The Remediation Standard Regulations

Connecticut Department of Energy and Environmental Protection and Environmental Professionals Organization of Connecticut, Inc.
The following presentation was performed by the Remediation Division of the Connecticut Department of Energy and Environmental Protection in April 2022 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.
“Notice” – meant to be made at time of verification

“Commissioner satisfaction” - language intended to clarify who determines what is satisfactory (in case of a difference of opinion)

“Acceptable to the commissioner” - no approval needed but will be reviewed at time of verification and could be determined to be unacceptable

“Shall” - means something required to met (shall meet Residential DEC within release area)

“May” - exception or alternative to the “shall” (may instead meet I/C DEC with EUR)
Groundwater Remediation Standards

- Section 22a-133k-3 of the Regulations of Connecticut State Agencies
Groundwater Remediation Standards *Important Concepts*

♦ Regulated by groundwater plume

♦ **Location** of plume

♦ **Migration** of plume

♦ Sinking or floating on Water table
Approximately 90% of the state classified as GA, GAA, or GA Impaired is regulated by a groundwater plume.
GA remediation requirements includes “the portion of a groundwater plume migrating from a GB area into a GA area”
Groundwater Remediation Standards Important Concepts

- Regulated by substance
- Background or
- Numerical criteria
  - GWPC
  - SWPC
  - VolC
Overall Goals of Groundwater Remediation

- Protect and preserve groundwater in GA areas as a natural resource
- Protect existing use of groundwater regardless of groundwater classification
- Prevent further degradation of groundwater quality
- Prevent degradation of surface-water from discharges of contaminated groundwater
- Protect human health
Representativeness of Sampling Program

♦ Key to correct application of RSRs
♦ Used in the decision-making process to represent the conditions in the environment
♦ Expect that all substances of concern
  • have been identified
  • distribution in the environment determined
♦ Refer to Site Characterization Guidance
Representativeness of Sampling Program

- Elements that go into gathering representative samples

  - Utilizing all knowledge of the release
    - Size of release area
    - Size of the plume (3D)
    - Type of contaminant
  
  - Flow direction

  - Multiple rounds
    - Capture variability in water table
    - Diminishing state
Major Components

- Criteria (GWPC, SWPC, and VolC)
- Background
- Alternative Criteria
- Applying the appropriate criteria
- Groundwater monitoring
- Technical Impracticability (TI)
Key Groundwater Definitions

- **Background concentration**
  - Validated with Conceptual Site Model
  - Geographic vicinity
  - Naturally occurring or minimally affected by humans

- **Groundwater plume [3-D]**
  - Substance in groundwater from a release area present above laboratory reporting limit

- **Groundwater Flow Direction** – not a definition but very important to CSM

22a-133k-1(a)
Key Groundwater Definitions

♦ Diminishing State Groundwater Plume
  ♦ Validated with Conceptual Site Model
  ♦ Not migrating, or limited potential to migrate
  ♦ Substances have decreased and will continue to decrease
    ♦ Exception for breakdown products – will not pose risk

♦ Replaced Steady State Plume

22a-133k-1(a)(14)
Groundwater Remediation Requirements

- Attain goal for specific groundwater classification area (GA or GB)
- Attain goal for a groundwater plume discharging to a low-dilution surface water body
Groundwater Remediation Goal in GA Area / GAA Area

Remediation to:

♦ BACKGROUND
  ♦ Except as provided for in GWPC subsection -3(d) or -3(h)(4);
  ♦ SWPC (or background); and
  ♦ VolC

22a-133k-3(a)(1)
Groundwater Remediation Goal in GB Area

Remediation to:

- SWPC (or background);
- VolC (or background)

AND

- When groundwater is being used, GWPC
- Groundwater plume in a GB area is migrating into a GA Area

22a-133k-3(a)(2)
Groundwater Remediation Goal in GB Area

- Must consider that drinking water wells or other domestic uses may be present even though municipal water supply available
  - Importance of receptor survey in GB areas
  - Remediate the groundwater plume to concentration that does not interfere with any existing uses
  - Can connect all private wells so there is no existing use
Groundwater Remediation Goal in GB Area

- If groundwater plume in a GB area is migrating into a GA Area
  - Portion of the plume within GA area must meet GA Goal
  - Could require remediation to background

22a-133k-3(a)(2)
GW Applicability

Property Boundary

Receptor Survey

GB – Groundwater Class

Scenario 1
GW Applicability

- Receptor Survey
- GW Plume
- Property Boundary
- ACME Inc.
- GW flow direction
- GB – Groundwater Class
- GA – Groundwater Class
- Scenario 2

Not to Scale
GA remediation requirements includes “the portion of a groundwater plume migrating from a GB area into a GA area”
Groundwater Remediation Goal for Plume Discharging to Low-dilution Surface Water

Where a plume discharges to a:

- Wetland, tidal flat, intermittent watercourse, or
- Plume occupies more than 0.5% (or other approved percentage) of the upstream drainage basin

22a-133k-3(a)(3)
Groundwater Remediation Goal for Plume Discharging to Low-dilution Surface Water

Remediation to:

- Applicable WQC
  - Lower of human health or aquatic life (definition)
- Alternative SWPC
  - Aquifer Dilution 22a-133k-3(b)(2)
  - Commissioner approval alternative 22a-133k-3(b)(3)
Groundwater Background
Background as Groundwater Remediation Goal

Remediation to Background:

♦ Required in GA Areas (unless certain scenarios are met where GWPC can be the goal)

♦ Optional in GB Areas (instead of meeting promulgated criteria or requesting APS criteria)

22a-133k-3(a)(1)&(2)
[5] "Background concentration for ground water" with respect to a particular release means the concentration of a substance in ground water (A) at the nearest location upgradient of and unaffected by the release; or (B) if such release occurred at or created a ground-water divide, at the nearest location representative of ground water quality unaffected by any release.

♦ New definition focuses on the Conceptual Site Model to determine proper location to determine background in Groundwater

♦ Moved implementation to Applying GW Criteria 22a-133k-3(h) 22a-133k-3(a)(1)&(2)
• Upgradient well(s) must be representative of potential release

• Upgradient groundwater is ND then have to remediate to ND

• Background Not ND as long as background is below GWPC
Compliance with Background

♦ If never detected in groundwater, compliance monitoring for background is not required (only characterization to determine presence of a GW plume)

♦ Compliance monitoring required if ever detected in groundwater (definition of a groundwater plume), if background is the remediation goal

22a-133k-3(a) & 22a-133k-3(h)
Compliance with Background

22a-133k-3(a)

Unless otherwise specified in the RSRs, all substances in groundwater from a release shall be remediated to comply with the following, as applicable:

22a133k-3(h)

[Ground-water monitoring shall be conducted in accordance with this subsection for any groundwater plume and for any release area remediated … except for those release areas remediated solely to address exceedances of direct exposure criteria]

Compliance with the standards for groundwater in this section, or standards specified in section 22a-133k-2 of the RSRs that refer to or require groundwater monitoring, shall be based upon groundwater monitoring conducted in compliance with this subsection.

22a-133k-3(a) & 22a-133k-3(h)
Surface Water Protection Criteria
Surface Water Protection Criteria

♦ SWPC Located in Appendix D in RSRs

♦ Groundwater plume which discharges to a surface water body must be remediated to surface water protection criteria

22a-133k-3(b)
Development of SWPC

- Based on State’s Ambient Water Quality Criteria & applied dilution factor
- No dilution applied for wetlands and water bodies w/ intermittent flow

(no water = no dilution)
4 Alternative SWPC options

1. Discharge to inland watercourse
   - AA, A, or B watercourse

2. Discharge to coastal watercourse
   - SA or SB watercourse

3. Aquifer Dilution, or

4. Commissioner Approval

*Only one alternative can be used
Dilution factor (DF) can be applied to the applicable WQC in the WQS (Table 3): (lower of human health and aquatic life)

$$DF = \left( 0.25 \times Q_{99} \right) / Q_{plume}$$

- $Q_{99}$ = Daily stream flow exceeded 99% of the days in a year
- $Q_{plume} = KiA$
  (Hydraulic conductivity x Hydraulic Gradient x Area) (Area = Thickness of Plume x Width of Plume)
Inland & Coastal Alt SWPC
(Cap on Dilution Factor)

Cap on the Alternative SWPC based on distance:

<table>
<thead>
<tr>
<th>Distance from compliance point to nearest downgradient surface water</th>
<th>Maximum Allowable Alternative SWPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than or equal to 100 feet</td>
<td>100 times WQC</td>
</tr>
<tr>
<td>Greater than 100 feet to 200 feet</td>
<td>200 times WQC</td>
</tr>
<tr>
<td>Greater than 200 feet to 300 feet</td>
<td>300 times WQC</td>
</tr>
<tr>
<td>Greater than 300 feet to 400 feet</td>
<td>400 times WQC</td>
</tr>
<tr>
<td>Greater than 400 feet to 500 feet</td>
<td>500 times WQC</td>
</tr>
<tr>
<td>Greater than 500 feet to 600 feet</td>
<td>600 times WQC</td>
</tr>
<tr>
<td>Greater than 600 feet to 700 feet</td>
<td>700 times WQC</td>
</tr>
<tr>
<td>Greater than 700 feet to 800 feet</td>
<td>800 times WQC</td>
</tr>
<tr>
<td>Greater than 800 feet to 900 feet</td>
<td>900 times WQC</td>
</tr>
<tr>
<td>Greater than 900 feet</td>
<td>1,000 times WQC</td>
</tr>
</tbody>
</table>
USGS Streamstats

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
Click to select a State or Regional Study Area

Connecticut
Massachusetts
Mystic River Basin

Step 2: You have zoomed in sufficiently to select a state or regional study area. Your selection will dictate the data used to perform basin delineation and flow statistics calculation.

Click to select a State or Regional Study Area

Step 2: Click the 'Delineate' button to activate the delineation tool.

Step 3: Your delineation is complete. You can now clear, edit, or download your basin, or choose a state or regional study specific function (if available). Click continue when you are ready.


<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 Percent Duration</td>
<td>96.9</td>
<td>ft^3/s</td>
</tr>
<tr>
<td>99 Percent Duration</td>
<td>2.71</td>
<td>ft^3/s</td>
</tr>
</tbody>
</table>

Flow-Duration Statistics Citations
Info needed for $Q_{plume}$
- Conductivity of Aquifer Material ($10^{-3}$ cm/s)
- Hydraulic gradient = 0.05
- Plume Area = X-section at stream discharge point
  - 2000 ft$^2$

$$\left(\frac{0.25 \times Q_{99}}{Q_{plume}}\right) (\text{Water Quality Criteria})$$

Cu – SWPC 48 ppb
Aquatic life 4.8 ppb
DF = 39
Alt. SWPC = 187.7 ppb
Max allowable = 960 ppb
COMPLIES

$$\left(\frac{0.25 \times 0.5 \text{ft}^3/s}{0.0032 \text{ft}^3/s}\right) (\text{Cu})$$
Info needed for Q\textsubscript{plume}
- Conductivity of Aquifer Material (10\textsuperscript{-3} cm/s)
- Hydraulic gradient = 0.05
- Plume Area = X-section at stream discharge point
  - Scenario 1 = 2000 ft\textsuperscript{2}
  - Scenario 2 = 1000 ft\textsuperscript{2}

Scenario 1: Doesn’t comply
Max allowable = 960 ppb
Groundwater at 1000 ppb

Scenario 2:
\[
\frac{(0.25 \times 0.5\text{ft}^3/\text{s})}{0.0016\text{ft}^3/\text{s}}\text{)(Cu) DF = 78}
\]
Alt. SWPC = 375 µg/L
Max allowable because within 480 ug/L
COMPLIES
Dilution factor (DF) can be applied to the applicable WQC in the WQS (Table 3):
(lower of human health and aquatic life)

\[
DF = \frac{((W \times 0.25) \times L \times D)}{(T \times Q_{plume})}
\]

- \(D\) = Mean depth of watercourse at discharge point
- \(L\) = Length of discharge along shore
- \(W\) = 0.25 x watercourse width (capped at 100 ft)
- \(T\) = Daily discharge location (1/2 day)
A dilution factor (DF) can be applied to the SWPC, provided that:

- Location in GW plume where compliance is being demonstrated is at least 500’ from surface water discharge location
- Calculated dilution ratio (DR) is greater than 5: \[ DR = \frac{RC}{DC} \]
  - RC = release area concentration
  - DC = downgradient concentration (no more than 50’ from where RC was collected)

22a-133k-3(b)(2)(A)
Cap on the Aquifer Dilution Factor based on distance:

<table>
<thead>
<tr>
<th>Distance to nearest downgradient surface water</th>
<th>Dilution factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 500 feet to 600 feet</td>
<td>5</td>
</tr>
<tr>
<td>Greater than 600 feet to 700 feet</td>
<td>6</td>
</tr>
<tr>
<td>Greater than 700 feet to 800 feet</td>
<td>7</td>
</tr>
<tr>
<td>Greater than 800 feet to 900 feet</td>
<td>8</td>
</tr>
<tr>
<td>Greater than 900 feet to 1000 feet</td>
<td>9</td>
</tr>
<tr>
<td>Greater than 1,000 feet</td>
<td>10</td>
</tr>
</tbody>
</table>
Alternative SWPC

Property Boundary

ACME Inc.

GW Plume

570 µg/L

48 ft

550 ft

5 x 48 ppb = 240 ppb

COMPLIES

DR = RC / DC
RC = 570 ug/L
DC : 100 ug/L

DR = 5.7
5.7 >5.0

Max allowable Alt. SWPC (Cu)

Not to Scale
Alternative SWPC (Notice)

Notice shall be provided (can be at Verification) and shall include:

- What is required in 22a-133k-1(g)
- Alt. SPWC calculation
- Values and basis of terms used
- Dilution factor that was calculated
  - Including the basis of the cap value that was used

22a-133k-3(b)(1)(D) and (b)(2)(D)
Commissioner Approval
Release-Specific SWPC

- Can be used for both alternative criteria and alternative method of demonstrating compliance
  - Ensure protect human health and the environment
  - Submitted in accordance with 22a-133k-1(g)
- Commissioner may also require:
  - Q99 of surface water body
  - Other SW or GW discharges within ½-mile
  - Instream water quality (TMDL)
  - Flow rate of plume discharge

22a-133k-3(b)(3)
Volatilization Criteria
Volatilization Criteria – Basic Concepts

♦ Groundwater plumes polluted with VOCs can pose risks to indoor air quality

♦ VOCs in groundwater volatilize at water table and accumulate in soil vapor

♦ Soil vapor can be drawn in or diffuse into buildings
Dissolved Contamination in Groundwater

Basement Capillary Fringe

Stack Effect

Contaminant Diffusion Through the Vadose Zone

Contaminant Advection & Diffusion Through Floor-Wall Cracks

Wind Effect

Conceptual Model of Vapor Intrusion

Capillary Fringe

Dissolved Contamination in Groundwater

Not to Scale
Unless otherwise specified, groundwater shall be remediated to a concentration that is equal to or less than the residential volatilization criteria.
Exception to Groundwater Volatilization Criteria

- If a parcel (subject area) is used solely for industrial or commercial activity (access limited) and an EUR is in place ensuring no residential use and limited access, then groundwater may be remediated the industrial/commercial volatilization criteria

22a-133k-3(c)(1)(B)
General Volatilization Criteria (VolC) 
Applicability

The VolC applies to volatile organic substances (other than petroleum organic substances) within 30 feet of the ground surface (or within 30 feet beneath the lowest level of a building)
General Volatilization Criteria (VolC) Applicability cont’d

The VolC applies to petroleum organic substances within 10 feet of the ground surface (or within 10 feet beneath the lowest level of a building)

22a-133k-3(c)(1)(C)(ii)
Alternative Demonstration of Compliance for Volatilization Criteria

♦ If soil gas *beneath a building* is below the residential vapor criteria, remediation may not be required

♦ If soil gas *beneath a building* is below the industrial/commercial vapor criteria, and the building is not used for residential activities and access is limited then remediation may not be required (EUR must be recorded)

22a-133k-3(c)(2)(A)
Alternative Demonstration of Compliance for Volatilization Criteria cont’d

♦ If the concentrations of a volatile organic substance that are exceeding the volatilization criteria are not at the water table, remediation may not be required

♦ Seasonally demonstrated (compliance monitoring) for the uppermost portion of the water column

♦ Can be Residential or Industrial/Commercial

22a-133k-3(c)(2)(B)
Risk from vapor intrusion only pertains when groundwater is polluted with VOCs at the water table – Standard wells (with representative screens bisecting the water table) are necessary to demonstrate.
Exemption to Volatilization Criteria – Mitigation

- Remediation of groundwater is not required if measures acceptable to the Commissioner are taken to prevent the migration of vapors into an overlying building (exemption only applies beneath a building)

- System must be maintained and monitored

- EUR must be recorded requiring system to remain operating & restrict demolition of the building (or other permanent measure needs to be in place)

- Notice must be provided (can be on Verification Form) – demonstration of effectiveness 22a-133k-3(c)(3)
Classic Conceptual Model of a Sub-Slab Depressurization System

Seal Cracks and Openings (to extent possible)

Depressurized Zone

Not to Scale
Examples of Classic Sub-Slab Depressurization System Installations

Standard Exterior Installation

Potential Freezing Issues

Interior Piping

Aesthetic Covers
Depressurized Zone

Pressurized pipe must be outside of living area (requires fan in attic)
Examples of Alternative Sub-Slab Depressurization System Installations

- Attic Fan Installations
- Roof Vent
- Interior Piping (Closet Space)
Example of What Not To Do When Installing a Sub-Slab Depressurization System

Fan Mounted in “Living Area”

Vent Location Below Roofline
Alternative Volatilization Criteria

Commissioner may approve alternative criteria and/or an alternative demonstration of compliance, provided:

♦ Must demonstrate that vapors will not accumulate in structures at a concentration which would exceed risk of $10^{-6}$ for any carcinogenic substance and a hazard index of 1 for any non-carcinogenic substance

AND

♦ For multiple substances (10 or more) cumulative risk cannot exceed $10^{-5}$ for carcinogenic substances (same target organ) and a cumulative hazard index of 1 for non-carcinogenic substances

22a-133k-3(c)(4)
Alternative Volatilization Criteria cont’d

♦ Will include Department of Public Health as part of the review (will require the use of current toxicology information and exposure pathway assumptions)

♦ EUR may be required as part of the approval:
  ♦ Provides the option to approve a greater range of scenarios
  ♦ Would be focused on maintaining exposure/transport assumptions
  ♦ Would not be needed if Alternative is based solely on updated toxicology

22a-133k-3(c)(4)
VolC Exemption - No Building

♦ If no building exists above plume and either:

1) EUR is recorded to ensure no building will be constructed over plume, or

2) Commissioner has approved a demonstration that no building can be built, or

3) Commissioner has approved a demonstration that natural attenuation will reduce concentration over 5 years to below applicable volatilization criteria

♦ If plume is within 30’ of a building, the vapor intrusion pathway into the building shall be thoroughly evaluated

22a-133k-3(c)(5)
Exemption from the Volatilization Criteria Through Indoor Air Monitoring

♦ Requires Commissioner Approval of the monitoring plan (request needs to include listed information)

♦ Review of the plan will include DPH (which will require the use of current toxicology information and exposure pathway assumptions)

22a-133k-3(c)(6)
Exemption from the Volatilization Criteria Through Indoor Air Monitoring cont’d

- Commissioner may impose conditions as part of the approval, such as:
  - Air handling changes
  - Occupancy limitations

- Requires ELUR to be recorded which requires that the compliance with the indoor air monitoring program (and any other conditions added in the approval)

22a-133k-3(c)(6)
Volatilization Criteria - Additional Polluting Substances

- For substances for which a VolC does not exist, remediation shall be to background or a Commissioner approved VolC
- Formulas are in Appendix G
- Fast Track criteria (as discussed previously) are available for approval
- Other criteria can be proposed (will include DPH in the review)

22a-133k-3(i)(3)
Recap for Evaluating Compliance with Volatilization Criteria (w/ building)

- Groundwater results from defined plume compared to default RSR criteria (GW Volatilization Criteria – Compliance)
- Concentrations at Water Table compared to default RSR criteria (Exemption)
- Soil Vapor results compared to default RSR criteria (SV Volatilization Criteria – Alternative Compliance)
- Undertake mitigation (Exemption)
- Conduct indoor air monitoring (Exemption)

22a-133k-3(c)(1)(A)&(2)(A)&(2)(B)&(3)&(5)
Recap for Evaluating Compliance with Volatilization Criteria (w/o building)

- Groundwater results from defined plume compared to default RSR criteria (GW Volatilization Criteria – Compliance)
- Concentrations at Water Table compared to default RSR criteria (Exemption)
- No Building Restrictions (Exemption)
  - EUR (prohibit construction), or
  - Commissioner Approval (nothing can be built or concentrations will meet criteria in 5 years)

22a-133k-3(c)(1)(A)&(2)(B)&(6)
Groundwater Protection Criteria
Development of GWPC

- Risk based number protects people drinking groundwater ($10^{-6}$ carcinogens; HI = 1)
- Basis – Federal MCL, State Action Level or risk-based calculated using RSR formula
- Adjusted upward based on detection limit
- Adjusted downward based on ceiling level
Exception from Background in a GA Area
(Public Water Available)

Can use GWPC when certain conditions are met:

♦ A public water system is available within 200’ of parcel, adjacent parcels, and any parcel within the area of the plume

♦ Not an aquifer protection area

♦ Not within area of influence of public supply well

22a-133k-3(d)(1)(A)
Exception from Background in a GA Area
(Meets GWPC Before Remediation)

Can use GWPC if prior to any soil or groundwater remediation, the concentration in the plume was less than or equal to the GWPC:

♦ The plume must be diminishing state

♦ Any remediation will remove more source material, improving conditions

• Expected groundwater will be restored, eventually reaching background

22a-133k-3(d)(1)(B)
Remedial goal in a GA area is background:

- Measures have reduced the concentration below GWPC but not to background
- Technically impracticable to further reduce the concentration to background

THEN:

22a-133k-3(d)(1)(C)
Exception from Background in a GA Area (Technical Impracticability cont’d)

- Exemption not designed to be used if MNA will achieve background in the near future
- Not an exit from additional monitoring
- If plume can and will reach background, it is expected background is applicable criteria
- Used when plume is no longer steadily degrading but plume shown to be in a diminishing state
No further remediation required, as long as

- All applicable GW monitoring has been conducted
- Understanding of why plume can not meet background
- Will need to be explained at Verification

22a-133k-3(d)(1)(C)
An alternative GWPC may be calculated for substances:

- LEP-calculation of the Alt. GWPC (specific scenario)
- Commissioner approval of the Alt. GWPC (may allow use outside of the LEP specified scenario)
An LEP may calculate an alternative GWPC provided that:

- The plume is in an area designated on “Potential Alternative Groundwater Protection Criteria Map” in Appendix I.
- No public/private drinking water wells (receptor survey).
- Public water is available (prevents new wells).
- All releases have been remediated.

22a-133k-3(d)(3)(A)
LEP-calculated Alternative GWPC cont’d

♦ No alternative PMC is used for the same substance (prevents stacking)
♦ Plume is in a diminishing state
♦ Plume is not in bedrock
♦ Calculated using following formulas (next slides)
♦ Capped at Residential VolC and 100x GWPC
♦ Notice is provided (can be at Verification)

22a-133k-3(d)(3)(A)
Appendix I – Potential Alternative Groundwater Protection Criteria Map
LEP-calculated Alternative GWPC
Volatile Organic Substances

Alternative GWPC = \frac{\text{TAC} \times \text{HV} \times \text{ER} \times \text{MC}}{f \times \text{WFR}}

- \text{TAC} = \text{Target Indoor Air Concentration}
- f = \text{Fraction of substance concentration volatized (0.5)}
- \text{HV} = \text{House Volume (1,000 m}^3\text{)}
- \text{ER} = \text{Air exchange rate (134 per day)}
- \text{WFR} = \text{Water flow rate (3,183 L/day)}
- \text{MC} = \text{mixing coefficient (0.33)}

TAC must be approved by the Commissioner. Currently working on a Fast Track process (similar to APS)

22a-133k-3(d)(3)(B)
LEP-calculated Alternative GWPC
SVOCs, Inorganics, and Pesticides

Alternative GWPC = WSF × RSC × DEC × UCF

- WSF = Water to soil concentration factor (0.02 mg/L)
- RSC = Relative source contribution (0.2)
- DEC = Residential DEC (Appendix A or APS)
- UCF = Unit Conversion Factor (1000 µg/mg)
The Commissioner may approve an Alt. GWPC for plumes outside the mapped area, provided that:

- All requirements listed for the mapped area are met
- Calculated using the above formulas
- Depending on why the area was not in the mapped area, a demonstration that:
  - Public water is available in the area (and not in APA)
  - Aquifer is not suitable as public water supply (based on nature of aquifer or sustainable pumping rates)

22a-133k-3(d)(4)
Scenario 1 – Public water extended (least common)

• Water extension not part of mapping of Potential Alternative GWPC area
• Need to still demonstrate not a potential for future water use
  • No coarse-grained layer greater than 50 thick
• Alt map can only be updated through regulation modifications
Scenario 2 – Potential Future water source (more common)

- Public water is available but not in mapped area
- Area typically surrounded by Alt GWPC
- Not mapped Alt GWPC because thick course-grained stratified layer identified as potential future use

- Demonstrated no future use:
  - No thick coarse-grained aquifer
  - No yield or sustainability
Scenario 3 – Plume Splits Alt GWPC

- Alt GWPC used 200 ft buffer from public water distribution system
- 1/2 plume falls in mapped area other 1/2 outside
- Potential Commissioner approval for area outside mapped area

- Demonstrate no current use threatened by plume outside mapped areas
- Not a coarse-grained aquifer
The Commissioner may approve an Alt. GWPC for plumes in bedrock, provided that:

- Plume is in mapped area
- All requirements listed for the mapped area are met
- Demonstration that the groundwater plume that exceeds the GWPC will not pose a risk to human health and the environment
GWPC for Additional Polluting Substances

- For substances for which a GWPC does not exist, remediation shall be to background or a Commissioner approved GWPC.

- Formulas are in Appendix G.

- Fast Track criteria (as discussed previously) are available for approval.

- Other criteria can be proposed (will include DPH in the review).

22a-133k-3(i)(1)
GW Variances & Exemptions (Technical Impracticability, Incidental Sources, & Pesticides)
Technical Impracticability (TI) of Groundwater Remediation

♦ Variance for GWPC/SWPC due to Technical Impracticability of Groundwater Remediation

♦ Requires Commissioner’s Approval
Technical Impracticability (TI)

“Technically impracticable” means, a determination by the commissioner, that further reduction of the concentration of a substance in soil or groundwater cannot be achieved using sound engineering and hydrogeologic remediation practices.

22a-133k-1(a)(91)
Technical Impracticability Variance

♦ Optional groundwater remedial approach (EC for groundwater)
  • Not a waiver for source area remediation or for addressing potential risks to receptors
  • Need to address the source of the pollution to the maximum extent practicable
  • Mechanism to manage risk where there is no readily available technology to complete remediation

♦ Must demonstrate that variance will protect human health and the environment

22a-133k-3(e)
Technical Impracticability Variance

1st Scenario - Residual Source

- Groundwater impacts resulting from NAPL, smears, or discontinuous residuals
- Cannot be effectively removed or degraded
- Typically applies to DNAPL
- Contamination removed to the maximum extent practicable (where can be found)
- Groundwater contamination will not extend outside TI Zone
Technical Impracticability Variance

2nd Scenario - Persistent Plume

- Steady state or slowly diminishing plumes that persist at unacceptable levels
  - Above GWPC, or SWPC, or both
- Plume fully characterized (3D)
- Will not dissipate within a reasonable timeframe
- Source area(s) remediated
Technical Impracticability Variance

TI Zone – Definition (92)
- Geographic area where groundwater contamination exceed the applicable criteria
- Contaminant Specific

- Public Input prior to DEEP approval

- Two-part approval
  - Approval of Eligibility (Step 1)
  - Approval of Final Variance (Step 2)

22a-133k-1(a)(92)
Step 1

• Submit the requested information identified in 22a-133-(3)(e)(1)(A) - (10 Total)

• Commissioner will “indicate in writing” if
  • Groundwater doesn’t qualify for the TI variance, or
  • Submit “Additional Information” (Step 2) in accordance with 22a-133-3(e)(2)
    • May required additional conditions

22a-133k-3(e)(1)(A) and (B)
10 Eligibility Clauses

1. Substance and concentration in GW plume

2. 3D Map showing extent of GW plume exceeding criteria

3. Demonstrate compliance with soil (22a-133k-2)
   - Or that soil remediation is not technically practicable

4. All actions taken to remediate the GW plume (including laboratory analytical results)

5. Feasibility study that achieving compliance within a reasonable timeframe in not technically practicable

22a-133k-3(e)(1)(A)
6. Plume is steady or diminishing state (or otherwise hydraulically controlled)

7. Map of the proposed TI Zone with:
   - Current and potential GW withdrawals and their potential to affect plume migration and protectiveness

8. Study evaluating risks of remaining polluted groundwater plume
   - If risk a contingency plan to minimize risk
9. **Long-term monitoring, operation, maintenance, and reporting to show:**
   - GW plume is not increasing in size or concentration
     - or no alterations in the risk assumptions
   - Unacceptable risks is not occurring
     - Land or water use change
     - If risk occurred contingency actions conducted
   - Any proposed controls continue to work and remain effective

10. **Type and estimated amount of FA to maintain long-term provisions**
Technical Impracticability Variance

- Possible long-term obligations
  - Five-year status reports
  - Continuation of O & M
  - Long-term monitoring program
  - Land use monitoring inspections
  - Receptor updates

22a-133k-3(e)(1)(A)
TI Additional Information

After initial request qualifies for the variance (Step 1) the following information shall be submitted (as requested) within 120 days:

1. Public Notice has been provided
2. Written notice has been provided to each parcel owner and local health within the TI Zone
3. If ELUR is required, consent from the owner of each parcel
4. Demonstration that FA has been obtained

22a-133k-3(e)(2)
TI Additional Information

5. ELUR or other permanent control is in place:

“Other permanent controls” - town ordinance or design districts

ELUR or permanent control shall:

♦ Require compliance with the plan and measures
♦ Include any conditions added by the Commissioner
♦ 5-year Reports with updating conditions
♦ If variance is for GWPC, prohibit drinking of groundwater use and withdrawal of groundwater

*TI variance approval after all additional information is received
Incidental Sources - Pesticides
Groundwater Exemption

Incidental Sources

Compliance with GW criteria not required for GW impacted with:

- Trihalomethanes (or any other substance within drinking water) from a public water system
- Metals, petroleum hydrocarbons, and SVOCs, if:
  - Groundwater polluted by normal operation of motor vehicles (not from spill, 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
Conditional Exemption - Pesticides

Exempted from Pesticide GW criteria if:

- Pesticides are solely as a result of “application of pesticides”
- Compliance has been achieved with DEC/PMC
  - Can use exceptions/exemptions/variances
- The nature & extent of the pesticides in GW evaluated
- Potable water at parcel sampled and if human health concern
  - Mitigated with treatment (GAC filter), or
  - Eliminate by connection to public water

22a-133k-3(g) & 22a-133k-1(a)(1)
Conditional Exemption (cont’d) - Pesticides

Exempted from Pesticide GW criteria if:

♦ Potable well receptor survey conducted
♦ Notice on the land record for the parcel
  ♦ Identifying GW exceedance for pesticides
♦ If identified on surrounding parcels, “best efforts” have been made to record an EUR on other affected parcels
♦ Notice submitted to the Commissioner and Local Health (at time of Verification) which documents all of the above

22a-133k-3(g)
Applying the Groundwater Criteria
Groundwater Monitoring

♦ When should groundwater monitoring be conducted?
♦ What is groundwater monitoring designed to determine?
♦ When can groundwater monitoring start?
♦ What is required prior to conducting monitoring?
♦ How long is Compliance monitoring timeframe?
Groundwater Monitoring (General)

Shall be capable of determining:

- The conceptual site model (so for any release area suspected to impact groundwater)
- Background concentrations
- The effectiveness of any release area remediation
- The effectiveness of any measures to render soil environmentally isolated
Effectiveness of any remediation taken to eliminate or minimize any risk (TI variance)

Whether applicable criteria have been met:
- SWPC, Alternative SWPC, or background
- VolC or Alternative VolC
- Background, GWPC, or Alt GWPC

In GB areas, whether the plume interferes with any existing use

The effectiveness of MNA to achieve GW compliance within a reasonable timeframe
When is compliance monitoring required?

- GW Compliance monitoring is required for any groundwater plume (any detection in groundwater)
- "Groundwater plume" means groundwater that has been polluted by a release and is emanating from a release area and in which one or more substances from such release is present at a concentration above the laboratory reporting limit.
Compliance Monitoring Applicability

- Compliance monitoring not triggered by soil remediation

- Groundwater monitoring is needed:
  - To characterize there is no plume
  - No plume - no compliance monitoring
Compliance Monitoring Concepts

♦ Characterization of source of plume complete:
  • Without complete release area characterization, don’t know where to look for the plume (and therefore, whether compliance monitoring will be necessary)

♦ GW sample locations must also represent extent and degree of plume:
  • Without representative sample locations, it is difficult to characterize plume and determine effectiveness of remediation
“Groundwater samples that will be used in determining compliance with an applicable criteria shall be collected after”:

♦ All monitoring events used for compliance must occur “after” the specified remedial actions “have been concluded”

● This includes all remedial effects of in-situ treatments
Compliance Monitoring Starts After:

- All remedial actions to achieve compliance with the PMC and GW criteria have been concluded:
  - Except other than natural attenuation of groundwater plume or recording an EUR
  - Pertains to the continued decrease in concentration (attenuation) during Compliance Monitoring not MNA as a remedial measure
Compliance Monitoring Starts After:

- If a site-wide clean up is the goal, or commingled plume, site-wide groundwater monitoring can be performed:
  - As long as wells are representative of all releases
  - All PMC/GW remedial actions for the site have been concluded (other than above)
Compliance Monitoring Starts After:

- Aquifer is no longer affected by withdrawal or injection (or other transient effects):
  - Monitoring wells need to be properly located to detect groundwater conditions both before and after remediation
- Geochemical changes from remediation have stabilized:
  - It may be difficult without proper baseline groundwater conditions to conclude the effects of remediation on groundwater conditions have ended and compliance monitoring can commence
Compliance Monitoring Starts After:

- Groundwater plume is in diminishing state (not migrating and concentrations decreasing except for breakdown components):
  - Knowledge of the groundwater flow direction
  - Proper well screening to determine the 3D extent of the plume
  - Multiple sampling events are needed to document diminishing state conditions are occurring
  - Increasing concentration cannot occur over time in any monitoring well representing the plume

22a-133k-3(h)(2)(D)
Compliance Monitoring Summary

- Remedial Action Complete
- Characterization Complete
- Start Compliance Monitoring
- Groundwater Plume at Diminishing State
- Remediation no longer affecting Aquifer
- GW impacted
Compliance Monitoring Timeframe

After groundwater reached applicable criteria:

- Compliance monitoring shall be a minimum of four sampling events seasonally on a quarterly basis within two years except for

- 95% UCL options for GWPC/SWPC and Soil Vapor for VolC (to be discussed on later slides)
Compliance Monitoring Timeframe

- 2-year window is between the first and last event (should be same season), so effectively only 8 quarters (9th quarter will be out of the window)
- Not necessarily consecutive, but representative of seasonal variation
- Samples must represent all four seasons:
  - Cover high and low water table events
  - Allows for access or logistical issues (snow/ice)
- Does not prevent sampling for four quarters over a one-year period
Application of 2-year Compliance Monitoring Time Frame

- If during the first year of compliance monitoring there are exceedances of applicable criteria during one sample round, it may be acceptable to collect another sample during the same quarter the following year. If that sample and three other quarterly samples meet the applicable criteria, compliance monitoring may be complete as long as:
Application of 2-year Compliance Monitoring Time Frame (cont’d)

- The anomalous exceedance was consistent with the goal of confirming the effectiveness of any soil or groundwater remediation.
- The exceedance can be explained through secondary lines of evidence.
- The difference between the exceedance and the subsequent compliance round is not due to differences in water table elevation (that would be a sign of an issue).
- If compliance is sought for a site-wide closure the exceedance is not due to a new source area.
Demonstrating Compliance with GWPC/Background

- All sampling location are equal to or less than GWPC/Background

OR

- 95% UCL of no less than 12 consecutive monthly samples, calculated individually for each well, is equal to or less than GWPC/Background
Demonstrating Compliance with SWPC/WQC

- Compliance with SWPC/WQC can be demonstrated at two different compliance points:
  - Most downgradient location (1st compliance point)
  - Whole plume (2nd compliance point)
Demonstrating Compliance with SWPC/WQC cont’d

1st Compliance Point

- Sample locations upgradient of groundwater discharge to surface water body
  - Does not have to be at the edge of the water
  - Could be most downgradient extent of the plume that complies
- All samples below SWPC/WQC, or
- 95% UCL of 12 consecutive monthly samples, calculated individually for each location, is equal to or less than SWPC/WQC

22a-133k-3(h)(3)(B)(i)
Demonstrating Compliance with SWPC/WQC cont’d

◆ 2nd Compliance Point

- Quarterly samples collected from entire plume – representative of seasonable variability
- 95% UCL of representative samples of entire plume (using all wells within the plume) is equal to or less than SWPC/WQC
- Use all compliance sampling rounds in calculation – not limited to 2-year window (go back as far as needed to strengthen data set)
Demonstrating Compliance with VolC

♦ All groundwater sampling location are equal to or less than GW VolC (4 quarterly seasons)

OR

♦ All soil vapor sampling locations beneath a building are equal to or less than SV VolC

♦ 2 seasons – Heating & Cooling
Alternative Methods to Determine GW Compliance – Commissioner Approval

- Commissioner may approve an alternative method of demonstrating compliance
  - The provision for approval of “an alternative method for demonstrating compliance” is to provide the ability to allow use of innovative approaches that might be developed in the future
  - Guidance, standard, or industrial code published by regulatory agency, governmental advisory group, or other professional organization

22a-133k-3(h)(3)(D)
Additional Remediation of Groundwater

♦ Commissioner may take any action necessary to prevent or abate any threat to human health or the environment

♦ Additionally, may require remediation if the presence of a substance impairs the aesthetic quality of groundwater which limits the use as water for drinking or other uses
Compliance Monitoring Recap

♦ Need to characterize release and extent of plume

♦ Groundwater monitoring still needs to determine the effectiveness of any remediation

♦ Remediation concluded (any for GW/PMC)

♦ Groundwater stabilized prior to compliance monitoring

♦ Any groundwater plume must be in diminishing state

♦ Compliance monitoring is 4 quarters within a 2-year window of monitoring
Upgradient Groundwater Plume
Upgradient/Downgradient

- Upgradient Parcel
- Downgradient Parcel
- Subject Parcel using upgradient provision
- ACME Inc.
- Joe’s Auto
- GW Plume

GW flow direction

Not to Scale
Upgradient Groundwater Plume

If substances in groundwater are coming solely from an upgradient parcel, the concentrations of such substances may be equal to or less than the concentrations coming onto the downgradient parcel, provided that:

♦ Downgradient parcel soil is in compliance with 22a-133k-2
♦ Downgradient parcel exposure pathways (drinking & vapors) have been eliminated & mitigated
♦ Such substances are not already present in a plume at the downgradient parcel

22a-133k-3(h)(4)(A)
Co-mingled Groundwater Plume

If substances in groundwater are coming from an upgradient parcel and co-mingling with an on-site plume, the concentrations of such substances may be equal to or less than the concentrations coming onto the parcel, provided that:

- Everything in 22a-133k-3(h)(4)(A) (previous slide)
- All exposure pathways (drinking & vapors) have been eliminated or mitigated for downgradient parcels, as well
Upgradient Contamination

• Onsite COC and groundwater plume needs to be fully characterized
• Upgradient well(s) must be representative of potential release
• Upgradient Policy applicable if contaminated groundwater migrating onsite from an offsite release on an upgradient property
Onsite or Upgradient?

GW Monitoring Well

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ACME Inc.

AOC

GW flow direction

Not to Scale
Connecticut Department of Energy and Environmental Protection
RSR Training
Environment Use Restrictions
2022

Thursday April 14, 2022
Presented by Amanda Limacher and Jade Barber

Connecticut Department of Energy and Environmental Protection
Environmental Use Restriction (EUR)

Environmental Land Use Restriction (ELUR)

Notice of Activity and Use Limitation (NAUL)
Environmental Land Use Restriction (ELUR)

- Approved by Commissioner
- Approved by LEP (pursuant to 22a-133y)
- Recorded on municipal land records
- Easement granted to the Commissioner by the property owner

Connecticut Department of Energy and Environmental Protection
Notice of Activity and Use Limitation (NAUL)

- Approved by LEP
- Approved by Commissioner
- Recorded on municipal land records
- NOT an easement granted to the Commissioner
Connecticut General Statutes
(CG) section 22a-133n through 22a-133s

Authorize
- Commissioner to approve ELURs and NAULs
- LEP to approve NAULs and ELURs pursuant to section 22a-133y

Specify circumstances in which EURs are applicable
Remediation Standard Regulations (RSRs)
sections 22a-133k-1 through 22a-133k-3 of RCSA

Specify circumstances in which EURs are required

Summarize the types of EURs available
EUR Statutes and Regulations

EUR Regulations
sections 22a-133q-1 through 22a-133q-9 of RCSA

Describe the process of preparation, approval, and recording of
• EURs
• allowable disturbances, releases, and terminations

Outline post-recordation requirements
Recipe for an EUR

Ingredient List:
- EUR Statutes
- RSRs

Directions:
EUR Regulations
**EURs - Soil**

### Residential Use Restriction – Soil (Non-PCBs)
- Exceeds Res DEC
- Meets I/C DEC
- <15ft bgs
- Site-wide Restriction

### Inaccessible Soil (Non-PCBs)
- Exceeds applicable DEC <15ft bgs
- Prevents disturbance of soil / demo of building or permanent structure
- Requires maintenance of cover
- Limited disturbance option

### Environmentally Isolated Soil
- Exceeds PMC beneath existing building
- Prevents infiltration of liquid / demo of building or permanent structure*
- Requires DEEP approval

### Engineered Control Variance
- LEP Certified – DEC EC
- DEEP Approved – PMC and DEC EC
- Prevents disturbance of EC and soil
- Requires maintenance & inspections

---

*This Photo by Unknown Author is licensed under CC BY-NC*
Widespread Polluted Fill Variance

- LEP Certified or DEEP Approved
- PMC do not apply
- Prohibits movement/reuse of impacted soil in a manner inconsistent with RSRs

Alternative Release-Specific DEC

- DEEP Approval
- Requires compliance with conditions specified in Approval

Soil Polluted with Pesticides

- Residential Activity
  - Exceeds Res DEC
  - Requires implementation of protective measures

- I/C Activity
  - Exceeds I/C DEC
  - Requires soil management plan
  - Prevents residential use within subject area

Connecticut Department of Energy and Environmental Protection
EURs - Groundwater

Residential Activity – Groundwater

**Groundwater:** VOCs exceed Res VolC  VOCs meet I/C VolC  <30ft bgs

**Soil Vapor Below a Building:** VOCs exceed RSVVC  VOCs meet I/C SVVC

**Concentrations at Water Table:** Uppermost portion of water column meets I/C VolC
- Requires seasonally representative data

**Vapor Mitigation**
VOCs exceed VolC below building
Prohibits demolition of the building
Requires implementation of protective measures

**No Build Restriction**
VOCs exceed VolC  <30ft bgs
Prohibits construction of a building

**Groundwater Polluted with Pesticides**
Pesticides originating from another parcel
No restrictions or obligations (notice only)

**Alternative Release-Specific Volatilization Criteria**
**Alternative Method of Demonstrating Compliance with Volatilization Criteria**
DEEP Approval of Alt VolC or Alt Method of Compliance
Requires compliance with conditions specified in Approval

Connecticut Department of Energy and Environmental Protection
Residential Activity – Soil (PCBs)

Inaccessible Soil and Residential Activity (PCBs)

Non-Aqueous Phase Liquids (NAPL) Variance
DEEP Approval Prevents disturbance/exposure of NAPL

Indoor Air Monitoring
VOCs in groundwater below building Ensures indoor air monitoring program is in effect

Technical Impracticability Variance
DEEP Approval SWPC or GWPC Requires measures to eliminate risk to human health/environment

Connecticut Department of Energy and Environmental Protection
NAUL Statutory Limitations

Residential Use Restriction: Zoning permits Industrial/Commercial uses

Inaccessible Soil Restriction: Concentrations less than 10x applicable DEC

Engineered Control Disturbance Restriction: Concentrations less than 10x applicable DEC

Environmentally Isolated Soil Restriction: Concentrations less than 10x applicable DEC and PMC, or total volume of soil greater than 10x DEC and PMC is less than or equal to 10 cubic yards.

CGS Section 22a-1330(c)(1)

Connecticut Department of Energy and Environmental Protection
Environmental Use Restrictions

The purpose of an Environmental Use Restriction (EUR) is to minimize the risk of human exposure to pollutants and hazards to the environment by preventing specific uses or activities at a property or a portion of a property. There are two types of EUR, the Environmental Land Use restriction (ELUR) and Notice of Activity and Use Limitation (NAUL), both are recorded on the municipal land records.

- Environmental Land Use Restrictions (ELUR) – forms, fees, and instructions
- Notices of Activity and Use Limitation (NAUL) – forms, fees, and instructions
- Emergency and Non-Emergency EUR Releases – allow for activities that are prohibited by EURs, such as excavation and utility work

EUR Map

EUR FAQs

March 2021 Remediation Roundtable Presentation (EUR presentation begins on slide 20)

Inspections

Inspection reports shall be completed in compliance with Section 22a-133q-8 of the RCSA, shall be maintained by the parcel owner, and shall be provided to the Commissioner upon request.

Annual Inspection. Between April 1st and July 31st of each year, an annual inspection shall be conducted and within 30 days a report of such inspection shall be completed and signed by the owner of the parcel.

Five-Year Comprehensive Inspections. Between April 1st and September 30th beginning in the year 2025, the owner of the parcel shall retain an LEP to conduct a comprehensive inspection. Within 30 days, a report of such inspection shall be completed, signed and sealed by the LEP and signed by the owner of the parcel. An annual inspection is not required the year a five-year comprehensive inspection is conducted.
Environmental Land Use Restrictions

An Environmental Land Use Restriction (ELUR) is a type of Environmental Use Restriction (EUR) that complies with the requirements of section 22a-133m of the Connecticut General Statutes, section 22a-133q of the Regulations of Connecticut State Agencies, and the RSIs. An ELUR is an easement granted to the Commissioner by the property owner and is recorded on the municipal land records. The purpose of an ELUR is to minimize the risk of human exposure to pollutants and hazards to the environment by (1) preventing the use of specified real property for certain purposes, or (2) prohibiting or requiring certain activities on such property.

EUR Fee Transmittal Form - Complete this form and submit to DEEP CPPU with the required fee.
- Commissioner Approved ELUR - $5,000 ($2,500 until February 15, 2023)
- LEP Approved ELUR 133y Commissioner approval of subordination waiver(s) - $2,500 ($1,250 until February 15, 2023)

The Electronic Transmittal Form must be completed and attached as the cover page of the ELUR package. The ELUR must be submitted in Word. Upload to the Connecticut Secure File Transfer website per the instructions on Transmittal-of-Documents.

EUR Submittal Form - documents the construction of an EUR from draft to recodification on the land records. The EUR Submittal Form houses the documents listed below, as applicable (see Instructions to Embed Documents).

Affirmative LEP Statement for 133y

Declaration of Environmental Land Use Restriction and Grant of Easement and Exhibit A: Parcel Description (Metes and Bounds)

Exhibit B: EUR Opinion Overview

Notices of Activity and Use Limitation

A Notice of Activity and Use Limitation (NAUL) is a type of Environmental Use Restriction (EUR) that complies with the requirements of section 22a-133o of the Connecticut General Statutes, section 22a-133q of the Regulations of Connecticut State Agencies, and the RSIs. Unlike an ELUR, a NAUL is a notice recorded on the municipal land records that does not create an easement on the parcel granted to the Commissioner. The purpose of a NAUL is to minimize the risk of human exposure to pollutants and hazards to the environment by (1) preventing the use of specified real property for certain purposes, or (2) prohibiting or requiring certain activities on such property.

EUR Fee Transmittal Form - Complete this form and submit to DEEP CPPU with the required fee.
- Commissioner Approved NAUL - $5,000 ($2,500 until February 15, 2023)
- LEP Approved NAUL - $1,500 ($750 until February 15, 2023)

The Electronic Transmittal Form must be completed and attached as the cover page of the NAUL package. The NAUL must be submitted in Word. Upload to the Connecticut Secure File Transfer website per the instructions on Transmittal of Documents.

NAUL forms prescribed by the Commissioner

EUR Submittal Form - documents the construction of an EUR from draft to recodification on the land records. The EUR Submittal Form houses the documents listed below, as applicable (see Instructions to Embed Documents).

Affirmative LEP Statement for NAUL

Declaration of Notice of Activity and Use Limitation and Exhibit A: Parcel Description (Metes and Bounds)

Exhibit B: EUR Opinion Overview
Requesting an EUR

Declaration of EUR

- Restricts certain activities and imposes obligations on a property
- NAUL and ELUR specific
- Includes Exhibit A: Parcel Description (Metes and Bounds)

EUR Factsheet

- Summarizes the EUR restrictions and obligations
- Maintained at the parcel or by person responsible for maintenance
- Must be provided to person responsible for overseeing health & safety of workers prior to any work on the site

22a-133q-2(b)
22a-133q-3(b)

Connecticut Department of Energy and Environmental Protection
Requesting an EUR

Exhibit C: Survey and Simplified Survey
- Revision date less than 90 days prior to EUR submittal

Title Search
- List of all legal interests and claims on a property derived from a search of public records
- Dated less than 90 days prior to EUR submittal
- Table 1 – Evaluation of recorded interests by an attorney
  - ELUR: Interests that interfere with the ELUR must be subordinated
    - Commissioner may waive requirement for subordination agreement for certain interests
  - NAUL: Owners of interests that interfere with the NAUL must subject interest to NAUL by signing the Declaration
- Table 2 – Evaluation of survey and property owner affidavit
Requesting an EUR

EUR Exhibit B: EUR Opinion Overview Form

- Summary of Restrictions and Obligations
- Historical Use Narrative
- Pollutant Types
- Proposed Restrictions
- Pollutant Concentrations
- Pollutant Location and Extent
- Applicable Criteria Exceeded
Requesting an EUR

**EUR Opinion – Restrictions and Obligations**
- fka Decision Documents
- Restriction
- Outlines site-specific measures or conditions

**EUR Opinion – Supplemental Information**

**DO Include:**
- Figures with Subject Areas and sample locations
- Data tables to support the EUR restrictions (i.e., confirmation samples following excavation)

**DON’T Include:**
- Historical data (i.e., sample results for soil excavated from the subject area)
- Unrelated data (i.e., sample results from AOC not addressed by EUR)
Requesting an EUR

Preliminary Parcel Owner Affidavit

- Attests to truth and accuracy of information in EUR

Public Notice

- Section 22a-133k-1(d) Public Participation
- Ensure appropriate restrictions are mentioned in published public notice
- Certified affidavit of publication
NAUL & ELUR 133y: EUR Form submittal post-recordation
- EUR Form submitted prior to recordation if waiver approval is required (133y)

Complete EUR Form and also include the following:

**Attorney Statement of Compliance**
- Licensed in CT
- Certifies to the best of their knowledge and belief that 1) no recorded interests interfere with EUR; and 2) owners of such interests have irrevocably subordinated the interest (133y) or have agreed to sign the NAUL

**Affirmative LEP Statement**
- Determines 1) applicability of EUR; 2) a CT attorney completed a Statement of Compliance (NAUL); 3) EUR complies with legal requirements; and 4) EUR is protective of human health and environment
Recording an EUR

Declaration
- Declaration of Environmental Land Use Restriction and Grant of Easement
- Declaration of Notice of Activity and Use Limitation

Exhibit A: Property Description (Metes and Bounds)

Exhibit B: EUR Opinion Overview Form
- Applicable Opinions (Restrictions and Obligations)

Exhibit C: Survey and Simplified Survey

ELUR-specific (separately, as applicable)
- Subordination Agreements
- Subordination Waiver Approval

Connecticut Department of Energy and Environmental Protection
# EUR Form Documents

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## EUR Post-Recordation Documents

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EUR Form Instructions

• Documents the process from proposal to recordation
• Embed documents in the squares provided per the instructions

• When to Embed Word vs. PDF
  • All fillable EUR form documents should be embedded in Word unless signatures required
  • PDFs must be embedded in Adobe Acrobat
EUR Form Submittal

EUR Form (completed by attorney, surveyor, and LEP)

Initial Submittal: Connecticut Secure File Transfer (SFT) website

Subsequent submittals: Directly to EUR staff

DEEP EUR Team conducts review/provides comments.

Final EUR

Final recorded submittal: SFT

LEP Approved NAUL and 133y ELURs

- EUR Form must be completed in its entirety and submitted to DEEP with final recorded documents

Connecticut Department of Energy and Environmental Protection
Failure to meet either deadline will result in automatic DISAPPROVAL.
133y ELUR

ELUR signed by Owner submitted to LEP for signature

14 Days

30 Days

90 Days Subordinations

Record fully executed ELUR

7 Days

(Section 22a-133q-2(e)(5) provides instructions if statutory deadline is missed)

Provide Certificate of Title

7 Days

(Section 22a-133q-2(e)(5) provides instructions if statutory deadline is missed)

BLUE: Initial deadline  RED: Extension deadline

Failure to meet either deadline will result in automatic DISAPPROVAL

Connecticut Department of Energy and Environmental Protection
Connecticut Department of Energy and Environmental Protection

DEEP Approved NAUL

- **Additional information requested by DEEP***
  - 90 Days
  - 90 Days

- **Obtain Interest Holder Agreement(s) to Sign***
  - 180 Days

- **Record Fully Executed NAUL***
  - 7 Days

- **Provide Post-Recording Submittals***
  - 30 Days

BLUE: Initial deadline  RED: Extension deadline

*Failure to meet either deadline will result in automatic DISAPPROVAL

MARK YOUR CALENDAR!
LEP Approved NAUL

Record Fully Executed NAUL

7 Days

Provide Completed EUR Form and Post-Recording Submittals

30 Days

Connecticut Department of Energy and Environmental Protection
Connecticut Department of Energy and Environmental Protection

**EUR Fees**

**DEEP Approved:**
- ELUR or NAUL $5,000
- Temp Release $1,000

**LEP Approved:**
- ELUR 133y Waiver $2,500
- NAUL $1,500

Some Exemptions Apply
RCSA Section 22a-133q-9(f)(2)

ALL FEES 50% OFF UNTIL 2/15/2023

SPECIAL PRICE
Surveys and Simplified Surveys

Surveys
(a) General standards & requirements
(b) 50-100%,
(c) <50%, OR
(d) Residential Rest. Only
(e) Simplified survey

All EURs

22a-133q-4

Connecticut Department of Energy and Environmental Protection
### Surveys and Simplified Surveys

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<td>Connecticut Department of Energy and Environmental Protection</td>
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**General standards and requirements for surveys**

The survey of a parcel prepared pursuant to this section shall:

- Be performed by a surveyor with a current and effective license issued by the Commissioner of Consumer Protection;
- For survey maps and plans, comply with map drafting standards in section 20-300b-18 of the RCSA;
- Include a vicinity map showing the approximate location and configuration of the parcel in reference to nearby highways or major street intersections;
- Depict the latitude and longitude of a point on the parcel, plotted and labeled in decimal degrees and referenced to a known datum, with an accuracy within 5 meters;
- Include a description of the parcel under the heading “Parcel Description” that shall be a metes and bounds description if the property boundaries are required to be surveyed pursuant to this section or, if portions of the boundary are not required to be surveyed, a metes and bounds description if found on the land records in the chain of title for the parcel;
- Depict adjoining properties and annotate with the most recently recorded owners’ names (N/F, now or formerly) or by subdivision map and lot numbers;
- Depict the boundaries of each proposed subject area by metes and bounds;

**Fix each proposed subject area to a parcel boundary to the Horizontal Accuracy Class A-2 or the Global Relative Positional Accuracy Class A-2 standards specified in section 20-300b-13(b) of the RCSA;**

For each subject area with the characteristics specified in this subdivision, mark or monument such subject area pursuant to sections 20-300b-12 to 20-300b-14, inclusive, of the RCSA:

- A subject area that does not have at least one contiguous boundary with the boundary of the parcel;
- A subject area that does not share a point in common with a structure or feature located on the parcel;

- A subject area that an LEP, surveyor, or the commissioner, deems appropriate to be located pursuant to the method specified in this subdivision;

**Label each subject area as “Proposed ELUR Subject Area” or “Proposed NAUL Subject Area” as applicable, and if there is more than one subject area, identify each subject area alphabetically, e.g., as “Proposed ELUR Subject Area A”, “Proposed ELUR Subject Area B”, “Proposed ELUR Subject Area C”, or “Proposed NAUL Subject Area A”, “Proposed NAUL Subject Area B”, “Proposed NAUL Subject Area C” and indicate by note each restriction imposed by the proposed ELUR for each subject area;**

**For each subject area labeled under subdivision (10) of this subsection, include a metes and bounds description under the heading “Proposed ELUR Subject Area Description” or “Proposed NAUL Subject Area Description;”**

- Indicate by note all recorded interests, including, but not limited to, easements. For all such interests, specify the volume and page in the municipal land records of the instrument granting the same, and label each as either plottable or non-plottable;

- Indicate by note all of the current zoning classifications of the parcel, and the revision date of the zoning regulations in effect at the time of the survey;

- Indicate by note the standards to which the survey was prepared. If a resurvey is conducted, identify by note each map referenced;

- Include in the title block: “Proposed Declaration of Environmental Land Use Restriction and Grant of Easement, Exhibit C” or “Proposed Notice of Activity and Use Limitation, Exhibit C”, the name of the parcel owner, the parcel address, the type of survey, the scale of the survey, and survey date.

- Be signed and sealed in accordance with section 20-300b-20 of the RCSA, and

- Include a simplified survey prepared in accordance with subsection (e) of this section.
Emergency and Non-Emergency EUR Releases

Reporting Environmental Emergencies and Spills
An environmental emergency is a situation that poses an immediate threat to public health or the environment resulting from the release or potential release of oil, hazardous chemicals or radioactive materials into the air, land, or water.

Environmental emergencies and spills must be reported to DEEP Emergency Dispatch Center at 860-424-3338 or Toll Free at 1-866-377-4475.

Emergency Suspension of EURs
In the event of an emergency that presents a significant risk to human health or the environment, an EUR may be suspended, provided such risk cannot be abated without suspending the EUR. The owner must immediately notify DEEP of the emergency and follow the other requirements of paragraph 4 of the Declaration of EUR presented in Section 22a-133q, Appendix 1 and 2. An EUR emergency typically involves the disturbance of contaminated soil to repair utilities when the EUR prohibits disturbance of soil.

Report the emergency suspension of the EUR to the Remediation Division at 860-424-3705 and via email at deep.eur@ct.gov.

Allowable Disturbance, Release or Termination of EUR for Non-Emergency Activities
Releases from EURs allow for activities that are prohibited by EURs, such as excavation and utility work.

EUR Fee Transmittal Form - Submit to DEEP CPPU with required fee.

- Commissioner Approved EUR Release - $1,000 ($500 until February 15, 2023)
- Commissioner Approved Initial TRRA - $1,000 ($500 until February 15, 2023)

The Electronic Transmittal Form must be completed and attached as the cover page of the Form.
EUR Allowable Disturbance Limitations

Allowable Disturbance section is organized like a checklist

- Not be one phase of a multi-phased project, continuous, or on-going project;
- Supervised by an LEP;
- Not exceed 90 days, and no new allowable disturbance in same subject area until 90 days has passed since the completion of previous activities;
- Excavation material limited to 250 cubic yards;
- Not exceed 1000 square feet of disturbance;
- No disturbance of PCBs;
- Not violate other EUR restrictions/obligations or regulations.

Can I use an Allowable disturbance for this activity?  
Do you meet the limitations?

22a-133q-6

Connecticut Department of Energy and Environmental Protection
EUR Allowable Disturbance

Notification to DEEP prior to commencement of activities

Not recorded on land records

Soil management and restoration outlined

Record of activities and submittal of Completion Report

*Environmental Use Restriction Form for: Allowable Disturbance, Release, Termination, or Post Emergency Abatement Remediation (Release Form)* used for all submittals and documentation storage

Connecticut Department of Energy and Environmental Protection

22a-133q-6
EUR Releases and Terminations

• Temporary Release
  – Temporary Release of NAUL by LEP
  – Temporary Release of EUR by DEEP
  – Temporary Releases for Recurring Activities (TRRA)

• Permanent Release
  – Permanent Release of ELUR or Termination of NAUL by DEEP
EUR Releases and Terminations

Recorded on the land records prior to commencement of activities

Use the Release Form for all submittals and documentation storage
Temporary Release of NAUL by LEP - Limitations

Notification of the release is sent to the DEEP at least 14 days before start of activities.

Activities must be completed within 180 days of recordation of the release on the land records.

LEP has not approved a temporary release in the same subject area in the last 2 years.
Temporary Release for Recurring Activities (TRRA)

- Approved by DEEP in advance recorded on the land records
- For site-specific activities that will be conducted in the same way, at the same location, multiple times
- Application of an approved TRRA requires notification to DEEP prior to commencement of work.
Permanent Release of ELUR /Termination of NAUL
by DEEP

- Approved by DEEP
  - Recorded on land records

- Changes to site that conflict with EUR

22a-133q-7

Connecticut Department of Energy and Environmental Protection
DEEP Approved Releases

Additional Information Requested by DEEP*:
- **30 Days**
- **60 Days**

Record Approved Release:
- **7 Days**

BLUE: Initial deadline  RED: Extension deadline

*Failure to meet either deadline will result in automatic DISAPPROVAL

Connecticut Department of Energy and Environmental Protection
EUR Emergency Releases

Emergency release protocol outlined in paragraph 4 of the Declaration Document

Subsequent abatement approval and reporting for an emergency release should be submitted on the Release Form

Appendix 1 & 2

Connecticut Department of Energy and Environmental Protection
Inspections

• **Annual Inspection** (between April 1st & July 31st)
  – Conducted by Owner
  – Report completed within 30 days of inspection
  – Not required on the years of a Five-Year Inspection

• **Five-Year Inspection** Beginning in 2025
  – Conducted by LEP (between April 1st & September 30th)
  – Report completed within 30 days of inspection

• **DEEP-Required Inspection**
  – Written notification by DEEP
  – Conducted by LEP

Connecticut Department of Energy and Environmental Protection
Inspections

- Reported on form prescribed by Commissioner
- Physical Inspection of the EUR
- Review of records and Factsheet

Inspection Requirements

Connecticut Department of Energy and Environmental Protection
EUR Corrective Action

Owner learns EUR is out of compliance

Correct in less than 90 days

Submit plan on Release Form within 30 days (if non-compliance cannot be corrected in 90 days)

LEP determines EUR is out of compliance

Notifies Owner in writing
Miscellaneous

• Lists requirements for the property owner to comply with for life of the EUR, for example:
  - Maintenance of EUR Factsheet
  - Health & Safety Notification
  - Document Retention
  - Transfer of Interest requirements

• Temporary Fee Reduction & Exemption from Fees

• Declarations

Connecticut Department of Energy and Environmental Protection

22a-133q-9 & Appendix 1 & 2
EUR GIS Map

- Depicts location, type, and name of recorded EURs across Connecticut.
- Great reference for evaluating the conditions at a property prior to transfer, construction, or any other subsurface work.

Map of Environmental Use Restrictions
Questions?

Feel free to contact us:
Jade Barber Jade.Barber@ct.gov
Amanda Limacher Amanda.Limacher@ct.gov
EUR Program DEEP.EUR@ct.gov