

- A map showing the proposed location & depth of the polluted soil
- Any other information needed to demonstrate compliance with the requirements of the categories being used

22a-133k-2(h)(3)

Reuse Rules for Polluted Soil Cont'd

Please reference the Best Management Practices from:

- General Permit for Contaminated Soil and/or Sediment Management (expired)

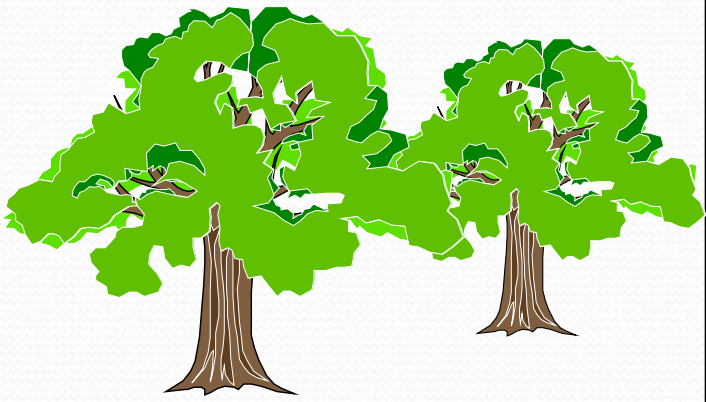
  (Link to Waste and Materials Management Permits Webpage)

Soil/sediment is contaminated if affected by known or suspected release & determined or reasonably suspected to be > ResDEC and/or > GA PMC

Natural Soil

May be used at any parcel (including after treatment), if:

- no naturally-occurring substance exceeds background
- no other substances are detectable above analytical detection limit



22a-133k-2(h)(4)

Clean Fill

Definition of clean fill in solid waste regulations includes natural soil and polluted soil treated to meet DEC and PMC *reused in accordance with the RSR re-use rules*.

RCSA 22a-209-1

Polluted Soil Containing Pesticides

Commissioner may approve a request for agricultural reuse of soil containing pesticides:

- Any such request shall be submitted in accordance with 22a-133k-1(g)
- If being reused on a different parcel, the request shall also include the acknowledgement and consent of the owner of the receiving parcel

22a-133k-2(h)(5)

Polluted Soil Containing Pesticides cont'd

Request shall demonstrate:

- Substances other than pesticides are below DEC/PMC
- Soil to be reused is surficial/topsoil
- Parcel where being reused is currently agricultural
- Pesticides in the soil to be reused are the result of "application of pesticides"
- Any such reuse is protective of human health and the environment

22a-133k-2(h)(5)(A) thru (E)

Additional Soil Remediation

Additional Remediation of Polluted Soil

Commissioner may take any action necessary to prevent or abate any threat to human health or the environment, including (but not limited to):

- May require ecological risk assessment (and additional remediation)
- Where polluted soil is eroding into surface water body, may require assessment and remediation
- May require additional remediation for multiple polluting substances with the same target organ (much like Alternative DEC requires)

22a-133k-2(i)