

RSR Wave 2 Conceptual Language

April 5, 2016

Prior to beginning the formal regulation amendment process, the Connecticut Department of Energy and Environmental Protection (DEEP) is presenting proposed concepts in this “RSR Wave 2 Conceptual Language” document. DEEP seeks and will accept public feedback through May 6, 2016. This concept document is preliminary and informal; it is not a final draft, does not start the formal rulemaking process pursuant to CGS section 4-168, and does not reflect any decisions or approval by DEEP or other parts of state government regarding the amendments that may be proposed. Therefore, some concepts presented in this document might not be included in the future proposed amendments. Also, the concepts presented in this document may continue to change or may appear differently when DEEP proposes amendments to the RSRs through the formal process. DEEP will begin the formal public process for adopting revisions to the RSRs at a later date.

Document Organization and Reading Tips.

1. This document is organized to follow the current sequence of the RSRs, but does not include every provision. It only presents the provisions that may be amended. RSR provisions that are intended to remain the same are not included.
2. Each provision has 3 parts: a concept statement identifying the goal of the amendment, the existing RSR provision (if there is one), and a redline/[deletion] showing the amendment concept language.
3. Language in red and underlined represents what would be new language. Language in [blue and bracketed] represents what would be deleted.

Section 22a-133k-1

22a-133k-1(a)(NEW#)

(Anthropogenic Origin)

(CONCEPT)

Refer to concept for background concentration definition.

(PROPOSED LANGUAGE)

(New#) “Anthropogenic origin” means the presence of a substance in environmental media due to the migration or deposition of a substance that is not from any single discernible off-site source and as a result of human activities unrelated to current or historical activities at the subject parcel.

22a-133k-1(a)(NEW#)**(APH)**

(CONCEPT)

Add definitions for names of new analytical methods referenced in the RSRs.

(PROPOSED LANGUAGE)

(New#) “APH” means the analytical results obtained using the “State of Connecticut, Department of Energy and Environmental Protection, Recommended Reasonable Confidence Protocols, Quality Assurance and Quality Control Requirements, Air-Phase Petroleum Hydrocarbons by the Massachusetts DEP APH Method”, as amended and approved by the Commissioner.

22a-133k-1(a)(NEW#)**(Application of Pesticides)**

(CONCEPT)

Include the definition of “application of pesticides” to clarify the term application to only be the actual use of the pesticide not the handling, mixing, storage, spilling, leaking or disposal, or equipment cleaning or repair. Releases related to those other activities are not intended to be exempted by this provisions.

(PROPOSED LANGUAGE)

(New#) “Application of pesticides” means, in the context of 22a-133k-1 through 22a-133k-3, the spraying, spreading, injection, placement or other intentional controlled releases of pesticides to the environment for the pesticide’s intended purpose, excluding releases related to handling, mixing, storage, spilling, leaking or disposal, or equipment cleaning or repair.

22a-133k-1(a)(5)**(Background)**

(CONCEPT)

Currently, there are separate definitions for both background concentrations in ground water and soil that focus on the determination and handling of background detections in relation to a release, rather than distinguishing whether a detection represents a release. New definitions for background concentration, natural condition, and anthropogenic origin included in this revision will describe the components which are elements of an evaluation to determine background conditions for environmental media (soil, groundwater, sediments, and even soil vapor). The approach for evaluating and determining background has been added to each section of the regulations for applicable media.

(CURRENT LANGUAGE)

(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.

(6) "Background concentration for soil" means the representative concentration of a substance in soil of similar texture and composition outside the subject release area and in the general geographic vicinity of such release area, but not within any other release area.

(PROPOSED LANGUAGE)

[Delete current language in whole]

(New#) "Background concentration" means the site-specific concentration of a substance in environmental media that would be expected to exist in the absence of any release due to current or historical site-related or nearby activities. A background concentration may result from a combination of naturally occurring conditions and anthropogenic origins.

22a-133k-1(a)(NEW#)

(Building)

(CONCEPT)

Definitions for "building" is being added to support the revisions to the Environmental Use Restrictions in 22a-133q.

(PROPOSED LANGUAGE)

(New#) "Building" means any structure enclosed by a roof, structural walls, and building slab(s), which prevents infiltration of precipitation into the polluted soil beneath the building footprint and prevents human contact with such polluted soil.

22a-133k-1(a)(NEW#)

(Demarcation layer)

(CONCEPT)

Refer to concept for engineered control definition.

(PROPOSED LANGUAGE)

(NEW#) "Demarcation layer" means a brightly-colored, puncture-resistant environmentally stable marker layer installed at an appropriate depth, suitable to warn of the presence of contaminated material beneath the layer.

22a-133k-1(a)(NEW#)

(Diminishing Plume)

(CONCEPT)

A definition for “Diminishing State Groundwater Plume” is being added to clarify the assumptions of groundwater conditions necessary to implement various current and proposed provisions of the RSRs. Diminishing State Groundwater Plume refers to a plume that will continue to degrade over time and will reach established criteria.

(PROPOSED LANGUAGE)

(New#) “Diminishing State Groundwater Plume” means a plume in which the concentrations decrease over time, allowing for seasonal variation; in which the breakdown components are not expected to exceed applicable criteria in the future; and where there is no migration or expansion in any direction at concentrations exceeding applicable criteria, as determined by three-dimensional and seasonal characterization of the groundwater plume.

22a-133k-1(a)(13)

(Direct Exposure Criteria)

(CONCEPT)

The additional polluting substance provision has been added to the definition of Direct Exposure Criteria.

(CURRENT LANGUAGE)

(13) “Direct Exposure Criteria” means the concentrations identified in Appendix A to sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies or any alternative direct exposure criteria approved by the Commissioner pursuant to section 22a-133k-2(d) of the Regulations of Connecticut State Agencies.

(PROPOSED LANGUAGE)

(13) “Direct Exposure Criteria” means the concentrations identified in Appendix A to sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies, [or] any alternative direct exposure criteria approved by the Commissioner pursuant to section 22a-133k-2(d) of the Regulations of Connecticut State Agencies, or any additional polluting substance direct exposure criteria approved by the Commissioner pursuant to Appendix G.

22a-133k-1(a)(16)

(Engineered Control)

(CONCEPT)

Expand the definition of Engineered Controls “EC” to allow the Commissioner to approve permanent remedial measures to address sources of pollution below the water table, or by means other than capping, collectively referred to as “Immobilization”. Additional terms (“Hardscape” and “Demarcation layer”) were also added to support the default designs for self-implementing ECs.

(CURRENT LANGUAGE)

(16) "Engineered control" means any physical barrier, system, technology or method that permanently renders pollution in soil environmentally isolated or inaccessible, when combined with appropriate long-term inspection, maintenance or monitoring.

(PROPOSED LANGUAGE)

(16) "Engineered control" means any physical barrier, system, technology or method, that permanently renders polluted [pollution in] soil environmentally isolated or inaccessible, or permanently reduces the migration of contaminants, when combined with appropriate long-term inspection, maintenance and [or] monitoring.

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

(Environmentally Isolated)

(CONCEPT)

The scope of the term "environmentally isolated soil" is being expanded to:

- *clarify the existing policy that any building or structure need not have been present at the time the contamination was detected;*
- *clarify that "polluted with volatile organic substances" refers to soil polluted by an exceedance of criteria for VOCs; and*
- *expand use of the “polluted with volatile organic substances” concept beyond merely requiring that VOCs not be present to allow an exemption to PMC for all substances when any PMC exceedances of VOCs in environmentally isolated soils are beneath engineered controls that have been designed to address the potential for vapor migration from PMC exceedances in soils.*

(CURRENT LANGUAGE)

(18) "Environmentally isolated soil" means polluted soil which is: (A)(i) beneath an existing building or (ii) beneath another existing and permanent structure which the Commissioner has determined in writing would prevent the migration of pollutants; (B) not a continuing source of pollution; (C) not polluted with volatile organic substances or, if it is polluted with such substances, the concentration of such substances has been reduced in concentration to the maximum extent prudent; and (D) above the seasonal high water table.

(PROPOSED LANGUAGE)

(18) "Environmentally isolated soil" means [polluted] soil above the seasonal high water table that is not a continuing source of pollution and that is [which]:

- (A)(i) beneath [an existing] a building or other permanent structure existing at the time that an environmental use restriction is recorded, [or] [(ii)] provided [beneath another existing and permanent structure which] the Commissioner has determined in writing that such other permanent structure would prevent the migration of pollutants;[,] or
 - (ii) beneath or immobilized by an engineered control specifically designed to address exceedances of the pollutant mobility criteria in accordance with section 22a-133k-2(f)(2)(B)(i)(bb); and
- [(B)] [not a continuing source of pollution;]
- [(C)](B)(i) not polluted with volatile organic substances either in excess of the applicable pollutant mobility criteria;[, or, if it is polluted with such substances or]
 - (ii) the concentration of such substances has been reduced in concentration, or immobilized, to the maximum extent prudent; or
 - (iii) beneath an engineered control specifically designed to address vapor migration [; and (D) above the seasonal high water table].

22a-133k-1(a)(NEW#)

(EPH)

(CONCEPT)

Add definitions for names of new analytical methods referenced in the RSRs.

(PROPOSED LANGUAGE)

(New#) "EPH" means the analytical results obtained using the "State of Connecticut, Department of Environmental Protection, Recommended Reasonable Confidence Protocols, Quality Assurance and Quality Control Requirements, Extractable Petroleum Hydrocarbons by the Massachusetts DEP EPH Method", as amended and approved by the Commissioner.

22a-133k-1(a)(20)

(ETPH)

(CONCEPT)

Update the definition of ETPH and add definitions for names of new analytical methods referenced in the RSRs.

(CURRENT LANGUAGE)

(20) "ETPH" means the analytical results obtained using the "State of Connecticut, Department of Environmental Protection, Recommended Reasonable Confidence Protocols, Quality Assurance and Quality Control Requirements For Extractable Total Petroleum Hydrocarbons by the State of Connecticut, Department of Public Health ETPH Method", Version 2.0 dated July 2006 that is available on the Department of Energy and Environmental Protection website at: http://www.ct.gov/deep/lib/deep/site_clean_up/guidance/RCP/RCP_Method_ETPH.pdf.

(PROPOSED LANGUAGE)

(20) "ETPH" means the analytical results obtained using the "State of Connecticut, Department of Environmental Protection, Recommended Reasonable Confidence Protocols, Quality Assurance and Quality Control Requirements For Extractable Total Petroleum Hydrocarbons by the State of Connecticut, Department of Public Health ETPH Method", as amended and approved by the Commissioner., Version 2.0 dated July 2006 that is available on the Department of Energy and Environmental Protection website at: http://www.ct.gov/deep/lib/deep/site_clean_up/guidance/RCP/RCP_Method_ETPH.pdf.]

22a-133k-1(a)(NEW#)

(EUR)

(CONCEPT)

Definitions for "Environmental Use Restriction" is being added to support the revisions to the Environmental Use Restrictions in 22a-133q.

(PROPOSED LANGUAGE)

(New#) "Environmental use restriction" means either a notice of activity and use limitation, as set forth in section 22a-133o(c)(1) of the Connecticut General Statutes, or environmental land use restriction, as defined in the Regulations of Connecticut State Agencies section 22a-133q-1.

22a-133k-1(a)(27)

(Groundwater Protection Criteria)

(CONCEPT)

Include the alternative criteria and additional polluting substance provision in the definition of Groundwater Protection Criteria.

(CURRENT LANGUAGE)

(27) "Ground-water protection criteria" means the concentrations identified in Appendix C to sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies.

(PROPOSED LANGUAGE)

(27) "Ground-water [p]Protection [c]Criteria" means the concentrations identified in Appendix C to sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies, any alternative groundwater protection criteria approved by the Commissioner pursuant to subsection 22a-133k-3(d)(4)(new) of the Regulations of Connecticut State Agencies, or any additional polluting substance groundwater protection criteria approved by the Commissioner pursuant to Appendix G.

22a-133k-1(a)(NEW#)

(Hardscape)

(CONCEPT)

Refer to concept for engineered control definition.

(PROPOSED LANGUAGE)

(New#) "Hardscape" means durable materials that are incorporated into landscape features, including, but not limited to, walkways constructed with asphalt, concrete, or pavers; gravel parking areas and driveways; paved or gravel storm water features; rip-rap; non-vegetated retaining walls; or lined water features.

22a-133k-1(a)(NEW#)

(Historically Impacted Materials)

(CONCEPT)

The new term "Historically Impacted Materials" cover the concepts of "Urban Soils" and "Historic Fill" to avoid the implications associated with those terms. This definition closely parallels the coal ash exemption.

(PROPOSED LANGUAGE)

(New#) "Historically Impacted Material" means material on a parcel that consists of predominantly fill or soil, which is polluted in excess of remedial criteria only by the presence of wood ash, coal ash, coal fragments, coal slag, coal clinkers, asphalt paving fragments, substances associated with anthropogenic origins, or any combination thereof, provided that the contaminants present above remedial criteria in the material are not the result of a release subsequent to the deposition of the material and the deposition of the material was not prohibited by law at the time of placement.

22a-133k-1(a)(NEW#)

(Immobilization)

(CONCEPT)

Refer to concept for engineered control definition.

(PROPOSED LANGUAGE)

(New#) "Immobilization" means the binding of pollution into a solid that is resistant to leaching, including but not limited to, the process of solidification to physically bind or enclose contaminants within a stabilized mass, stabilization to induce chemical reactions between a stabilizing agent and the contaminated soil to reduce contaminant mobility, and encapsulation by coating the contaminated soil.

22a-133k-1(a)(32)

(Inaccessible Soil)

(CONCEPT)

The definition for "Inaccessible Soil" is being expanded to:

- *clarify the existing policy that any building or structure need not have been present at the time the contamination was detected; and*
- *include engineered controls, since the proposed definition of engineered control now refers to rendering soil inaccessible.*

(CURRENT LANGUAGE)

(32) "Inaccessible soil" means polluted soil which is: (A) more than four feet below the ground surface; (B) more than two feet below a paved surface comprised of a minimum of three inches of bituminous concrete or concrete, which two feet may include the depth of any material used as sub-base for the pavement; (C) polluted fill beneath a bituminous concrete or concrete surface comprised of a minimum of three inches of bituminous concrete or concrete if such fill is (i) polluted in excess of applicable direct exposure criteria only by semi-volatile substances or petroleum hydrocarbons that are normal constituents of bituminous concrete, (ii) polluted by metals in concentrations not in excess of two times the applicable direct exposure criteria, or (iii) any combination of the substances or limits identified in clause (i) or (ii) of this subparagraph; or (D)(i) beneath an existing building or (ii) beneath another existing permanent structure provided written notice that such structure will be used to prevent human contact with such soil has been provided to the Commissioner.

(PROPOSED LANGUAGE)

(32) "Inaccessible soil" means polluted soil [which]that is:

- (A) more than four feet below the ground surface;
- (B) more than two feet below a paved surface comprised of either a minimum of three inches of bituminous concrete or concrete, which two feet may include the depth of any material used as sub-base for the pavement;
- (C) polluted fill beneath a bituminous concrete or concrete surface comprised of a minimum of three inches of bituminous concrete or concrete if such fill is:
 - (i) polluted in excess of applicable direct exposure criteria only by semi-volatile substances or petroleum hydrocarbons that are normal constituents of bituminous concrete,
 - (ii) polluted by metals in concentrations not in excess of two times the

- applicable direct exposure criteria, or
- (iii) any combination of the substances or limits identified in clause (i) or (ii) of this subparagraph[; or].
- (D)[(i)]beneath [an existing] a building or other permanent structure at the time that an environmental use restriction is recorded, [or (ii) beneath another existing permanent structure] provided a written notice that such other permanent structure will be used to prevent human contact with such has been provided to the Commissioner[.];or
- (E) present in a location that is not subject to human contact through the use of an engineered control in accordance with section 22a-133k-2(f)(2)(B).

22a-133k-1(a)(36)

(Intermittent Watercourse)

(CONCEPT)

Modify the definition of “Intermittent watercourse” to have basic useful language within the RSRs, rather than merely referring the reader to highly technical language in another location.

(CURRENT LANGUAGE)

(36) “Intermittent watercourse” means “intermittent watercourse” as defined in section 22a-38 of the General Statutes.

(PROPOSED LANGUAGE)

(36) “Intermittent watercourse” means [“intermittent watercourse”] a feature as [defined] described in section 22a-38 of the General Statutes, that is delineated by a defined permanent channel and bank and exhibiting two or more of the following characteristics:

- (A) evidence of scour or deposits of recent alluvium or detritus,
- (B) the presence of standing or flowing water for a duration longer than a particular storm incident, and
- (C) the presence of hydrophytic vegetation.

22a-133k-1(a)(NEW#)

(LEP)

(CONCEPT)

The term “Licensed Environmental Professional” is used in self-implemented Engineered Controls, therefore a definition is needed.

(New#) “Licensed environmental professional” means an environmental professional who is licensed pursuant to section 22a-133v of the Connecticut General Statutes.

22a-133k-1(a)(NEW#)**(Migrating NAPL)**

(CONCEPT)

A new term needs to be defined in support of the "Remediation of Non-Aqueous Phase Liquids" in Section 2(g). Concepts used in this definition were adapted from an ITRC document on the topic.

(PROPOSED LANGUAGE)

(New#) "Migrating non-aqueous phase liquid" means a non-aqueous phase liquid that spreads or expands laterally or vertically or otherwise results in an increased areal extent, except for accumulation of non-aqueous phase liquid that appears in a well solely due to a fluctuating water table.

22a-133k-1(a)(NEW#)**(MNA)**

(CONCEPT)

A definition for "Monitored Natural Attenuation" is being added to support the addition of that concept to subsection 3(g) "Applying Ground Water Criteria", not as a remediation endpoint, but as a component of characterization.

(PROPOSED LANGUAGE)

(New#) "Monitored Natural Attenuation" means monitoring the natural attenuation of a diminishing state plume that occurs within a reasonable timeframe from completion of source area remediation.

22a-133k-1(a)(NEW#)**(Naturally Occurring Condition)**

(CONCEPT)

Refer to concept for background concentration.

(PROPOSED LANGUAGE)

(New#) "Naturally occurring condition" means the presence of a substance in environmental media as a result of natural processes.

22a-133k-1(a)(NEW#)

(Pesticide)

(CONCEPT)

A definition for “pesticides” is being added to support the partial exemptions of pesticides being proposed in the DEC, PMC and Groundwater sections. CGS Sec. 22a-47(w) states, “ ‘Pesticide’ means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, or any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant.”

(PROPOSED LANGUAGE)

(New#) "Pesticide" means insecticides, fungicides, herbicides and rodenticides, which are further described in the definition of “pesticide” in Connecticut General Statutes section 22a-47(w).

22a-133k-1(a)(NEW#)

(Petroleum Substance)

(CONCEPT)

A definition for “petroleum substance” is being added to be able to incorporate the fate and transport concepts of petroleum vapor intrusion into the Volatilization Criteria. In Wave 2, this will primarily be done by retaining the 15’ applicability depth for “petroleum substances” instead of increasing the applicability depth to 30’ along with the other volatile substances.

(PROPOSED LANGUAGE)

(New#) “Petroleum substance” means hydrocarbons found in gasoline, diesel, kerosene, and jet fuel along with volatile substances other than hydrocarbons that may have been used as fuel additives.

22a-133k-1(a)(48)

(Pollutant Mobility Criteria)

(CONCEPT)

Include the additional polluting substance provision in the definition of Pollutant Mobility Criteria.

(CURRENT LANGUAGE)

(48) "Pollutant mobility criteria" means the concentrations identified in Appendix B to sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies or any alternative pollutant mobility criteria approved by the Commissioner pursuant to subsection 22a-133k-2(d) of the Regulations of Connecticut State Agencies.

(PROPOSED LANGUAGE)

(48) "Pollutant mobility criteria" means the concentrations identified in Appendix B to sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies, [or] any alternative pollutant mobility criteria approved by the Commissioner pursuant to subsection 22a-133k-2(d) of the Regulations of Connecticut State Agencies, or any additional polluting substance pollutant mobility criteria approved by the Commissioner pursuant to Appendix G.

22a-133k-1(a)(NEW#)

(Potentially Occupied Structure)

(CONCEPT)

A definition for “potentially occupied structure” is being added to clarify the applicability of the various Volatilization Criteria options and provisions in light of the addition of a “building” definition to support EURs. Since the “building” definition requires the presence of a slab, the “potentially occupied structure” is needed to capture structures that may be occupied, but may not have a slab, and could have the potential for vapor intrusion issues (buildings being a subset of potentially occupied structures).

(PROPOSED LANGUAGE)

(New#) “Potentially occupied structure” means any enclosed structure that has the potential to accumulate vapors from subsurface sources and is currently occupied or may be occupied in the future.

22a-133k-1(a)(54)

(Prudent)

(CONCEPT)

The concept of the “timeframe for the remedy to achieve compliance” is being added to the definition of “Prudent”, which presently only compares cost with the social and environmental benefits.

(CURRENT LANGUAGE)

(54) “Prudent” means reasonable, after taking into consideration cost, in light of the social and environmental benefits.

(PROPOSED LANGUAGE)

(54) “Prudent” means reasonable, after taking into consideration cost and timeframe for the remedy to achieve compliance or significant reduction of risk, in light of the social and environmental benefits.

22a-133k-1(a)(NEW#)

(Q99)

(CONCEPT)

A definition for “Q99” is being added to replace 7Q10 once changes to the WQS have been made to allow for Q99 to be used as the method for determining low flow in surface water calculations.

(PROPOSED LANGUAGE)

(New#) “Q99” means the daily stream flow that is equaled or exceeded on 99 percent of days in the rearing and growth bioperiod (July 1 to October 31, inclusive, of each year) and is calculated using methods developed by the U.S. Geological Survey or those otherwise acceptable to the Commissioner.

22a-133k-1(a)(NEW#)

**(Reporting Limits)
(Reasonable Confidence Protocols)**

(CONCEPT)

Replace the inaccurate definition of “analytical detection limit” with the term “reporting limits” to be consistent with the terminology used in the reasonable confidence protocols and define the term “Reasonable Confidence Protocols.”

(CURRENT LANGUAGE)

(1) “Analytical detection limit” means the minimum concentration of a substance that can be quantified consistently and reliably using methods approved by EPA and which concentration shall be (A) for a substance in ground water, equal to or less than the ground-water protection criterion for such substance determined (i) for a sample of ground water in a GA area using analytical methods specified in subpart C of 40 CFR part 141 or (ii) for a sample of ground water in a GB area using methods established pursuant to “Test Methods for Evaluating Solid Waste: Physical/Chemical Methods”, SW-846, U.S. Environmental Protection Agency, Office of Solid Waste, Washington D.C. 20460; or (B) for a substance in soil, equal to or less than the residential direct exposure criteria or the applicable pollutant mobility criteria, whichever is lower using methods established pursuant to “Test Methods for Evaluating Solid Waste: Physical/Chemical Methods”, SW-846, U.S. Environmental Protection Agency, Office of Solid Waste, Washington D.C. 20460.

(NEW LANGUAGE)

[Delete current language in whole]

(New#) “Reasonable Confidence Protocols” means the State of Connecticut Department of Energy and Environmental Protection recommended reasonable confidence protocols, quality assurance and quality control requirements for analytical methods.

(New#) “Reporting Limit” means the concentration of the lowest calibration standard of a calibration curve used for analysis of a given sample by a specific method, consistent with the reasonable confidence protocols and corrected for specific sample weight or volume, dilutions and, for soil and sediment samples, moisture content.

22a-133k-1(a)(58)

(Residential)

(CONCEPT)

The definition for “residential activity” is being revised to:

- *clarify the meaning of a “school”;*
- *specifically include dormitories on college campuses; and*
- *acknowledge that exposure to soil at hospitals is more representative of industrial/commercial uses.*

(CURRENT LANGUAGE)

(58) "Residential activity" means any activity related to a (A) residence or dwelling, including but not limited to a house, apartment, or condominium, or (B) school, hospital, day care center, playground, or outdoor recreational area.

(PROPOSED LANGUAGE)

(58) "Residential activity" means any activity related to a (A) residence or dwelling, including but not limited to a house, apartment, condominium, dormitory; [or] (B) pre-school, primary and secondary school, [hospital,] day care center, playground, [or] outdoor recreational area; or (C) hospital, solely for purposes of volatilization criteria.

22a-133k-1(a)(69)

(Surface-Water Protection Criteria)

(CONCEPT)

Include the additional polluting substance provision in the definition of Surface-water protection criteria.

(CURRENT LANGUAGE)

(69) "Surface-water protection criteria" means the concentrations identified in Appendix D to sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies or any alternative surface-water protection criteria calculated or approved by the Commissioner in accordance with subdivision 22a-133k-3(b)(3) of the Regulations of Connecticut State Agencies.

(PROPOSED LANGUAGE)

(69) "Surface-water [p]Protection [c]Criteria" means the concentrations identified in Appendix D to sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies, [or] any alternative surface-water protection criteria calculated or approved by the Commissioner in accordance with subdivision 22a-133k-3(b)(3) of the Regulations of Connecticut State Agencies, or any additional polluting substance surface-water protection criteria approved by the Commissioner pursuant to Appendix G.

22a-133k-1(a)(NEW#)

(TI ZONE)

(CONCEPT)

The term "TI Zone" is being used to replace a more generic "subject groundwater plume" that is presently used in the TI section 3(e)(2). Use of this definition makes the TI zone clear that it is related to the area which exceeds an applicable criteria, rather than the area that has any detectable concentration.

(NEW LANGUAGE)

(New#) "TI Zone" means the areal extent of a substance related to the Technical Impracticability variance that is not required to comply with applicable groundwater criteria, and represents the area known or anticipated to not be technically practicable to be remediated to such criteria.

22a-133k-1(a)(75)

(Volatilization criteria for groundwater)

(CONCEPT)

Include the alternative and additional polluting substance provisions to the definition of Volatilization criteria.

(CURRENT LANGUAGE)

(75) "Volatilization criteria for ground water" means the concentrations identified in Appendix E to sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies.

(PROPOSED LANGUAGE)

(75) "Volatilization criteria for ground water" means the concentrations identified in Appendix E to sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies, any alternative volatilization criteria approved by the Commissioner pursuant to subsection 22a-133k-3(c)(3) of the Regulations of Connecticut State Agencies, or any additional polluting substance volatilization criteria approved by the Commissioner pursuant to Appendix G.

22a-133k-1(a)(NEW#)

(VPH)

(CONCEPT)

Add definitions for names of new analytical methods referenced in the RSRs.

(PROPOSED LANGUAGE)

(New#) “VPH” means the analytical results obtained using the “State of Connecticut, Department of Environmental Protection, Recommended Reasonable Confidence Protocols, Quality Assurance and Quality Control Requirements, Volatile Petroleum Hydrocarbons by the Massachusetts DEP VPH Method”, as amended and approved by the Commissioner.

22a-133k-1(a)(NEW#)

(WQS)

(CONCEPT)

A definition for “Water Quality Standards” is being added so that when referring to the Water Quality Standards throughout the RSRs the full reference is not needed.

(PROPOSED LANGUAGE)

(New#) “Water Quality Standards” means the Connecticut Water Quality Standards, as defined in the Regulations of Connecticut State Agencies sections 22a-426-2.

22a-133k-1(b)

(Applicability - Release Areas)

(CONCEPT)

The RSRs apply to actions taken to remediate pollution from a release area. Under CGS section 22a-423, the term “pollution” does not merely refer to exceedances of remedial criteria, but rather describes that any detections above natural background represent an alteration of the properties of the waters of the state. To clarify that some detections of pollution do not represent a discrete release area requiring remediation under the RSRs, or may be associated with widespread past practices considered acceptable at the time, the concepts of “Exempt Release” and “Partially-Exempt Release” is proposed to be added to the Applicability section.

(CURRENT LANGUAGE)

Sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies apply to any action taken to remediate polluted soil, surface water or a ground-water plume at or emanating from a release area which action is required pursuant to Chapter 445, 446k or section 22a-208a(c)(2) of the General Statutes, including but not limited to any such action required to be taken or verified by a licensed environmental professional.

Sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies do not apply within the zone of influence of a ground-water discharge permitted by the Commissioner under section 22a-430 of the General Statutes. Any person conducting a remediation in accordance with said sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies shall obtain all permits and other authorizations required by state, federal and local law and shall comply with all applicable state, federal and local laws, including without limitation the requirements of 40 CFR Part 761. In the event that any provision of sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies conflicts with any provision of any other statute or regulation, the more stringent provision shall prevail. Nothing in this subsection shall be construed as requiring any further remediation of any release which has been remediated and which remediation has been approved in writing by the Commissioner, unless the Commissioner takes action to require such remediation pursuant to any section of Chapter 446k of the General Statutes.

(PROPOSED CHANGES)

1(b) Applicability.

(1) Sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies apply to any action taken to remediate polluted soil, surface water or a ground-water Plume at or emanating from a release area which action is required pursuant to Chapter 445, 446k or section 22a-208a(c)(2) of the General Statutes, including but not limited to any such action required to be taken or verified by a licensed environmental professional.

(2) Actions conducted in fulfillment of the requirements of section 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies shall be based on appropriate characterization of a release completed in accordance with prevailing standards and guidelines, based on, but not limited to, the State of Connecticut, Department of Energy and Environmental Protection “Site Characterization Guidance Document”, as amended and approved by the Commissioner.

(3) Exempt Release.

Sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies do not apply to the detection of pollution resulting from the following, except as provided in the associated regulatory reference or as a result of additional releases into that material:

(A) “Background concentration” as defined under subsection 1(a)(New#)

(B) Incidental Sources as specified under subparagraphs 2(b)(4)(A), 2(c)(5)(A), and 3(f)(1); and

(C) [w]Within the zone of influence of a ground-water discharge permitted by the Commissioner under section 22a-430 of the General Statutes.

(4) Partially-Exempt Release.

The detection of pollution resulting from the following are exempt from the requirement to be remediated to certain criteria, provided they comply with requirements in the associated regulatory references, except for pollution occurring as a result of additional releases into that material:

- (A) Historically Impacted Material, as specified under subparagraph 2(c)(4)(B) for pollutant mobility criteria;
- (B) Widespread polluted fill, as specified under subparagraph 2(f)(1) for pollutant mobility criteria; and
- (C) Pesticides, as specified under subparagraphs 2(b)(4)(B), 2(c)(5)(B), and 3(f)(2), except that this exemption is not applicable to properties which are the subject of a governmental enforcement action regarding the presence of pesticides in soil or groundwater that has not been fully complied with.

22a-133k-1(c)(NEW#)

(Reasonable Confidence Protocols)

(CONCEPT)

A new section on Reasonable Confidence Protocols, which are Quality Assurance/Quality Control analytical procedures that provide data of known and sufficient quality, will better describe the application of the RCPs within the context of the RSRs. Also, the matrix interference effects section was modified to be consistent with the removal of the analytical detection limit definition and the addition of the reporting limit definition. Both the reasonable confidence protocols and matrix interference were placed in section 22a-133k-1 to cover soil, sediment and groundwater.

(CURRENT LANGUAGE)

(3) Matrix interference effects.

If any applicable criterion for a substance in soil is less than the concentration for such substance that can be consistently and accurately quantified in a specific sample due to matrix interference effects, the following actions shall be taken:

(A) (i) “Test Methods for Evaluating Solid Waste: Physical/Chemical Methods,” SW-846, U.S. Environmental Protection Agency, Office of Solid Waste, Washington D.C. 20460 shall be consulted to determine if an analytical method sufficiently sensitive to achieve the applicable analytical detection limit was used to conduct the analysis of the subject substance. If there is available an alternative analytical method which is sufficient to achieve the required analytical detection limit, appropriate for the sample matrix, and has been approved by EPA or approved in writing by the Commissioner, the subject soil shall be re-analyzed for the subject substance using such alternative method.

(ii) If a sample has been analyzed by one or more analytical methods in accordance with subparagraph (A)(i) of this subdivision and the applicable analytical detection

limit has not been achieved due to matrix interference effects, such method(s) shall be modified in order to compensate for such interferences, in accordance with analytical procedures specified by EPA within the scope of the analytical method.

(B) If, after re-analyzing the subject soil and attempting to compensate for matrix interference effects in accordance with to subparagraph (A) of this subdivision, any applicable criterion for a substance in soil is less than the concentration for such substance that can be consistently and accurately quantified in a specific sample due to matrix interference effects, compliance with such criterion shall be achieved when such soil has been remediated to the lowest concentration for such substance which can be consistently and accurately quantified without matrix interference effects.

(C) A detailed summary of all measures taken to overcome matrix interference effects and a determination of the lowest alternative quantification level applicable to the analysis of such substance shall be prepared and, if requested by the Commissioner in writing, shall be submitted to the Commissioner for his review and approval.

(PROPOSED LANGUAGE)

(1) Analytical Requirements for Soil, Groundwater, and Sediment sampling.

(A) Use of Reasonable Confidence Protocols.

All analytical data for samples shall be generated using the Reasonable Confidence Protocols or methodologies that contain a level of quality control and documentation at least equivalent to the reasonable confidence protocols.

(B) Reporting limit requirements.

The reporting limit shall be established consistent with the Reasonable Confidence Protocols and standard industry and laboratory practices. The reporting limit shall not be set at levels greater than those used in such standard practices, as determined by the Commissioner in consultation with the Commissioner of the Department of Public Health, and in no case shall be greater than the applicable criteria.

(C) Analytical interferences due to instrument software limitations.

If any applicable criterion for a substance is less than the reporting limit for such substance in a specific sample due to analytical interferences resulting solely from instrument software limitations, the following actions shall be taken:

(i) Additional analytical methods shall be evaluated to:

(aa) Determine whether any such additional analytical method is sufficiently sensitive to achieve the applicable reporting limit for the

subject substance. At a minimum, the following methods shall be evaluated:

- (I) “Test methods for evaluating solid waste: Physical/Chemical Methods.” SW-846;
 - (II) other analytical methods approved by EPA;
 - (III) and any analytical method approved in writing by the Commissioner; and
- (bb) If there is an available alternative analytical method which is sufficient to achieve the required reporting limit appropriate for the sample matrix and such method has been approved by EPA or approved in writing by the Commissioner, the subject soil shall be re-analyzed for the subject substance using such alternative method;

(ii) The reporting limit shall be equivalent to:

(aa) a Reasonable Confidence Protocol has been established for a particular method, or

(bb) If a reasonable confidence protocol has not been established for a particular method and the instrument used in the analysis cannot be calibrated at the required reporting limit due solely to instrument software limitations, the reporting limit shall be equivalent to a low-level check standard analyzed in the same analytical batch as the samples. The low-level check standard shall be within thirty percent of its true value and such value shall be corrected for specific sample weight or volume, any dilutions, and, for soil and sediment samples, moisture content;

(iii) If after re-analyzing the sample and attempting to compensate for instrument software limitations, any applicable criterion for a substance is less than the reporting limit for such substance that can be consistently and accurately achieved in a specific sample due solely to instrument software limitations, compliance with such criterion shall be achieved when such soil, sediment, groundwater or soil vapor has been remediated to the lowest reporting limit for such substance which can be consistently and accurately achieved, as approved by the Commissioner in writing in consultation with the Commissioner of the Department of Public Health; and

(iv) A detailed description of all measures taken to overcome instrument software limitations and a determination of the lowest achievable reporting limit applicable to the analysis of such substance shall be prepared and submitted to the Commissioner for review and approval.

(D) Matrix interference effects.

If any applicable criterion for a substance [in soil] is less than the [concentration] reporting limit for such substance [that can be consistently and accurately quantified] in a specific sample due solely to matrix interference effects, the following actions shall be taken:

- [(A)](i)** **(aa)** “Test Methods for Evaluating Solid Waste: Physical/Chemical Methods[,]”, SW-846, [U.S. Environmental Protection Agency, EPA Office of Solid Waste, Washington D.C. 20460,] any other analytical method approved by EPA, and any analytical method approved in writing by the Commissioner shall be consulted to determine if an analytical method sufficiently sensitive to achieve the applicable [analytical detection] reporting limit was used to conduct the analysis of the subject substance.
- (bb)** If there is an available [an] alternative analytical method which is sufficient to achieve the required [analytical detection] reporting limit appropriate for the sample matrix, and such method has been approved by EPA or approved in writing by the Commissioner, the subject soil shall be re-analyzed for the subject substance using such alternative method.
- (ii)** If a sample has been analyzed by one or more analytical methods in accordance with subparagraph **[(A)](i)** of this subdivision and the applicable [analytical detection] reporting limit has not been achieved solely due to matrix interference effects, such [method(s)] method or methods shall be modified in order to compensate for such interferences, in accordance with analytical procedures specified by EPA within the scope of the analytical method and, in accordance with analytical cleanup procedures approved by EPA or approved in writing by the Commissioner. Such EPA or Commissioner approval includes, but is not limited to, the methods found in the most current version of “Test Methods of Evaluating Solid Waste: Physical/Chemical Methods”, SW-846: “Alumina Column Cleanup” Method 3610; “Florisil Cleanup” Method 3620; or “Gel-Permeation Cleanup” Method 3640.
- [(B)](iii)** If, after re-analyzing the subject soil and attempting to compensate for matrix interference effects in accordance with [to] subparagraph **[(A)] (ii)** of this subdivision, any applicable criterion for a substance in soil is less than the [concentration] reporting limit for such substance that can be consistently and accurately [quantified] achieved in a specific sample due solely to matrix interference effects, compliance with such criterion shall be achieved when such soil has been remediated to the lowest [concentration] reporting limit for such substance which can be consistently and accurately [quantified without matrix interference effects] achieved, as approved by the Commissioner in writing.
- [(C)](iv)** A detailed summary of all measures taken to overcome matrix interference effects and a determination of the lowest [alternative quantification level] achievable reporting limit applicable to the analysis of such substance shall be prepared and, if requested by the Commissioner in writing, shall be submitted to the Commissioner for his review and approval.

(E) Specific requirements for soil samples.

The results of analytical analyses for all soil and sediment samples shall be reported on a dry weight basis unless otherwise specified in writing by the Commissioner.

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

(Public Notice)

(CONCEPTS)

Proposed changes to public notice designed to:

- *Create a new subsection in the RSRs that lists the various public notice requirements for all remediation;*
- *Include language from the statutes for Property Transfer Program 22a-134a Voluntary Programs 22a-133x and 22a-133y, and Brownfields 32-769;*
- *Move language from RSR sections on Engineered Controls, TIs and ELURs (22a-133q) into one section;*
- *Clarify what information is needed in various types of notice;*
- *Clarify that public notice is for releases being addressed in a given RAP, rather than for the entire site;*
- *Provide an opportunity for additional public notice when the RAP is developed in phases;*
- *Require posting of a sign or additional notification to abutters during additional periods of active remediation;*
- *Create consistency in the duration of various public notices and reduce the comment period from 45 to 30 days;*
- *Add a requirement to post on electronic media provided by the Commissioner; and*
- *Clarify "abutters" by indicating properties within 200 feet.*

(CURRENT LANGUAGE)

(d) Public Participation.

(1) Public Hearing on Remediation. If the Commissioner determines that there is substantial public interest in any remediation proposed pursuant to Chapter 445, Chapter 446k or section 22a-208a(c) of the General Statutes, he may hold a public hearing on such proposed remediation, and he shall hold a hearing upon receipt of a petition signed by twenty-five or more persons. Notice of any such hearing shall be published in a newspaper of substantial circulation in the area of the proposed remediation at least thirty days prior to such hearing. Such hearing need not be conducted pursuant to the provisions of Chapter 54 of the General Statutes.

(2) Comment Procedures. Any public notice published or mailed pursuant to section 22a-133x, 22a-133y or 22a-134a of the General Statutes shall provide that comments on the proposed remediation may be submitted to the Commissioner within forty-five days of the publication or mailing of such notice. The Commissioner shall forward a copy of all comments received by the date specified in the public notice and all comments made at a public hearing to the owner of the subject parcel and, if different, the person undertaking remediation at such parcel. The person

undertaking remediation at the subject parcel shall, within sixty days of receiving such comments, submit to the Commissioner a written summary of all such comments and a written response to each such comment. The Commissioner shall review such summary and responses and shall adopt it as his own, adopt it with modifications, or reject it and prepare a response to each such comment. The Commissioner shall send a copy of the initial summary and responses and of his action with respect thereto to each person who submitted comments on the remediation proposal.

(PROPOSED LANGUAGE)

[(d)](e) Public Participation.

(1) Public Notice.

(A) General.

Except for remedial actions conducted in an emergency or immediate response required for releases reported under Connecticut General Statutes sections 22a-6u, 22a-450, or other law, prior to commencement of the remedial action for each release area at parcels being remediated pursuant to Connecticut General Statutes sections 22a-133x, 22a-133y, 22a-134a, or 32-769, the person undertaking the remediation and required to make the notice pursuant to said sections shall:

- (i) submit notice of the remediation on a form prescribed by the Commissioner;
- (ii) publish notice of the remediation in a newspaper having a substantial circulation in the area affected;
- (iii) provide notice of the remediation to the director of health of the municipality where the parcel is located; and
- (iv) either
 - (aa) erect and maintain for at least thirty days in a legible condition a sign not less than six feet by four feet on the parcel, which sign shall be clearly visible from the public highway, and shall include the words "ENVIRONMENTAL CLEAN-UP IN PROGRESS AT THIS SITE. FOR FURTHER INFORMATION CONTACT:" and include a telephone number and an e-mail address for a representative of person responsible undertaking the remediation from which any interested person may obtain additional information about the remediation, and for an additional thirty days upon commencement of any active remedial activities if such activities were not implemented within two years of the previous posting of such a sign, or
 - (bb) mail notice of the remediation to each owner of record of property within 200 feet of the site boundary, at the last-known address of such owner on the last-completed grand list of the municipality where the parcel is located.
- (v) Notices provided under subparagraphs (A)(i), (ii), (iii) and (iv)(bb) shall include the name and address of either the owner of the subject parcel or the person responsible for undertaking the remediation; the location address and/or a description of the location such parcel; Remediation Identification Number(s); a

brief description of the general nature of the releases being remediated; proposed remedial actions including a description of any proposed variances, engineered controls, or environmental use restrictions requiring the Commissioner's approval; the approximate time period to initiate and complete the remedial activities; an electronic-mail address and a telephone number for an office from which any interested person may obtain additional information about the remediation; and a brief description of the procedures for providing comments on the proposed remediation and for requesting a hearing.

(B) Supplemental Notices.

If a previously noticed release area or one or more additional release areas require a subsequent remedial action plan, and such a remedial action plan is to address greater than 200 cubic yards of soil, groundwater contamination leaving the site, or will result in surficial site disturbances extending for more than ninety days, supplemental notice shall be provided in accordance with subparagraph (A).

(C) Engineered Controls.

For Engineered Control variance requests, notice of the subject proposal shall be provided by the person responsible for undertaking remediation consistent with sections 22a-133k-1(d)(1), prior to the Commissioner's approval of an engineered control under section 22a-133k-2(f)(2)(A)(iv) or the use of an engineered control under section 22a-133k-2(f)(2)(C). When notice is published, or mailed, it shall also include a brief description of the proposed engineered control. The person undertaking remediation shall verify to the Commissioner in writing on a form prescribed by the Commissioner that notice has been given in accordance with this subsection.

(D) Technical Impracticability Variances.

For Technical Impracticability variances allowed under 22a-133k-3(e)(2), within thirty days of receiving notification from the Commissioner that the request package for the variance is complete, the person requesting the variance shall provide notice to the public consistent with:

- (i) subparagraph (A); and
- (ii) to the chief elected official and director of health of the municipality, and each owner of parcel, within the TI Zone. If the Commissioner determines the public interest will be best served thereby, the Commissioner may expand the requirements of such a public notice, including increasing time allowed for public comment and the scope of the mailing of notices, regarding the proposed variance request, and requiring additional public notice for any future modifications to the long-term obligations associated with this variance.

(E) Recording on Land Records.

- (i) The owner of the property which is the subject of a proposed environmental use restriction shall, except as specified in clause (iii) of this subparagraph, publish in at least one newspaper of general circulation in the area affected by the proposed environmental use restriction, notice of intent to record an environmental use restriction. Such notice shall include the name and address of such owner, the address of the property or a brief description of its location, a brief description of the purpose of the proposed environmental use restriction, the name and address of an individual from whom interested persons may obtain a copy of the proposed use restriction, and a statement that public comments on the proposed environmental use restriction may be submitted in writing for thirty days after the date of publication of the notice to:
 - (aa) for an environmental land use restriction, the Commissioner of Energy and Environmental Protection, CARE/OF ENVIRONMENTAL LAND USE RESTRICTION COORDINATOR, 79 Elm Street, Hartford, CT 06106; or
 - (bb) for a notice of activity and use limitation, the owner of the land and the LEP, or the Commissioner as applicable who will approve the notice of activity and use limitation pursuant to section 22a-133q(#);
- (ii) Public notice of a proposed notice of activity and use limitation need not be published if
 - (aa) such limitation provides solely that the use of the subject property or portion thereof is limited to industrial or commercial activities, and
 - (bb) the municipal zoning of such property limits the property to such use.
- (iii) Public notice is required in accordance with subparagraph (E) of this subsection when a notice of activity and use limitation is amended in accordance with section 22a-133q.

(F) Nothing in this subsection shall prohibit the combining of multiple public notices where applicable and feasible.

(G) Any public notice published or mailed pursuant to subsection 1(d)(1) shall provide that comments on the proposed remediation may be submitted to the person undertaking remediation within thirty days of last of the date(s) of the public notice(s) under subparagraph (A)(i) through (A)(iv).

(H) The person undertaking remediation at the subject parcel shall submit to the Commissioner a written summary of all such comments and a written response to each prior to implementing the remediation.

[1](2) Public Hearing on Remediation.

(A) If the Commissioner determines that there is substantial public interest in any remediation proposed pursuant to Chapter 445, Chapter 446k or section 22a-208a(c) of the General Statutes, the Commissioner [he] may hold a hearing on such proposed remediation, and the Commissioner [he] shall hold a hearing upon receipt of a petition signed by twenty-five or

more persons. Notice of any such hearing shall be published in a newspaper of substantial circulation in the area of the proposed remediation at least thirty days prior to such hearing. Such hearing need not be conducted pursuant to the provisions of Chapter 54 of the General Statutes.

[(2) Comment Procedures. Any public notice published or mailed pursuant to section 22a-133x, 22a-133y or 22a-134a of the General Statutes shall provide that comments on the proposed remediation may be submitted to the Commissioner within forty-five days of the publication or mailing of such notice.]

(B) If a public hearing is held in accordance with subsection (3), t[T]he Commissioner shall forward a copy of [all comments received by the date specified in the public notice and] all comments made at a public hearing to the owner of the subject parcel and, if different, the person undertaking remediation at such parcel.

(C) Prior to commencing remedial action and [The person undertaking remediation at the subject parcel shall,] within sixty days of receiving such public hearing comments, the person undertaking remediation at the subject parcel shall submit to the Commissioner a written summary of all such comments and a written response to each such comment. The Commissioner shall review such summary and responses and shall adopt it as his own, adopt it with modifications, or reject it and prepare a response to each such comment. The Commissioner shall send a copy of the initial summary and responses and of his action with respect thereto to each person who submitted comments on the remediation proposal.

22a-133k-1(NEW)

(Financial Assurance)

(CONCEPT)

- *Clarify that Technical Impracticability variances may include financial assurance requirements.*
- *Consolidate financial assurance requirements into a single location.*
- *Provide a method for updating the assurance instrument in the RSRs for inflation every 5 years. Current language for engineered controls require posting 5 years of the 30 year cost, which is 17%. Front-loading an assumed incremental inflationary increase of 3% inflation per year for five years would increase this to 20%.*
- *Create a minimum surety value of \$5000, below which surety is not required to be posted.*

(PROPOSED LANGUAGE)

(f) Financial Assurance

(1) Financial assurance shall be established and appropriately maintained in a form prescribed by the Commissioner for the duration of the period that the engineered control or Technical Impracticability variance will be used to achieve compliance with the RSRs. Such financial assurance shall be available to the Commissioner in the event

that the Commissioner must act to perform such compliance measures due to inaction by the property owner;

(2) Consistent with subparagraphs (5) and (6) of this subsection, the amount of financial assurance shall:

(A) For an engineered control, be sufficient to operate, maintain, and monitor existing controls;

(B) For a Technical Impracticability variance, be sufficient to perform all actions in the plan approved under subsection 3(f)(2)(B)(vii), to perform five-year review reports under subsection 3(f)(2)(G)(ii), and if required by the Commissioner under subsection 3(f)(2)(B)(vi), to perform future corrective measures;

(3) With respect to any release area subject to any of the requirements of section 22a-209-4(i) or section 22a-449(c)-100 through 110 of the Regulations of Connecticut State Agencies, all such requirements shall be satisfied;

(4) With respect to a release area that is not subject to any such regulations referenced in subdivision (3) of this subsection, the property owner of the subject parcel shall demonstrate to the Commissioner that the property owner has posted, or another party has posted on their behalf, a surety in a form and amount either approved in writing by the Commissioner or, for engineered controls subject to certification by a licensed environmental professional, in a manner allowed under clause 2(f)(2)(D)(vii), prior to the release area being determined to be in full compliance with 22a-133k and no later than:

(A) for an engineered control, within one year of its installation;

(B) for a Technical Impracticability variance, within one year of its approval;
or

(C) as otherwise approved by the Commissioner;

(5) Such surety shall be initially established in an amount equal to the cost of twenty percent of thirty years of maintenance, monitoring, and other reasonably anticipated repairs, which amount shall be maintained in effect for as long as the long-term obligations associated with the engineered control or Technical Impracticability variance remains in effect;

(6) Such surety shall be adjusted to reflect annual inflationary costs by adjusting for inflation at each five-year interval of the anniversary date of the establishment of the financial instrument used to comply with subdivision (4) of this subsection. The adjustment shall be made by using an inflation factor derived from the most recent Implicit Price Deflator for Gross National Product published by the U.S. Department of Commerce in its *Survey of Current Business* and multiplying the latest adjusted surety estimate for the site by that five-year inflation factor;

(7) Such surety may be adjusted, subject to the Commissioner's approval, to reflect recalculating the maximum costs of maintenance, monitoring, and other reasonably

anticipated repairs in current dollars;

(8) No financial assurance is required for any value less than \$5,000, unless the Commissioner requires a financial assurance for such lesser amount; and

(9) Such financial assurance shall be one or more of the following instruments from a financial institution: Trust Fund; Irrevocable Standby Letter of Credit; Financial Guarantee “Payment” Bond; Performance Bond; and Certificate of Insurance. A cover letter signed by the property owner shall be submitted along with the Irrevocable Standby Letter of Credit, in accordance with Section 40 CFR 264.143(d)(4).

22a-133k-1(e)

(Periodic review)

(CONCEPT)

Remove outdated language.

(CURRENT LANGUAGE)

(e) Periodic review.

The Commissioner shall periodically review sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies to determine whether the implementation of such regulations is successfully protecting public health and the environment from the hazards of pollution. The Commissioner shall also evaluate whether the implementation of the regulations streamlines the process of conducting remediation projects in Connecticut, based upon, among other things, his review of the number of remediation projects completed in accordance with said sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies, the number of such projects reviewed by the Commissioner pursuant to section 22a-133x or 22a-134a of the General Statutes, the length of time required for the Commissioner's review of complete requests for approval of alternative criteria or variances, and the number of remediation projects conducted pursuant to sections 22a-133x, 22a-133y and 22a-134a of the General Statutes, which projects were verified by a licensed environmental professional. Such reviews shall be conducted at intervals of no more than five years, provided that nothing in this subsection shall preclude the Commissioner, at his discretion, from conducting such a review at any time and further provided that the first such review shall be conducted no later than eighteen months after the effective date of sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies. As a result of such a periodic review, the Commissioner may conclude that the goals of this subsection and section 22a-133k of the General Statute are being met, or he may conclude that revisions to such regulations are necessary to ensure that the implementation of said sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies achieves such goals, in which case he may revise such Regulations as he deems necessary to achieve those goals.

(PROPOSED LANGUAGE)

[(e)](g) Periodic review.

The Commissioner shall periodically review sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies to determine whether the implementation of such regulations is successfully protecting public health and the environment from the hazards of pollution. The Commissioner shall also evaluate whether the implementation of the regulations streamlines the process of conducting remediation projects in Connecticut, based upon, among other things, his review of the number of remediation projects completed in accordance with said sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies, the number of such projects reviewed by the Commissioner pursuant to section 22a-133x or 22a-134a of the General Statutes, the length of time required for the Commissioner's review of complete requests for approval of alternative criteria or variances, and the number of remediation projects conducted pursuant to sections 22a-133x, 22a-133y and 22a-134a of the General Statutes, which projects were verified by a licensed environmental professional. Such reviews shall be conducted at intervals of no more than five years, provided that nothing in this subsection shall preclude the Commissioner, at his discretion, from conducting such a review at any time **[and further provided that the first such review shall be conducted no later than eighteen months after the effective date of sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies]**. As a result of such a periodic review, the Commissioner may conclude that the goals of this subsection and section 22a-133k of the General Statute are being met, or he may conclude that revisions to such regulations are necessary to ensure that the implementation of said sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies achieves such goals, in which case he may revise such Regulations as he deems necessary to achieve those goals.

22a-133k-1(h)

(Lead Transition)

(CONCEPT)

Update the lead transition period to reflect the effective date for the 2013 RSRs.

(CURRENT LANGUAGE)

(g) Remediation of Soils Polluted with Lead.

Soil polluted with lead may be remediated to a concentration of 500 milligrams per kilogram in compliance with Section 22a-133k-2(b) provided:

(1) Prior to the effective date of this subsection:

(A) Such remediation has been initiated; or

(B) A remedial action plan has been completed for such release area; and

- (2) On or before twenty-four months after the effective date of this subsection such remediation has been completed.

(PROPOSED LANGUAGE)

[(g)](h) Remediation of Soils Polluted with Lead.

Soil polluted with lead may be remediated to a concentration of 500 milligrams per kilogram in compliance with Section 22a-133k-2(b) provided:

- (1) Prior to the June 27, 2013 [effective date of this subsection]:
- (A) Such remediation has been initiated; or
 - (B) A remedial action plan has been completed for such release area; and
- (2) On or before June 27, 2015 [twenty-four months after the effective date of this subsection] such remediation has been completed.

22a-133k-1(i)

(Transition)

(CONCEPT)

A transition period between the 2013 RSRs and the proposed 2016 RSRs would be allowed for sites that can demonstrate that a Remedial Action Plan based on the 2013 RSRs was prepared and initiated prior to the effective date of the 2016 revisions and a Verification or Interim Verification is submitted within 2 years of the effective date. The transition period would last 2 years from the adoption of the effective date.

(PROPOSED LANGUAGE)

- (i) Remediation of any release area may continue to utilize any provision of sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies, as adopted on June 27, 2013, with the exception of (B) of this subsection and provided that:
- (A) Prior to the effective date of the 2016 amendments to sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies:
 - (i) such remediation has been initiated as documented by the submittal of a Remedial Action Plan and the date such remediation was initiated; and
 - (ii) notice of such remediation has been published, if required, pursuant to Chapter 445 or any other applicable chapter of the Connecticut General Statutes;
 - (B) On or before twenty-four months after the effective date of the 2016 amendments to sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies, remediation at such release area has been completed pursuant to sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut

State Agencies, as adopted on June 27, 2013 sufficient to support a final site closure, verification, or interim verification pursuant to Connecticut General Statutes 22a-134 (19) and (28); and

(C) The following provisions of this regulation are not subject to the twenty-four month transition period in subsection (B):

- (i) 2(c)(4)(C) Soils Subject to Infiltration,
- (ii) 3(b)(3)(A)(iii) Alternative surface-water protection criteria – inland watercourse dilution calculation,
- (iii) 3(b)(3)(B)(iii) Alternative surface-water protection criteria – coastal watercourse dilution calculation, and
- (iv) 3(c)(3)(B) Volatilization criteria.

22a-133k-1(j)

(Q99 /7Q10 Transition)

(CONCEPT)

Estimates of stream flow have been found to be more easily obtained and have a more dependable accuracy through the use of Q99 data available through the USGS Stream Stats web page than by the current use of 7Q10. However, the Connecticut Water Quality Standard currently require certain calculations specifically use values derived using 7Q10. Those WQS are expected to be revised in the next few years. The revised language being proposed for the RSRs will enable the transition from 7Q10 to Q99.

(PROPOSED LANGUAGE)

- (j) Use of Q99 will replace 7Q10 in section 22a-133k-3(A)(i), 22a-133-3(D) and Appendix G, once Q99 is adopted in the Water Quality Standards.

22a-133k-2 Standards for Soil Remediation

22a-133k-2(a)

(Background)

(CONCEPT)

Concepts that have been removed from the definition of background have been added to this section because they are more appropriately discussed in the section of the regulations that deals with its implementation.

(CURRENT LANGUAGE)

(a) General.

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 (2) or 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 (3) or (5) of subsection (d) of this section; or (2) the background concentration for soil provided notice has been submitted to the Commissioner which notice shall be submitted on a form furnished by the Commissioner and 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; and the results of all laboratory analyses of such samples.

(PROPOSED LANGUAGE)

(a) General.

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 22a-133k-2(d)(2) and subdivision (2) or 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 (3), [or] (5), or (8) of subsection (d) of this section; [or]
- (2) the background concentration for soil provided that notice has been submitted to the Commissioner [which notice shall be submitted] on a form prescribed[furnished] by the Commissioner and shall include:

- (A) a brief description of the subject release area and of the general characteristics of soils in the vicinity of such release area;
- (B) 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;
- (C) the results of all laboratory analyses of such samples, and
- (D) the background concentration for soil:
 - (i) of similar texture and composition;
 - (ii) outside the subject release area and in the general vicinity of such release area; and
 - (iii) not affected by another release of the same substance or another release affecting the same substance, except that of anthropogenic origin; or

[provided notice has been submitted to the Commissioner which notice shall be submitted on a form furnished by the Commissioner and 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; and the results of all laboratory analyses of such samples.]

- (3) for releases which occur into an area impacted by a previous release, the concentration of such substance that is representative of the previous release, provided that such previous release shall still be required to be remediated to its applicable remedial criteria as a separate release.

22a-133k-2(b) Direct Exposure Criteria

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

(PCBs)

(CONCEPT)

Clarification is added for when PCBs can use the RSR industrial/commercial direct exposure criteria. This provision only applies to “outdoor substations” or “other restricted access location” that are limited to industrial use only (as required by 40 CFR 761.123).

(CURRENT LANGUAGE)

22a-133k-2(b)(2)(B) Soil polluted with PCB at a release area may be remediated to a concentration at which the industrial/commercial direct exposure criteria for PCB is met if the parcel upon which such release area is located is (i) an outdoor electrical substation as defined in 40 CFR 761.123; or (ii) an other restricted access location as defined in said section 40 CFR 761.123 and an environmental land use restriction is in effect with respect to such parcel, or to the portion of such parcel containing such release area, which environmental land use restriction ensures that the parcel or restricted portion thereof is not used for any residential activity in the future and that any future use of such parcel or restricted portion thereof is limited to an industrial or commercial activity.

(PROPOSED LANGUAGE)

(2) (B) Soil polluted with PCB at a release area may be remediated to a concentration at which the industrial/commercial direct exposure criteria for PCB is met if the parcel upon which such release area is located is:

- (i) an “outdoor electrical substation” as defined in 40 CFR 761.123; or
- (ii) an “other restricted access (nonsubstation) location” as defined in said section 40 CFR 761.123 and an environmental [land] use restriction is in effect with respect to such parcel, or to the portion of such parcel containing such release area, which environmental [land] use restriction ensures that the parcel or restricted portion thereof is not used for any residential activity in the future and that any future use of such parcel or restricted portion thereof is limited to an industrial [or commercial] activity, as specified in 40 CFR 761.123.

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

(PCBs)

(CONCEPT)

Clarification of the Inaccessible Soil provision for PCBs includes:

- *splitting the language between the 10, 25, and 50 ppm options to make it clear that they are separate options; and*
- *adding language requiring an ELUR limiting the site to I/C use to use the inaccessible soil criteria.*

(CURRENT LANGUAGE)

22a-133k-2(b)(3) The direct exposure criteria for substances other than PCB do not apply to inaccessible soil at a release area provided that if such inaccessible soil is less than 15 feet below the ground surface an environmental land use restriction is in effect with respect to the subject parcel or to the portion of such parcel containing such release area, which environmental land use restriction ensures that such soils will not be exposed as a result of excavation, demolition or other activities and that any pavement which is necessary to render such soil inaccessible is maintained in good condition unless and until such restriction is released in accordance with said section 22a-133q-1. Unless an alternative criterion has been approved in accordance with subsection 22a-133k-2(d)(7), inaccessible soil polluted with PCB may be remediated to a concentration of 10 ppm PCB by weight provided that (A) if such inaccessible soil is located on a parcel which is an other restricted access location as defined in said section 40 CFR 761.123, such soil may be remediated to a concentration of 25 ppm PCB by weight, or (B) if such inaccessible soil is located on a parcel which is an outdoor electrical substation as defined in 40 CFR 761.123, such soil may be remediated to a concentration of 25 ppm PCB by weight, or if a label or notice is visibly placed in the area in accordance with 40 CFR Part 761, to a concentration of 50 ppm PCB by weight.

(PROPOSED LANGUAGE)

(3) Inaccessible Soil

(A) The direct exposure criteria for substances other than PCB do not apply to inaccessible soil at a release area provided that if such inaccessible soil is less than 15 feet below the ground surface an environmental [land] use restriction is in effect with respect to the subject parcel or to the portion of such parcel containing such release area, which environmental [land] use restriction ensures that such soils will not be exposed as a result of excavation, demolition or other activities and that any pavement which is necessary to render such soil inaccessible is maintained in good condition unless and until such restriction is released in accordance with said section 22a-133q-1.

(B) The direct exposure criteria for substances other than PCB do not apply to inaccessible soil at a release area or portion of a release area located beneath a road, as defined in section 22a-133q of the Regulations of Connecticut State Agencies, provided that notice is submitted to the Commissioner in accordance with section 22a-133q of the Regulations of Connecticut State Agencies.

(C) Unless an alternative criterion has been approved in accordance with subsection 22a-133k-2(d)(7), [i] Inaccessible soil polluted with PCB may be remediated to a concentration of 10 ppm PCB by weight, provided that:

(i)(aa) an environmental land use restriction is in effect with respect to the subject parcel or to the portion of such parcel containing such release area, which environmental land use restriction ensures that such soils will not be exposed as a result of excavation, demolition or other activities;

(bb) any pavement that is necessary to render such soil inaccessible is maintained in good condition; and

(cc) any future use of such parcel or restricted portion thereof is limited to an industrial activity as specified in section 40 CFR 761, until such restriction is released in accordance with said section 22a-133q of the RSCA; and

[(A)](ii) If such inaccessible soil polluted with PCB is located on a parcel which is an “other restricted access location” as defined in said section 40 CFR 761.123, such soil may be remediated to a concentration of 25 ppm PCB by weight[,]; or

[(B)](iii) If such inaccessible soil polluted with PCB is located on a parcel which is an “outdoor electrical substation” as defined in 40 CFR 761.123, such soil may be remediated to a concentration of 25 ppm PCB by weight, or if a label or notice is visibly placed in the area in accordance with 40 CFR Part 761, to a concentration of 50 ppm PCB by weight.

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

(Pesticides)

(CONCEPT)

A partial exemption for soils impacted by the normal use of pesticides is proposed. If the specified conditions are met, the impacts from such pesticides would be exempted from other RSR requirements. Guidance would be provided which would provide the basis for determining that a plan is “acceptable to the Commissioner.

(CURRENT LANGUAGE)

(4) Incidental Sources

The direct exposure criteria contained in subsection (b) of this section do not apply to metals, petroleum hydrocarbons or semi-volatile substances in soil provided such pollution is the result of:

(A) An incidental release due to the normal operation of motor vehicles, not including refueling, repair or maintenance of a motor vehicle; or

(B) Normal paving and maintenance of a consolidated bituminous concrete surface provided such bituminous concrete surface has been maintained for its intended purpose.

(PROPOSED LANGUAGE)

(4) Incidental Sources and Pesticides.

(A) “The direct exposure criteria ... do not apply to metals, petroleum hydrocarbons, or semi-volatile substances in soil provided such pollution is the result of:

[(A)](i) An incidental release due to the normal operation of motor vehicles, not including refueling, repair or maintenance of a motor vehicle; or

[(B)](ii) Normal paving and maintenance of a consolidated bituminous concrete surface provided such bituminous concrete surface has been maintained for its intended purpose.

(B) The direct exposure criteria do not apply to pesticides in soil resulting from application of pesticides in accordance with accepted practices at the time of use and which are uniformly distributed, provided that:

(i) a plan is implemented, which is acceptable to the Commissioner in consultation with the Commissioner of the Department of Public Health, to limit human exposure based on land use, including:

(aa) short-term measures to limit human exposure;

(bb) long-term maintenance program to ensure that such soils will not be exposed as a result of erosion, excavation, demolition or other activities and that any vegetative cover which is necessary to prevent

- exposure to such soil is maintained in good condition; and
- (cc) long-term maintenance program is to be updated in accordance with changes in land use;
- (ii) written notice is provided to the Commissioner on a form prescribed by the Commissioner, the local director of health, and the owners of adjacent parcels; and
- (iii) an appropriate environmental use restriction is in effect on the parcel, including but not limited to:
 - (aa) a map depicting the nature and extent of pesticides; and
 - (bb) reference to the long-term soil management program.

22a-133k-2(c) Pollutant Mobility Criteria

22a-133k-2(c)(1)(B)(ii) (Mass analysis)

(CONCEPT)

Modify language to allow use of mass metals analyses divided by 20 for PMC compliance because the 20:1 dilution for the SPLP analysis will not exceed criteria. This provides an alternative to running an additional SPLP analysis, which may not be necessary in cases where the mass metals divided by 20 do not exceed PMC.

(CURRENT LANGUAGE)

(B) An inorganic substance or PCB in soil above the seasonal low water table, or above the seasonal high water table if (i) remediation to the seasonal low water table is not technically practicable or would not result in the permanent elimination of a source of pollution or (ii) the subject soil is located in a GB area, shall be remediated to at least that concentration at which the results of a TCLP or SPLP analysis of such soil for such substance does not exceed the pollutant mobility criterion applicable to the ground-water classification of the area at which such soil is located, except that in the circumstances identified in subdivision (2) of this subsection, remediation to achieve compliance with the pollutant mobility criteria may be conducted in accordance with the requirements established in said subdivision (2).

(PROPOSED LANGUAGE)

- (A)(i) An inorganic substance or PCB shall be remediated to at least [that] the concentration at which the results of a TCLP or SPLP analysis, or the results of the mass analysis in mg/kg divided by 20 for such substance, does not exceed the applicable pollutant mobility criterion in mg/L [such soil] for such substance [does not exceed the pollutant mobility criterion applicable to the ground-water classification of the area at] in soil which such soil is located above the seasonal low water table, or above the seasonal high water table if:
- [(i)](aa) remediation to the seasonal low water table is not technically practicable or would not result in the permanent elimination of a source of pollution, or
 - [(ii)](bb) the subject soil is located in a GB area,

- (ii) except that in the circumstances identified in subdivision (2) of this subsection, remediation to achieve compliance with the pollutant mobility criteria may be conducted in accordance with the requirements established in said subdivision (2).

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

(10x PMC)

(CONCEPT)

The provision allowing 10X PMC for inorganics and SVOCs should be modified as follows:

- *This alternative dilution or dilution attenuation factor provision is not allowed under TSCA and so the reference to PCBs is being dropped;*
- *Clarify that the mass analysis in (bb) is not appropriate for metals; and*
- *Clarify that the NAPL prohibition is only for NAPL above the water table in both GA and GB areas.*

(CURRENT LANGUAGE)

(C) Inorganic, semi-volatile, PCB or pesticide contamination in a GA area.

A soil in a GA area that is polluted with inorganic substances, semi-volatile substances, PCB or pesticides, which soil is at or above the seasonal low water table, or at or above the seasonal high water table if remediation to the seasonal low water table is not technically practicable or would not result in the permanent elimination of a source of pollution, may be remediated to a level at which (i)(aa) the results of a TCLP or SPLP analysis of such soil for such substance do not exceed the ground-water protection criterion for such substance multiplied by ten or by an alternative dilution or dilution and attenuation factor approved by the Commissioner in accordance with subdivision (4) of subsection (d) of this section or (bb) the results of a mass analysis of such soil for a substance do not exceed the pollutant mobility criterion for such substance multiplied by ten or by an alternative dilution or dilution and attenuation factor approved by the Commissioner in accordance with subdivision (4) of subsection (d) of this section; provided (ii) (aa) the release area and any portion thereof is located at least twenty-five feet from the nearest legal boundary of the parcel in the downgradient direction, (bb) no non-aqueous phase liquids are present in the release area as determined in accordance with subdivision (3) of this subsection, and (cc) the water table is at least fifteen feet above the surface of the bedrock.

(D) Polluted Soils in a GB area.

A substance in soil above the seasonal high water table in a GB area may be remediated to a level at which the results of a TCLP or SPLP analysis of such soil does not exceed the ground-water protection criterion for any such substance (i) (aa) multiplied by 10, (bb) multiplied by the ratio of the summation of the areas downgradient and upgradient of the release area to the release area, provided that such ratio does not exceed 500, or (cc) or multiplied by an alternative dilution or dilution and attenuation factor approved by the Commissioner in accordance with subdivision (5) of subsection (d) of this section; (ii) provided non-aqueous phase liquids are not present in such soil as determined in accordance with subdivision (3) of this subsection.

(PROPOSED LANGUAGE)

(C) Inorganic, semi-volatile, [PCB] or pesticide contamination in a GA area.

A soil in a GA area that is polluted with inorganic substances, pesticides, or semi-volatile substances other than PCB, [PCB or pesticides,] which soil is at or above the seasonal low water table, or at or above the seasonal high water table if remediation to the seasonal low water table is not technically practicable or would not result in the permanent elimination of a source of pollution, may be remediated to a level: [at which]

- (i) at which:
 - (aa) the results of a TCLP or SPLP analysis of such soil for such substance do not exceed the ground-water protection criterion for such substance multiplied by ten or by an alternative dilution or dilution and attenuation factor approved by the Commissioner in accordance with subdivision (4) of subsection (d) of this section; or
 - (bb) the results of a mass analysis, of such soil for a substance do not exceed the pollutant mobility criterion for such substance multiplied by ten or by an alternative dilution or dilution and attenuation factor approved by the Commissioner in accordance with subdivision (4) of subsection (d) of this section;
- (ii) provided that:
 - (aa) the release area and any portion thereof is located at least twenty-five feet from the nearest legal boundary of the parcel in the downgradient direction;[,]
 - (bb) no non-aqueous phase liquids as determined in accordance with subdivision (3) of this subsection are present in the release area that are associated with the substances for which this provision is being applied [as determined in accordance with subdivision (3) of this subsection,]; and
 - (cc) the water table is at least fifteen feet above the surface of the bedrock.

(D) Polluted Soils in a GB area.

A substance in soil above the seasonal high water table in a GB area may be remediated to a level at which the results of a TCLP or SPLP analysis of such soil does not exceed the ground-water protection criterion for any such substance

- (i)
 - (aa) multiplied by 10,
 - (bb) multiplied by the ratio of the summation of the areas downgradient and upgradient of the release area to the release area, provided that such ratio does not exceed 500, or
 - (cc) [or] multiplied by an alternative dilution or dilution and attenuation factor approved by the Commissioner in accordance with subdivision (5) of subsection (d) of this section;
- (ii) provided non-aqueous phase liquids are not present in [such soil] the release area above the seasonal high water table as determined in accordance with subdivision (3) of this subsection.

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

(Background)

(CONCEPT)

Use of background in this provision is intended to demonstrate how much capacity there is for contamination before the GWPC is exceeded. Proposed changes to this section are to carry over concepts that have been removed from the background definition and do not represent a change in the concept or implementation of this provision.

(CURRENT LANGUAGE)

(E) Site specific dilution in a GB area.

(i) A substance in a soil at or above the seasonal high water table in a GB area where the background concentration for ground water for such substance is less than the applicable ground-water protection criterion, may be remediated to a level at which the results of a mass analysis of such soil for a substance do not exceed the pollutant mobility criterion applicable to such substance in a GA area multiplied by a site-specific dilution factor calculated in accordance with clause (ii) of this subparagraph, or the results of a TCLP or SPLP analysis of such soil for a substance do not exceed the ground-water protection criterion for such substance multiplied by a site-specific dilution factor calculated in accordance with clause (ii) of this subparagraph, provided (aa) no non-aqueous phase liquids are present in such soil as determined in accordance with subdivision (3) of this subsection; (bb) notice has been submitted to the Commissioner in accordance with clause (iii) of this subparagraph; and (cc) the water table in the release area is at least fifteen feet above the surface of the bedrock and the downward ground water vertical flow velocity is not greater than the ground water horizontal flow velocity.

(PROPOSED LANGUAGE)

(E) Site specific dilution in a GB area.

- (i) A substance in [a] soil at or above the seasonal high water table in a GB area where the background concentration, representative of site [for] ground water unaffected by the subject release, [for such substance] is less than the applicable ground-water protection criterion, may be remediated to a level at which:
- (aa) the results of a mass analysis of such soil for a substance do not exceed the pollutant mobility criterion applicable to such substance in a GA area multiplied by a site-specific dilution factor calculated in accordance with clause (E)(ii) [of this subparagraph,] or
 - (bb) the results of a TCLP or SPLP analysis of such soil for a substance do not exceed the ground-water protection criterion for such substance multiplied by a site-specific dilution factor calculated in accordance with clause (E)(ii) [of this subparagraph,] provided that:
 - [(aa)](I) no nonaqueous phase liquids are present in such soil as determined in accordance with subdivision (c)(3) of this subsection;

- [(bb)](II) notice has been submitted to the Commissioner in accordance with clause (E)(iii) [of this subparagraph;] and
- [(cc)](III) the water table in the release area is at least fifteen feet above the surface of the bedrock and the downward ground water vertical flow velocity is not greater than the ground water horizontal flow velocity.

22a-133k-2(c)(2)(E)(ii) (PMC calc. 15ft saturated thickness)

(CONCEPT)

Use of the full 15-foot saturated thickness in the site-specific dilution calculation for PMC in GB areas is not technically accurate, since mixing will only occur in a portion of the aquifer. The proposed revision would correct this issue by replacing the use of the 15-foot with the appropriate mixing zone formula and allow the use of a more conservative default value to retain the ease of use for the provision.

(CURRENT LANGUAGE)

(ii) For the purpose of clause (i) of this subparagraph, the site-specific dilution factor shall be calculated using the following formula: $DF = (1 + (Kd/iL))(1-F_{adj})$, where:

DF = site-specific dilution factor

K = hydraulic conductivity, in feet per year, of the unconsolidated aquifer underlying the release area

i = horizontal hydraulic gradient in feet per foot

d = 15 feet

I = infiltration rate in feet per year, as specified in subparagraph (iv) of this subparagraph

L = length in feet of the release area parallel to the direction of ground-water flow

F_{adj} = background concentration for ground water divided by the ground-water protection criterion for the subject substance, or, where the background concentration for ground water can not be quantified, 1/2 the minimum detection limit for the subject substance divided by the ground-water protection criterion for the subject substance.

(PROPOSED LANGUAGE)

(ii) For the purpose of clause (i) of this subparagraph, the site-specific dilution factor shall be calculated using the following formula: $[DF = (1 + (Kd/iL))(1-F_{adj})]$, where:]

[DF = site-specific dilution factor

K = hydraulic conductivity, in feet per year, of the unconsolidated aquifer underlying the release area

i = horizontal hydraulic gradient in feet per foot

[d = 15 feet]

I = infiltration rate in feet per year, as specified in subparagraph (iv) of this subparagraph

L = length in feet of the release area parallel to the direction of ground-water flow

F_{adj} = background concentration for ground water divided by the ground-water protection criterion for the subject substance, or, where the background concentration for ground water can not be quantified, 1/2 the minimum detection limit for the subject substance divided by the ground-water protection criterion for the subject substance.]

$$DF = \left(1 + \frac{Kid}{IL}\right)(1 - F_{adj})$$

<u>Terms</u>	<u>Description</u>	<u>Value</u>	<u>Units</u>
<u>DF</u>	<u>site-specific dilution factor</u>	<u>Substance-specific</u>	
<u>K</u>	<u>hydraulic conductivity of the unconsolidated aquifer underlying the release area</u>	<u>Calculated</u>	<u>ft/year</u>
<u>i</u>	<u>horizontal hydraulic gradient</u>	<u>Calculated</u>	<u>ft/ft</u>
<u>d</u>	<u>aquifer mixing zone default value of 3 feet can be used, or a release-specific value can be calculated using</u> $d = (0.0112L^2)^{0.5} + d_{\alpha} \left[1 - e^{\left(-\frac{LI}{Kid_{\alpha}}\right)}\right]$	<u>3</u> <u>unless otherwise calculated</u>	<u>ft</u>
<u>d_α</u>	<u>aquifer thickness</u>	<u>Calculated</u>	<u>ft</u>
<u>I</u>	<u>infiltration rate, as specified in subparagraph (iv) of this subparagraph</u>	<u>Calculated</u>	<u>ft/year</u>
<u>L</u>	<u>length of the release area parallel to the direction of ground-water flow</u>	<u>Calculated</u>	<u>ft</u>
<u>F_{adj}</u>	<u>background concentration for ground water divided by the ground-water protection criterion for the subject substance or, where the background concentration for ground water cannot be quantified, 1/2 the reporting limit for the subject substance divided by the ground-water protection criterion listed in Appendix C or calculated using Appendix G for the subject substance.</u>	<u>Calculated</u>	

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

(Determining NAPL)

(CONCEPT)

The equation for determining the presence of NAPL in soil in the current RSRs is specifically for unsaturated soils. Additional parameters have been added which are appropriate for saturated soils. The distinction between unsaturated and saturated soils reflected in the soil porosity in the proposed table is to be added to the equation.

(CURRENT LANGUAGE)

(3) Determining the Presence of Non-aqueous Phase Liquids in Soil.

For the purpose of this subsection, the presence of non-aqueous phase liquids in soil shall be determined using the following equation: $C_{nap} = (S/2\rho_b)(K_d\rho_b + \theta_w + H'\theta_a)$, where:

- C_{nap} = the concentration of an organic substance at which or above which such substance may be present in a non-aqueous phase
- S = the effective solubility
- ρ_b = dry soil bulk density
- K_d = soil-water partition coefficient, which may be approximated by $K_{OC} \cdot f_{OC}$
- 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)
- H = Henry's law constant ($atm \cdot m^3/mol$)

(PROPOSED LANGUAGE)

(3) Determining the Presence of Non-aqueous Phase Liquids in Soil.

[For the purpose of this subsection], [t]The presence of non-aqueous phase liquids in soil shall be determined using the following equation: [$C_{nap} = (S/2\rho_b)(K_d\rho_b + \theta_w + H'\theta_a)$, where:]

- [C_{nap} = the concentration of an organic substance at which or above which such substance may be present in a non-aqueous phase
- S = the effective solubility
- ρ_b = dry soil bulk density
- K_d = soil-water partition coefficient, which may be approximated by $K_{OC} \cdot f_{OC}$
- 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)
- H = Henry's law constant ($atm \cdot m^3/mol$)

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

[The terms defined above shall be assigned the following values:]

Term	Description	Value	Units
C _{NAP}	<u>the concentration of an organic substance at which or above which such substance may be present in a non-aqueous phase</u>	calculated	mg/kg
S	<u>the effective solubility</u>	<u>Substance-specific</u> <u>[chemical-specific]</u>	mg/L
ρ _b	<u>dry soil bulk density</u>	1.5 or the lowest value measured at the subject release area	kg/L
K _d	<u>soil-water partition coefficient, which may be approximated by (K_{oc})*(f_{oc})</u>	calculated	L/kg
K _{oc}	<u>soil organic carbon-water partition coefficient</u>	<u>Substance-specific</u> <u>[chemical-specific]</u>	L/kg
f _{oc}	<u>fraction organic carbon of soil</u>	0.006 or the lowest value measured at the subject release area	g/g
θ _w	<u>water-filled soil porosity L_{water}/L_{soil}</u>	0.15 <u>for Unsaturated</u> 0.43 <u>for Saturated</u>	L _{water} / L _{soil}
θ _a	<u>air-filled soil porosity L_{air}/L_{soil}</u>	0.28 <u>for Unsaturated</u> 0.0 <u>for Saturated</u>	L _{air} / L _{soil}
H'	<u>Henry's law constant (dimensionless)</u>	H x 41 where 41 is a conversion factor	unitless
H	<u>Henry's law constant</u>	<u>Substance-specific</u> <u>[chemical-specific]</u>	atm- m ³ /mo l

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

(PMC Exemptions and Variances)

(CONCEPT)

Proposed language is designed to:

- Consolidate PMC exemptions;
- Add the concept of *Historically Impacts Materials (Urban Soils)* to the coal ash section;
- Make corrections to the current coal ash section to address limitations to its use; and
- Relocate the *Wide Spread Polluted Fill* variance from 2(f) to this section of the RSRs to be grouped with other PMC options.

(CURRENT LANGUAGE)

(4) Exceptions.

(A) The pollutant mobility criteria do not apply to environmentally isolated soil provided an environmental land use restriction is in effect with respect to the parcel, or portion thereof, containing such soil which environmental land use restriction ensures that such soil will not be exposed to infiltration of soil water due to, among other things, demolition of the building.

(B) The pollutant mobility criteria do not apply to polluted fill on a parcel if: (i) such fill is polluted only with coal ash, wood ash, coal fragments, asphalt paving fragments, or any combination thereof; (ii) such fill is not polluted with any volatile organic substance which exceeds an applicable pollutant mobility criterion; (iii) the concentration of each substance in any such fill is consistent with the requirements established in subsection (b) of this section; (iv) such substance is not affecting and will not affect the quality of an existing or potential public water supply resource or an existing private drinking water supply; (v) a public water supply distribution system is available within 200 feet of such parcel and all parcels adjacent thereto; and (vi) the placement of the fill was not prohibited by law at the time of placement.

(PROPOSED LANGUAGE)

2(c)(4) Exceptions and Variances.

(A) Environmentally Isolated Soil.

The pollutant mobility criteria do not apply to environmentally isolated soil provided an environmental [land] use restriction is in effect with respect to the parcel, or portion thereof, containing such soil which environmental [land] use restriction ensures that such soil will not be exposed to infiltration of soil water due to, among other things, demolition of the building.

(B) Historically Impacted Material.

(i) The pollutant mobility criteria do not apply to Historically Impacted Material [polluted fill] on a parcel if:

[(i)](aa) such material [fill] is polluted in excess of remedial criteria only due to the presence of [only with] coal ash, wood ash, coal fragments, coal slag, coal clinkers, asphalt paving fragments, deposition from anthropogenic origin, or any combination thereof;

(bb) such material [fill] is not polluted with any volatile organic substance which exceeds an applicable pollutant mobility criterion, or applicable soil vapor volatilization criteria under an engineered control, building, or other permanent structure approved by the Commissioner;

- [(iii)](cc) [the concentration of each substance in any such fill is consistent] compliance with the requirements established in subsection (b) of this section is achieved;
- [(iv)](dd) such substance is not affecting and will not affect the quality of an existing or potential public water supply resource or an existing private drinking water supply;
- [(v)](ee) a public water supply distribution system is available within 200 feet of such parcel and all parcels adjacent thereto; and
- [(vi)](ff) the placement of the material [fill] was not prohibited by law at the time of placement.

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

(80% rule)

(CONCEPT)

Changes to this provision are needed to address the following:

- *Existing language is not protective in the event that the distribution of the pollution in soil is not uniform, which would allow hotspots under a building to be exempt.*
- *Compliance sampling frequency is made consistent with other compliance monitoring requirements.*
- *An error in the current language related to existing groundwater condition is modified, since "exceedances" would not be allowed under this provision.*
- *Proposed language would relate back to the new definition of a "diminishing state groundwater plume".*
- *Clarification is provided regarding the applicable groundwater criteria.*

(CURRENT LANGUAGE)

(C) The pollutant mobility criteria do not apply to substances, other than volatile substances, in soil at a release area provided:

(i) Such release area

(I) Is located in an area in which at least eighty percent of the release area has been subject to infiltration, and not obstructed by anthropogenic features, for a minimum of five years; or

(II) Has been determined by the Commissioner, in writing, to have been subject to sufficient infiltration of precipitation such that the concentration of the substance and the areal extent of the ground-water plume will not likely increase if any obstruction to infiltration is removed in the future; and

(ii) The analytical results of four consecutive quarterly samples of ground water for such substance:

(I) For a GA area or for an aquifer protection area or other ground-water area used as a source of public drinking water supply located in a GB area are all less than the surface-water protection criterion and the ground-water protection criterion; or

(II) For a GB area, are all less than the surface-water protection criterion; and

(iii) The ground-water sampling locations are representative of the areal extent of the ground-water plume and the areal extent of such ground-water plume which exceeds an applicable remedial criterion is not increasing over time;

(PROPOSED LANGUAGE)

(C) Soils Subject to Infiltration.

The pollutant mobility criteria do not apply to substances, other than volatile substances, in soil at a release area provided:

(i) Such release area:

[(I)(aa) Is located in an area in which at least eighty percent of the release area and eighty percent [the] of the contamination mass of the release area at the time of a final site closure, verification or interim verification, pursuant to Connecticut General Statutes 22a-134 (19) and (28), or as otherwise approved by the Commissioner, has been subject to infiltration, and infiltration has not been obstructed by anthropogenic features, for a minimum of five years; or

[(II)(bb) Has been determined by the Commissioner, in writing, to have been subject to sufficient infiltration of precipitation such that the concentration of the substance and the areal extent of the ground-water plume will not likely increase if any obstruction to infiltration is removed in the future;[and]

(ii) The analytical results of four ground-water sampling events, which reflect seasonal variability on a quarterly basis, were performed within two years prior to the most current sampling event [consecutive quarterly samples of ground water] for such substance~~[:]; and~~

[(I)(aa) For a GA area or for an aquifer protection area or other ground-water area used as a source of either private or public drinking water supply located in a GB area, such results are all less than the ground-water protection criterion listed in Appendix C or calculated using Appendix G and surface-water protection criterion listed in Appendix D or calculated using Appendix G or, if required, the lower of the human health or aquatic life criteria contained in Table 3 of the most recent Water Quality Standards [and the ground-water protection criterion]; or

[(II)(bb) For a GB area, such results are all less than the surface-water protection criterion listed in Appendix D or calculated using Appendix G or, if required, the lower of the human health or aquatic life criteria contained in Table 3 of the most recent Water Quality Standards;[and]

- (iii) The ground-water sampling locations are representative of the areal extent of the ground-water plume and demonstrate a diminishing state ground-water plume [the areal extent of such ground-water plume which exceeds an applicable remedial criterion is not increasing over time];
- (iv) Except for seasonal variations, the concentration of the subject substance is not increasing at any point over time; and
- (v) The ground-water samples are collected at locations where ground water is most likely to have been impacted by such substance from the release area.

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

(Pesticides)

(CONCEPT)

A partial exemption for soils impacted by the normal use of pesticides is proposed. If the specified conditions are met, the impacts from such pesticides would be exempted from other RSR requirements.

(CURRENT LANGUAGE)

(5) Incidental Sources

The pollutant mobility criteria do not apply to metals, petroleum hydrocarbons or semi-volatile substances in soil provided such pollution is the result of:

- (A) An incidental release due to the normal operation of motor vehicles, not including refueling, repair or maintenance of a motor vehicle; or
- (B) Normal paving and maintenance of a consolidated bituminous concrete surface provided such bituminous concrete surface has been maintained for its intended purpose

(PROPOSED LANGUAGE)

(5) Incidental Sources and Pesticides.

- (A) The pollutant mobility criteria do not apply to metals, petroleum hydrocarbons, or semi-volatile substances in soil provided such pollution is the result of:
 - [(A)](i) An incidental release due to the normal operation of motor vehicles, not including refueling, repair or maintenance of a motor vehicle; or
 - [(B)](ii) Normal paving and maintenance of a consolidated bituminous concrete surface provided such bituminous concrete surface has been maintained for its intended purpose.

(B) The pollutant mobility criteria do not apply to pesticides in soil resulting from application in accordance with accepted practices at the time of use and which are uniformly distributed, provided that the requirements of the incidental sources and pesticide sections for Direct Exposure Criteria 2(b)(4)(B) and Groundwater 3(f)(3) are met.

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

(Alternative DEC – EUR)

(CONCEPT)

Modify the RSR language to make consistent with changes to section 22a-133q of RCSA (ELURs).

(CURRENT LANGUAGE)

(2) Alternative Direct Exposure Criteria.

With respect to a substance except PCB for which a direct exposure criterion is specified in sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies, the Commissioner may approve an alternative direct exposure criterion and an alternative method for determining compliance with such criterion provided it is demonstrated to the satisfaction of the Commissioner, after consultation with the Commissioner of Public Health that the application of such alternative criterion at the subject release area will protect human health and the environment from the risks associated with direct exposure to polluted soil by ensuring that (A) the concentration of each carcinogenic substance in such soil does not exceed a 1×10^{-6} excess lifetime cancer risk level and the concentration of each non-carcinogenic substance in such soil does not exceed a hazard index of 1; or (B) for a release area polluted with multiple substances, the cumulative excess lifetime cancer risk for all carcinogenic substances in such soil does not exceed 1×10^{-5} , and the cumulative hazard index does not exceed 1 for non-carcinogenic substances in such soil with the same target organ. Any person requesting approval of an alternative direct exposure criterion shall submit to the Commissioner and the Commissioner of Public Health a risk assessment prepared in accordance with the most recent EPA Risk Assessment Guidance for Superfund or other risk assessment method approved by the Commissioner in consultation with the Commissioner of Public Health, and shall submit any additional information specified by the Commissioner or the Commissioner of Public Health.

(PROPOSED LANGUAGE)

(2) Alternative Direct Exposure Criteria.

(A) With respect to a substance except PCB for which a direct exposure criterion is specified in sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies, the Commissioner may approve an alternative direct exposure criterion and an alternative method for determining compliance with such criterion provided it is demonstrated to the satisfaction of the Commissioner, after consultation with the Commissioner of Public Health that the application of such

alternative criterion at the subject release area will protect human health and the environment from the risks associated with direct exposure to polluted soil by ensuring that (A) the concentration of each carcinogenic substance in such soil does not exceed a 1×10^{-6} excess lifetime cancer risk level and the concentration of each non-carcinogenic substance in such soil does not exceed a hazard index of 1; or (B) for a release area polluted with multiple substances, the cumulative excess lifetime cancer risk for all carcinogenic substances in such soil does not exceed 1×10^{-5} , and the cumulative hazard index does not exceed 1 for non-carcinogenic substances in such soil with the same target organ. Any person requesting approval of an alternative direct exposure criterion shall submit to the Commissioner and the Commissioner of Public Health a risk assessment prepared in accordance with the most recent EPA Risk Assessment Guidance for Superfund or other risk assessment method approved by the Commissioner in consultation with the Commissioner of Public Health, and shall submit any additional information specified by the Commissioner or the Commissioner of Public Health.

(B) An environmental use restriction is in effect with respect to such parcel, or the portion of such parcel containing such release area, which environmental use restriction ensures that the parcel or restricted portion thereof is not used in a manner that is inconsistent with the assumptions used to develop the alternative direct exposure criteria.

22a-133k-2(d)(3) and 22a-133k-2(d)(5)

(Alternative PMC)

(CONCEPT)

Clarify that a request can be made for either the alternative pollutant mobility criteria or alternative method for determining compliance.

(CURRENT LANGUAGE)

(3) Alternative Pollutant Mobility Criteria for GA Areas.

With respect to a substance occurring at a release area located in a GA area, and for which substance a pollutant mobility criterion is specified in sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies, the Commissioner may approve an alternative pollutant mobility criterion and an alternative method for determining compliance with such criterion, provided it is demonstrated to the Commissioner's satisfaction that the application of such alternative criterion at the subject release area will ensure that soil water at such release area will not exceed the ground-water protection criterion for such substance.

(5) Alternative Pollutant Mobility Criteria for GB Areas.

With respect to a substance occurring at a release area located in a GB area, and for which substance a pollutant mobility criterion is specified in sections 22a-133k-1 through 22a-

133k-3, inclusive, of the Regulations of Connecticut State Agencies, the Commissioner may approve an alternative pollutant mobility criterion and an alternative method for determining compliance with such criterion at such release area, provided it is demonstrated to the Commissioner's satisfaction that the application of such criterion will ensure that soil water at the release area, after dilution with ground water derived from infiltration on the parcel, will not exceed the ground-water protection criterion for such substance.

(PROPOSED LANGUAGE)

(3) Alternative Pollutant Mobility Criteria for GA Areas.

With respect to a substance occurring at a release area located in a GA area, and for which substance a pollutant mobility criterion is specified in sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies, the Commissioner may approve an:

- (A) alternative pollutant mobility criterion, or [and]
- (B) an alternative method for determining compliance with the pollutant mobility [such] criterion at such release area, provided it is demonstrated to the Commissioner's satisfaction that the application of such alternative criterion at the subject release area will ensure that soil water at such release area will not exceed the ground-water protection criterion for such substance.

(5) Alternative Pollutant Mobility Criteria for GB Areas.

With respect to a substance occurring at a release area located in a GB area, and for which substance a pollutant mobility criterion is specified in sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies, the Commissioner may approve an:

- (A) alternative pollutant mobility criterion, or [and]
- (B) an alternative method for determining compliance with the pollutant mobility [such] criterion at such release area, provided it is demonstrated to the Commissioner's satisfaction that the application of such criterion will ensure that soil water at the release area, after dilution with ground water derived from infiltration on the parcel, will not exceed the ground-water protection criterion for such substance.

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

(PCBs)

(CONCEPT)

The alternative DEC provision for PCBs needs clarification that the option is only available for inaccessible soil.

(CURRENT LANGUAGE)

22a-133k-2(d)(7) Alternative Direct Exposure Criterion for PCB.

The Commissioner may approve an alternative direct exposure criterion for PCB including an alternative direct exposure criterion for an inaccessible soil polluted with PCB, and an alternative method for determining compliance with such criterion, provided it is demonstrated to the satisfaction of the Commissioner after consultation with the Commissioner of Public Health that the application of such alternative criterion at the subject release area will protect human health and the environment from the risks associated with direct exposure to soil polluted with PCB and is consistent with 40 CFR Part 761 and with the "Guide on Remedial Actions at Superfund Sites with PCB Contamination" (EPA Directive 9355.4-01, August 1990).

(PROPOSED LANGUAGE)

(7) Alternative Inaccessible Soil Direct Exposure Criterion for PCB.

The Commissioner may approve [an alternative direct exposure criterion for PCB including] an alternative direct exposure criterion for an inaccessible soil polluted with PCB, [and an alternative method for determining compliance with such criterion,] provided it is demonstrated to the satisfaction of the Commissioner after consultation with the Commissioner of Public Health that the application of such alternative criterion at the subject release area will protect human health and the environment from the risks associated with direct exposure to soil polluted with PCB, [and] is consistent with 40 CFR Part 761 and with the "Guide on Remedial Actions at Superfund Sites with PCB Contamination" (EPA Directive 9355.4-01, August 1990), and that an environmental land use restriction is in effect that ensures such soils will not be exposed as a result of excavation, demolition or other activities.

22a-133k-2(d)(8)(NEW)

(Alt. PMC Site-specific Calculation)

(CONCEPT)

This proposal is intended to allow self-implementing site-specific fate and transport-based evaluations to derive alternative PMC criteria. This self-implementing derivation is intended to result in soil cleanup criteria that incorporates consideration of a site's attenuation capacity but still results in groundwater that meets the applicable risk-based criteria.

(PROPOSED LANGUAGE)

(8) Alternative Site-specific Pollutant Mobility Criteria.

Site-specific pollutant mobility criteria for a substance may be calculated using the equations in Appendix H to sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies, provided that:

- (A) The analytical results of four ground-water sampling events, which reflect seasonal variability on a quarterly basis, were performed within two years prior to the most current sampling event for such substance, and:
- (i) For a GA area or for an aquifer protection area or other ground-water area used as a source of either private or public drinking water supply located in a GB area, such results are all less than the volatilization protection criteria in Appendix E, the ground-water protection criteria in Appendix C, and the surface-water protection criterion in Appendix D or, if required, the lower of the human health or aquatic life criteria contained in Table 3 of the most recent Water Quality Standards; or
 - (ii) For a GB area, such results are all less than the volatilization protection criteria in Appendix E and the surface-water protection criterion in Appendix D or, if required, the lower of the human health or aquatic life criteria contained in Table 3 of the most recent Water Quality Standards; and
- (B) The ground-water sampling locations are representative of the areal extent of the ground-water plume and such plume is a diminishing state groundwater plume.

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

(PMC Compliance)

(CONCEPT)

Modify an error in the current language by replacing the term "direct exposure criteria" with "pollutant mobility criteria".

(CURRENT LANGUAGE)

(A) (i) a representative sampling program consisting of not less than twenty samples of soil located above the water table has been used to characterize the distribution and concentration of such substance at the subject release area or remaining at the subject release area following remediation, and (ii) the ninety-five percent upper confidence level of the arithmetic mean of all the sample results of laboratory analyses of soil from the subject release area for such substance is equal to or less than the applicable pollutant mobility criterion or the results of all laboratory analyses of samples from the subject release area are equal to or less than the applicable direct exposure criterion; or

(PROPOSED LANGUAGE)

- (A) (i) a representative sampling program consisting of not less than twenty samples of soil located above the water table has been used to characterize the distribution and concentration of such substance at the subject release area or remaining at the subject release area following remediation, and
- (ii) the ninety-five percent upper confidence level of the arithmetic mean of all the sample results of laboratory analyses of soil from the subject release area for such substance is equal to or less than the applicable pollutant mobility criterion or the results of all

laboratory analyses of samples from the subject release area are equal to or less than the applicable pollutant mobility criterion [direct exposure criterion]; or

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

(WSPF)

(CONCEPT)

- *Experience has shown that use of the Widespread Polluted Fill variance could be self-implementing in some settings.*
- *There is also a need for better-defined requirements for use of this provision in non-harbor settings.*
- *The requirement for the fill to extend onto multiple parcels has been removed.*
- *Since this is an option for dealing with PMC issues, this provision will be moved to 2(c)(2).*

(CURRENT LANGUAGE)

(1) Widespread Polluted Fill.

The Commissioner may grant a variance from any of the requirements of subsection (c) of this section upon the written request of the owner of the subject parcel if the Commissioner determines that (A) geographically extensive polluted fill is present at such parcel and at other parcels in the vicinity of the subject parcel; (B) such fill is not polluted with volatile organic substances; (C) such fill is not affecting and will not affect the quality of an existing or potential public water supply resource or an existing private drinking water supply; (D) the concentration of each substance in such fill is consistent with subsection (b) of this section; and (E) the placement of such fill was not prohibited by law at the time of placement. In determining whether to grant or deny such a variance, the Commissioner may consider the relative cost of compliance with subsection (c) of this section, how extensive the polluted fill is, what relative proportion of such fill occurs on the subject parcel, and whether the person requesting the variance is affiliated with any person responsible for such placement through any direct or indirect familial relationship or any contractual, corporate or financial relationship other than that by which such person's interest in such parcel is to be conveyed or financed.

(PROPOSED LANGUAGE)

(1) Widespread Polluted Fill.

(A) The Commissioner may grant a variance from [any of the requirements of subsection (c) of this section upon the written request of the owner of the subject parcel if the Commissioner determines that (A)] pollutant mobility criteria for geographically extensive polluted fill [is] present at [such] a parcel, [and at other parcels in the vicinity of the subject parcel;] provided that:

- [B](i) such fill is not polluted with volatile organic substances in excess of the applicable pollutant mobility criteria;
- (ii) such fill is not polluted by other releases subsequent to the placement of the fill at concentrations in excess of either:
 - (aa) the applicable pollutant mobility criteria or,

- (bb) a background concentration for such substances in the polluted fill that exceeds the applicable pollutant mobility criteria;
- [C](iii) such fill is not affecting and will not affect the quality of an existing or potential public water supply resource or an existing private drinking water supply;
- [D](iv) the concentration of each substance in such fill is consistent with the requirements of Direct Exposure Criteria subsection (b) of this section and groundwater at the parcel is in compliance with Ground-water Section 22a-133k-3; and
- [E](v) the placement of such fill was not prohibited by law at the time of placement; and
- (vi) an environmental use restriction is in effect which provides notice that a variance from pollutant mobility criteria due to geographically extensive polluted fill on the parcel has been granted.

(B) The Commissioner may approve a request for a variance under section (A), to pollutant mobility criteria based on factors including: [In determining whether to grant or deny such a variance, the Commissioner may consider]

- (i) availability of a public water supply distribution system to all areas between the plume and the downgradient surface water discharge point;
- (ii) the relative cost of compliance with pollutant mobility criteria subsection (c) of this section[.];
- (iii) the degree to which such fill exceeds pollutant mobility criteria;
- (iv) the proportion of such fill on the subject parcel that extends below the water table;
- (v) how extensive the polluted fill is[.];
- (vi) what relative proportion of such fill occurs on the subject parcel[.];
- (vii) whether the fill was related to a municipal, commercial, or industrial waste landfill;
- (viii) the existing surface water quality; [and]
- (ix) whether the person requesting the variance or the owner of the parcel subject to the variance is affiliated with any person responsible for such placement through any direct or indirect familial relationship or any contractual, corporate or financial relationship other than that by which such person's interest in such parcel is to be conveyed or financed; and
- (x) any other information the Commissioner reasonably deems necessary to evaluate such request.

(C) A variance to pollutant mobility criteria under section (A) does not require the Commissioner's approval if the following conditions are also met:

- (i) such fill is located within the coastal boundary mapped in accordance with Connecticut General Statutes section 22a-94 and is within an area with a groundwater classification of GB;
- (ii) such fill extends over an area of five acres or greater;
- (iii) a public water supply distribution system is available to all areas between the plume and the downgradient surface water discharge point;
- (iv) demonstration has been made that the fill was not related to hazardous waste as specified in 22a-449(c)-101, 104 or -105 RCSA; and
- (v) except in the case of a municipality, state, or federal agency, the person performing the remediation and the owner of the parcel subject to the exemption did not place the fill on the subject parcel and is not affiliated with any person responsible for

such placement through any direct or indirect familial relationship or any contractual, corporate or financial relationship other than that by which such person's interest in such parcel is to be conveyed or financed.

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

(Engineered Control)

(CONCEPT)

Proposed revisions to Engineering Control language include:

- *Creation of a self-implementing Engineered Control for default designs to render soil inaccessible;*
- *Adding the concept that solar arrays mounted on concrete ballast with 2 feet of clean material are suitable for use as ECs;*
- *Adding the concept of Immobilization, both for a low permeability measure as an alternative to a cap, and also for a method to chemically or physically reduce leachability;*
- *An Immobilization EC can be used below the water table;*
- *An Immobilization EC would require periodic groundwater monitoring;*
- *Inserting environmentally isolated language consistent with the previously revised definition;*
- *Modification to reflect consolidation of the existing Public Notice provision for ECs into section 1(d); and*
- *Moving language for surety to consolidate into section 1(f).*

(2) Engineered Control of Polluted Soils.

(CURRENT LANGUAGE)

(2) Engineered Control of Polluted Soils.

- (A) Provided that an engineered control of polluted soils is implemented pursuant to subparagraphs (B) and (C) of this subsection, the requirements of subsections (a) through (e) of this section do not apply if:
- (i) The Commissioner authorized the disposal of solid waste or polluted soil at the subject release area;
 - (ii) The soil at such release area is polluted with a substance for which remediation is not technically practicable;
 - (iii) The Commissioner, in consultation with the Commissioner of Public Health, has determined that the removal of such substance or substances from such release area would create an unacceptable risk to human health; or
 - (iv) The Commissioner has determined, after providing notice and an opportunity for a public hearing, that a proposal by the owner of the subject parcel to use an engineered control is acceptable because (aa) the cost of remediating the polluted soil at such release area is significantly greater than the cost of installing and maintaining an engineered control for such soil and conducting ground-water monitoring at such release area in accordance with subsection (g) of section 22a-133k-3, and (bb) that the significantly

greater cost outweighs the risk to the environment and human health if the engineered control fails to prevent the mobilization of a substance in the soil or human exposure to such substance. The Commissioner may hold a public hearing pursuant to this section if in his discretion the public interest will be best served thereby, and he shall hold a hearing upon receipt of a petition signed by at least twenty-five persons. Notice of the subject proposal shall be provided by the owner of the subject parcel in two of the three following manners: (i) by publication in a newspaper of substantial circulation in the affected area; (ii) by placing and maintaining on the subject parcel, for at least thirty days, in a legible condition a sign which shall be not less than six feet by four feet which sign shall be clearly visible from the public highway; or (iii) by mailing notice to the owner of record of each property abutting the subject parcel at his address on the most recent grand tax list of the municipality or municipalities in which such properties are located. When notice is published or mailed, it shall include the name and address of owner of the subject parcel; the location address and/or a description of the location such parcel; a brief description of the nature of the pollution on the subject parcel; a brief description of the proposed engineered control; and a brief description of the procedures for requesting a hearing. When notice is provided by posting a sign, the sign shall include the words "Environmental remediation is proposed for this site. For further information contact..." and shall include the name and telephone number of an individual from whom any interested person may obtain information about the remediation. The owner of the subject parcel shall verify to the Commissioner in writing on a form furnished by him that notice has been given in accordance with this subsection.

(B) A request to use an engineered control shall be submitted to the Commissioner in writing and shall be accompanied by a detailed written report and plan which demonstrates that:

- (i) (I) if the engineered control is to address exceedances of the direct exposure criteria, the proposed engineered control has been designed and will be constructed to physically isolate polluted soil; or (II) if the engineered control is to address exceedances of the pollutant mobility criteria, the proposed engineered control has been designed and will be constructed to minimize migration of liquids through soil and have a permeability of less than 10^{-6} cm/sec or, unless otherwise specified by the Commissioner in writing, to have the permeability specified in a closure plan implemented under sections 22a-209-1 et seq of the Regulations of Connecticut State Agencies for a release area which is a lawfully authorized solid waste disposal area; and
- (ii) for all engineered controls, the proposed engineered control has been designed and will be constructed to function with minimum maintenance, to promote drainage and minimize erosion of or other damage to such control, and to accommodate settling and subsidence of the underlying soil so as to maintain the control's functional integrity;
- (iii) plans for ground-water monitoring at the subject release area are adequate to ensure that any substance migrating therefrom will be detected;
- (iv) plans for maintenance of the subject release area are adequate to ensure that the structural integrity, design permeability, and effectiveness of the engineered control will be maintained; such plans shall include without limitation measures to prevent run-on and run-off of storm water from eroding or otherwise damaging the engineered control and measures to repair such control to correct the effects of any settling, subsidence, erosion or

other damaging events or conditions;

(v) an environmental land use restriction is or will be in effect with respect to the parcel at which the subject release area is located, which restriction ensures that such parcel will not be used in a manner that could disturb the engineered control or the polluted soil;

(vi) any other information that the Commissioner reasonably deems necessary; and

(vii) with respect to any release area subject to any of the requirements of section 22a-209-4(i) or section 22a-449(c)-100 through 110 of the Regulations of Connecticut State Agencies, all such requirements are or will be satisfied. With respect to a release area which is not subject to any such regulations, the owner of the subject parcel shall demonstrate that he or she has posted or will post a surety in a form and amount approved in writing by the Commissioner, which surety during the first year after installation of the engineered control shall be equal to the cost of one year's maintenance and monitoring of the engineered control, and which in each subsequent year shall be increased in amount by adding an amount equal to the cost of one year's maintenance and monitoring, until the total amount of such surety is equal to the cost of five year's of maintenance and monitoring, which amount shall be maintained in effect for the next twenty-five years or for such other period as may be required by the Commissioner.

- (C) When the Commissioner approves a request pursuant to this subsection to use an engineered control he may require that such control incorporate any measures which he deems necessary to protect human health and the environment. Any person implementing an engineered control under this subsection shall perform all actions specified in the approved engineered control proposal including the recordation of the environmental land use restriction and posting of the surety, and any additional measures specified by the Commissioner in his approval of such plan. Nothing in this subdivision shall preclude the Commissioner from taking any action he deems necessary to protect human health or the environment if an approved engineered control fails to prevent the migration of pollutants from the release area or human exposure to such pollutants.

(PROPOSED LANGUAGE)

(2) Engineered Control of Polluted Soils.

(A) Provided that an engineered control of polluted soils is implemented pursuant to either of subparagraphs (E) and (B) [and] or (D)[(C)] of this subsection, the requirements of subsections (a) through (e) of this section do not apply if:

- (i) the Commissioner authorized the disposal of solid waste or polluted soil at the subject release area;
- (ii) the soil at such release area is polluted with a substance for which remediation is not technically practicable;
- (iii) the Commissioner, in consultation with the Commissioner of Public Health, has determined that the removal of such substance or substances from such release area would create an unacceptable risk to human health; or
- (iv) either the Commissioner [has determined], or a Licensed Environmental Professional as allowed under subparagraph (C) of this subsection, [after providing

notice and an opportunity for a public hearing,] has determined that a proposal by the owner of the subject parcel to use an engineered control is acceptable because:

- (aa) public notice of the subject proposal has been provided by the owner of the subject parcel in accordance with section 22a-133k-1(e)(1)(C), along with an opportunity for public hearing in accordance with section 22a-133k-1(e)(2);
- (bb) the cost of remediating the polluted soil at such release area is significantly greater than the cost of installing and maintaining an engineered control for such soil and conducting ground-water monitoring at such release area in accordance with subsection (g) of section 22a-133k-3; and
- (cc) that the significantly greater cost outweighs the risk to the environment and human health if the engineered control fails to prevent the mobilization of a substance in the soil or human exposure to such substance.

[the cost of remediating the polluted soil at such release area is significantly greater than the cost of installing and maintaining an engineered control for such soil and conducting ground-water monitoring at such release area in accordance with subsection (g) of section 22a-133k-3, and (bb) that the significantly greater cost outweighs the risk to the environment and human health if the engineered control fails to prevent the mobilization of a substance in the soil or human exposure to such substance. The Commissioner may hold a public hearing pursuant to this section if in his discretion the public interest will be best served thereby, and he shall hold a hearing upon receipt of a petition signed by at least twenty-five persons. Notice of the subject proposal shall be provided by the owner of the subject parcel in two of the three following manners: (i) by publication in a newspaper of substantial circulation in the affected area; (ii) by placing and maintaining on the subject parcel, for at least thirty days, in a legible condition a sign which shall be not less than six feet by four feet which sign shall be clearly visible from the public highway; or (iii) by mailing notice to the owner of record of each property abutting the subject parcel at his address on the most recent grand tax list of the municipality or municipalities in which such properties are located. When notice is published or mailed, it shall include the name and address of owner of the subject parcel; the location address and/or a description of the location such parcel; a brief description of the nature of the pollution on the subject parcel; a brief description of the proposed engineered control; and a brief description of the procedures for requesting a hearing. When notice is provided by posting a sign, the sign shall include the words “Environmental remediation is proposed for this site. For further information contact...” and shall include the name and telephone number of an individual from whom any interested person may obtain information about the remediation. The owner of the subject parcel shall verify to the Commissioner in writing on a form furnished by him that notice has been given in accordance with this subsection.]

- (B) [A request to use] An application on a form prescribed by the Commissioner requesting the use of an engineered control [shall be] submitted to the Commissioner [in writing and], or notice on a form prescribed by the Commissioner submitted to the Commissioner of the intent to use an engineered control under the provisions of subsection (D), shall be

accompanied by a detailed written report and plan, signed and sealed by a licensed environmental professional, which demonstrates [that]:

(i)

[I](aa) if the engineered control is to address exceedances of the direct exposure criteria, the proposed engineered control has been designed and will be constructed to physically isolate polluted soil by rendering it inaccessible; [or]

[if the engineered control is to address exceedances of the pollutant mobility criteria, the proposed engineered control has been designed and will be constructed to minimize migration of liquids through soil and have a permeability of less than 10^{-6} cm/sec or, unless otherwise specified by the Commissioner in writing, to have the permeability specified in a closure plan implemented under sections 22a-209-1 et seq of the Regulations of Connecticut State Agencies for a release area which is a lawfully authorized solid waste disposal area; and]

[II](bb) if the engineered control is to address exceedances of the pollutant mobility criteria, the proposed engineered control is either:

(I) adequate to environmentally isolate the soil with such exceedances and has been designed and will be constructed to minimize migration of liquids through soil, either by capping to achieve [and have] a permeability of less than 10^{-6} cm/sec or by the use of immobilization to reduce the permeability of the impacted soil to a permeability approved by the Commissioner, or
[unless otherwise specified by the Commissioner in writing, to have the permeability specified in a closure plan implemented under sections 22a-209-1 et seq of the Regulations of Connecticut State Agencies for a release area which is a lawfully authorized solid waste disposal area; or]

(II) adequate to otherwise immobilize contaminants in the soil exceeding the pollutant mobility criteria to achieve compliance with applicable groundwater criteria; and

(cc) if the engineered control is to address an ongoing residual source of pollution below the water table, the proposed engineered control has been designed and will be constructed to reduce the migration of contaminants from the pollution source by immobilization to achieve compliance with applicable groundwater criteria; and

(ii) for all engineered controls, the proposed engineered control has been designed and will be constructed to function with minimum maintenance, to promote drainage and minimize erosion of or other damage to such control, and to accommodate settling and subsidence of the underlying soil so as to maintain the control's functional integrity;

- (iii) The design of any proposed or existing paved surface or hardscape proposed for use as an engineered controls shall include specifications signed and sealed by a professional engineer indicating that the surface and sub-base materials are suitable for the intended use and are able to function with minimal maintenance and repair for fifteen years and shall be signed and sealed by a professional engineer;
- (iv) for engineered controls proposed under subparagraphs (B)(i)(bb) or (B)(i)(cc), plans for ground-water monitoring at the subject release area are adequate to ensure that any substance migrating therefrom will be detected;
- (v) plans for inspection and maintenance of the subject release area are adequate to ensure that the structural integrity, design permeability, and effectiveness of the engineered control will be maintained; such plans shall include without limitation measures to evaluate the continued effectiveness of the engineered control, prevent run-on and run-off of storm water from eroding or otherwise damaging the engineered control and measures to repair such control to correct the effects of any settling, subsidence, erosion or other damaging events or conditions;
- (vi) an environmental [land] use restriction is or will be in effect with respect to the parcel at which [the subject release area] the engineered control is located, which environmental use restriction ensures that such parcel will not be used in a manner that could disturb the engineered control or the polluted soil;
- (vii) any other information that the Commissioner reasonably deems necessary; and
- (ix) Financial assurance associated with an engineered control shall meet the requirements of subsection 1(f) of these regulations. [with respect to any release area subject to any of the requirements of section 22a-209-4(i) or section 22a-449(c)-100 through 110 of the Regulations of Connecticut State Agencies, all such requirements are or will be satisfied. With respect to a release area which is not subject to any such regulations, the owner of the subject parcel shall demonstrate that he or she has posted or will post a surety in a form and amount approved in writing by the Commissioner, which surety during the first year after installation of the engineered control, shall be equal to the cost of one year's maintenance and monitoring of the engineered control, and which in each subsequent year shall be increased in amount by adding an amount equal to the cost of one year's maintenance and monitoring, until the total amount of such surety is equal to the cost of five year's of maintenance and monitoring, which amount shall be maintained in effect for the next twenty-five years or for such other period as may be required by the Commissioner].

[(D)](C) When the Commissioner approves a request pursuant to this subsection to use an engineered control he may require that such control incorporate any measures which he deems necessary to protect human health and the environment.

(D) A licensed environmental professional may, in lieu of Commissioner approval certify the use of certain engineered controls, specified in this subdivision (D), is compliant with the requirements of subparagraph (B)(i)(aa) of this subsection, that all other provisions of subparagraph (A), (B), (E), (F) and (G) are met, and that there are no PCB present in excess of 1 mg/kg. Such engineered controls shall meet the following:

- (i) for non-paved surfaces, consisting of shallow rooted vegetation, mulch, or gravel:
 - (aa) a minimum of one foot of material not exceeding applicable criteria underlain by a demarcation layer,
 - (bb) inspections accompanied by appropriate repair shall be conducted on a semi-annual basis and after significant storm events,
 - (cc) annual reports shall be submitted to the Commissioner, and
 - (dd) areas with existing mature lawns are exempt from the need to install a demarcation layer, but shall be inspected and repaired quarterly;

- (ii) for non-paved surfaces, consisting of shrubbery:
 - (aa) a minimum of eighteen inches of material not exceeding applicable criteria underlain by a demarcation layer suitable to inhibit root penetration,
 - (bb) inspections accompanied by appropriate repair shall be conducted on a semi-annual basis and after significant storm events,
 - (cc) annual reports shall be submitted to the Commissioner, and
 - (dd) areas with existing mature shrubs are exempt from the need to install a demarcation layer, but shall be inspected and repaired quarterly;

- (iii) for non-paved surfaces, consisting of hardscape:
 - (aa) a minimum of nine inches as a combined thickness of hardscape and suitably engineered sub-base consisting of material not exceeding applicable criteria and a demarcation layer,
 - (bb) inspections accompanied by appropriate repair shall be conducted each spring and after significant storm events,
 - (cc) annual reports shall be submitted to the Commissioner, and
 - (dd) areas with existing hardscapes are exempt from the need to install a demarcation layer, but shall be inspected and repaired semi-annually;

- (iv) for paved surfaces:
 - (aa) a minimum of two and one-half (2.5) inches of bituminous concrete or three inches of reinforced concrete, and six inches of suitably engineered sub-base consisting of material not exceeding applicable criteria or is in compliance with section 1(a)(32)(C) and a demarcation layer,
 - (bb) inspections accompanied by appropriate repair shall be conducted each spring,
 - (cc) annual reports shall be submitted to the Commissioner, and
 - (dd) areas with existing paved surfaces are exempt from the need to install a demarcation layer;

- (v) for a concrete ballast, ground-mounted solar array:
 - (aa) a minimum of two feet of material not exceeding applicable criteria underlain by a demarcation layer,
 - (bb) inspections accompanied by appropriate repair shall be conducted on a semi-annual basis and after significant storm events, and
 - (cc) annual reports shall be submitted to the Commissioner;
- (vi) designs for engineered control pursuant to subparagraphs (iii) and (iv) shall be signed and sealed by a professional engineer in accordance with paragraph (B)(ii) of this subsection as being appropriately designed to work for their intended use, with minimal maintenance and repair; and
- (vii) for engineered controls subject to certification by a licensed environmental professional, the financial assurance required under subparagraph (B)(ix) of this subsection shall be calculated on a form prescribed by the Commissioner. Concurrent with the public notice process required under subsection 22a-133k-1(d)(1), such calculations along with a copy of the notice shall be submitted to the Commissioner.

(E) Any person implementing an engineered control under this subsection shall perform all actions specified in the approved engineered control proposal including:

- (i) the recordation of the environmental [land] use restriction and posting of the surety, [and] any additional measures specified by the Commissioner in his approval of such plan, and document the completion of such actions in a Final Engineered Control Completion Statement;
- (ii) submission of the Final Engineered Control Completion Statement that is:
 - (aa) within one hundred and twenty days following installation of the engineered control and prior to final site closure, verification or interim verification, pursuant to Connecticut General Statutes 22a-134 (19) and (28), and
 - (bb) accompanied by as built drawings and an opinion, on a form prescribed by the Commissioner, signed and sealed by a Licensed Environmental Professional, or for designs under subdivisions (B)(i)(bb)(I) or (B)(iii) by a professional engineer, verifying that the engineered control meets the performance objectives of this subsection;
- (iii) the property owner shall submit to the Commissioner an annual report describing the status of such engineered control beginning no later than one year following submittal of the Final Engineered Control Completion Statement, final site closure, verification, or interim verification, pursuant to Connecticut General Statutes 22a-134 (19) and (28), and continuing each year thereafter, on a form prescribed by the Commissioner; and
- (iv) Nothing in this subdivision shall preclude the Commissioner from taking any action he deems necessary to protect human health or the environment if an approved

engineered control fails to prevent the migration of pollutants from the release area or human exposure to such pollutants.

(F) No person shall disturb or interfere with the engineered control without prior approval by the Commissioner, except as allowed under 22a-133q. The property owner, shall inspect and maintain the engineered control as set forth in plans pursuant to (B)(iv) of this subsection.

22a-133k-2(g) (Removal of Non-aqueous Phase Liquids)

(CONCEPT)

Changes to the RSR language in 2(g) for "Removal of Non-aqueous Phase Liquids" are needed to allow for differentiation between migrating, mobile, or residual NAPL. These changes also limit the requirement for "practicable" rather than prudent to releases which are regulated by the Underground Storage Tank, PCBs, and Marine Terminal Programs. The present broader application of the term "practicable" to all LNAPL is unnecessarily restrictive because it limits flexibility. Where NAPL is allowed to remain, some land use restriction is necessary and compliance with groundwater and volatilization criteria still apply.

(CURRENT LANGUAGE)

Removal of light non-aqueous phase liquids from soil and ground water shall be conducted in accordance with section 22a-449(d)-106(f) of the Regulations of Connecticut State Agencies. Any other non-aqueous phase liquid shall be contained or removed from soil and ground water to the maximum extent prudent.

(PROPOSED LANGUAGE)

(1) Removal of [light] non-aqueous phase liquids from soil and ground water [shall be conducted in accordance with] that is required pursuant to sections 22a-449(d)-(1), 22a-449(d)-106, and 25-54cc-5 of the Regulations of Connecticut State Agencies and section 22a-467 of the Connecticut General Statutes shall be conducted in accordance with section 22a-449(d)-106(f) of the Regulations of Connecticut State Agencies.

(2) Any other non-aqueous phase liquids shall be contained or removed from soil and ground water as follows: [to the maximum extent prudent.]

(A) Migrating non-aqueous phase liquids shall be removed from the soil and groundwater to the extent that such non-aqueous phase liquids do not migrate;

(B) Non-aqueous phase liquids that are not migrating shall be removed from the soil and groundwater to the maximum extent prudent or contained, provided that such containment is approved by the Commissioner; and

- (C) The presence of non-aqueous phase liquids resulting from a release that is allowed to remain in place as the result of a maximum extent prudent determination is required to be recorded on the land records with an appropriate environmental use restriction to ensure such non-aqueous phase liquids will not be disturbed, and where applicable, be rendered inaccessible and environmentally isolated.

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

(Background)

(CONCEPT)

Because the definition for "background concentration" is being modified to include both "natural conditions" and "anthropogenic origin" the reference to "background" in the soil reuse provision for natural should be modified to prevent an unintended expansion of what is currently regulated as "natural soil."

(CURRENT LANGUAGE)

(4) Natural Soil.

Polluted soil may be used at any parcel of land if after treatment of such soil to reduce or remove substances: (A) any naturally-occurring substance is present therein in concentrations not exceeding background concentration for soil of such substance at the release area from which such soil is removed; and (B) no other substance is detectable in such soil at a concentration greater than its analytical detection limit.

(NEW LANGUAGE)

(4) Natural Soil.

Polluted soil may be used at any parcel of land if, after treatment of such soil to reduce or remove substances:

- (A) any [naturally-occurring] substance is present therein in concentrations not exceeding naturally-occurring conditions in [background concentration for] soil [of such substance] at the release area from which such soil is removed; and
- (B) no other substance is detectable in such soil at a concentration greater than its [analytical detection limit] reporting limit.

22a-133k-3 Groundwater

22a-133k-3(a)

(Background)

(CONCEPT)

These sections require the clean-up of groundwater to applicable criteria (depending on GA/GB area) or background. These revisions are needed to add in the groundwater background concepts, removed from the old definition of background. A revision is also being proposed to clarify that where groundwater is migrating from a GB to a GA area compliance with the stricter groundwater criteria is needed.

(CURRENT LANGUAGE)

(a) General.

- (1) Remediation of a ground-water plume shall result in the attainment of: (A) the requirements concerning surface water protection set forth in subsection (b) of this section and the requirements concerning volatilization set forth in subsection (c) of this section; or (B) the background concentration for ground water for each substance in such plume.
- (2) Remediation of a ground-water plume in a GA area shall also result in the reduction of each substance therein to a concentration equal to or less than the background concentration for ground water of such substance, except as provided in subsection (d) of this section.
- (3) Remediation of a ground-water plume in a GB area shall also result in the reduction of each substance therein to a concentration such that such ground-water plume does not interfere with any existing use of the ground water.

(PROPOSED LANGUAGE)

(a) General.

- (1) Remediation of a ground-water plume shall result in the attainment of:
 - (A) the requirements concerning surface water protection set forth in subsection (b) of this section and the requirements concerning volatilization set forth in subsection (c) of this section; or
 - (B) the background concentration:
 - (i) upgradient and representative of site [for] ground water unaffected by the subject release for each substance in such plume[.]; or

- (ii) where a release area is on a groundwater divide, the background concentration representative of site groundwater unaffected by the subject release for each substance in such plume.
- (2) Remediation of a ground-water plume in a GA area, or the portion of the groundwater plume migrating from a GB area into a GA area, shall also result in the reduction of each substance in the GA area therein [to a concentration] equal to [or less than]:
 - (A) the background concentration upgradient and representative of site [for] ground water unaffected by the subject release for [of] such substance, except as provided in subsection (d) of this section; or[.]
 - (B) where a release area is on a groundwater divide, the background concentration representative of site ground water unaffected by the subject release for each substance in such plume.
- (3) Remediation of a ground-water plume in a GB area shall also result in the reduction of each substance therein to a concentration such that such ground-water plume does not interfere with any existing use of the ground water.

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

(Watercourse)

(CONCEPT)

A definition is provided for “intermittent watercourse” in 1(a)(36); however, that term is not used in the RSRs. Instead, 3(b)(2) uses the term “intermittent stream.” A correction is being made for consistency. A revision is also being proposed to clarify that plumes discharging to tidal flats need to be addressed similarly to wetlands and intermittent watercourses.

(EXISTING LANGUAGE)

(2) If a ground-water plume (A) discharges to a wetland or an intermittent stream, or (B) the areal extent of such ground-water plume occupies more than...

(PROPOSED LANGUAGE)

(2) If a ground-water plume (A) discharges to a wetland, tidal flat, or an intermittent watercourse [stream], or (B) the areal extent of such ground-water plume occupies more than...

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

(WQS Reference language)

(CONCEPT)

Update reference to Appendix D of the WQS to Table 3.

(CURRENT LANGUAGE)

(B) the areal extent of such ground-water plume occupies more than 0.5%, or other percentage which is approved in writing by the Commissioner, of the upstream drainage basin of the stream to which such plume discharges measured from the intersection of stream and such ground-water plume, each substance therein shall be remediated to a concentration equal to or less than the applicable aquatic life criteria contained in Appendix D to the most recent Water Quality Standards, or equal to or less than an alternative water quality criterion adopted by the Commissioner in accordance with section 22a-426 of the General Statutes and paragraph 12b of the Water Quality Standards effective May 15, 1992.

(PROPOSED LANGUAGE)

(B) the areal extent of such ground-water plume occupies more than 0.5%, or other percentage which is approved in writing by the Commissioner, of the upstream drainage basin of the stream to which such plume discharges measured from the intersection of stream and such ground-water plume, each substance therein shall be remediated to a concentration equal to or less than the lower of the human health or [applicable] aquatic life criteria contained in Table 3 of the most recent Water Quality Standards, or equal to or less than an alternative water quality criterion adopted by the Commissioner in accordance with Water Quality Standards section 22a-426-9(a)(4).

22a-3(b)

(Alternative SWPC)

(CONCEPT)

- *Since the Q99 for a watercourse is much easier to access/calculate than the 7Q10, the RSRs will use the Q99 concept, upon adoption of Q99 in the Water Quality Standards.*
- *Consistent with the Department's long-standing policy, these revisions to the regulations limit a site-specific SWPC calculation to no more than 100 times the default SWPC (from Appendix D of the RSRs).*
- *An equation is provided for calculations of a site-specific Surface Water Protection Criteria for tidal situations.*

(CURRENT LANGUAGE)

(b) Surface-water protection criteria.

(1) Except as provided in subdivision (2) of this subsection, remediation of a ground-water plume which discharges to a surface water body shall result in the reduction of each substance therein to a concentration which is consistent with subdivision (2)(C) of subsection (g) of this section and which is equal to or less than the surface-water protection criterion or an alternative surface-water protection criterion established in accordance with subdivision (3) of this subsection.

(2) If a ground-water plume (A) discharges to a wetland or an intermittent stream, or (B) the areal extent of such ground-water plume occupies more than 0.5%, or other percentage which is approved in writing by the Commissioner, of the upstream drainage basin of the stream to which such plume discharges measured from the intersection of stream and such ground-water plume, each substance therein shall be remediated to a concentration equal to or less than the applicable aquatic life criteria contained in Appendix D to the most recent Water Quality Standards, or equal to or less than an alternative water quality criterion adopted by the Commissioner in accordance with section 22a-426 of the General Statutes and paragraph 12b of the Water Quality Standards effective May 15, 1992.

(3) Alternative surface-water protection criteria.

Alternative surface-water criteria may be calculated in accordance with subparagraph (A) of this subdivision or may be approved in writing by the Commissioner in accordance with subparagraph (B) of this subdivision.

(A) An alternative surface-water protection criterion may be calculated for a substance in Appendix D of the most recent Water Quality Standards by multiplying the lower of the human health or aquatic life criterion for such substance in said Appendix D by $[(0.25 \times 7Q_{10})/Q_{\text{plume}}]$ where Q_{plume} is equal to the average daily discharge of polluted ground water from the subject ground-water plume.

(B) The Commissioner may approve an alternative surface-water protection criterion to be applied to a particular substance at a particular release area. Any person requesting such approval shall submit to the Commissioner: (i) a report on the flow rate, under seven day ten year low flow conditions, of the surface water body into which the subject ground water plume discharges (ii) a report on other surface water or ground water discharges to the surface water body within one-half mile upstream of the areal extent of the ground-water plume, (iii) a report on the instream water quality, (iv) a report on the flow rate of the ground-water discharge from such release area to the surface water body and the extent and degree of mixing of such discharge in such surface water, and (v) and any other information the Commissioner reasonably deems necessary to evaluate such request. The Commissioner shall not approve an alternative surface-water protection criterion under this subparagraph unless the requester demonstrates that such criterion will protect all existing and proposed uses of such surface water.

(PROPOSED LANGUAGE)

(b) Surface-water protection criteria.

(1) General Requirements.

Except as provided in subdivision (2) of this subsection, remediation of a ground-water plume [which]that discharges to a surface water body shall result in the reduction of each substance therein to a concentration [which is consistent with subdivision (2)(C) of subsection (g) of this section and] [which]that is equal to or less than the surface-water protection criterion or an alternative surface-water protection criterion established in accordance with subdivision (3) of this subsection.

(2) Where a groundwater plume discharges to surface water bodies that have limited dilution, [if a ground-water plume]

(A) defined as either:

[(A)](i) [discharges to] a tidal flat, wetland, or an intermittent [steam] watercourse, or

[(B)](ii) [discharges at] a location where the areal extent of such ground-water plume occupies more than 0.5%, or other percentage [which]that is approved in writing by the Commissioner, of the upstream drainage basin of the [stream] water body to which such plume discharges measured from the intersection of the [stream] water body and such ground-water plume~~[,];~~

[(C)](B) each substance [therein] in such plume shall be remediated to a concentration equal to or less than the lower of the human health or [applicable] aquatic life criteria contained in Table 3 [Appendix D] of the most recent Water Quality Standards, or equal to or less than an alternative water quality criterion adopted by the Commissioner in accordance with Water Quality Standards [section 22a-426 of the General Statutes and paragraph 12b of the Water Quality Standards effective May 15, 1992].

(3) Alternative surface-water protection criteria.

Alternative surface-water protection criteria may be calculated in accordance with subparagraph (A), ~~(B) or (C)~~ of this subdivision or may be approved in writing by the Commissioner in accordance with subparagraph ~~(D)~~[(B)] of this subdivision.

[(A)] An alternative surface-water protection criterion may be calculated for a substance in Appendix D of the most recent Water Quality Standards by multiplying the lower of the human health or aquatic life criterion for such.]

(A) Alternative Surface-Water Protection Criteria – inland watercourse dilution calculation.

For a plume that discharges to a surface water body with a water quality classification of AA, A, or B, an alternative surface-water protection criterion may be calculated for a substance in Table 3 [Appendix D] of the most recent Water Quality Standards provided that:

- (i) the dilution factor shall be derived using the following equation:

$$DF = (0.25 \times (Q99)[7Q10])/Q_{\text{plume}}$$

<u>Terms</u>	<u>Description</u>	<u>Value</u>	<u>Units</u>
<u>DF</u>	<u>site-specific dilution factor</u>	<u>Substance-specific</u>	
<u>Q99</u>	<u>daily stream flow that is equaled or exceeded on 99 percent of days in the rearing and growth bioperiod</u>	<u>Calculated</u>	<u>ft³/sec</u>
<u>Q_{plume}</u>	<u>the average daily discharge of polluted groundwater from the subject ground-water plume</u> $Q_{\text{plume}} = KIA$	<u>Calculated</u>	<u>ft/ft</u>
<u>K</u>	<u>hydraulic conductivity</u>	<u>Calculated</u>	<u>ft/sec</u>
<u>I</u>	<u>hydraulic gradient</u>	<u>Calculated</u>	<u>ft/ft</u>
<u>A</u>	<u>area of flow = thickness of plume discharging to surface water</u> <u>watercourse * width of plume</u>	<u>Calculated</u>	<u>ft²</u>

[where Q_{plume} is equal to the average daily discharge of polluted ground water from the subject ground-water plume]

- (ii) the calculated dilution factor in subdivision (i) is multiplied by [multiplying] the lower of the human health or aquatic life criterion for such substance in said Table 3 [Appendix D], and
- (iii) such alternative surface-water protection criterion does not exceed one hundred times the surface-water protection criterion for the substance in Appendix D.

(B) Alternative Surface-Water Protection Criteria – coastal watercourse dilution calculation.

For a plume that discharges to a surface water body with a water classification of SA or SB, an alternative surface-water protection criterion may be calculated for substances in Table 3 of the most recent Water Quality Standards provided that:

- (i) the dilution factor shall be derived using the following equation:

$$DF = (W \times 0.25) \times L \times D / (0.5 \times Q_{\text{plume}})$$

<u>Terms</u>	<u>Description</u>	<u>Value</u>	<u>Units</u>
<u>D</u>	<u>mean depth of the water from mean low tide within width of plume discharging</u>	<u>Calculated</u>	<u>ft</u>
<u>DF</u>	<u>site-specific dilution factor</u>	<u>Substance-specific</u>	
<u>L</u>	<u>distance along the shoreline at which the groundwater plume intersects the surface water body</u>	<u>Calculated</u>	<u>ft</u>
<u>W</u>	<u>cross-sectional distance from one shoreline to the other for the tidally influenced water body under low tide conditions up to a maximum value for (0.25*watercourse width) or 100 feet</u>	<u>Calculated</u>	<u>ft</u>
<u>Q_{plume}</u>	<u>the average daily discharge of polluted groundwater from the subject groundwater plume</u> $Q_{\text{plume}} = KIA$	<u>Calculated</u>	<u>ft/ft</u>
<u>K</u>	<u>hydraulic conductivity</u>	<u>Calculated</u>	<u>ft/sec</u>
<u>I</u>	<u>hydraulic gradient</u>	<u>Calculated</u>	<u>ft/ft</u>
<u>A</u>	<u>area of flow = thickness of plume discharging to surface water * width of plume</u>	<u>Calculated</u>	<u>ft²</u>

- (ii) the calculated dilution factor in subdivision (i) is multiplied by the lower of the human health or aquatic life criterion for such substance in said Table 3, and
- (iii) such alternative surface-water protection criterion does not exceed one hundred times the surface-water protection criterion for the substance in Appendix D.

22a-3(b)(3)(C) (Alternative SWPC -Aquifer Dilution)

(CONCEPT)

This provision adds a multiplier to the SWPC for sites where the surface water discharge point is greater than 500 feet from the most downgradient compliance point. USGS Natural Attenuation Software (NAS) was used to model a conservative scenario to determine appropriate multipliers based on surface-water discharge distances. Sensitivity analysis was conducted with the NAS model using an aquifer with high hydraulic conductivity, no chemical or biological degradation, and no chemical retardation. This conservative scenario was used to simulate only the effects of dilution from the aquifer. The modeling showed a correlation between on-site dilution from the source area and having adequate dilution. This is not to be used in conjunction with other alternative SWPC provisions.

(PROPOSED LANGUAGE)

(B) Alternative Surface-water Protection Criteria – aquifer dilution calculation

For a plume that does not achieve the surface-water protection criteria, or aquatic life criteria, as applicable, an alternative criteria may be calculated provided that:

- (aa) within fifty feet of the source area of the groundwater plume, the concentration must decrease by a factor equal to or greater than five. This factor is calculated by dividing the groundwater concentration within the source area by the groundwater concentration within fifty feet downgradient of the source area; and
- (bb) the applicable criteria is multiplied by a dilution factor of five if the surface-water discharge point is greater than five hundred feet from the most downgradient groundwater sampling point used for compliance. An additional dilution factor of one may be applied for each additional one hundred feet between the most downgradient groundwater sampling point used for compliance and the surface water discharge point, with a maximum allowable dilution ratio of ten.

22a-3(b)(3)(D) (Alternative SWPC Commissioner Option)

(CONCEPT)

Modification to the Alternative SWPC Commissioner approval option was made to make this provision more usable.

(CURRENT LANGUAGE)

(B) The Commissioner may approve an alternative surface-water protection criterion to be applied to a particular substance at a particular release area. Any person requesting such approval shall submit to the Commissioner: (i) a report on the flow rate, under seven day ten year low flow conditions, of the surface water body into which the subject ground water plume discharges (ii) a report on other surface water or ground water discharges to the surface water body within one-half mile upstream of the areal extent of the ground-water plume, (iii) a report on the instream water quality, (iv) a report on the flow rate of the ground-water discharge from such release area to the surface water body and the extent and degree of mixing of such discharge in such surface water, and (v) and any other information the Commissioner reasonably deems necessary to evaluate such request. The Commissioner shall not approve an alternative surface-water protection criterion under this subparagraph unless the requester demonstrates that such criterion will protect all existing and proposed uses of such surface water.

(PROPOSED LANGUAGE)

[(B)](D) The Commissioner may approve an alternative surface-water protection criterion to be applied to a particular substance at a particular release area. The Commissioner shall not approve an alternative surface-water protection criterion under this subparagraph unless the requester demonstrates that such criterion will protect all existing and proposed uses of such surface water. Any person requesting such approval shall submit to the Commissioner:

- (i) a report on the flow rate, under Q99 [seven day ten year low] flow conditions, of the surface water body into which the subject ground water plume discharges;
- (ii) a report on other surface water or ground water discharges to the surface water body within one-half mile upstream of the areal extent of the ground-water plume[.];
- (iv) a report on the instream water quality[.];
- (v) a report on the flow rate of the ground-water discharge from such release area to the surface water body and the extent and degree of mixing of such discharge in such surface water[.]; and
- (vi) [and] any other information, the Commissioner reasonably deems necessary to evaluate such request
- [(v)] The Commissioner shall not approve an alternative surface-water protection criterion under this subparagraph unless the requester demonstrates that such criterion will protect all existing and proposed uses of such surface water].

22a-133k-3(c)(1)&(2)(Volatilization Criteria Applicability & Requirements)

(CONCEPT)

As laid out in the proposed 2003 RSR Revisions for volatilization criteria, the Department finds it technically appropriate to increase the depth for the applicability of the Volatilization Criteria to 30 feet beneath a building for non-petroleum substances (it is intended that the applicability depth will remain 15 feet for petroleum substances). Additionally, for non-petroleum substances, an evaluation of the vapor intrusion pathway will be required whenever the plume is both within 30 feet vertically and laterally from a “potentially occupied structure”. Proposed changes also include a correction for the language of the section to clarify that the Industrial/Commercial Volatilization Criteria is available for entire parcels that are restricted from residential use, not just the area of the parcels that have the plume beneath a building restricted from residential use.

(CURRENT LANGUAGE)

(c) Volatilization criteria.

- (1) Except as specified in subdivisions (2), (3), (4) and (5) of this subsection, all ground water polluted with a volatile organic substance within 15 feet of the ground surface or a building, shall be remediated such that the concentration of each such substance is equal to or less than the applicable residential volatilization criterion for ground water.
- (2) If ground water polluted with a volatile organic substance is below a building used solely for industrial or commercial activity, such ground water shall be remediated such that the concentration of such substance is equal to or less than the applicable industrial/commercial volatilization criterion for ground water, provided that an environmental land use restriction is in effect with respect to the parcel or portion

thereof upon which such building is located, which restriction ensures that the parcel or portion thereof will not be used for any residential purpose in the future and that any future use of the parcel or portion thereof is limited to industrial or commercial activity;

(PROPOSED LANGUAGE)

(1) Except as specified in subdivisions (2), (3), and (4) [and (5)] of this subsection,

- (A) all ground water polluted with a petroleum substance within 15 feet or other volatile organic substance within [15] 30 feet of the ground surface or from the lowest level of a building or potentially occupied structure, shall be remediated such that the concentration of each such substance is equal to or less than the applicable residential volatilization criterion for ground water[.];
- [2](B) if ground water polluted with a volatile organic substance is below a parcel [building] or portion thereof used solely for industrial or commercial activity, such ground water [shall] may be remediated such that the concentration of such substance is equal to or less than the applicable industrial/commercial volatilization criterion for ground water, provided that an environmental [land] use restriction is in effect with respect to the parcel or portion thereof [upon which such building is located], which environmental use restriction ensures that the parcel or portion thereof will not be used for any residential purpose in the future and that any future use of the parcel or portion thereof is limited to industrial or commercial activity; and
- (C) if ground water polluted with a volatile organic substance, other than a petroleum substance, exceeding the applicable volatilization criterion is within 30 feet of the ground surface and within 30 feet laterally from a potentially occupied structure, the potential for a complete vapor intrusion pathway into such potentially occupied structure shall be evaluated.

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

(Vapor Mitigation Requirements)

(CONCEPT)

Volatilization Criteria do not apply if mitigation has been used beneath a building; however, currently we have no way to track that the system continues to remain operational. This change would require an EUR to be recorded on the land records, which serves to notify future owners of the mitigation requirement and will require annual notice on the status of the system (similar to what is required in New Hampshire) as part of the EUR. Language was also changed to clarify that mitigation could be used for any “potentially occupied structure” with measures acceptable to the Commissioner, while leaving the option to demonstrate compliance using sub-slab soil vapor concentration only for structures that meet the definition of a building (requiring a slab).

(CURRENT LANGUAGE)

(B) The requirements of subdivision (1), (2), and (3) of this subsection do not apply if: (i) measures acceptable to the Commissioner have been taken to prevent the migration of such substance into any overlying building, (ii) a program is implemented to maintain and monitor all such measures, and (iii) notice of such measures has been submitted to the Commissioner on a form furnished by him which notice includes (aa) a brief description of the areal extent of the ground-water plume and of the area which exceeds any such volatilization or soil vapor criterion; (bb) a brief description of the method of controlling the migration of such substance into any overlying building; (cc) a plan for the monitoring and maintenance of such control method; and (dd) a map showing all existing buildings, the areal extent of the ground-water plume, and the location of such control method.

(PROPOSED LANGUAGE)

~~[(3)]~~⁽²⁾ (A) Remediation of a volatile organic substance to the volatilization criterion for ground water shall not be required if the concentration of such substance in soil vapors below a building is equal to or less than (i) the residential volatilization criterion for soil vapor or (ii) the industrial/commercial volatilization criterion for soil vapor, if such building is solely used for industrial or commercial activity and, an environmental land use restriction is in effect with respect to the parcel or portion thereof upon which such building is located, which restriction ensures that the parcel or portion thereof will not be used for any residential purpose in the future and that any future use of the parcel or portion thereof is limited to industrial or commercial activity.

(B) The requirements of subdivision (1)~~[,]~~ ^{and} (2)~~[, and (3)]~~ of this subsection do not apply if:

- (i) measures acceptable to the Commissioner have been taken to prevent the migration of such substance into any overlying building ~~or potentially occupied structure;~~^[,]
- (ii) a program is implemented to maintain and monitor all such measures~~;~~^[, and]
- (iii) notice of such measures has been submitted to the Commissioner on a form furnished by him which notice includes:
 - (aa) a brief description of the areal extent of the ground-water plume and of the area which exceeds any such volatilization or soil vapor criterion;
 - (bb) a brief description of the method of controlling the migration of such substance into any overlying building ~~or potentially occupied structure;~~
 - (cc) a plan for the monitoring and maintenance of such control method; and

- (dd) a map showing all existing buildings or potentially occupied structures, the areal extent of the ground-water plume, and the location of such control method[.];
- (iv) an environmental use restriction is in effect requiring such measures to remain in operation.

22a-133k-3(c)(4)

(Alternative Volatilization Criteria)

(CONCEPT)

Proposed changes for this section from a self-implementing calculation to Commissioner approval are due to the human-health implications of the site-specific and alternative criteria that can be calculated. Due to the addition of TAC formulas in Appendix G, the functionality of this provision has been increased.

(CURRENT LANGUAGE)

(4) Site-specific and alternative volatilization criteria.

(A) Site-specific residential volatilization criteria for ground water or soil vapor may be calculated using the equations in Appendix G to sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies.

(B) The Commissioner may approve an alternative volatilization criterion for ground water or for soil vapor to be applied to a substance at a particular release area. The Commissioner shall not approve any alternative criterion under this subparagraph unless it has been demonstrated that such criterion will ensure that volatile organic substances from such ground water or soil do not accumulate in the air of any structure used for residential activities at a concentration which, (i) for any carcinogenic substance creates a risk to human health in excess of a 10^{-6} excess lifetime cancer risk level, and for any non-carcinogenic substance does not exceed a hazard index of 1, or (ii) for a ground-water plume polluted with multiple volatile organic substances does not exceed a cumulative excess cancer risk level of 10^{-5} for carcinogenic substances, and for non-carcinogenic substances with the same target organ, the cumulative hazard index does not exceed 1.

(PROPOSED LANGUAGE)

[(4)](3) Site-specific and alternative volatilization criteria.

[(A) Site-specific residential volatilization criteria for ground water or soil vapor may be calculated using the equations in Appendix G to sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies.]

[(B)] For a substance at a particular release area [T] the Commissioner may approve site-specific volatilization criterion or an alternative volatilization criterion for ground water or for soil vapor which may be calculated using the equations in Appendix G to sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies [to be applied to a substance at a particular release area]. The Commissioner shall not approve any site-specific volatilization criterion or alternative criterion under this subparagraph unless it has been demonstrated that such criterion will ensure that volatile organic substances from such ground water or soil do not accumulate in the air of any potentially occupied structure [used for residential activities] at a concentration which,

- [(i)](A) for any carcinogenic substance creates a risk to human health in excess of a 10^{-6} excess lifetime cancer risk level, and for any non-carcinogenic substance does not exceed a hazard index of 1₁; or
- [(ii)](B) for a ground-water plume polluted with multiple volatile organic substances does not exceed a cumulative excess cancer risk level of 10^{-5} for carcinogenic substances, and for non-carcinogenic substances with the same target organ, the cumulative hazard index does not exceed 1.

22a-133k-3(c)(5) (Volatilization Downgradient Exception)

(CONCEPT)

Purpose of change is to add the concept of Notice of Activity and Use Limitation to the “best efforts” section by changing the reference to an Environmental Use Restriction and to make sure that the provisions in this section apply to any potentially occupied structure, rather than just a building, because a slab need not be present for a vapor intrusion issue to exist.

(CURRENT LANGUAGE)

(5) Exemption from volatilization criteria.

(A) The volatilization criteria do not apply to ground water polluted with volatile organic substances, where the water table is less than fifteen feet below the ground surface, if no building exists over the ground water polluted with volatile organic substances at a concentration above the applicable volatilization criteria, and (i) it has been documented that best efforts have been made to ensure that each owner of any parcel of land or portion thereof overlying such polluted ground water records an environmental land use restriction is in effect which ensures that no building is constructed over such polluted ground water; or (ii) the Commissioner has approved in writing a request demonstrating that no building can reasonably be expected to be constructed over the subject ground water or that natural attenuation or other methods of remediation will, within five years, reduce the concentration of volatile organic substances in such ground water to a concentration equal to or less than the applicable volatilization criteria.

(B) The volatilization criteria for ground water underlying an existing building do not apply to ground water polluted with volatile organic substances where the Commissioner has approved in writing and there have been implemented an indoor air monitoring program and measures to control the level of any such volatile organic substances in the air of the subject building.

(i) Any person seeking the Commissioner's approval of an indoor air monitoring program shall submit to him: a detailed written plan describing the proposed indoor air monitoring program, including but not limited to a description of the distribution and concentration of volatile organic compounds beneath the building, the location of proposed monitoring points, the proposed frequency of monitoring, the parameters to be monitored, and a description of proposed actions to be taken in the event such monitoring indicates that the monitored parameters exceed proposed specified concentrations and a proposed schedule for reporting to the Commissioner on the results of such monitoring for as long as monitoring is conducted at the site.

(ii) In approving any indoor air monitoring program pursuant to this subdivision, the Commissioner may impose any additional conditions he deems necessary to ensure that the program adequately protects human health. In the event that the Commissioner approves an indoor air monitoring program pursuant to this subparagraph, any person implementing such program shall perform all actions specified in the approved plan, and any additional measures specified by the Commissioner in his approval of such plan.

(PROPOSED LANGUAGE)

~~[(5)]~~(4) Exemption from volatilization criteria.

(A) The volatilization criteria do not apply to ground water polluted with volatile organic substances, where the water table is less than fifteen feet below the ground surface, if no building or potentially occupied structure exists over the ground water polluted with volatile organic substances at a concentration above the applicable volatilization criteria, and (i) it has been documented that best efforts have been made to ensure that each owner of any parcel of land or portion thereof overlying such polluted ground water records an environmental [land] use restriction is in effect which ensures that no building is constructed over such polluted ground water; or (ii) the Commissioner has approved in writing a request demonstrating that no building or potentially occupied structure can reasonably be expected to be constructed over the subject ground water or that natural attenuation or other methods of remediation will, within five years, reduce the concentration of volatile organic substances in such ground water to a concentration equal to or less than the applicable

volatilization criteria.

- (B) The volatilization criteria for ground water underlying an existing building or potentially occupied structure do not apply to ground water polluted with volatile organic substances where the Commissioner has approved in writing and there have been implemented an indoor air monitoring program and measures to control the level of any such volatile organic substances in the air of the subject building or potentially occupied structure.
- (i) Any person seeking the Commissioner's approval of an indoor air monitoring program shall submit to him: a detailed written plan describing the proposed indoor air monitoring program, including but not limited to a description of the distribution and concentration of volatile organic compounds beneath the building or potentially occupied structure, the location of proposed monitoring points, the proposed frequency of monitoring, the parameters to be monitored, and a description of proposed actions to be taken in the event such monitoring indicates that the monitored parameters exceed proposed specified concentrations and a proposed schedule for reporting to the Commissioner on the results of such monitoring for as long as monitoring is conducted at the site.
- (ii) In approving any indoor air monitoring program pursuant to this subdivision, the Commissioner may impose any additional conditions he deems necessary to ensure that the program adequately protects human health. In the event that the Commissioner approves an indoor air monitoring program pursuant to this subparagraph, any person implementing such program shall perform all actions specified in the approved plan, and any additional measures specified by the Commissioner in his approval of such plan.

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

(GA groundwater criteria)

(CONCEPT)

The language for this provision currently requires that a demonstration is made that background is below the GWPC; however, if background was above the GWPC, this would not be a useful provision. Because of this, an assumption is usually made that background is below the GWPC, but as written, this requirement would seem to necessitate a background demonstration to use this provision. Since the usefulness of having this requirement is questionable, it is proposed to be removed to clarify that a background demonstration is not necessary.

(CURRENT LANGUAGE)

(1) Ground water in a GA area may be remediated to a concentration for each substance therein equal to or less than the ground-water protection criterion for each such substance if, with respect to the subject ground-water plume: (A) the background concentration for ground water is equal to or less than such ground-water protection criterion; (B) a public water supply distribution system is available within 200 feet of the subject parcel, parcels adjacent thereto, and any parcel within the areal extent of such plume; (C) such groundwater plume is not located in an aquifer protection area; and (D) such ground-water plume is not located within the area of influence of any public water supply well.

(PROPOSED LANGUAGE)

- (1) Ground water in a GA area may be remediated to a concentration for each substance therein equal to or less than the ground-water protection criterion for each such substance if, with respect to the subject ground-water plume: [(A) the background concentration for ground water is equal to or less than such ground-water protection criterion; (B)]
- (A) a public water supply distribution system is available within 200 feet of the subject parcel, parcels adjacent thereto, and any parcel within the areal extent of such plume that exceeds applicable criteria;
- [(C)](B) such groundwater plume is not located in an aquifer protection area; and
- [(D)](C) such ground-water plume is not located within the area of influence of any public water supply well.

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

(Applicable Criteria)

(CONCEPT)

If a site has groundwater data prior to conducting soil or groundwater remediation and that data indicates the concentration is below the GWPC, active groundwater remediation should not be required to reach background. After both soil and groundwater remediation, compliance monitoring must be conducted to demonstrate compliance with the GWPC.

(CURRENT LANGUAGE)

(d) Applicability of Ground-water Protection Criteria.

(1) Ground water in a GA area may be remediated to a concentration...

(2) If prior to any ground-water remediation the maximum concentration of a substance in a ground-water plume in a GA area is equal to or less than the ground-water protection criteria, remediation of ground water to achieve background ground-water concentration is not required, provided that the extent of the ground-water plume is not increasing over time and, except for seasonal variations, the concentration of the subject substance in such

ground-water plume is not increasing at any point over time.

(PROPOSED LANGUAGE)

(d) Applicability of Ground-water Protection Criteria.

- (2) If prior to any soil or ground-water remediation the maximum concentration of a substance in a ground-water plume in a GA area is and has been equal to or less than the ground-water protection criteria, remediation of ground water to achieve background ground-water concentration is not required for a diminishing state groundwater plume, [provided that the extent of the ground-water plume is not increasing over time and, except for seasonal variations, the concentration of the subject substance in such ground-water plume is not increasing at any point over time.]

22a-133k-3(d)(4)(New)

(Alt. GWPC)

(CONCEPT)

The goal of an Alternative Groundwater Protection Criteria (Alternative GWPC) is to provide more flexibility in meeting groundwater cleanup goals in certain GA areas that are served by public water, based on reasonable assumptions regarding risk and known groundwater resource allocation. To uses this provision the source of the groundwater plume must be remediated and the groundwater plume shall be in a diminishing state. Also, the plume must be located within the area designated on the Potential Alternative GWPC Map, which is an area that is served by public water and is not within existing or proposed source areas for public water supply.

(PROPOSED LANGUAGE)

(4) Alternative Ground-water Protection Criteria.

Alternative groundwater protection criteria may be used if all requirements of subparagraph (A) and (B) are met and either an alternative groundwater protection criteria is calculated in accordance with subparagraph (C) or is approved in writing by the Commissioner in accordance with subparagraph (D) of this subsection:

- (A) Groundwater may be remediated to a concentration for each substance therein equal to or less than the alternative groundwater protection criterion for each such substance provided:
- (i) the subject plume is located within the area defined on the current Department's Potential Alternative GWPC Map;
 - (ii) there is no current use of the water resource, as evidenced by the following:
 - (aa) a public water supply distribution system is available within two hundred feet of the subject parcel, parcels adjacent thereto, and any parcel within the areal extent of such portion of the groundwater plume

- that exceeds background groundwater concentration,
- (bb) a public water supply distribution system is available to all areas between the groundwater plume and the downgradient surface water discharge point, and
 - (cc) no private water supply wells are in use for drinking purposes;
 - (iii) releases to soil that constitute a source of pollution resulting in the subject groundwater plume have been remediated so there is no longer an ongoing source in soil impacting groundwater;
 - (iv) this alternative groundwater protection criteria is not used in conjunction with subsection (2)(d) alternative pollutant mobility criteria for the same substance;
 - (v) groundwater monitoring has been completed in accordance with 22a-133k-3(g)(1) for any groundwater plume and for any remediated release area;
 - (vi) the subject groundwater plume is a diminishing state groundwater plume;
 - (vii) the groundwater complies with applicable surface water protection criteria and volatilization criteria; and
 - (viii) any groundwater plume located within a bedrock aquifer does not exceed the ground-water protection criteria.
- (B) Notice of the proposed use of an alternative groundwater protection criteria shall be provided on a form prescribed by the Commissioner, including:
- (i) documentation that the requirements of subparagraph (A) are met, including but not limited to a well receptor survey;
 - (ii) a map of the areal extent of such groundwater plume exceeding applicable criteria, and
 - (iii) demonstration of a diminishing state groundwater plume including but not limited to well construction diagrams, documentation of plume trends, and indicator parameters.
- (C) Alternative ground-water protection criteria is calculated for volatile organic substances using subdivision (i) and for semi-volatile organic substances, inorganics and pesticides using subdivision (ii). The alternative ground-water protection criteria shall not exceed one hundred times the Groundwater Protection Criteria listed in Appendix C, or calculated in Appendix G nor fifty percent of the applicable Volatilization Criteria listed in Appendix E, or calculated in Appendix G.
- (i) For volatile organic substances, the following equation shall be used to calculate the alternative ground-water protection criterion:

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

Terms	Description	Units	Value
<u>TAC</u>	<u>Target Indoor Air Concentration in Appendix G or additional TAC as approved by the Commissioner</u>	<u>(ug/m³)</u>	<u>Substance-specific</u>
<u>Alternative GWPC</u>	<u>Concentration in groundwater as alternative to groundwater protection criteria</u>	<u>ug/L</u>	<u>Calculated</u>
<u>f</u>	<u>fraction volatilized</u>	<u>unitless</u>	<u>0.5</u>
<u>HV</u>	<u>Volume</u>	<u>m³</u>	<u>1,000</u>
<u>ER</u>	<u>air exchange rate per day as a time weighted average</u>	<u>times per day</u>	<u>5.6</u>
<u>MC</u>	<u>mixing coefficient</u>	<u>unitless</u>	<u>0.5</u>
<u>WHF</u>	<u>Water Flow Rate</u>	<u>L/day</u>	<u>3,183</u>

- (ii) For Semi-Volatile Organic Compounds, Inorganic and Pesticides, the following equation shall be used to calculate the alternative ground-water protection criterion:

$$\text{Alternative GWPC} = \text{WSF} \times \text{RSC} \times \text{DEC} \times \text{UCF}$$

Terms	Description	Units	Value
<u>WSF</u>	<u>water to soil concentration factor based upon accumulation of arsenic in soil</u>	<u>(mg/L)/(mg/kg)</u>	<u>0.02</u>
<u>RSC</u>	<u>relative source contribution to account for other background contributions to semi-volatile organic compounds in soil</u>	<u>Unitless</u>	<u>0.2</u>
<u>DEC</u>	<u>Residential Direct Exposure Criterion</u>	<u>mg/kg</u>	<u>Substance-specific</u>
<u>UCF</u>	<u>Unit Conversion Factor</u>	<u>ug/mg</u>	<u>1,000</u>
<u>Alternative GWPC</u>	<u>Concentration in groundwater as alternative to GWPC</u>	<u>ug/L</u>	<u>Calculated</u>

- (D) A person may apply to the Commissioner for approval to use an alternative ground-water protection criterion for an area outside the Department's Potential Alternative GWPC Map, pursuant to the following:

- (i) Public water is available within two hundred feet of the subject parcel, parcels adjacent thereto, and any parcel within the areal extent of such portion of the groundwater plume that exceeds background groundwater concentrations that are not previously mapped on the current Department's Potential Alternative GWPC Map. In such circumstance, the applicant shall provide to the Commissioner on a form prescribed by the Commissioner:

- (aa) all requirements in 22a-133k-3(d)(3)(A) and 22a-133k-3(d)(3)(B);
- (bb) provide documentation from the water utility that public water is available, including an updated public water service area map indicating the area where public water is now available; and
- (cc) any other requirements determined by the Commissioner.

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

(Technical Impracticability)

(CONCEPT)

Update the process for getting a TI variance based on lessons learned through previous approvals, by clarifying the conditions necessary, information needed, long-term obligations, approval process and public notice requirements. A provision is also included to highlight the fact that for small plumes in simple geologic settings there is flexibility in the need for long-term obligations.

(CURRENT LANGUAGE)

(2) Variance Due to Technical Impracticability of Ground-water Remediation

The Commissioner may grant a variance from any of the requirements of this section if he finds that: non-aqueous phase liquids that cannot be contained or removed in accordance with R.C.S.A. section 22a-133k-2(g) are present; remediation to the extent technically practicable has reduced the concentration of pollutants in ground water to steady-state concentrations that exceed any applicable criteria; or achieving compliance with the applicable criteria is technically impracticable as determined using Directive No. 9234.2-25 issued September 1993 by the U.S. Environmental Protection Agency's Office of Solid Waste and Emergency Response.

- (A) Any person requesting a variance pursuant to this subsection from any ground-water protection criterion shall submit: (i) information concerning the concentration of each substance in the ground-water plume with respect to which a variance is sought; (ii) information demonstrating that (aa) the extent of the ground-water plume which exceeds such ground-water protection criterion has been reduced to the extent technically practicable, or (bb) it is not technically practicable to reduce the extent of the ground-water plume; (iii) the results of a study conducted to determine the risks to human health posed by the polluted ground water remaining after such reduction; (iv) if such study shows a risk or a potential risk to human health, a plan to eliminate such risk or potential risk; (v) an application to change the ground-water classification of such polluted ground water to GB in accordance with section 22a-426 of the General Statutes; and (vi) any other information the Commissioner reasonably deems necessary to evaluate such request.
- (B) Any person requesting a variance pursuant to this subsection from the requirement to remediate ground water to a concentration which does not exceed the applicable surface-water protection criteria shall submit information concerning the concentration of each substance in the ground-water plume with respect to which a variance is sought. If such information demonstrates that any such concentration exceeds any applicable surface-water protection criterion, such person shall also submit: (i) a map showing the areal extent

- of the ground-water plume that exceeds such surface-water protection criterion, and (ii) a plan for controlling the migration of such substance to the receiving surface water body.
- (C) If the Commissioner grants a variance pursuant to this subsection from any ground-water protection criterion, the person receiving the variance shall, no later than thirty days after the date of granting of such variance, submit to the Commissioner on a form prescribed and provided by him: (i) certification that written notice of the extent and degree of such pollution has been provided to each owner of property overlying the subject ground-water plume at which it is not technically practicable to remediate a substance to a concentration equal to or less than the ground-water protection criterion; (ii) certification that written notice of the presence of pollution on each such parcel and a description of the extent and degree of such pollution has been sent to the Director of Health of the municipality or municipalities in which the ground-water plume is located; and (iii) certification that best efforts have been made to ensure that each owner of property overlying the subject ground-water plume records an environmental land use restriction which ensures that the subject ground-water plume is not used for drinking or other domestic purposes;
- (D) If the Commissioner grants a variance pursuant to this subsection from the requirement to remediate ground water to a concentration which does not exceed the applicable surface-water protection criteria, the person receiving the variance shall perform all actions specified in the plan submitted with the request for such variance, and any additional actions required by the Commissioner in his approval of such plan or granting of such variance.

(PROPOSED LANGUAGE)

(3)(e)(2) Variance Due to Technical Impracticability of Ground-water Remediation

The Commissioner may grant a variance from [any of] the groundwater compliance requirements of this section for technical impracticability of groundwater remediation. [if he finds that: non-aqueous phase liquids that cannot be contained or removed in accordance with R.C.S.A. section 22a-133k-2(g) are present; remediation to the extent technically practicable has reduced the concentration of pollutants in ground water to steady-state concentrations that exceed any applicable criteria; or achieving compliance with the applicable criteria is technically impracticable as determined using Directive No. 9234.2-25 issued September 1993 by the U.S. Environmental Protection Agency's Office of Solid Waste and Emergency Response.]

(A) Applicability.

A Technical Impracticability variance may be granted if:

- (i) the pollution source, including but not limited to non-aqueous phase liquids, has been remediated to the maximum extent prudent, and remediated in accordance with 2(g);
- (ii) the resultant groundwater plume, after being remediated to the maximum extent prudent, continues to exceed any applicable criteria and is technically impracticable to achieve groundwater criteria in a reasonable timeframe;

- (iii) the mass of contaminant dissolved in the groundwater is in a steady-state or is a diminishing state groundwater plume, or the plume is hydraulically controlled, unless otherwise approved by the Commissioner; and
- (iv) the potential exposure risk is identified and managed to protect human health and the environment.

[A](B) Variance Request.

Any person requesting a Technical Impracticability variance pursuant to this subsection from any groundwater compliance requirements [ground-water protection criterion] shall submit on a form prescribed by the Commissioner a request including:

- (i) Information concerning the concentration of each substance in the ground-water plume with respect to which a variance is sought;
- (ii) A map showing the horizontal and vertical extent of the groundwater plume that exceeds or could be expected to exceed any applicable criterion;
- (iii) Information regarding all remedial efforts which were considered and any which were implemented for the source area, including remediation of non-aqueous phase liquids in accordance with Section (2)(g) and (3)(e)(2)(A)(i) of the regulations;
- (iv) Information demonstrating that:
 - (aa) it is not technically practicable to remediate the groundwater plume in a reasonable timeframe to meet applicable criterion,
 - (bb) the groundwater plume has been remediated to the maximum extent prudent, or a plan is submitted describing how this will be accomplished, and
 - (cc) withdrawals of water in the vicinity of the proposed TI Zone, will not induce movement of the contaminants into uncontaminated areas or interfere with proposed long-term measures;

[(ii) information demonstrating that (aa) the extent of the ground-water plume which exceeds such ground-water protection criterion has been reduced to the extent technically practicable, or (bb) it is not technically practicable to reduce the extent of the ground-water plume;]

[iii](v) The results of a study conducted to determine the risks to human health and the environment posed by the polluted ground water remaining after such remediation;

[iv](vi) If such study shows [a] an unacceptable risk or [a] potential risk to human health or the environment, a plan to eliminate such risk, or a contingency plan to eliminate such potential risk;

- (vii) A plan for appropriate long-term monitoring, operation, maintenance, and reporting, including:
 - (aa) Long-term groundwater monitoring to validate the conceptual site model presented in the Technical Impracticability variance request, which demonstrates that the plume is not increasing in size or concentration, or otherwise migrating in a manner that would alter the risk assumptions, and which confirms that unexpected risks to human health and the environment do not occur,
 - (bb) Land use monitoring, inspection, review and reporting to confirm that the selected remedy remains effective in its protectiveness,
 - (cc) Operation and maintenance of any associated approved controls, and
 - (dd) Financial assurance requirements associated with the plan;
- (ix) A justification for the determination that actions taken have met the requirements of being practical or prudent, as applicable, including a supporting cost benefit evaluation; and
- [(v) an application to change the ground-water classification of such polluted ground water to GB in accordance with section 22a-426 of the General Statutes; and]
- [vi](x) any other information the Commissioner reasonably deems necessary to evaluate such request.

(C) Limited Overburden Plumes.

A Technical Impracticability variance request which satisfies the requirements of subparagraphs (A), (B)(i) through (B)(iv), and (B)(x), and also meets the following conditions, may be exempt from the requirements of subparagraphs (B)(v) through (B)(ix) and (G), as approved by the Commissioner:

- (i) the portion of the plume subject to the TI Variance is limited to overburden, not extending into bedrock;
- (ii) the extent of the TI Zone does not extend more than one hundred feet beyond the property on which the release occurred;
- (iii) a study conducted to determine the risks to human health and the environment posed by the polluted ground water remaining after such remediation, restrictions and administrative controls concludes that there is no potential for the migration of contaminants exceeding remedial criteria beyond the TI Zone;

(D) Within thirty days of receiving notification from the Commissioner that the variance request is complete, the person requesting the variance shall provide public notice as specified in section 22a-133k-(1)(d)(1)(A) and (D) of these regulations.

(E) The Commissioner may approve, approve with conditions, including any mechanism to ensure long-term durability, or disapprove the Technical Impracticability request.

[(B) Any person requesting a variance pursuant to this subsection from the requirement to remediate ground water to a concentration which does not exceed the applicable surface-water protection criteria shall submit information concerning the concentration of each substance in the ground-water plume with respect to which a variance is sought. If such information demonstrates that any such concentration exceeds any applicable surface-water protection criterion, such person shall also submit: (i) a map showing the areal extent of the ground-water plume that exceeds such surface-water protection criterion, and (ii) a plan for controlling the migration of such substance to the receiving surface water body.]

(F) If the Commissioner grants a [variance] Technical Impracticability variance pursuant to this subsection from any groundwater compliance requirements [ground-water protection criterion], the person receiving the variance shall, no later than thirty days after the date of granting of such variance, submit to the Commissioner on a form prescribed by the [to the] Commissioner [on a form prescribed and provided by him]:

- (i) certification that written notice of the extent and degree of such pollution has been provided to each owner of property overlying the TI Zone [subject ground-water plume at which it is not technically practicable to remediate a substance to a concentration equal to or less than the ground-water protection criterion] the Director of Health of the municipality or municipalities in which the TI Zone [ground-water plume] is located; and
- (ii) if environmental use restrictions or other controls on future use of the TI Zone are required by the Commissioner in the approval of such plan or granting of such variance, certification that: [best efforts have been made to ensure]
 - (aa) each owner of property in the TI Zone [overlying the subject ground-water plume records] has recorded an environmental [land] use restriction which ensures that any use of the subject ground-water plume is consistent with the requirements of the approved site-specific Technical Impracticability variance including, but not limited to:
 - (I) groundwater [is] not being used for drinking or other domestic purposes[;], and
 - (II) no withdrawal of groundwater except for remedial measures in accordance with the approved plan, and water quality monitoring;
or
 - (bb) other controls are in place to prevent risks associated with exposure to the groundwater use.

(G) Long-Term Requirements.

If the Commissioner grants a variance pursuant to this subsection, consistent with the approved plan, the person receiving the variance shall, as applicable:

- (i) perform all actions required by the Commissioner to monitor or mitigate the effects of the contamination;
- (ii) submit five year reviews of the effectiveness of the plan approved under subparagraph (E) of this subsection and appropriateness of the TI Zone;
- (iii) if as a condition to the approval by the Commissioner under subparagraph (E) of this subsection, enter into long-term obligations associated with the Technical Impracticability variance, and a mechanism for enforcing such obligations; and
- (iv) establish and appropriately maintain financial assurance as specified under section 1(f).

[(D) If the Commissioner grants a variance pursuant to this subsection from the requirement to remediate ground water to a concentration which does not exceed the applicable surface-water protection criteria, the person receiving the variance shall perform all actions specified in the plan submitted with the request for such variance, and any additional actions required by the Commissioner in his approval of such plan or granting of such variance.]

22a-133k-3(f)

(Pesticides)

(CONCEPT)

A partial exemption is proposed for groundwater impacted by the normal use of pesticides, as described in the proposed definition. If the specified conditions are met, the impacts from such pesticides would be exempted from other RSR requirements.

(CURRENT LANGUAGE)

(f) Incidental Sources.

Remediation criteria for ground water do not apply to:

- (1) Trihalomethanes resulting from releases of drinking water from a public water supply system; or
- (2) Metals, petroleum hydrocarbons or semi-volatile substances provided such pollution is the result of:
 - (A) An incidental release due to the normal operation of motor vehicles, not including refueling, repair or maintenance of a motor vehicle; or
 - (B) Normal paving and maintenance of a consolidated bituminous concrete surface provided such bituminous concrete surface has been maintained for its intended purpose.

(PROPOSED LANGUAGE)

(f) Incidental Sources and Pesticides.

(1) The groundwater criteria [Remediation criteria for ground water] do not apply to:

[(1)](A) Trihalomethanes or other substances resulting from releases of drinking water from a public water supply system; or

[(2)](B) Metals, petroleum hydrocarbons, or semi-volatile substances, provided such pollution is the result of:

[(A)](i) An incidental release due to the normal operation of motor vehicles, not including refueling, repair or maintenance of a motor vehicle; or

[(B)](ii) Normal paving and maintenance of a consolidated bituminous concrete surface provided such bituminous concrete surface has been maintained for its intended purpose.

(2) The groundwater criteria do not apply to pesticides in groundwater resulting from application in accordance with accepted practices at the time of use, provided that:

(i) the nature of pesticides in the groundwater has been evaluated either on-site or downgradient of the site, or representative downgradient potable wells have been sampled;

(ii) any potable well on the subject parcel has been sampled;

(iii) a sensitive receptor survey identifying existing groundwater uses has been submitted to the Commissioner and the local director of health; and

(iv) written notice, on a form prescribed by the Commissioner, of the findings of subparagraphs (i), (ii), and (iii) are provided to the Commissioner, the local director of health, and the owners of adjacent parcels.

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

(MNA)

(CONCEPT)

The concept of Monitored Natural Attenuation (MNA) has been added to the section on what groundwater monitoring shall be designed to determine. The definition of MNA has also been added to the definition section to capture the concept that MNA shall not be designed to go on indefinitely.

(CURRENT LANGUAGE)

(1) Ground-water Monitoring.

Monitoring shall be designed to determine:

(A) The effectiveness of any soil remediation to prevent the pollution of ground water by substances from the release area;

(B) The effectiveness of any measures to render soil environmentally isolated;

(C) The effectiveness of any remediation taken to eliminate or minimize health or safety risks associated with such release or identified in any risk assessment conducted in accordance with subsection (e)(2) of this section or otherwise identified;

(D) Whether a substance in ground water in a GA area or an aquifer protection area meets the background concentration or ground-water protection criteria, as applicable, in accordance with the provisions of subdivision (2) of this subsection;

(E) Whether a substance in ground water meets the surface-water protection criteria and the applicable volatilization criteria in accordance with the provisions of subdivision (2) of this subsection; and

(F) Whether a ground-water plume in a GB area interferes with any existing use of the ground water for a drinking water supply or with any other existing use of the ground water, including but not limited to, industrial, agricultural or commercial purposes.

(PROPOSED LANGUAGE)

(1) Ground-water Monitoring.

Monitoring shall be designed to determine:

(A) The effectiveness of any soil remediation to prevent the pollution of ground water by substances from the release area;

(B) The effectiveness of any measures to render soil environmentally isolated;

(C) The effectiveness of any remediation taken to eliminate or minimize health or safety risks associated with such release or identified in any risk assessment conducted in accordance with subsection (e)(2) of this section or otherwise identified;

(D) Whether a substance in ground water in a GA area or an aquifer protection area meets the background concentration or ground-water protection criteria, as applicable, in accordance with the provisions of subdivision (2) of this subsection;

(E) Whether a substance in ground water meets the surface-water protection criteria and the applicable volatilization criteria in accordance with the provisions of subdivision (2) of this subsection; [\[and\]](#)

(F) Whether a ground-water plume in a GB area interferes with any existing use of

the ground water for a drinking water supply or with any other existing use of the ground water, including but not limited to, industrial, agricultural or commercial purposes[.]; and

(G) Whether natural attenuation is occurring in groundwater to achieve criteria within a reasonable timeframe if the groundwater remedy relies upon natural attenuation.

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

(95% quarterly sampling)

(CONCEPT)

Limiting compliance data to 2 years for 95% UCL for SWPC, 22a-133k-3(g)(2)(C)(i), may make it difficult to collect the number of samples necessary to properly calculate the 95% UCL under this provision. By not restricting the sampling to 2 years, larger data sets could be used, producing a more accurate calculation.

(CURRENT LANGUAGE)

(ii) For determining compliance with an applicable remedial criterion for a substance, a minimum of four sampling events shall be performed which reflect seasonal variability on a quarterly basis, provided that all sampling events used to demonstrate compliance were performed within two years prior to the most current sampling event used to determine compliance, with the exception of monitoring conducted in accordance with subparagraph (D)(ii) of this subsection.

(PROPOSED LANGUAGE)

(ii) For determining compliance with an applicable remedial criterion for a substance, a minimum of four sampling events shall be performed which reflect seasonal variability on a quarterly basis, provided that all sampling events used to demonstrate compliance were performed within two years prior to the most current sampling event used to determine compliance, with the exception of monitoring conducted in accordance with subparagraph (C)(i) or (D)(ii) of this subsection.

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

(Emerging Technologies)

(CONCEPT)

Update the language for Groundwater Monitoring Emerging Technologies (22a-133k-3(g)(2)(A)(iii)) to allow more flexibility.

(CURRENT LANGUAGE)

(iii) The Commissioner may approve in writing an alternative method of determining compliance with an applicable remedial criterion for a substance utilizing emerging technologies for which guidance, standard or industrial code has been published by a regulatory agency, governmental

advisory group, or other recognized professional organization, at the time of the approval.

(PROPOSED LANGUAGE)

(iii) The Commissioner may approve in writing an alternative method of determining compliance with an applicable remedial criterion for a substance utilizing emerging technologies and approaches for which guidance, standard, or industrial code has been published by a regulatory agency, governmental advisory group, or other recognized professional organization, at the time of the approval.

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

(Background and 95%UCL)

(CONCEPT)

- *In response to the changes to the definition of Background, changes are needed in the section on demonstrating compliance to account for upgradient impacts.*
- *The use of the 95% UCL for the GWPC needs to be done on a well-by-well basis (in order to be protective of any potential receptors; and*
- *The 95% UCL can be used to demonstrate compliance with background.*

(CURRENT LANGUAGE)

(B) Compliance with Ground-water Protection Criteria or Background.

Compliance with the ground-water protection criterion for a substance in ground water or background concentration for ground water for such substance is achieved when the sampling locations are representative of the subject ground-water plume and (i) the analytical results for such substance at all such sampling locations are equal to or less than either the ground-water protection criterion for such substance or the background concentration for ground water, whichever is applicable, as determined by subsection (d) of this section or (ii) a representative sampling program consisting of not less than twelve consecutive monthly samples from each such sampling location has been used to characterize the ground-water plume and the ninety-five percent upper confidence level of the arithmetic mean of all results of laboratory analyses of such samples for such substance are equal to or less than the criterion for such substance.

(PROPOSED LANGUAGE)

(B) Compliance with Ground-water Protection Criteria or Background.

Compliance with the ground-water protection criterion for a substance in ground water or background concentration for ground water for such substance is achieved when the sampling locations are representative of the subject groundwater plume and (i) the analytical results for such substance at all such sampling locations are equal to or less than either the ground-water protection criterion for such substance or the background

concentration upgradient and representative of site [for] ground water unaffected by the subject release for such substance, whichever is applicable, as determined by subsection (d) of this section or (ii) a representative sampling program consisting of not less than twelve consecutive monthly samples from each such sampling location has been used to characterize the ground-water plume and the ninety-five percent upper confidence level of the arithmetic mean, calculated individually for each well, using [of] all results of laboratory analyses of such samples for such substance are equal to or less than the criterion or the background concentration upgradient and representative of site ground water unaffected by the subject release, for such substance, whichever is applicable.

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

(95% UCL SW)

(CONCEPT)

Currently, establishing SWPC compliance does not include the use of 95% UCL at the surface water discharge point. The language below is modified to allow for the use of 95% UCL for the entire subject groundwater plume or at the surface water discharge point. The calculation for the 95% UCL at the surface water discharge point is structured along the lines of calculating the 95% UCL for individual wells for compliance with the GWPC. Language was also incorporated into (i) to ensure that the samples used in the calculation reflect seasonal variability on a quarterly basis.

(CURRENT LANGUAGE)

(C) Compliance with Surface-water Protection Criteria.

Compliance with a surface-water protection criterion for a substance in ground water is achieved when the sampling locations are representative of the subject ground-water plume and (i) the ninety-five percent upper confidence level of the arithmetic mean of all sample results representative of the subject ground water plume is equal to or less than such criterion; or (ii) the concentration of such substance in that portion of such plume which is immediately upgradient of the point at which such ground-water discharges to the receiving surface-water body is equal to or less than the applicable surface-water protection criterion.

(PROPOSED LANGUAGE)

(C) Compliance with Surface-water Protection Criteria.

Compliance with a surface-water protection criterion for a substance in ground water is achieved when the sampling locations are representative of the subject ground-water plume and:

- (i) the ninety-five percent upper confidence level of the arithmetic mean of all sample results representative of the subject ground water plume, reflecting seasonal variability on a quarterly basis, is equal to or less than [such] the applicable surface-water protection criterion[, or];

- (ii) the ninety-five percent upper confidence level of the arithmetic mean of not less than twelve consecutive monthly samples, calculated individually for each well in that portion of such plume which is upgradient of the point at which such ground-water discharges to the receiving surface water body, is equal to or less than the applicable surface-water protection criterion; or
- (iii) the concentration of such substance in that portion of such plume which is [immediately] upgradient of the point at which such ground-water discharges to the receiving surface-water body is equal to or less than the applicable surface-water protection criterion.

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

(Volatilization Compliance)

(CONCEPT)

The terminology used to describe the part of the regulation being referenced is fixed.

(CURRENT LANGUAGE)

(D) Compliance with Volatilization Criteria.

A volatile substance may be remediated to a concentration as specified in either subdivision (2)(D)(i) or subdivision (2)(D)(ii) of this subsection.

(PROPOSED LANGUAGE)

(D) Compliance with Volatilization Criteria.

A volatile substance may be remediated to a concentration as specified in either [subdivision] clause (2)(D)(i) or [subdivision] clause (2)(D)(ii) of this [subsection] subparagraph.

22a-133k-3(g)(2)(D)(ii)

(Seasonal Volatilization –Soil Vapor)

(CONCEPT)

Volatilization compliance monitoring seasonal variability for groundwater indicates “four sampling events ... which reflect seasonal variability on a quarterly basis” (meaning winter, spring, summer, and fall) and seasonal variability for soil vapor reflects heating and cooling. The language change below clarifies the required sampling frequency for soil vapor.

(CURRENT LANGUAGE)

(ii) Compliance with volatilization criteria in soil vapor.

Compliance with a volatilization criterion for a substance in soil vapor is achieved when the sampling locations and frequency are representative of the subject soil vapor, including seasonal

variability, and the results of all laboratory analyses of samples for such substance are equal to or less than the applicable volatilization criterion.

(PROPOSED LANGUAGE)

(ii) Compliance with volatilization criteria in soil vapor.

Compliance with a volatilization criterion for a substance in soil vapor is achieved when the sampling locations and frequency are representative of the subject soil vapor, including the heating and cooling seasons [seasonal variability], and the results of all laboratory analyses of samples for such substance are equal to or less than the applicable volatilization criterion.

22a-133k-3(g)(4)(New)

(Upgradient Policy)

(CONCEPT)

The proposed language formalizes the August 28, 1997 “Policy on Upgradient Contamination” as regulation. It also clarifies that this applies to dissolved contamination, rather than any free product that is present and that on-site risks must be addressed.

(POLICY WORDING)

In accordance with the Remediation Standard Regulations (RCSA Section 22a-133k-1 through 133k-3), it is the policy of the Connecticut Department of Energy & Environmental Protection that a down gradient property owner is not responsible for remediating groundwater contamination flowing onto his or her property from another site, as long as the contamination is present solely as a result of the off-site source(s). The Remediation Division of the Bureau of Water Protection and Land Reuse (860-424-3705) and the above referenced regulations should be consulted for further guidance on this matter.

(PROPOSED LANGUAGE)

- (4) A downgradient property owner is not responsible for remediating a dissolved groundwater plume migrating onto his or her property from an upgradient property, provided that:
- (A) such dissolved plume is present solely as a result of off-site source(s);
 - (B) any exposure pathways to drinking water in supply wells or from volatilization into buildings or potentially occupied structures on such downgradient property are eliminated or mitigated to the extent necessary to protect human health; and
 - (C) notice is submitted to the Commissioner on a form prescribed by the Commissioner.

**22a-133k-(2)(b)(5), 22a-133k-(2)(c)(6),
22a-133k-3(h)(1), 22a-133k-3(h)(2) and h(3)**

**(APS)
(NEW)**

(CONCEPT)

Methods for calculating criteria for Additional Polluting Substances are being added for SWPC and Volatilization Criteria, which are not presently available in the RSRs. The current requirement for such new compounds to meet background is expanded by providing an alternative to background, which gives additional flexibility to achieve compliance. The APS calculations came from the December 10, 2015 [DEEP Technical Support Document](#) titled “Recommended Numeric Criteria for Common Additional Polluting Substances and Certain Alternative Criteria”. Also, the calculations are being moved out of the body of RSRs and into Appendix G.

APS for DEC

(CURRENT LANGUAGE)

22a-133k-(2)(b)(5) Additional Polluting Substances

(A) With respect to a substance at a release area for which a direct exposure criterion is not specified in sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies, the Commissioner may, after consultation with the Commissioner of Public Health, approve in writing a direct exposure criterion to apply to such substance at a particular release area. Any person requesting approval of a direct exposure criterion for such substance shall submit to the commissioner (i) a proposed risk-based direct exposure concentration for such substance calculated in accordance with subparagraph (B) or (C) of this subdivision as applicable, and (ii) the analytical detection limit for such substance. Before approving a direct exposure criterion the Commissioner shall consider the proposed risk-based direct exposure concentration for such substance, the analytical detection limit for such substance, any information about the health effects such substance may cause due to exposure pathways not accounted for in the proposed risk-based direct exposure, and any other information that the Commissioner reasonably deems necessary.

(PROPOSED LANGUAGE)

(5) Additional Polluting Substances

(A) With respect to a substance at a release area for which a direct exposure criterion is not specified in sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies, the Commissioner may, after consultation with the Commissioner of Public Health, approve [\[in writing\]](#) a direct exposure criterion to apply to such substance at a particular release area.

- (i) Any person requesting approval of a direct exposure criterion for such substance shall submit to the [c]Commissioner on a form prescribed by the Commissioner:
 - [(i)](aa) a proposed risk-based direct exposure concentration for such substance calculated in accordance with Appendix G [subparagraph (B) or (C) of this subdivision] as applicable, and
 - [(ii)](bb) the [analytical detection limit] reporting limit for such substance.
- [(iii)](ii) Before approving a direct exposure criterion the Commissioner shall consider:
 - (aa) the proposed risk-based direct exposure concentration for such substance[.];
 - (bb) the [analytical detection limit] reporting limit for such substance[.];
 - (cc) any information about the health effects such substance may cause due to exposure pathways not accounted for in the proposed risk-based direct exposure[.]; and
- [(cc)](dd) and any other information that the Commissioner reasonably deems necessary.

APS for PMC

(CURRENT LANGUAGE)

22a-133k-(2)(c)(6) Additional Polluting Substances.

With respect to any substance for which a pollutant mobility criterion is not specified in sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies, the Commissioner may approve a pollutant mobility criterion, a dilution or dilution and attenuation factor, and a method for determining compliance with such criterion to apply to such substance at a particular release area, provided the Commissioner finds that such criterion will ensure that soil water at such release area does not exceed, in a GA area, the ground-water protection criterion, or in a GB area the ground-water protection criterion multiplied by a dilution factor of 10.

(PROPOSED LANGUAGE)

(6) Additional Polluting Substances.

- (A) With respect to any substance for which a pollutant mobility criterion is not specified in sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies, the Commissioner may approve a pollutant mobility criterion calculated in accordance with Appendix G, [a dilution or dilution and attenuation factor, and a method for determining compliance with such criterion to apply to such substance at a particular release area, provided] if:
 - (i) the Commissioner finds that such criterion will ensure that soil water at such release area does not exceed [, in a GA area,] the ground-water protection criterion in a GA area, or
 - (ii) [in a GB area] the ground-water protection criterion multiplied by a dilution factor of 10 in a GB area.

(B) Any person requesting approval of such pollutant mobility criterion under this subsection (A), shall submit the request to the Commissioner on a form prescribed by the Commissioner.

APS for GWPC

(CURRENT LANGUAGE)

(h) Additional Polluting Substances

(1) With respect to a substance in ground water for which a ground-water protection criterion is not specified in sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies, the Commissioner may approve in writing a ground-water protection criterion to apply to such substance. Any person requesting approval of a ground-water protection criterion for such substance shall submit to the commissioner (A) a risk-based ground-water protection criterion for such substance calculated in accordance with subdivision (2) of this subsection, (B) the analytical detection limit for such substance, (C) a description of the organoleptic properties of such substance. Before approving a ground-water protection criterion the Commissioner shall consider the proposed risk-based ground-water protection criterion for such substance, the analytical detection limit for such substance, the organoleptic effects of such substance, any information about the health effects such substance may cause due to exposure pathways not accounted for in the proposed risk-based ground-water protection criterion, and any other information that the Commissioner reasonably deems necessary.

(2) The risk-based ground-water protection criterion shall be calculated using the following equations:

(PROPOSED LANGUAGE)

(h) Additional Polluting Substances

(1) With respect to a substance in ground water for which a ground- [] water protection criterion is not specified in sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies, the Commissioner may approve in writing a ground-water protection criterion to apply to such substance.

(A) Any person requesting approval of a ground-water protection criterion for such substance shall submit to the [c]Commissioner on a form prescribed by the Commissioner:

- [(A)](i) a risk-based ground-water protection criterion for such substance calculated in accordance with Appendix G [subdivision (2) of this subsection,];
- [(B)](ii) the [analytical detection limit] reporting limit for such substance~~[,]; and~~
- [(C)](iii) a description of the organoleptic properties of such substance.

- (B) Before approving a ground-water protection criterion, the Commissioner shall consider:
- (i) the proposed risk-based ground-water protection criterion for such substance[.];
 - (ii) the [analytical detection limit] reporting limit for such substance[.];
 - (iii) the organoleptic effects of such substance[.];
 - (iv) any information about the health effects such substance may cause due to exposure pathways not accounted for in the proposed risk-based ground-water protection criterion[.]; and
 - (v) any other information that the Commissioner reasonably deems necessary.
- [(2) The risk-based ground-water protection criterion shall be calculated using the following equations:]

APS for SWPC

(PROPOSED LANGUAGE)

- (2) With respect to a substance in ground water for which a surface water protection criterion is not specified in sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies, the Commissioner may approve in writing a surface water protection criterion to apply to such substance.
- (A) Any person requesting approval of a surface water protection criterion for such substance shall submit to the Commissioner on a form prescribed by the Commissioner:
- (i) a risk-based surface water protection criterion for such substance calculated in accordance with Appendix G;
 - (ii) the reporting limit for such substance; and
 - (iii) a description of the bioaccumulative properties of such substance.
- (B) Before approving a surface water protection criterion, the Commissioner shall consider:
- (i) the proposed risk-based surface water protection criterion for such substance;
 - (ii) the reporting limit for such substance;
 - (iii) the bioaccumulative properties of such substance;
 - (iv) any information about the ecological effects such substance may cause due to exposure pathways not accounted for in the proposed risk-based surface water protection criterion; and
 - (v) any other information that the Commissioner reasonably deems necessary.

APS for Volatilization Criteria

(PROPOSED LANGUAGE)

- (3) With respect to a substance in ground water for which a volatilization criterion is not specified in sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies, the Commissioner may approve in writing a target indoor air concentration and a volatilization criterion for ground water or for soil vapor to apply to such substance at a release area, provided the Commissioner finds that such criterion will ensure that such target indoor air concentration will not be exceeded at such release area.
- (A) Any person requesting approval of a volatilization criterion for such substance shall submit to the Commissioner on a form prescribed by the Commissioner:
- (i) a risk-based volatilization criterion for such substance calculated in accordance with Appendix G, as applicable;
 - (ii) the reporting limits for such substance; and
 - (iii) a description of the odor threshold of such substance.
- (B) Before approving a volatilization criterion, the Commissioner shall consider:
- (i) the proposed risk-based volatilization protection criterion for such substance;
 - (ii) the reporting limit for such substance;
 - (iii) the odor threshold of such substance;
 - (iv) any information about the health effects such substance may cause due to exposure pathways not accounted for in the proposed risk-based volatilization criterion; and
 - (v) any other information that the Commissioner reasonably deems necessary.

22a-133k-Appendix A Direct Exposure Criteria

(PCBs)

(CONCEPT)

The use of industrial/commercial criteria for PCBs (10 ppm) requires compliance with a 22a-133K-2(b)(3)(B), (C) or (D) and in accordance with 40 CFR 761. The note is added to the Table to reference this language in the regulations.

(PROPOSED LANGUAGE)

Substance	Residential Criteria in mg/kg (ppm)	Industrial/Commercial Criteria in mg/kg (ppm)
PCB's	1	10
<u>The use of the Industrial/Commercial Criteria requires the parcel to be used pursuant to 22a-133k-2(b)(3)(B), (C) or (D) and in accordance with 40 CFR 761.</u>		

22a-133k-Appendix G

(APS calculations and tables)

(CONCEPT)

The proposed changes to Appendix G are intended to place all Additional Polluting Substance calculations and tables (DEC, PMC, GWPC, SWPC and VolC) in one appendix to make the RSRs more readable and comprehensive. The original Appendix G formulas for alternative volatilization criteria have been removed and replaced with the volatilization criteria formulas used to generate volatilization criteria APS criteria. These volatilization criteria formulas will also be able to be used to generate alternative volatilization criteria with Commissioner approval.

(PROPOSED)

[Delete current Appendix G]

Appendix G to
Sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies
Equations, Terms and Values for Calculating Site-specific Additional Polluting Substances for Direct Exposure Criteria, Pollutant Mobility Criteria, Groundwater Protection Criteria, Surface Water Protection Criteria and Volatilization Criteria and Alternative Volatilization Criteria. [for Ground Water and Soil Vapor]

Section 1: Additional Direct Exposure Criteria

(A) The proposed residential risk-based direct exposure concentration shall be calculated using the following equations:

(i) For carcinogenic substances:

$$\text{Res DEC}_{\text{RB}} = \left(\frac{\text{RL}}{\text{CSF}} \right) \div \left[\left(\frac{\text{IR}_C \times \text{ED}_C \times \text{EF} \times \text{CF}}{\text{BW}_C \times \text{AT}} \right) + \left(\frac{\text{IR}_A \times \text{ED}_A \times \text{EF} \times \text{CT}}{\text{BW}_A \times \text{AT}} \right) \right]$$

(ii) For non-carcinogenic substances:

$$\text{Res DEC}_{\text{RB}} = (\text{RfD} \times \text{HI}) \div \left[\left(\frac{\text{IR}_C \times \text{ED}_C \times \text{EF} \times \text{CF}}{\text{BW}_C \times \text{AT}_C} \right) + \left(\frac{\text{IR}_A \times \text{ED}_A \times \text{EF} \times \text{CT}}{\text{BW}_A \times \text{AT}_A} \right) \right]$$

(iii) The abbreviations used in subparagraphs (i) and (ii) shall be interpreted in accordance with the following table and shall be assigned the values specified therein:

<u>Variable</u>	<u>Description</u>	<u>Value</u>	<u>Units</u>
<u>AT</u>	<u>Averaging Time – Carcinogens</u>	<u>25,550</u>	<u>days</u>
<u>ATA</u>	<u>Averaging Time – Adult non-carcinogen</u>	<u>8,760</u>	<u>days</u>
<u>ATc</u>	<u>Averaging Time – Child non-carcinogen</u>	<u>2,190</u>	<u>days</u>
<u>BWA</u>	<u>Body Weight – Adult</u>	<u>70</u>	<u>kg</u>
<u>BWc</u>	<u>Body Weight – Child</u>	<u>15</u>	<u>kg</u>
<u>CF</u>	<u>Conversion Factor</u>	<u>0.000001</u>	<u>kg/mg</u>
<u>CSF</u>	<u>Cancer slope Factor</u>	<u>substance-specific</u>	<u>1/mg/kg/day</u>
<u>DEC_{RB}</u>	<u>Risk-based Direct Exposure Criterion</u>	<u>calculated</u>	<u>mg/kg</u>
<u>EDA</u>	<u>Exposure Duration – Adult non-carcinogen</u>	<u>24</u>	<u>years</u>
<u>EDc</u>	<u>Exposure Duration – Child non-carcinogen</u>	<u>6</u>	<u>years</u>
<u>EF</u>	<u>Exposure Frequency</u>	<u>365</u>	<u>days/year</u>
<u>HI</u>	<u>Hazard Index</u>	<u>1.0</u>	<u>unitless</u>
<u>IRA</u>	<u>Ingestion Rate – Adult</u>	<u>100</u>	<u>mg/day</u>
<u>IRc</u>	<u>Ingestion Rate – Child</u>	<u>200</u>	<u>mg/day</u>
<u>RfD</u>	<u>Reference Dose</u>	<u>substance-specific</u>	<u>mg/kg/day</u>
<u>RL</u>	<u>Target Cancer Risk Level</u>	<u>1.0E-06</u>	<u>unitless</u>

(iv) The calculated residential risk-based direct exposure concentrations shall not exceed the following ceiling values:

<u>Volatile Organic Substance</u>	<u>Semivolatile Substance</u>	<u>Pesticides</u>	<u>Inorganics</u>	<u>Units</u>
<u>500</u>	<u>1,000</u>	<u>500</u>	<u>50,000</u>	<u>mg/kg</u>

(B) The proposed industrial/commercial risk-based direct exposure concentration shall be calculated using the following equations:

(i) For carcinogenic substances:

$$I/C DEC_{RB} = \left(\frac{RL}{CSF} \right) \times \left(\frac{BW \times AT}{IR \times ED \times EF \times CF} \right)$$

(ii) For non-carcinogenic substances:

$$I/C DEC_{RB} = \left(\frac{RfD \times HI \times BW \times AT_{nc}}{IR \times ED \times EF \times CF} \right)$$

(iii) The abbreviations used in subparagraphs (i) and (ii) shall be interpreted in accordance with the following table and shall be assigned the values specified therein:

<u>Variable</u>	<u>Description</u>	<u>Value</u>	<u>Units</u>
<u>AT</u>	<u>Averaging Time – Carcinogens</u>	<u>25,550</u>	<u>days</u>
<u>ATnc</u>	<u>Averaging Time – Non-carcinogen</u>	<u>9,125</u>	<u>days</u>
<u>BW</u>	<u>Body Weight, Adult</u>	<u>70</u>	<u>kg</u>
<u>CF</u>	<u>Conversion Factor</u>	<u>0.000001</u>	<u>kg/mg</u>
<u>CSF</u>	<u>Cancer slope Factor</u>	<u>substance-specific</u>	<u>1/mg/kg/day</u>
<u>DEC_{RB}</u>	<u>Risk-based Direct Exposure Criterion</u>	<u>calculated</u>	<u>mg/kg</u>
<u>ED</u>	<u>Exposure Duration</u>	<u>25</u>	<u>years</u>
<u>EF</u>	<u>Exposure Frequency</u>	<u>250</u>	<u>days/year</u>
<u>HI</u>	<u>Hazard Index</u>	<u>1.0</u>	<u>unitless</u>
<u>IR</u>	<u>Ingestion Rate</u>	<u>50</u>	<u>mg/day</u>
<u>RfD</u>	<u>Reference Dose</u>	<u>substance-specific</u>	<u>mg/kg/day</u>
<u>RL</u>	<u>Target Cancer Risk Level</u>	<u>1.0E-06</u>	<u>unitless</u>

(iv) The calculated industrial/commercial risk-based direct exposure concentrations shall not exceed the following ceiling values:

<u>Volatile Substance</u>	<u>Semivolatile Substance</u>	<u>Pesticides</u>	<u>Inorganics</u>	<u>Units</u>
<u>1,000</u>	<u>2,500</u>	<u>1,000</u>	<u>50,000</u>	<u>mg/kg</u>

Section 2: Additional Pollutant Mobility Criteria

(A) The proposed risk-based pollutant mobility criteria for inorganic compounds shall be calculated using the following equations:

(i) GA groundwater classification

$$PMC_{ug/L} = GWPC \times CF$$

(ii) GB groundwater classification

$$PMC_{ug/L} = GWPC \times CF \times DF$$

(B) The proposed risk-based pollutant mobility criteria for organic compounds shall be calculated using the following equations:

(i) GA groundwater classification

$$PMC_{mg/kg} = GWPC \times CF \times AAF$$

(ii) GB groundwater classification

$$PMC_{\text{mg/kg}} = \text{GWPC} \times \text{CF} \times \text{AAF} \times \text{DF}$$

(C) The abbreviations used in subparagraphs (A) and (B) of this subdivision shall be interpreted in accordance with the following table and shall be assigned the values specified therein:

<u>Terms</u>	<u>Description</u>	<u>Value</u>	<u>Units</u>
<u>AAF</u>	<u>Analytical Adjustment Factors</u>	<u>20</u>	<u>unitless</u>
<u>CF</u>	<u>Conversion Factor</u>	<u>0.001</u>	<u>mg/ug</u>
<u>DF</u>	<u>Dilution Factor</u>	<u>10</u>	<u>unitless</u>
<u>GWPC</u>	<u>Groundwater Protection Criteria</u>	<u>substance-specific</u>	<u>ug/L</u>
<u>PMC</u>	<u>Pollutant Mobility Criteria</u>	<u>calculated</u>	<u>mg/kg or mg/L</u>

Section 3: Additional Groundwater Protection Criteria

(A) The proposed risk-based ground-water protection criterion shall be calculated for carcinogenic substances using the following equations:

$$\text{GWPC} = \left(\frac{\text{Risk}}{\text{CSF}} \right) \times \left(\frac{\text{BW} \times \text{AT}}{\text{IR} \times \text{EF} \times \text{ED} \times \text{CT}} \right)$$

(B) The proposed risk-based ground-water protection criterion shall be calculated for non-carcinogenic substances using the following equations:

$$\text{GWPC} = \frac{\text{RfD} \times \text{HI} \times \text{BW} \times \text{AT} \times \text{SA}}{\text{IR} \times \text{EF} \times \text{ED} \times \text{CT}}$$

(C) The abbreviations used in subparagraphs (A) and (B) of this subdivision shall be interpreted in accordance with the following table and shall be assigned the values specified therein:

<u>Term</u>	<u>Description</u>	<u>Value</u>	<u>Units</u>
<u>AT</u>	<u>Averaging Time</u>	<u>25,550</u>	<u>days</u>
<u>BW</u>	<u>Body Weight</u>	<u>70</u>	<u>kg</u>
<u>CSF</u>	<u>Cancer slope Factor</u>	<u>substance-specific</u>	<u>1/mg/kg/day</u>
<u>CF</u>	<u>Conversion Factor</u>	<u>0.001</u>	<u>mg/ug</u>
<u>ED</u>	<u>Exposure Duration</u>	<u>70</u>	<u>years</u>
<u>EF</u>	<u>Exposure Frequency</u>	<u>365</u>	<u>days/year</u>
<u>GWPC</u>	<u>Risk-based Ground-water protection Criterion</u>	<u>calculated</u>	<u>ug/l</u>
<u>HI</u>	<u>Hazard Index</u>	<u>1.0</u>	<u>unitless</u>
<u>IR</u>	<u>Ingestion Rate</u>	<u>2</u>	<u>l/day</u>
<u>RfD</u>	<u>Reference Dose</u>	<u>substance-specific</u>	<u>mg/kg/day</u>
<u>RL</u>	<u>Target Cancer Risk Level</u>	<u>1.0E-06</u>	<u>unitless</u>
<u>SA</u>	<u>Source Allocation</u>	<u>0.2</u>	<u>unitless</u>

(D) The calculated risk-based groundwater protection criterion shall not exceed the following ceiling values:

<u>Volatile Substance</u>	<u>Semivolatile Substance</u>	<u>Pesticides</u>	<u>Inorganics</u>	<u>Units</u>
<u>500</u>	<u>1,000</u>	<u>500</u>	<u>50,000</u>	<u>mg/kg</u>

Section 4: Additional Surface water Protection Criteria

(A) The proposed risk-based surface water protection criteria shall be calculated using the following equations:

(i) Calculating the water quality criteria for Human Health on Fish Consumption:

(aa) For Substances that are Non-carcinogenic:

$$WQC = \frac{Rfd \times BW \times CF}{FC \times BCF}$$

(bb) For Substances that are Carcinogenic:

$$WQC = \frac{RL \times BW \times CF}{CSF \times FC \times BCF}$$

(cc) The abbreviations used in subparagraphs (aa) and (bb) of this subdivision shall be interpreted in accordance with the following table and shall be assigned the values specified therein:

<u>Terms</u>	<u>Description</u>	<u>Value</u>	<u>Units</u>
<u>BCF</u>	<u>Bioconcentration Factor</u>	<u>Substance-specific</u>	<u>unitless</u>
<u>BW</u>	<u>Body Weight</u>	<u>70</u>	<u>kg</u>
<u>CF</u>	<u>Conversion Factor</u>	<u>1000</u>	<u>ug/mg</u>
<u>CSF</u>	<u>Cancer Slope Factor</u>	<u>substance-specific</u>	<u>kg-d/mg</u>
<u>FC</u>	<u>Fish Consumption Rate</u>	<u>0.0175</u>	<u>kg/d</u>
<u>RfD</u>	<u>Reference Dose</u>	<u>substance-specific</u>	<u>mg/kg-d</u>
<u>RL</u>	<u>Risk Level</u>	<u>1.00E-06</u>	<u>unitless</u>
<u>WQC</u>	<u>Water Quality Criteria</u>	<u>substance-specific</u>	<u>ug/L</u>

(dd) The calculated risk-based groundwater protection criterion shall not exceed the following ceiling values:

<u>Volatile Substance</u>	<u>Semivolatile Substance</u>	<u>Pesticides</u>	<u>Inorganics</u>	<u>Units</u>
<u>500</u>	<u>1,000</u>	<u>500</u>	<u>50,000</u>	<u>mg/kg</u>

(ii) Calculating the Surface water Protection Criteria

(aa) Water Quality Criterion for Freshwater Chronic Aquatic Life Protection x 10 where:

The Freshwater Chronic Aquatic Life Criteria shall be calculated:

- (I) in accordance with 40 CFR 132 Appendix A (Great Lakes Water Quality Initiative Methodologies for Development of Aquatic Life Criteria and Values),
- (II) using the Tier 1 protocols for calculating a Criterion Continuous Concentration, or
- (III) if insufficient information is available to use the Tier 1 CCC procedure, then use the Tier 2 protocols for calculating a Secondary Continuous Concentration.

(bb) Human Health based Water Quality Criterion for Fish Consumption x Flow Factor* x 10.

*Flow Factor = 1 for known human carcinogens or substances which may bioaccumulate

Flow Factor = 2 for non-carcinogenic substances

Flow Factor = 3 for carcinogenic substances

(cc) The calculated risk-based surface water protection criterion shall not exceed the following ceiling values:

<u>Volatile Substance</u>	<u>Semivolatile Substance</u>	<u>Pesticides</u>	<u>Inorganics</u>	<u>Units</u>
<u>10,000</u>	<u>10,000</u>	<u>10,000</u>	<u>10,000</u>	<u>mg/kg</u>

Section 5: Additional and Alternative Volatilization Protection Criteria

(A) Calculate Residential Target Indoor Air Concentration using the following equations:

(i) For Substances that are Non-carcinogenic:

$$TAC = \frac{HQ \times BW \times RfDi \times AT \times CF}{CexpF \times IRair \times EF \times ED}$$

(ii) For Substances that are Carcinogenic:

$$TAC = \frac{RL \times BW \times ATc \times CF}{CSFi \times CexpF \times CsensF \times IRair \times EF \times ED}$$

(iii) The abbreviations used in subparagraphs (A) of this subdivision shall be interpreted in accordance with the following table and shall be assigned the values specified therein:

<u>Terms</u>	<u>Description</u>	<u>Value</u>	<u>Units</u>
<u>AT</u>	<u>Averaging Time – Non-carcinogen</u>	<u>10,950</u>	<u>days</u>
<u>ATc</u>	<u>Averaging Time – Carcinogen</u>	<u>25,550</u>	<u>days</u>
<u>BW</u>	<u>Body Weight</u>	<u>70</u>	<u>kg</u>
<u>CexpF</u>	<u>Children’s Exposure Factor</u>	<u>2</u>	<u>unitless</u>
<u>CF</u>	<u>Conversion Factor</u>	<u>1,000</u>	<u>ug/mg</u>
<u>CsensF</u>	<u>Children’s Sensitivity Factor</u>	<u>Unitless</u>	<u>#</u>
<u>CSFi</u>	<u>Cancer Slope Factor – Inhalation</u>	<u>substance-specific</u>	<u>kg-d/mg</u>
<u>ED</u>	<u>Exposure Duration</u>	<u>30</u>	<u>years</u>
<u>EF</u>	<u>Exposure Frequency</u>	<u>350</u>	<u>days/year</u>
<u>HQ</u>	<u>Hazard Quotient</u>	<u>1</u>	<u>unitless</u>
<u>IRair</u>	<u>Inhalation Rate – Air</u>	<u>20</u>	<u>m³/day</u>
<u>RfDi</u>	<u>Reference Dose – Inhalation</u>	<u>substance-specific</u>	<u>mg/m³</u>
<u>RL</u>	<u>Risk Level</u>	<u>1.00E-06</u>	<u>unitless</u>
<u>TAC</u>	<u>Target Indoor Air Concentration</u>	<u>substance-specific</u>	<u>ug/m³</u>

#: CsensF = 1 for noncarcinogens and nonmutagenic carcinogens.

CsensF = 2 for mutagenic carcinogens

(iv) The calculated residential target indoor air concentration shall not exceed a ceiling value of 500 ug/m³.

(B) Calculate Industrial/Commercial Target Indoor Air Concentration using the following equations:

(i) For Substances that are Non-carcinogenic:

$$TAC = \frac{HQ \times BW \times RfDi \times AT \times CF}{IRair \times EF \times ED}$$

(ii) For Substances that are Carcinogenic:

$$TAC = \frac{RL \times BW \times ATc \times CF}{CSFi \times IRair \times EF \times ED}$$

(iii) The abbreviations used in subparagraphs (i) and (ii) of this subdivision shall be interpreted in accordance with the following table and shall be assigned the values specified therein:

<u>Terms</u>	<u>Description</u>	<u>Value</u>	<u>Units</u>
<u>AT</u>	<u>Averaging Time – Non-carcinogen</u>	<u>9,125</u>	<u>days</u>
<u>ATc</u>	<u>Averaging Time – Carcinogen</u>	<u>25,550</u>	<u>days</u>
<u>BW</u>	<u>Body Weight</u>	<u>70</u>	<u>kg</u>
<u>CF</u>	<u>Conversion Factor</u>	<u>1,000</u>	<u>ug/mg</u>
<u>CSFi</u>	<u>Cancer Slope Factor – Inhalation</u>	<u>substance-specific</u>	<u>kg-d/mg</u>
<u>ED</u>	<u>Exposure Duration</u>	<u>25</u>	<u>years</u>
<u>EF</u>	<u>Exposure Frequency</u>	<u>250</u>	<u>days/year</u>
<u>HQ</u>	<u>Hazard Quotient</u>	<u>1</u>	<u>unitless</u>
<u>IRair</u>	<u>Inhalation Rate – Air</u>	<u>10</u>	<u>m³/day</u>
<u>RfDi</u>	<u>Reference Dose – Inhalation</u>	<u>substance-specific</u>	<u>mg/m³</u>
<u>RL</u>	<u>Risk Level</u>	<u>1.00E-06</u>	<u>unitless</u>
<u>TAC</u>	<u>Target Indoor Air Concentration</u>	<u>substance-specific</u>	<u>ug/m³</u>

(iv) The calculated industrial/commercial target indoor air concentration shall not exceed a ceiling value of 500 ug/m³.

(C) The proposed risk-based volatilization protection criterion shall be calculated using the following equations:

(i) For groundwater Volatilization Criteria:

$$GWVC_{\mu g/L} = \frac{TAC}{CF \times \alpha \times H}$$

(ii) The calculated groundwater volatilization criteria shall not exceed a ceiling value of 50,000 ug/L.

(iii) For Soil Vapor Volatilization Criteria:

$$SVVC_{mg/m^3} = \frac{TAC}{CF \times \alpha}$$

$$SVVC_{ppm} = SVVC_{mg/m^3} \times \left(\frac{MV}{MW} \right)$$

(iv) Calculate α using the following equations:

$$\alpha = \left(\frac{A \times e_B}{E_B + A + (A/C)} \right) \times (E_B - 1)$$

$$A = \left(\frac{D_{effT} \times A_B}{Q_B \times L_T} \right) \quad \text{or} \quad A = \left(\frac{D_{effT}}{e_B \times (V_B/A_B) \times L_T} \right)$$

$$B = \left(\frac{Q_{soil} \times L_{crack}}{D_{effcrack} \times \eta \times A_B} \right) \quad \text{or} \quad B = \left(\left(\frac{Q_{soil}}{Q_B} \right) \times E_B \times \left(\frac{V_B}{A_B} \right) \times L_{crack} \right) / (D_{effcrack} \times \eta)$$

$$C = \left(\frac{Q_{soil}}{Q_B} \right)$$

$$D_{effT} = \left(\frac{L_T}{(L_{vadose}/D_{effvadose})} \right) + \left(\frac{L_{cap}}{D_{effcap}} \right)$$

$$D_{effcrack} = D_{air} \times \left(\frac{\theta_{V-crack3.33}}{\theta_{T-crack2}} \right) + \left(\frac{D_{water}}{H} \right) \times \left(\frac{\theta_{m-crack3.33}}{\theta_{T-crack2}} \right)$$

$$D_{effvadose} = D_{air} \times \left(\frac{\theta_{V-vadose3.33}}{\theta_{T-vadose2}} \right) + \left(\frac{D_{water}}{H} \right) \times \left(\frac{\theta_{m-vadose3.33}}{\theta_{T-vadose2}} \right)$$

$$D_{effcap} = D_{air} \times \left(\frac{\theta_{V-cap3.33}}{\theta_{T-cap2}} \right) + \left(\frac{D_{water}}{H} \right) \times \left(\frac{\theta_{m-cap3.33}}{\theta_{T-cap2}} \right)$$

(v) The abbreviations used in subparagraphs (C) of this subdivision shall be interpreted in accordance with the following table and shall be assigned the values specified therein:

<u>Terms</u>	<u>Description</u>	<u>Value</u>	<u>Units</u>
<u>GWVC</u>	<u>Ground Water Volatilization Criteria</u>	<u>Calculated</u>	<u>ug/(L)</u>
<u>TAC</u>	<u>Target Indoor Air Concentration calculated using (A) or (B), as applicable</u>	<u>substance-specific</u>	<u>ug/m³</u>
<u>α</u>	<u>Attenuation Factor for Diffusion and Advection</u>	<u>Calculated</u>	<u>unitless</u>
<u>SVVC</u>	<u>Soil Vapor Volatilization Criteria</u>	<u>Calculated</u>	<u>mg/m³</u>
<u>CF</u>	<u>Conversion Factor</u>	<u>1,000</u>	<u>L/m³ or ug/mg</u>
<u>MV</u>	<u>Molar Volume (at standard conditions)</u>	<u>24.45</u>	<u>L</u>
<u>MW</u>	<u>Molecular Weight</u>	<u>substance-specific</u>	<u>g/mol</u>
<u>DeffT</u>	<u>Total Effective Diffusion</u>	<u>calculated</u>	<u>cm²/s</u>
<u>Deffcrack</u>	<u>Effective Diffusion Through Foundation Cracks</u>	<u>calculated</u>	<u>cm²/s</u>
<u>Deffcap</u>	<u>Effective Diffusion Through Capillary Fringe</u>	<u>calculated</u>	<u>cm²/s</u>
<u>Deffvadose</u>	<u>Effective Diffusion Through Vadose Zone</u>	<u>calculated</u>	<u>cm²/s</u>
<u>H</u>	<u>Henry's Law Constant</u>	<u>substance-specific</u>	<u>unitless</u>
<u>θ_{m-vadose}</u>	<u>Volumetric Moisture Content in Vadose Zone</u>	<u>calculated</u>	<u>unitless</u>
<u>θ_{T-vadose}</u>	<u>Total Porosity in Vadose Zone</u>	<u>calculated</u>	<u>unitless</u>
<u>θ_{m-crack}</u>	<u>Volumetric Moisture Content in Cracks</u>	<u>calculated</u>	<u>unitless</u>
<u>θ_{T-crack}</u>	<u>Total Porosity in Crack</u>	<u>calculated</u>	<u>unitless</u>
<u>θ_{m-cap}</u>	<u>Volumetric Moisture Content in Cracks in Capillary Fringe</u>	<u>calculated</u>	<u>unitless</u>
<u>θ_{T-cap}</u>	<u>Total Porosity in Capillary Fringe</u>	<u>calculated</u>	<u>unitless</u>
<u>D_{air}</u>	<u>Molecular Diffusion Coefficient in Air</u>	<u>substance-specific</u>	<u>m²/d</u>
<u>D_{water}</u>	<u>Molecular Diffusion Coefficient in Water</u>	<u>substance-specific</u>	<u>m²/d</u>
<u>η</u>	<u>Fraction of Enclosed Space Area Open for Vapor Intrusion</u>	<u>calculated</u>	<u>m²/d</u>
<u>AB</u>	<u>Surface Area of the Enclosed Space in Contact with Soil</u>	<u>calculated</u>	<u>m²</u>
<u>V_B</u>	<u>Enclosed Space Volume</u>	<u>calculated</u>	<u>m³</u>
<u>E_B</u>	<u>Enclosed Space Air Exchange Rate</u>	<u>calculated</u>	<u>1/day</u>
<u>L_T</u>	<u>Depth from foundation to source</u>	<u>calculated</u>	<u>m</u>
<u>L_{cap}</u>	<u>Thickness of Capillary Fringe</u>	<u>calculated</u>	<u>m</u>
<u>L_{crack}</u>	<u>Foundation Thickness</u>	<u>calculated</u>	<u>m</u>
<u>Q_B</u>	<u>Enclosed Space Volumetric Air Flow Rate</u>	<u>calculated</u>	<u>m³/d</u>
<u>θ_{V-vadose}</u>	<u>Volumetric Vapor Content in Vadose Zone</u>	<u>calculated</u>	<u>unitless</u>
<u>θ_{V-crack}</u>	<u>Volumetric Vapor Content in Cracks</u>	<u>calculated</u>	<u>unitless</u>
<u>θ_{V-cap}</u>	<u>Volumetric Vapor Constant in Capillary Fringe</u>	<u>calculated</u>	<u>unitless</u>

22a-133k-Appendix H

(Alternative PMC)

(CONCEPT)

Appendix H is added to support the addition of 22a-133k-2(8), the Alternative PMC calculation.

(PROPOSED)

Appendix H to
Sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies
Equations, Terms and Values for Calculating Site-specific Pollutant Mobility Criteria

Site-Specific Pollutant Mobility Criteria may be calculated using the following equation:

$$\text{Alternative PMC} = \text{GWC} \times \text{DF} \left(K_d + \frac{(\theta_w + \theta_a H')}{\rho_b} \right)$$

where:

<u>Terms</u>	<u>Description</u>	<u>Units</u>	<u>Value</u>
<u>Alt. PMC</u>	<u>Alternative pollutant mobility criteria</u>	<u>mg/kg</u>	<u>Calculated</u>
<u>GWC</u>	<u>Groundwater criteria goal</u>	<u>mg/L</u>	<u>Substance-specific (lowest of groundwater criteria applicable to release area)</u>
<u>DF</u>	<u>Dilution factor</u>	<u>unitless</u>	<u>20 or calculated using 22a-133k-2(c)(2)(E)(ii) with $F_{adj} = 0$</u>
<u>K_d</u>	<u>Distribution coefficient for organic contaminants may be approximated by: $K_{oc} * f_{oc}$</u>	<u>L/kg</u>	<u>Substance-specific (see table below for inorganics)</u>
<u>K_{oc}</u>	<u>Soil organic carbon-water partition coefficient</u>	<u>L/kg</u>	<u>Substance-specific (see table below for organics)</u>
<u>f_{oc}</u>	<u>Soil fraction of organic carbon</u>	<u>kg/kg</u>	<u>0.001 or tested for site-specific value (max value = 0.006)</u>
<u>θ_w</u>	<u>Water-filled soil porosity</u>	<u>L_{water}/L_{soil}</u>	<u>0.28</u>
<u>θ_a</u>	<u>Air-filled soil porosity</u>	<u>L_{air}/L_{soil}</u>	<u>0.15</u>
<u>H'</u>	<u>Henry's law constant (dimensionless)</u>	<u>unitless</u>	<u>Substance-specific (see tables below)</u>
<u>ρ_b</u>	<u>Dry soil bulk density</u>	<u>kg/L</u>	<u>1.5</u>

Soil Organic Carbon-Water Partition Coefficient (K_{oc}) and Henry's Constant (H') Values:
Organics

<u>Substance</u>	<u>K_{oc} (L/kg)</u>	<u>H' (Dimensionless)</u>
<u>Acenaphthylene</u>	<u>6,800</u>	<u>4.51E-03</u>
<u>Acetone</u>	<u>0.575</u>	<u>1.75E-03</u>
<u>Acrylonitrile</u>	<u>2</u>	<u>4.10E-03</u>
<u>Aldicarb</u>	<u>24.6</u>	<u>5.89E-08</u>
<u>Anthracene</u>	<u>23,500</u>	<u>2.67E-03</u>
<u>Atrazine</u>	<u>360</u>	<u>1.21E-07</u>
<u>Benzene</u>	<u>62</u>	<u>2.26E-01</u>
<u>Benzo(a)anthracene</u>	<u>358,000</u>	<u>1.37E-04</u>
<u>Benzo(a)pyrene</u>	<u>969,000</u>	<u>4.63E-05</u>
<u>Benzo(b)fluoranthene</u>	<u>1,230,000</u>	<u>4.55E-03</u>
<u>Benzo(k)fluoranthene</u>	<u>1,230,000</u>	<u>3.40E-05</u>
<u>Bis(2-chloroethyl)ether</u>	<u>76</u>	<u>7.38E-04</u>
<u>Bis(2-chloroisopropyl)ether</u>	<u>360</u>	<u>3.03E-03</u>
<u>Bis(2-ethylhexyl)phthalate</u>	<u>111,000</u>	<u>4.18E-06</u>
<u>Bromoform</u>	<u>126</u>	<u>2.18E-02</u>
<u>2-Butanone (MEK)</u>	<u>10</u>	<u>1.12E-03</u>
<u>Butyl benzyl phthalate</u>	<u>13,700</u>	<u>5.17E-05</u>
<u>Carbon tetrachloride</u>	<u>152</u>	<u>1.20E+00</u>
<u>Chlordane</u>	<u>51,300</u>	<u>1.99E-03</u>
<u>Chlorobenzene</u>	<u>224</u>	<u>1.61E-01</u>
<u>Chloroform</u>	<u>53</u>	<u>1.39E-01</u>
<u>2-Chlorophenol</u>	<u>398</u>	<u>1.60E-02</u>
<u>Dibromochloromethane (Chlorodibromomethane)</u>	<u>63.1</u>	<u>3.21E-02</u>
<u>1,2-Dichlorobenzene (o)</u>	<u>379</u>	<u>7.95E-02</u>
<u>1,3-Dichlorobenzene (m)</u>	<u>700</u>	<u>1.08E-01</u>
<u>1,4-Dichlorobenzene (p)</u>	<u>616</u>	<u>1.12E-01</u>
<u>1,1-Dichloroethane</u>	<u>53</u>	<u>2.23E-01</u>
<u>1,2-Dichloroethane</u>	<u>38</u>	<u>4.51E-02</u>
<u>1,1-Dichloroethylene</u>	<u>65</u>	<u>6.11E-01</u>
<u>cis-1,2-Dichloroethylene</u>	<u>35.5</u>	<u>1.70E-01</u>
<u>trans-1,2-Dichloroethylene</u>	<u>38</u>	<u>3.80E-01</u>

<u>Substance</u>	<u>K_{oc} (L/kg)</u>	<u>H' (Dimensionless)</u>
<u>2,4-Dichlorophenol</u>	<u>159</u>	<u>1.30E-04</u>
<u>2,4-Dichlorophenoxyacetic acid (2,4-D)</u>	<u>29.6</u>	<u>1.45E-06</u>
<u>1,2-Dichloropropane</u>	<u>47</u>	<u>1.16E-01</u>
<u>1,3-Dichloropropene</u>	<u>27</u>	<u>1.44E-01</u>
<u>Dieldrin</u>	<u>25,500</u>	<u>6.19E-04</u>
<u>Di-<i>n</i>-butyl phthalate</u>	<u>1,570</u>	<u>3.85E-08</u>
<u>Di-<i>n</i>-octyl phthalate</u>	<u>83,200,000</u>	<u>2.74E-03</u>
<u>Ethylbenzene</u>	<u>204</u>	<u>1.41E-01</u>
<u>Ethylene dibromide (EDB)</u>	<u>66</u>	<u>2.76E-02</u>
<u>Fluoranthene</u>	<u>49,100</u>	<u>6.60E-04</u>
<u>Fluorene</u>	<u>7,710</u>	<u>2.61E-03</u>
<u>Heptachlor</u>	<u>9,530</u>	<u>4.47E-02</u>
<u>Heptachlor epoxide</u>	<u>83,200</u>	<u>3.90E-04</u>
<u>Hexachlorobenzene</u>	<u>80,000</u>	<u>5.41E-02</u>
<u>γ-HCH (Lindane)</u>	<u>1,350</u>	<u>5.74E-04</u>
<u>Hexachloroethane</u>	<u>1,780</u>	<u>1.59E-01</u>
<u>Methoxychlor</u>	<u>80,000</u>	<u>6.48E-04</u>
<u>Methyl isobutyl ketone</u>	<u>65</u>	<u>5.33E-03</u>
<u>Methyl-tert-butyl-ether (MTBE)</u>	<u>34</u>	<u>2.42E-02</u>
<u>Methylene chloride</u>	<u>10</u>	<u>1.31E-01</u>
<u>Naphthalene</u>	<u>1,190</u>	<u>1.98E-02</u>
<u>Pentachlorobenzene</u>	<u>32,100</u>	<u>2.87E-02</u>
<u>Phenanthrene</u>	<u>21,200</u>	<u>9.43E-04</u>
<u>Phenol</u>	<u>28.8</u>	<u>1.63E-05</u>
<u>Pyrene</u>	<u>68,000</u>	<u>4.51E-04</u>
<u>Simazine</u>	<u>147</u>	<u>3.85E-08</u>
<u>Styrene</u>	<u>912</u>	<u>1.07E-01</u>
<u>1,1,1,2-Tetrachloroethane</u>	<u>86</u>	<u>4.51E-01</u>
<u>1,1,1,2,2-Tetrachloroethane</u>	<u>79</u>	<u>1.56E-02</u>
<u>Tetrachloroethylene</u>	<u>265</u>	<u>8.36E-02</u>
<u>Toluene</u>	<u>140</u>	<u>2.74E-01</u>
<u>Toxaphene</u>	<u>95,800</u>	<u>2.46E-04</u>
<u>1,1,1-Trichloroethane</u>	<u>135</u>	<u>9.47E-01</u>
<u>1,1,2-Trichloroethane</u>	<u>75</u>	<u>3.73E-02</u>

<u>Substance</u>	<u>K_{oc} (L/kg)</u>	<u>H' (Dimensionless)</u>
<u>Trichloroethylene</u>	<u>94</u>	<u>3.74E-01</u>
<u>Vinyl chloride</u>	<u>18.6</u>	<u>1.14E+00</u>
<u>Xylenes</u>	<u>1,700</u>	<u>2.16E-01</u>

Sources:

1996 EPA Soil Screening Guidance: Technical Background Document - Geometric Mean of Measured K_{oc} (Table 38)

1996 EPA Soil Screening Guidance: Technical Background Document – Calculated K_{oc} (Table 39)

1996 EPA Soil Screening Guidance: User's Guide – K_{oc} Values for Ionizing Organics as a Function of pH (Table C-2) – pH = 5.0

ATSDR Toxicological Profile for 1,2-Dibromoethane

Superfund Chemical Data Matrix

1996 EPA Soil Screening Guidance: Technical Background Document – K_{oc} calculated from K_{ow} using Equation 70 (SVOCs) [K_{ow} from Superfund Chemical Data Matrix]

1996 EPA Soil Screening Guidance: Technical Background Document – K_{oc} calculated from K_{ow} using Equation 71 (VOCs) [K_{ow} from Superfund Chemical Data Matrix]

2003 Proposed Revisions to Connecticut's Remediation Standard Regulations Volatilization Criteria

EPA Vapor Intrusion Screening Level (VISL) Calculator

Distribution Coefficient (K_d) and Henry's Constant (H') Values: Inorganics

<u>Substance</u>	<u>K_d (L/kg)</u>	<u>H' (Dimensionless)</u>
<u>Antimony</u>	<u>45</u>	<u>=</u>
<u>Arsenic</u>	<u>25</u>	<u>=</u>
<u>Barium</u>	<u>12</u>	<u>=</u>
<u>Beryllium</u>	<u>26</u>	<u>=</u>
<u>Cadmium</u>	<u>17</u>	<u>=</u>
<u>Chromium (hexavalent or total)</u>	<u>31</u>	<u>=</u>
<u>Chromium (trivalent only)</u>	<u>1900</u>	<u>=</u>
<u>Copper</u>	<u>35</u>	<u>=</u>
<u>Cyanide</u>	<u>9.9</u>	<u>=</u>
<u>Lead</u>	<u>900</u>	<u>=</u>
<u>Mercury</u>	<u>0.06</u>	<u>4.67E-01</u>
<u>Nickel</u>	<u>18</u>	<u>=</u>
<u>Silver</u>	<u>0.13</u>	<u>=</u>
<u>Selenium</u>	<u>17</u>	<u>=</u>
<u>Thallium</u>	<u>45</u>	<u>=</u>
<u>Vanadium</u>	<u>1,000</u>	<u>=</u>
<u>Zinc</u>	<u>18</u>	<u>=</u>

Sources:

1996 EPA Soil Screening Guidance: User's Guide – Table C-4 (pH = 5.0)
Superfund Chemical Data Matrix
EPA Vapor Intrusion Screening Level (VISL) Calculator