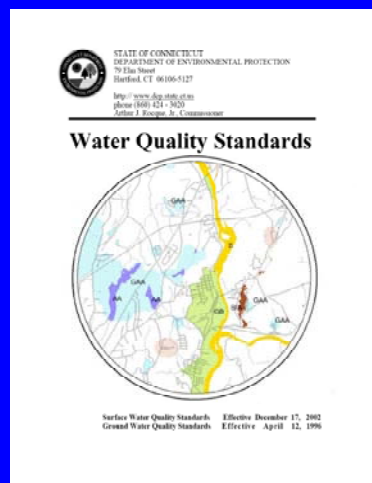


Contaminated Sediments: Case Studies in Connecticut



CT Water Quality Standards



Defines WQ goals
by designating uses
and setting criteria
and policies
necessary to protect
the uses

CT WQS:

Surface waters and sediments shall be free from chemical constituent in concentrations or combinations that:

Cause toxicity to aquatic organisms or impair the aquatic ecosystem

Bioconcentrate/bioaccumulate in tissues of aquatic life at concentrations that will impair aquatic life/wildlife, result in unacceptable tastes, odors, health risks to people or wildlife



Remediation Programs

Federal
RCRA
CERCLA
State
LEP Regs
RSRs

STATE OF CONNECTICUT
REGULATION
OF
DEPARTMENT OF ENVIRONMENTAL
PROTECTION

concerning
REMEDIATION STANDARD

Section 1. The Regulations of Connecticut State Agencies are amended by adding a new section 22a-137b-1 as follows:

Section 22a-137b-1

(a) Definitions.

For the purposes of sections 22a-137b-1 through 22a-137b-3 of the Regulations of Connecticut State Agencies, the following definitions apply:

(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 as a U.S. using analytical methods specified in subpart C, of 40 CFR part 141 or (ii) for a sample of ground water as a U.S. using analytical methods approved by the 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 maximum dose response criteria in the applicable protection priority 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;

(2) "Aquifer protection area" means an aquifer protection area as defined in section 22a-154b of the General Statutes;

(3) "Area of influence" means an "area of influence" as defined in section 22a-154b-1(a) of the Regulations of Connecticut State Agencies;

(4) "Areal extent of a ground-water plume" means the surface area beneath which ground water has been or may be polluted by a release and in which ground water one or more substances from such release is or may be present at a concentration above the analytical detection limit;

(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 existed at 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;

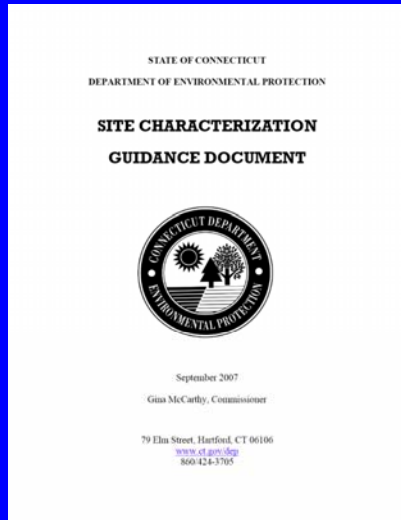
(7) "Inorganic substance" means a substance defined as "inorganic" by federal or state agencies and for which a quantitative health risk extrapolation is available;

(8) "SRL" means the Code of Federal Regulations;

(9) "Commissioner" means the Commissioner of Environmental Protection or his designee;

(10) "Non-aqueous phase liquid" means a non-aqueous phase liquid that has a density greater than water at 20 degrees Celsius;

Site Characterization



Identifies the need to characterize all media potentially affected by site related activities – including sediment

Self-Implementation????

Site Characterization Activities can be conducted by LEP

Assessment and Remediation Decisions must be done in consultation with DEP as RSRs do not contain provisions for self-implementation for sediment remediation decisions

General Process

Characterize nature & extent of sediment contamination
Horizontal & Vertical

Evaluate Potential Risks
Ecological
Human Health



Human Health Risk

- Direct contact
 - Residential DEC is a quick conservative benchmark to use
 - Option for site-specific criteria (exposure rates)
- Fish consumption pathway
 - Site specific evaluation
 - Consideration of Fish Consumption Advisories



Ecological Risk Assessment

- Screening Level
 - Comparison to Benchmarks
 - Food Chain Models
- Site Specific
 - Toxicity Testing
 - Benthic Community Evaluation
 - Bioaccumulation Testing



Sediment Remediation Goals

Background
Benchmark based
Biologically based



Determining Background Conditions

Site Specific

From areas immediately upgradient of site in question

From areas with similar land use

Not in areas directly affected by other releases

Not from literature/regional publications

Case Studies

- Sites where the potential for risk was indicated.....

Site 1

- RCRA Corrective Action Site
- Urban wetland environment
- Previous NPDES discharge
- GW plume remediated
- Copper in sediments above benchmarks
- Sediment toxicity testing conducted
- No remediation required



Site 2

- Site with a strong conceptual site model
- Site-related sediment contamination resulting from fill activities
- Sampling confirms site-related sediments located in narrow band adjacent to site

Site 2

- Highly urban area
 - Poor sediment quality
 - Site-specific chemical indicator
- Sediment remediation area set using indicator parameter and designed to remove site-related contamination

Site 4

- On-going
- Extensive Sediment Contamination
- Human Health Risk Assessment
 - Direct Contact
 - Fish Consumption
 - Evaluation of Subsistence Fishing

Site 4

- Ecological Risk Assessment
 - Sediment Toxicity Tests
 - Benthic Community Evaluation
 - Food Chain Evaluations augmented with site specific tissue and plant concentrations
 - Remedial Goals based on toxicity test and benthic community evaluation



CT Approach to Contaminated Sediments

- Characterization of nature/extent of release
- Evaluation of potential risks to people and ecological populations
- Flexible approach
- Site-specific
- Work in partnership with CTDEP



Questions??



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