REMEDIATION ROUNDTABLE

May 14, 2013

www.ct.gov/deep/remediationroundtable

AGENDA

- Various Updates

- Presentations with Q&A:
  - Stewardship Permit
  - Proposed Beneficial Use Regulations
  - 95% UCL Workgroup Report Out
  - Transformation RSR Amendments Package

UPDATES

- Drinking Water Action Levels – DPH has updated some action levels and constituents

http://www.ct.gov/dph/lib/dph/environmental_health/eoha/pdf/pw_action_levels.pdf

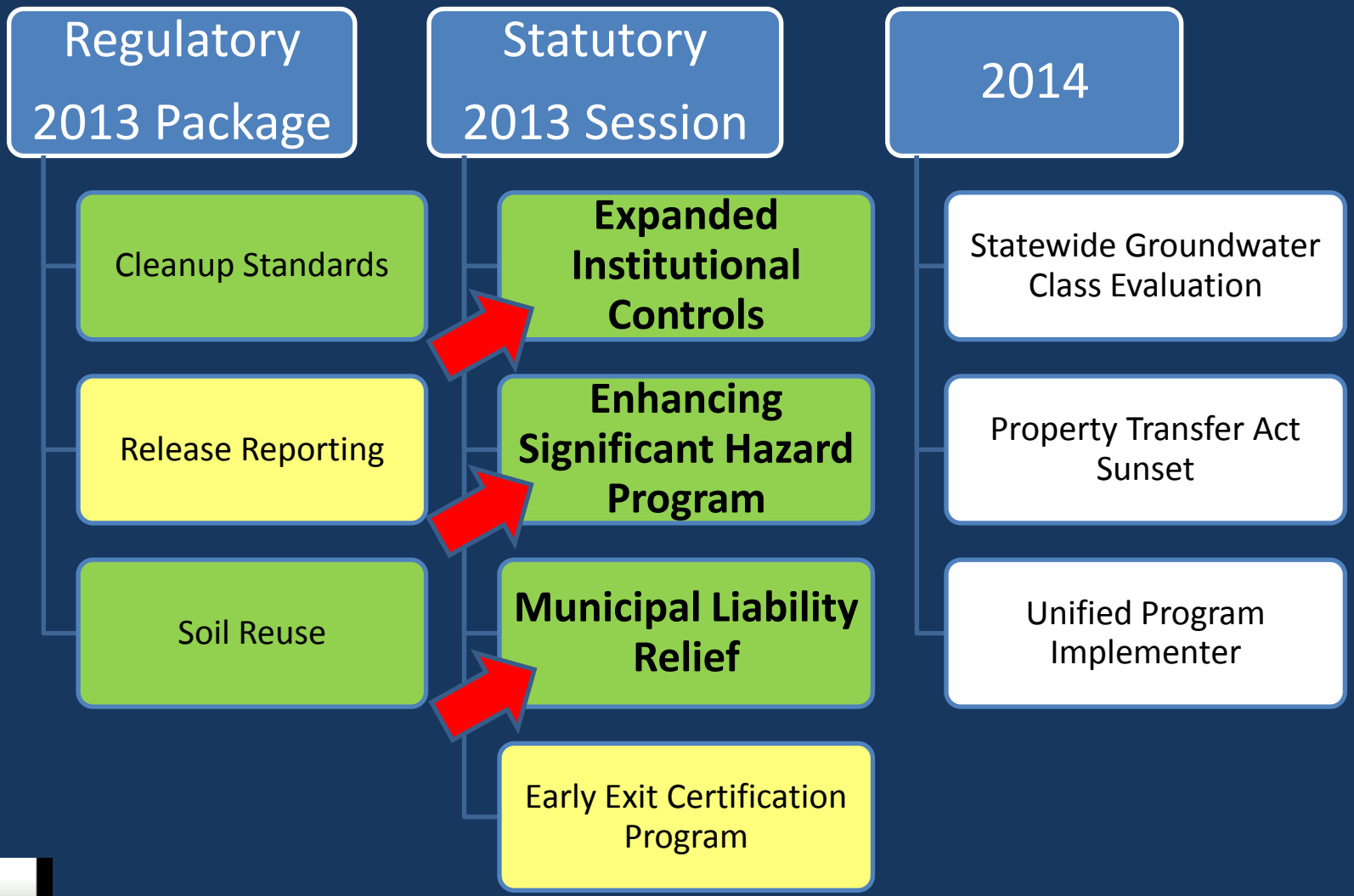
- Remediation Website
  - Remediation Transformation Report to Governor and Legislature posted February 7
  - Revised EC Database

UPDATES

BILL 1082

ROBERT BELL
ASSISTANT DIRECTOR
REMEDIATION DIVISION

CLEANUP TRANSFORMATION ROADMAP



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Section 1 – Municipal Liability Relief

- Allows municipalities to serve as the facilitator for redevelopment of Brownfields without the fear that they will be required to clean up the contamination

- Municipalities receive environmental liability relief for pre-existing releases from any third party

- Will be a means to redevelop more Brownfields in our cities and towns

BILL 1082

Sections 2 & 3 - Significant Environmental Hazards

Three main goals:

- Increase in self-implementation
- Decrease stigma of notification and publication
- Better address short-term risks
  - 30x ⇨ 10X for surface soil and volatilization

Current SEH Program Statistics

YEAR	DW Well >AL	DW Well<AL	GW Plume	Soil 0-2’	Volatilization	Surface Water
1998	21	18	51	8	18	27
1999	10	21	45	5	17	20
2000	5	14	21	3	4	11
2001	8	14	23	4	4	7
2002	8	18	17	12	4	7
2003	6	9	24	14	2	7
2004	14	14	22	10	5	4
2005	14	17	29	11	5	5
2006	6	11	33	9	8	0
2007	6	10	28	15	3	7
2008	5	9	26	18	3	2
2009	9	3	26	5	3	1
2010	3	4	22	5	1	0
2011	6	7	16	10	1	3
2012	4	4	15	14	2	3
2013 YTD	2	1	3	1	2	1
TOTAL 829	**127**	**174**	**401**	**144**	**82**	**105**

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Significant Environmental Hazards – DRINKING WELL

	Current	Proposed Joint Favorable	DEEP Further Proposals
(b)(1) drinking water well	Trigger is pollution in drinking water well > GWPC. TEP to notify owner in 24 hours.	Adds non aqueous phase trigger	
(b)(2)	Verbal notice to commissioner within 24 hours. Written notice in 5 days.		
(b)(3)		Notice after 30 days with self-implementing actions to evaluate extent of pollution.	

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Significant Environmental Hazards - SOIL

	Current	Proposed Joint Favorable	DEEP Further Proposals
(d)(1) surface soil	Trigger at 30x within 0-2 feet. Excludes TPH. Includes PAHs. TEP to notify owner in 7 days.	Trigger at 10x within 0-10 feet	Exemption of TPH moved to later in paragraph with exemption for PAHs. Changed back to 0-2 feet.
(d)(2)			New exemptions for: - soil under maintained pavement - industrial sites in supervised remedial program with controlled access and not >30x cleanup criteria - local health residential lead programs
(d)(3)		Notice after 90 days with self-implementing actions to evaluate and prevent pollution.	

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Significant Environmental Hazards - VOLATILIZATION

	Current	Proposed Joint Favorable	DEEP Further Proposals
(e)(1) volatilization	Trigger at 30x. Distance 15 feet beneath building. TEP to notify owner within 7 days.	Trigger at 10x criteria	Distance within 15 feet of building.
(e)(2)	Notify commissioner within 30 days with exceptions.		Indoor air monitoring option moved here.
(e)(3)	Specifies action for indoor air monitoring.		Notify commissioner within 30 days and requests proposed plan of action.

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Significant Environmental Hazards – SURFACE WATER

	Current	Proposed Joint Favorable	DEEP Further Proposals
(f)(1) surface water	Trigger is 10X WQS or > than site-specific dilution.	Adds non aqueous phase trigger	
(f)(2)	Notify in writing within 7 days.	For non aqueous, verbally notify commissioner within 24 hours and take action. Submit written notification with report/plan within 30 days.	Exempt sites regulated for non-aqueous phase under UST program.
(f)(3)			For other pollutants (not NAPL), 30 days to notify and submit plan.

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Sections 2 & 3 – Significant Environmental Hazards

	Current	Proposed Joint Favorable	DEEP Further Proposals
(m)(1) Notification	Notification to multiple persons, including elected officials		Notification to local health director and Mayor/1st Selectman only. May be electronic.
(m)(2)	List of all notifications published on DEEP web site. No provision to remove from list.		List on DEEP web site only includes not mitigated or abated. Abated and mitigated sites may be removed from list by DEEP.

BILL 1082

Sections 4 through 7 – Deed Notice

- Creates faster, less expensive, optional Deed Notice tool for smaller release areas

- Retains existing Environmental Land Use Restriction tool for larger, more complex releases

Questions / Comments

Please state your name and
speak loudly.

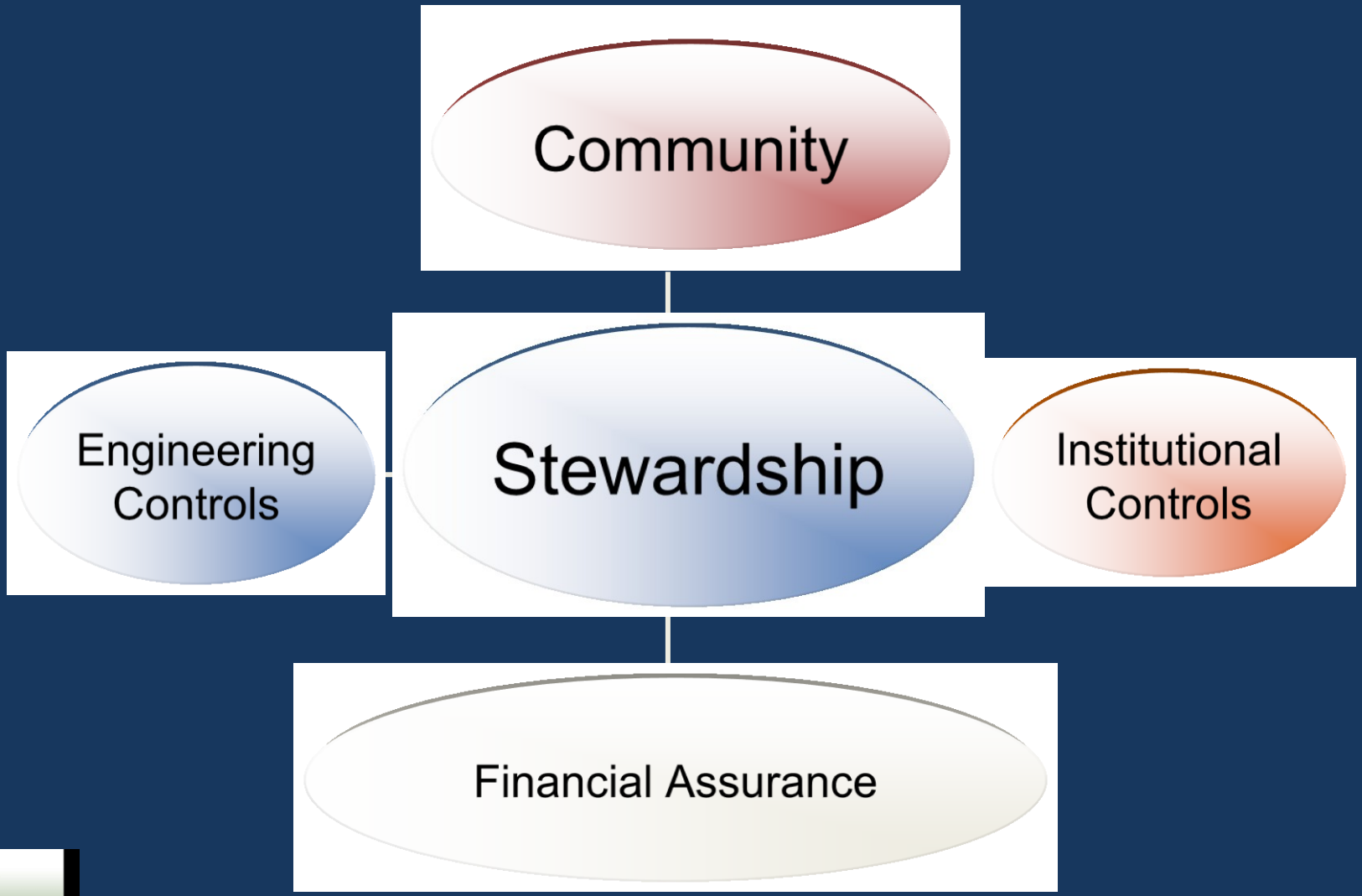
www.ct.gov/deep/remediationroundtable

Stewardship Permits

The Next Best Thing to Completion without Controls

DIANE DUVA, ASSISTANT DIRECTOR
WASTE ENGINEERING AND ENFORCEMENT DIVISION
BUREAU OF MATERIALS MANAGEMENT & COMPLIANCE ASSURANCE

A Stewardship Permit Links Together



Relevance of Stewardship Permits

- Required for Some Properties and Remedies
- **Not Required for All**
  - Can generally use institutional controls without need for permit
  - Can generally use engineered control of polluted soil without need for permit
- **Useful** when ownership transfers or land parceling occurs
  - Permit transfer is straightforward and **simple**

Examples of Stewardship Permit Use

- RCRA Hazardous Waste **Land Disposal Facilities**
- Other RCRA hazardous waste facilities with **controls needed to maintain effectiveness of property-wide remediation**
- Other RCRA hazardous waste facilities with outstanding obligations to complete remediation, used **in place of enforcement**

- Properties where a **historic solid waste disposal area** requires remediation or closure, and **remedy involves leaving waste in place**
- **Closed landfills** that lack a permit or need to update permit

Stewardship Permit Information Page

Stewardship Permit Fact Sheet

RCRA Specifics

- Different names, though basically the same
  - RCRA Post-Closure Permit
  - HSWA [Hazardous and Solid Waste Amendments] Permit
  - Corrective Action permit
  - Stewardship Permit
- All describe the Closure, Post-closure Care, Corrective Action, and/or monitoring obligations for facilities that have managed hazardous wastes
- 1998 EPA "Post-Closure" Rule says name doesn't matter, just needs to be enforceable document

•Corrective Action must be included in a RCRA Permit: RCSA 22a-449(c)-104(a)(2), incorporating 40 CFR 264.101
•Post-Closure Permit Required: RCSA 22a-449(c)-110(a), incorporating 40 CFR 270.1(c)
Note: A Stewardship Permit does not authorize receipt of hazardous or solid wastes.

RCRA Facilities: How you got in

- Someone filed a Part A permit application to be a Hazardous Waste Treatment, Storage, or Disposal Facility per RCRA
  - RCRA requires that hazardous waste facilities be issued an enforceable document and have a cleanup schedule in place
- Facility is committed to either:
  - Complete cleanup *by the time the permit is issued*, or
  - *Receiving a permit and following a schedule* to clean up property sitewide and put financial assurance in place
- Cleaning up includes addressing past releases, even if releases occurred prior to RCRA
  [Ensure clean slate going forward and prevent CERCLA sites!]

RCRA Facilities: How you get OUT

- To exit RCRA "interim status" **without** a permit, you must **complete** unit closure *and* sitewide "corrective action" [remediation]
- State can concurrently terminate RCRA interim status and approve completion of remediation
  - when endpoints [Remediation Standards] are achieved and documented
  - public has been informed that commissioner finds that remedy is protective

RCRA Facilities: How you get OUT

- Ensure public participation in proposed remedial action and proposed determination that remediation is complete
- Document cleanup is complete without controls
- Based on remediation completion, and if not yet permitted, DEEP terminates your RCRA “interim status” which is what allowed your facility to operate before permit issuance
- RCSA 22a-449(c)-110(a)(2), incorporating 40 CFR 270.43

Sometimes it is easy to see when cleanup is done…

CT and EPA Prefer Permanent Remedies and Restoration

CERTIFICATE OF COMPLETION

The Commissioner of Environmental Protection has made a final administrative decision that no activities are being conducted that require a RCRA permit at ABB Inc. for the portion of the site consisting of 300 Scotland Drive and a portion of 2000 Day Hill Road, EPA ID No. CTD001159557, located at **2000 Day Hill Road, Windsor, Connecticut.**

Environmental investigation and remediation activities are complete at the facility.. Opportunities for public comment were provided related to the environmental investigation and remediation. Opportunity for public comment was also provided related to the Commissioner's proposed disposition of the facility's permit status.

The issuance of this certificate is based on the completion of environmental clean-up work required by state laws and regulations, including RCRA Corrective Action and Closure, as determined by compliance with Connecticut's Hazardous Waste Management Regulations and Remediation Standard Regulations, as well as state and federal guidance. This clean-up is consistent with the requirements of Connecticut's Property Transfer Act defined in Connecticut General Statutes Sections 22a-134 and 22a-134(a) through (e), and may be used as the basis for submitting a Form II pursuant to Connecticut's Property Transfer Act.

September 29, 2009

Amey W. Marrella
Commissioner

The Next Best Thing to Clean-Up Completion without Controls: A Permit with a Schedule

CERTIFICATE OF STEWARDSHIP

The Commissioner of Environmental Protection has made a final administrative decision to issue a Stewardship Permit to **ABB Inc.** for the former Combustion Engineering Facility, EPA ID No. CTD001159557, located at 2000 Day Hill Road, Windsor, Connecticut.

This permit is for the continuation of facility closure, post-closure care and corrective action activities, meaning environmental investigation and remediation, at the facility and may be transferred upon the written authorization of the Commissioner. Opportunity for public comment has been provided in accordance with state and federal requirements.

This action is based on the obligation to initiate and complete closure, post-closure care and environmental clean-up work required by state laws and regulations, including RCRA Corrective Action and Closure, and requires compliance with Connecticut's Hazardous Waste Management Regulations and Remediation Standard Regulations, as well as state and federal guidance.

September 29, 2009

Amey W. Marrella
Commissioner

CERTIFICATE OF STEWARDSHIP

The Commissioner of Environmental Protection has made a final administrative decision to issue Stewardship Permit DEP/HWM/CS-061-002 to

Connecticut Yankee Atomic Power Co. ("CYAPCO"), Haddam Neck Plant

EPA ID No. CTD042306720, located at 362 Injun Hollow Road, Haddam, Connecticut.

This certificate confirms CYAPCO's completion of corrective action measures, including environmental investigation and remediation activities, with the exception of post-remediation groundwater monitoring. Upon issuance of this permit, CYAPCO's Interim Status granted under RCRA is hereby terminated.

This action is based on environmental clean-up work required by federal and state laws and regulations, including RCRA Corrective Action and Closure, and represents compliance with Connecticut's Hazardous Waste Management Regulations and Remediation Standard Regulations. Consistent with federal and state regulations and guidance, upon the Commissioner's determination that CYAPCO has satisfied the requirements of this permit, CYAPCO may receive a Certificate of Completion.

October 23, 2007

/signed/

Gina McCarthy
Commissioner

Stewardship Permits

communicate
the status of a property
and

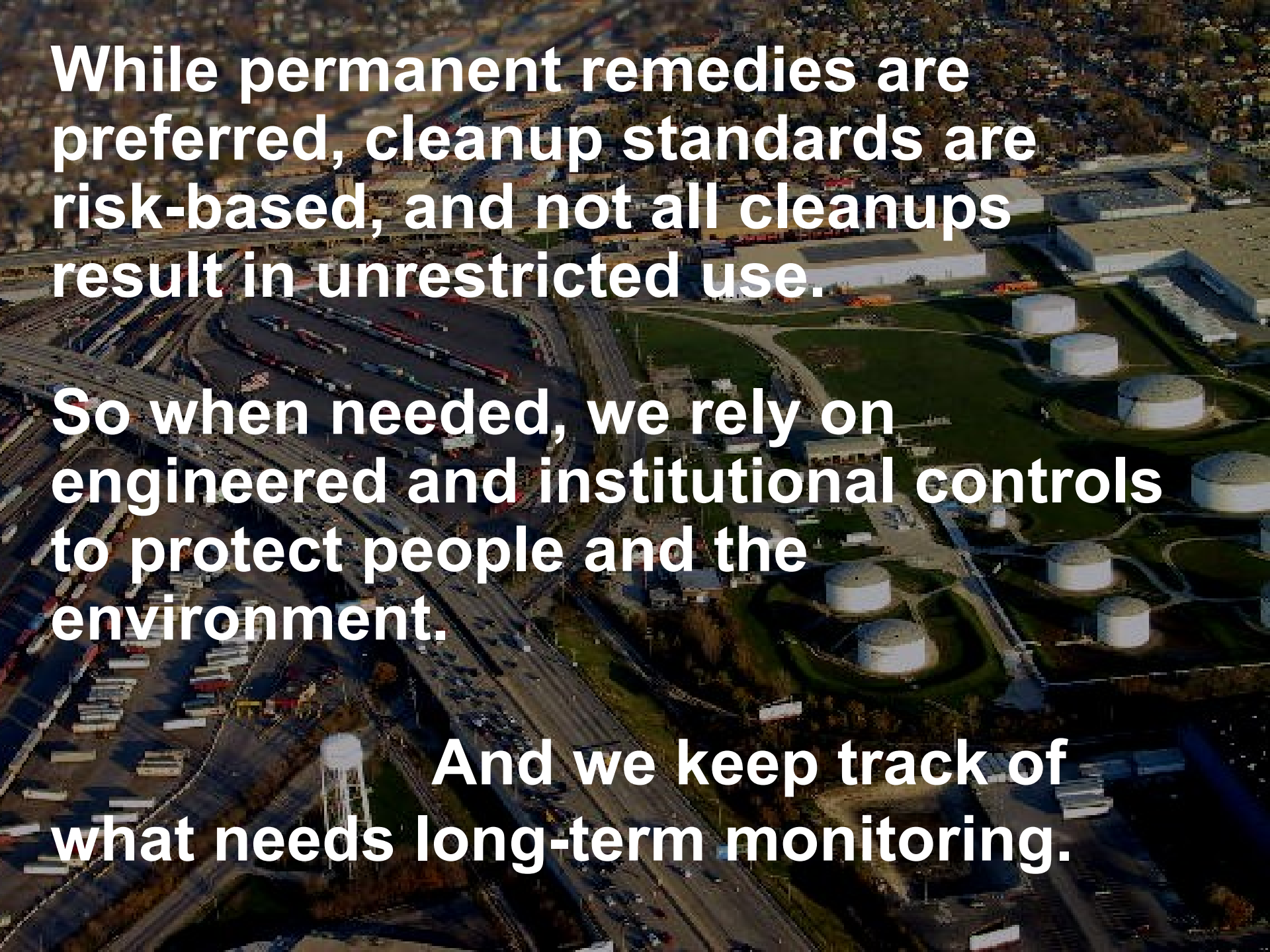
clarify it is okay that remedies use controls to complete remediation.

A Permit with a Schedule is an Agreement

- **Communicates** the property's status to **banks** and **insurance underwriters,** including that cleanup work is underway
- **Defines** long-term obligations for the property, such as
  - performing water quality monitoring
  - maintaining an engineered control
  - maintaining institutional control
- **Documents** and creates historic record of the work completed [documents decisions so that they don't have to be revisited]
- Contains a Compliance Schedule that specifies **timeframes** in which remaining work will be completed
- Can include language to address future **parceling**
- **Balances** current cleanup costs with phased-in financial assurance obligations

Completion vs. The Next Best Thing

- When Cleanup is Complete, exit RCRA facility status by determining remediation is complete and no permit is needed
- When there is still cleanup work ahead, move from interim status to permitted status—to reduce future permitting or enforcement uncertainty
- Use permit to document stewardship obligations in a mutually agreeable schedule



While permanent remedies are preferred, cleanup standards are risk-based, and not all cleanups result in unrestricted use.

So when needed, we rely on engineered and institutional controls to protect people and the environment.

And we keep track of what needs long-term monitoring.

How to Succeed in Business and in Permitting

- Understand existing environmental conditions
- Share your business needs with DEEP:
  - timing constraints,
  - ownership transfer plans,
  - plans to separate or combine parcels, now or in future
- Propose schedule
- Set clear expectations
- Document decisions so that they don't have to be revisited if cleanup process outlasts the regulator's assignment
- Revise schedule as needed
- Stay focused on results, not process

Elements of Stewardship Permits

I. **Standard Conditions**
   - Identify who has duty to comply, site security, etc.
   - Delegation to LEP, if applicable

II. **Authorized Activities**
   - investigate, clean up
   - install and maintain engineered controls
   - apply institutional controls

III. **Schedule of Compliance**
   - "to-do" list, Financial Assurance

Appendices (e.g., Areas of Concern addressed)

Public Participation at Permit Issuance

- **Public Notice of Tentative Determination**
  - Commissioner Issues a Notice of Tentative Determination to issue Permit
    - *Published in the newspaper having significant circulation in the municipality*
    - *Broadcast on a radio station*
  - The notice provides for:
    - A Public Informational Meeting
    - A 45-Day comment period during which the public and others may submit comments regarding the draft permit

- **Permit Issuance**
  - At the end of the comment period, the Commissioner will consider all comments received and will issue, modify, or deny the permit as deemed appropriate

Stewardship is an Opportunity

Demonstrate* that you are:

- Committed to cleaning up
- Resolving uncertainty
- Clear about what it takes to be a good steward of this property

*to investors, insurance companies, regulators, prospective purchasers

Transferring Ownership: Interim Status Facilities

- ***Notify new owner***
  - " (b) Before transferring ownership or operation of a facility...the owner or operator must notify the new owner or operator in writing of the requirements of this part and part 270 of this chapter…"
  - RCSA 22a-449(c)-105(a)(1), incorporating **40 CFR 265.12(b)**
- ***Notify Commissioner***
  - RCSA 22a-449(c)-110(a)(1), incorporating **40 CFR 270.72(a)(4)**

Transferring Ownership: Permitted Facilities

- RCSA 22a-449(c)-110(a)(1), incorporating **40 CFR 270.40**
- Commissioner's approval is required prior to transfer of the permit or a change in ownership or operational control of the facility
- Permit transfer is simple process and is bundled with other agency permits and processed through DEEP Permit Ombudsman's Office.

Connecticut and EPA prefer permanent remedies and restoration.

The Next Best Thing to Clean-Up Completion: A Permit with a Schedule

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September 29, 2009

Amey W. Marrella
Commissioner

Summary: RCRA Stewardship Permit

- **Defines long-term obligations of permittee**
- **Provides public participation in cleanup**
- **Documents cleanup as it is completed**
- **Phases in financial assurance obligations**

Outcomes of Stewardship Permits

Keep our promise to the future by institutionalizing remedies that effectively protect human health and the environment

Remove cleanup uncertainty so that we can move forward to restore and revitalize our urban centers

Guide growth to preserve open land

Ease transfer of property ownership

Promote and maintain a sustainable economy

Information Resources

- CT DEEP Stewardship Permit links

Stewardship Permit Information Page Stewardship Permit Fact Sheet

- EPA Corrective Action Guidance www.epa.gov/wastes/hazard/correctiveaction/resources/

- EPA *Final Guidance on Completion of Corrective Action Activities at RCRA Facilities* 02-25-03 Federal Register [68 FR 8757] [Copy and Paste the URL] http://www.epa.gov/wastes/hazard/correctiveaction/resources/guidance/gen_ca/compfedr.pdf
- EPA Training Module on RCRA Long-Term Stewardship [Copy and paste the URL] http://www.epa.gov/wastes/hazard/correctiveaction/training/vision/mod12.pdf
- CT DEEP Financial Assurance links www.ct.gov/deep/financialassurance

Questions / Comments

Please state your name and
speak loudly.

www.ct.gov/deep/remediationroundtable

DRAFT Beneficial Use Regulations

KEVIN SULLIVAN
SUPERVISING ENVIRONMENTAL ANALYST
WASTE ENGINEERING AND ENFORCEMENT DIVISION

BENEFICIAL USE REGULATIONS

1) Background / LEAN event

2) Categories of Exempt Materials

3) Classes of Exempt Recycling Facilities

    » Presentation focus: soil and sediment

BACKGROUND

- 2008: previous regulations proposal and stakeholder dialogue
- Proposed regulations were packaged with RSR regs changes that were not adopted
- LEAN event in January 2013

LEAN Opportunities

- Safely reuse low-level polluted soil material from construction projects, which generate excess materials
- DEEP's current reuse process in RSRs not often used
- Reduce, reuse, recycle
- Savings from reduced transport and disposal costs
- Provide clear direction to contractors and others managing excess materials

INFRASTRUCTURE SAVINGS

- Examples:
  - DOT: $35 million+ saved with staging and reuse
  - NU/Yankee Gas estimates significant savings
  - MDC - similar savings when reused
  - DPW/DCS saved $3 million from demonstrating reusability of materials

Current Definition of "Clean Fill"

(1) **natural soil**

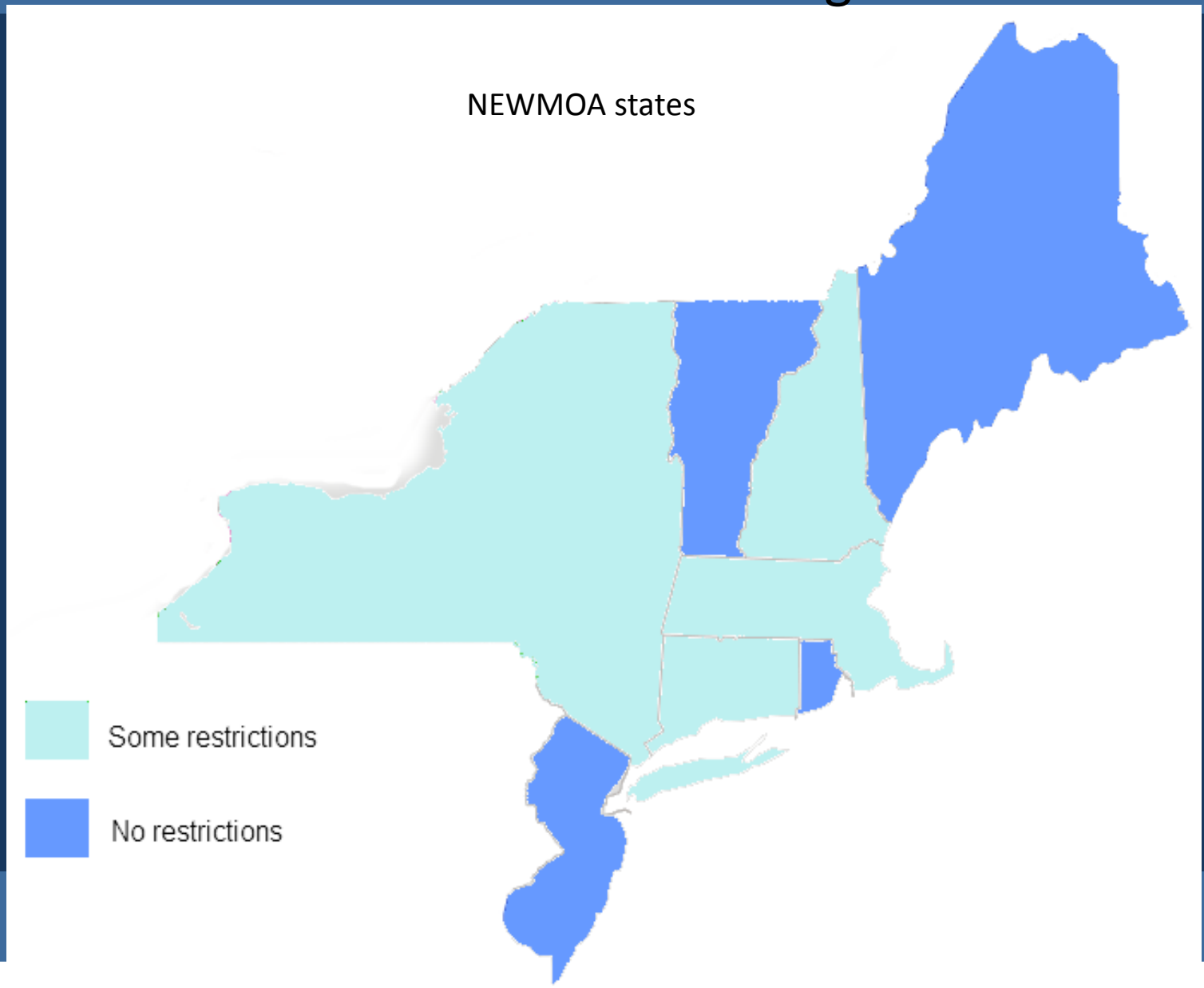
(2) **brick, ceramics, concrete, and asphalt paving fragments** which are virtually inert and pose neither a pollution threat to ground or surface waters nor a fire hazard

(3) **polluted soil** as defined in subdivision (45) of subsection (a) of Section 22a-133k-1 of the Regulations of Connecticut State Agencies which soil has been treated to reduce the concentration of pollutants to levels which do not exceed the applicable pollutant mobility criteria and direct exposure criteria established in Sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies and which soil is reused in accordance with R.C.S.A. subdivision (3) of Subsection (h) of section 22a-133k-2 of such Regulations.

Good news!!

- DOT: 70 % of excavated soil tests as below residential DEC AND GA PMC
- Opportunity: lots of easily reusable soil

Regional Regulation of Soil Reuse with Contamination Below Most Stringent Criteria



LEAN Results

- Develop Beneficial Use regulations for the reuse and management of certain materials

  1. Create exemption* for materials used according to the regulations

     * Material would not be considered solid waste

  2. Create exemption* for facilities managing exempt materials

     * Facility would not need solid waste permit

- Not tied to current RSR regulations package

LEAN Results (cont'd)

- Beneficial Use regulations could largely replace the RSR process for off-site polluted soil management
- Self-implementing categorization
- Clarify how materials can be legally and safely reused
  - Define categories of soil quality by concentrations of substances to identify its proper reuse
  - Separate soil and sediment from asphalt, brick, concrete

CATEGORIES OF EXEMPT MATERIALS

- CGS 22a-209d – Commissioner may:
  - Adopt regulations
  - establish categories of materials that would not be considered solid waste – *IF…*
  - the materials are used in accordance with the regulations

MATERIAL CATEGORIES AND USES

- Examples:
  - Excavated soil and sediment
    - ✓ used in accord with soil quality category
  - Asphalt materials
    - ✓ used in pavement structure or asphalt production
  - Clean wood
    - ✓ used in landscaping

DRAFT REGULATIONS LANGUAGE

- Example material category definition:

  "Asphalt materials" means bituminous concrete, asphalt pavement, asphalt millings, asphalt roofing shingles, or soil containing asphalt materials or substances associated with asphalt

  – More material category definitions….

DRAFT REGULATIONS LANGUAGE

- Material use language example:

  Categories of materials. The following categories of materials used in accordance with the standards in this section shall not be considered solid waste:

  – List materials and standards for their use

MATERIAL USE EXAMPLE

- **Asphalt materials** reused in asphalt pavement structures or as an ingredient in asphalt production. Any person reusing or recycling asphalt materials or any mixture or combination of only such materials may use, reuse, or recycle such materials as sub-base under asphalt or in asphalt production in accordance with industrial standards. Any person reusing or recycling asphalt materials, shall ensure that such materials are reused as bituminous concrete, reused in an asphalt pavement structure, such as driveways, parking lots or roads, or are recycled by being added as an ingredient to asphalt mix. Asphalt materials are not authorized for use as fill or to contour the land.

SOIL CATEGORIES OR QUALITY GRADES

- March 2013 Outreach:
  - March 15 : CBIA
  - March 20 : Utility Contractors Assoc. of CT
  - March 22 : CT Construction Industry Assoc.
  - March 28 : Open informational meeting at DEEP

DRAFT QUALITY CATEGORIES

Grade	Standard	Reuse
A+ [Res 1]	Tested and not > : • 50% Residential DEC • 50% GA PMC • no PCBs	• use as fill anywhere , except • Not authorized for ➢ gardening or topsoil
A [Res 2]	Tested or knowledge of origin, not > : • Residential DEC • GA PMC • no PCBs	• use as fill anywhere, except • Not authorized for ➢ gardening or topsoil ➢ below water table ➢ within 75’ of drinking water well

DRAFT QUALITY CATEGORIES

Grade	Standard	Reuse
B [Res 3 & I/C]	Tested and not > : • GB PMC • Res DEC or I/C DEC • no ELUR if not > Res DEC • ELUR for > Res and not > I/C DEC • no PCBs	"**Conditional fill**" • use as fill in GB areas only • Not authorized for ➢ use in gardening or as topsoil ➢ below water table ➢ within 75' of drinking water well

DRAFT QUALITY CATEGORIES

Grade	Standard	Reuse
C	Tested or originates from transportation or utility corridor • "like to like"; i.e. ➢ Rail to rail ➢ road to road ➢ utility to utility • not > GB PMC and I/C DEC • PCBs below Res DEC	"**Corridor fill**" • reuse in corridors, provided: no contamination from a release not associated with the corridor

DRAFT QUALITY CATEGORIES

Grade	Standard	Reuse
DF	Freshwater Dredged Materials	• Managed like soil (characterization guidance needed) ➢ If associated with dam removal, reuse on site within area of the historic impoundment, and - either consistent with applicable DEC, or - as approved by the Commissioner as a condition of the Dam Safety Permit
DM	Marine Dredged Materials	• Managed like soil after treatment/processing as needed (characterization guidance and treatment/processing requirements needed) • Upland placement along bank according to regulation

GETTING WHAT YOU PAY FOR

- Self-implementing: Match the quality category with the specified types of use and no DEEP approval or involvement is needed
- Seller certification: seller or distributor of soil is responsible for:
  - Identifying the soil quality category
  - Maintaining records of that determination for 3 years
  - If requested within 3 years, must provide documentation to:
    - Landowner soil was placed on, Commissioner, municipality

CLASSES OF EXEMPT RECYCLING FACILITIES

- CGS 22a-208i - Commissioner may:
  - Adopt regulations
  - Establish classes of facilities that are exempt from solid waste permitting requirement
  - *IF* facility
    - Register with DEEP
    - follows requirements in the regulations

("conditionally exempt registered recycling facility")

CONDITIONALLY EXEMPT RECYCLERS

- Examples of Exempt Facility Classes
  - Asphalt manufacturers
  - Clean wood processors
  - Soil Management Facilities
    - Excavation site (no registration required)
    - Staging area (registration)
    - Soil Processing facility (register and report)

CONDITIONALLY EXEMPT RECYCLERS

- Soil recycling facilities exemption:
  - All materials handled must be < GB PMC and I/C DEC
  - Does not allow treatment
  - Allows blending for making a product
  - Reporting is material tonnages annually to DEEP for recycling goals tracking

NEXT STEPS

- May 14 : DEEP Remediation Roundtable
- June: open informational meeting TBA
- Public comment period summer 2013
- Adopt regulations winter 2013

QUESTIONS FOR YOU

- What are you already doing that can be copied so we keep things simple and workable?

- Does every person selling or distributing have to maintain records, or just the “last one” (last seller to the user/landowner)?

Questions? Comments? Ideas?

Please e-mail or call:

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www.ct.gov/deep/remediationroundtable

95% UCL Workgroup

Report Out

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ENVIRONMENTAL ANALYST 2
REMEDIATION DIVISION
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CHRISTINA POLLOCK
GEO-ENVIRONMENTAL MANAGEMENT SERVICES

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Dermot Jones – CT DPH

Kathy Lehnus – Stantec Consulting Services

Tina Pollock – Geo-Environmental Management Services

Dan Rioux – Environ International

Brian Washburn – HRP Associates

Carolyn Fusaro & Carl Gruszczak – DEEP Remediation Staff

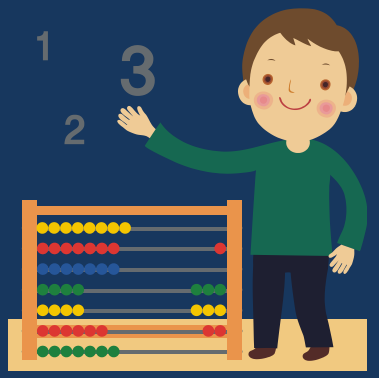
2012 Proposed RSR Amendments

Workgroup provided public comments:

- ✓ Remove 2x limit on maximum concentration
- ✓ Clarify/correct PMC language where "excavation as remedial method" was proposed for deletion
- ✓ Allow for the use of 97.5% or 99% UCL
- ✓ Retain 12 Consecutive Month GWPC 95% UCL option
- ✓ Clarify samples to be used with SWPC 95% UCL option
- Decrease number of samples for PMC to 10

95% UCL Definition

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



Applicability

Current RSR Criteria with Option to use 95% UCL:

- Direct Exposure Criteria
- Pollutant Mobility Criteria
- Groundwater Protection Criteria
- Volatilization Criteria

2012 Proposed RSR Amendment Changes:

- Add Surface Water Protection Criteria
- Remove Volatilization Criteria

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Release Area/Groundwater Plume

- Related to Single Source
- Representative of Concentration Distribution
- Use of NDs – Inside vs. Outside
- Other Lines of Evidence and Professional Judgment

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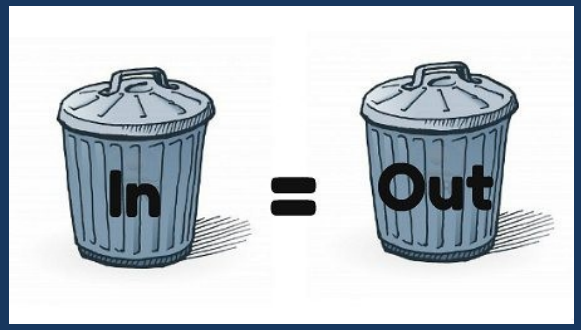
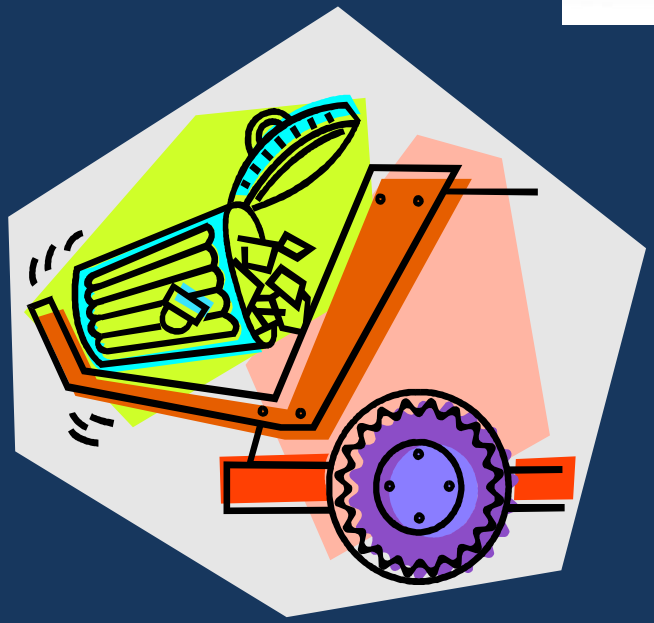
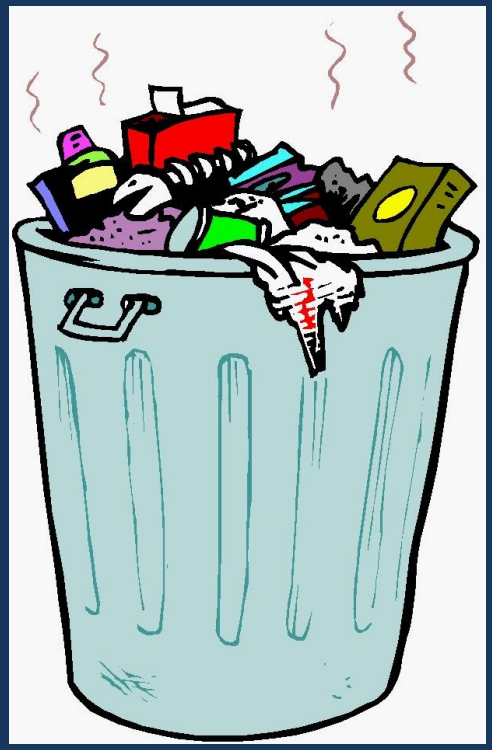
Data Set: Garbage In – Garbage Out







Data Set Evaluation

Data Set Size

- Sufficient to produce reliable and accurate results

Representativeness

- Replicate what is in the ground

Statistical DQOs

- Randomness
- Strength
- Skewness

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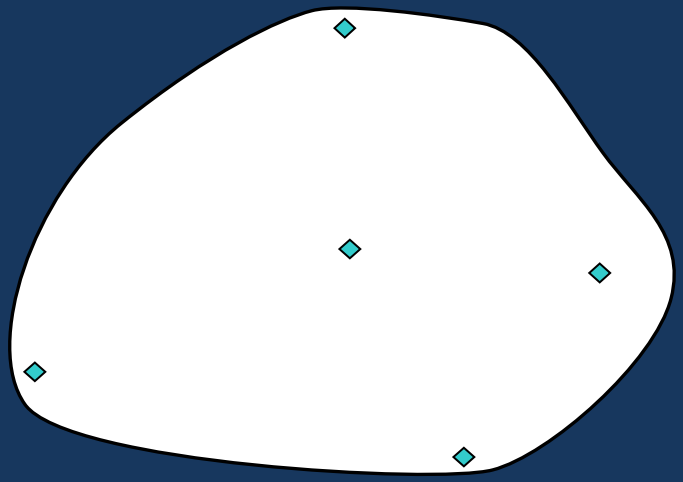
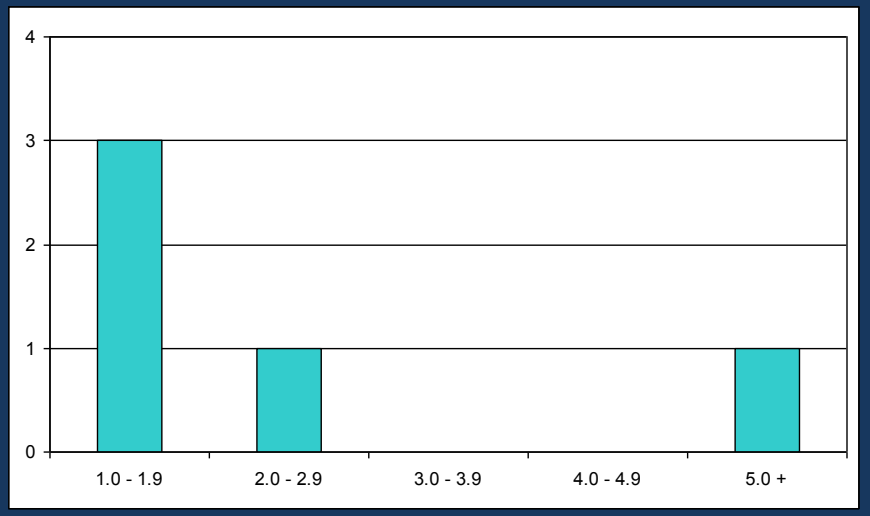
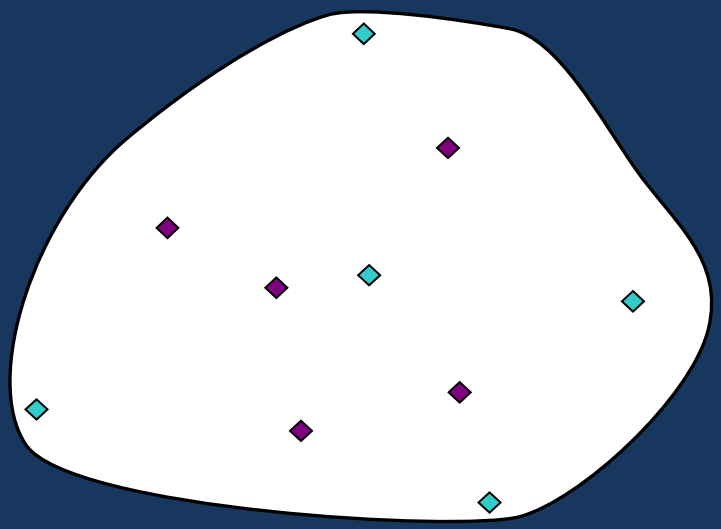
Data Set: Size & Representativeness

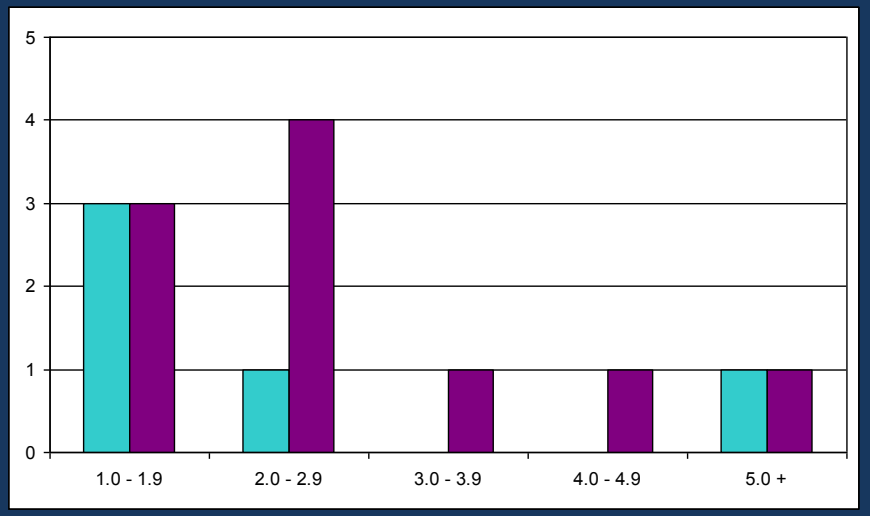




n = 5
Range = 1 to 5
Mean = 2.16
StDev = 1.665
Skewness = 1.789
95% UCL = 3.748

Data Set: Size & Representativeness

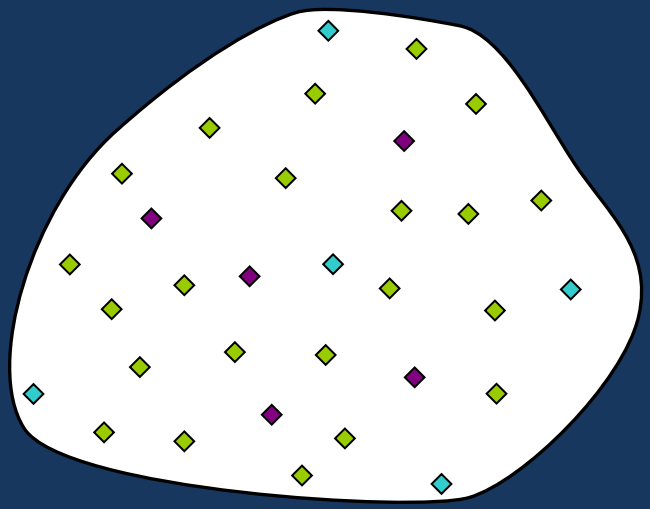


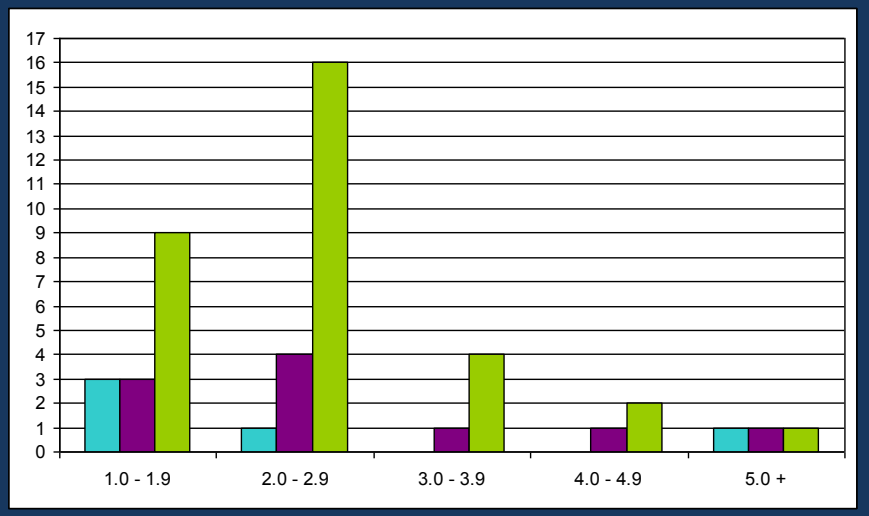


n = 5
Range = 1 to 5
Mean = 2.16
StDev = 1.665
Skewness = 1.789
95% UCL = 3.748

n = 10
Range = 1 to 5
Mean = 2.51
StDev = 1.304
Skewness = 0.815
95% UCL = 3.266

Data Set: Size & Representativeness



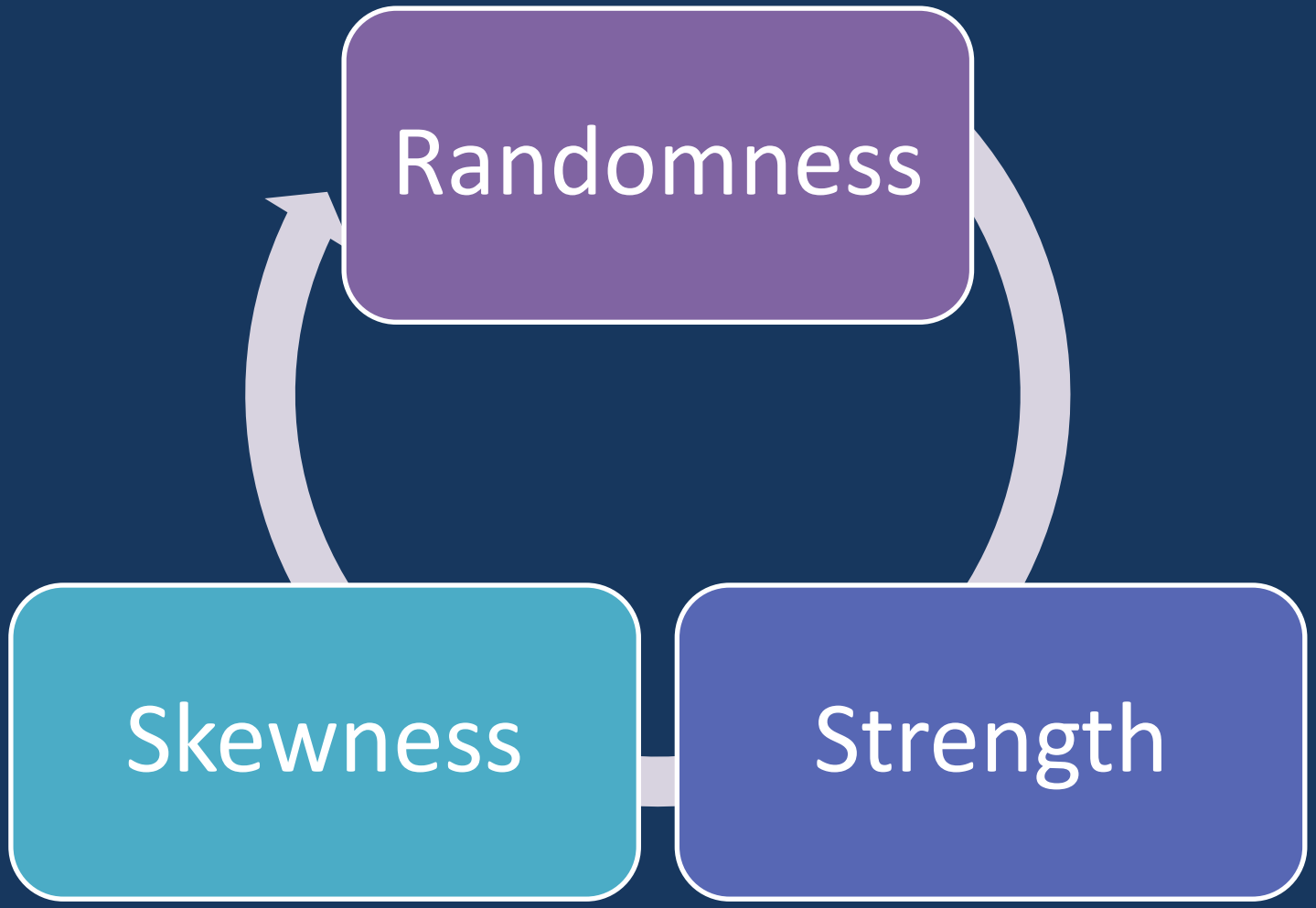


n = 5
Range = 1 to 5
Mean = 2.16
StDev = 1.665
Skewness = 1.789
95% UCL = 3.748

n = 10
Range = 1 to 5
Mean = 2.51
StDev = 1.304
Skewness = 0.815
95% UCL = 3.266

n = 32
Range = 1 to 5
Mean = 2.344
StDev = 1.001
Skewness = 0.988
95% UCL = 2.668

Data Set: Statistical DQOs



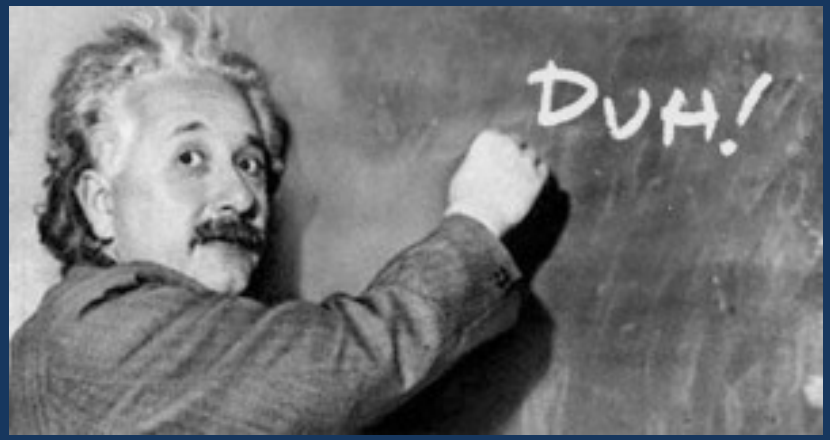
Calculating the 95% UCL

$$\chi^2 = \sum \left[\frac{(O_{ij} - E_{ij})^2}{E_{ij}} \right]$$

$$UCL = \bar{x} + t(s/\sqrt{n})$$

$$W = \frac{\left(\sum_{i=1}^{n} a_i x_{(i)}\right)^2}{\sum_{i=1}^{n} (x_i - \bar{x})^2}$$

$$UCL = e^{(\bar{x} + 0.5s^2 + sH/\sqrt{n-1})}$$



Calculating the 95% UCL

Workgroup Recommends use of ProUCL

- Free software available from EPA
- Calculation methods available for normal, lognormal, gamma, and non-parametric data distributions
- http://www.epa.gov/osp/hstl/tsc/software.htm

Other software/spreadsheets may be used

- Documentation must be submitted
- Results will likely be compared to ProUCL output

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Handling Non-Detect Results

Former Practice

- Substitution (DL or DL/2) is no longer recommended

Best Practice

- For Normal, Lognormal, Gamma Distributions - ROS
- For Non-Parametric Distribution – Kaplan Meier

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ProUCL Output

- General Statistics
- Distribution Analysis
- Calculated 95% UCL Values
  - ➢231 mg/kg – 338.4 mg/kg
- Recommended 95% UCL to Use
  - ➢264.2 mg/kg

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

DIBENZ(A,H)ANTHRACENE

General Statistics

Number of Valid Data	110	Number of Detected Data	81
Number of Distinct Detected Data	52	Number of Non-Detect Data	29
Number of Missing Values	2	Percent Non-Detects	26.36%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	20	Minimum Detected	2.9
Maximum Detected	1600	Maximum Detected	7.37
Mean of Detected	253.9	Mean of Detected	4.98
SD of Detected	344.3	SD of Detected	0.98
Minimum Non-Detect	90	Minimum Non-Detect	4.5
Maximum Non-Detect	700	Maximum Non-Detect	6.551

Note: Data have multiple DL's - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	104
Number treated as Detected	6
Single DL Non-Detect Percentage	94.55%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.295	Lilliefors Test Statistic	0.08
5% Lilliefors Critical Value	0.0984	5% Lilliefors Critical Value	0.098
Data Not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	214.2	Mean	4.879
SD	305.9	SD	2.879
95% DL/2 (t) UCL	262.2	95% H-Stat (DL/2) UCL	23
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	4.843
		SD in Log Scale	0.897
		Mean in Original Scale	210.8
		SD in Original Scale	304.1
		95% t UCL	258.9
		95% Percentile Bootstrap UCL	261
		95% BCA Bootstrap UCL	266.4
		95% H-UCL	227.8

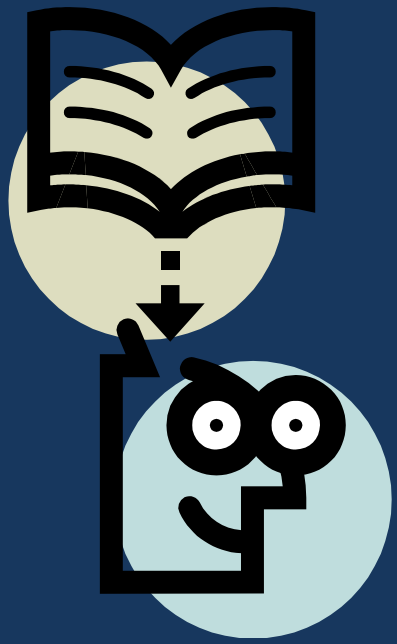
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.01	Data appear Lognormal at 5% Significance Level	
Theta Star	249.6		
nu star	164.8		
A-D Test Statistic	3.345	Nonparametric Statistics	
5% A-D Critical Value	0.781	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.781	Mean	210.9
5% K-S Critical Value	0.082	SD	303.5
Data not Gamma Distributed at 5% Significance Level		SE of Mean	29.26
		95% KM (t) UCL	259.4
Assuming Gamma Distribution		95% KM (z) UCL	259
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	259.4
Minimum	1.0000E-6	95% KM (bootstrap t) UCL	273
Maximum	1600	95% KM (BCA) UCL	266.2
Mean	216.3	95% KM (Percentile Bootstrap) UCL	261.3
Median	130	95% KM (Chebyshev) UCL	338.4
SD	305.5	97.5% KM (Chebyshev) UCL	393.6
k star	0.394	99% KM (Chebyshev) UCL	502
Theta star	549.3		
Nu star	86.64	Potential UCLs to Use	
A-D Test Statistic	66.18	95% KM (BCA) UCL	264
95% Gamma Approximate UCL (Use when n >= 40)	283.2		
95% Adjusted Gamma UCL (Use when n < 40)	284.2		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

Guidance Document Status

- Internal Review – On-going
- Out for Public Comments – Fall 2013



CARL GRUSZCZAK & CHRISTINA POLLOCK

95% UCL Workgroup

Questions / Comments

Please state your name and
speak loudly.

www.ct.gov/deep/remediationroundtable

Transformation RSR Amendments

JAN CZECZOTKA
ASSISTANT DIRECTOR
REMEDIATION DIVISION

PROPOSED RSR AMENDMENT PACKAGE
Wave 1

1. Public "Notice of Intent to Amend Regulations and hold a Public Hearing" – *Completed 08/21/12*
2. DEEP informational meetings – *Completed 9/20/12 and 9/26/12*
3. Public Hearing – *Completed 10/25/12*
4. Hearing Officer's Report – *Completed 3/11/13*
5. Final proposed regulations and associated documents to Commissioner – *Completed 3/11/13*

PROPOSED RSR AMENDMENT PACKAGE
Wave 1

6. DEEP notifies all interested parties of availability of final wording – *Completed 3/11/13*
7. DEEP submits final regulations to Attorney General for "Legal Sufficiency" approval – *Completed 3/12/13*
8. DEEP submits final regulations to Office of Fiscal Analysis and Comm. of Cognizance (Environment Committee) – *Completed 4/2/13*

PROPOSED RSR AMENDMENT PACKAGE
Wave 1

9. LRRC holds meeting on regulation amendments per CGS 4-170 - *Scheduled for 5/28/13*

10. Regulations filed with Secretary of State Office per CGS 4-172 (Regulations final upon Filing)

11. Publication of Regulations in the CT Law Journal

http://www.ct.gov/deep/cwp/view.asp?a=2715&q=325012&deepNav_GID=1626

RELATION TO TRANSFORMATION GOALS

Focus limited resources where needed most

- Inaccessibility definition change
- Incidental releases

Balance protection and costs

- PMC groundwater exception

Increase self-implementation

- 95% UCL
- Groundwater Compliance demonstration

CLEANUP TRANSFORMATION ROADMAP

Regulatory 2013 Package	Statutory 2013 Session	2014
Cleanup Standards (RSRs)	Expanded Institutional Controls	Statewide Groundwater Class Evaluation
Release Reporting	Enhancing Significant Hazard Program	Property Transfer Act Sunset
Soil Reuse	Municipal Liability Relief	Unified Program Implementer
	Early Exit Certification Program	

RSR AMENDMENT PACKAGE
Wave 2

- Goal of RSR amendments is to support the Transformation into forming ONE unified program
  - Remediation compliance from start to finish
    - Early Exits
    - Self-implementing options
    - Site-specific approaches
    - Institutional Controls
    - Tiered Exits A, B, C
- Does not propose to change 1996 criteria yet

RSR AMENDMENT PACKAGE
Wave 2

- Any parties can choose to use the standard cleanup approach (Class A, B1 or C1 cleanups)
- Parties can also choose to adjust their cleanup based on site-specific conditions or uses (Class B2 or C2 cleanups)
- Many of the B2 or C2 alternatives will be self-implementing with few alternatives requiring agency review and approval

MULTI-LEVEL EXIT CLASSES

C1/C2	B1/B2	A
➢ Soil Cleanup Complete	➢ Soil Cleanup Complete	➢ Soil Cleanup Complete
➢ Groundwater Remedy Operational	➢ Groundwater Cleanup Complete	➢ Groundwater Cleanup Complete
➢ Long-term Maintenance	➢ Land-Use Controls ➢ Long-term Maintenance	➢ Unrestricted Reuse

INCREASING LEVEL OF CLEANUP

RSR AMENDMENT PACKAGE
Wave 2

Internal Discussion Groups

PMC

- Evaluating fate and transport process of current PMC calculations
- Developing potential self-implementing options

ALT GWPC

- Conducting sensitivity analysis on map
- Working with DPH on toxicity considerations when determining a multiplier for GWPC

MNA

- Developing concept for a self-implementing MNA compliance point

RSR AMENDMENT PACKAGE
Wave 2

Internal Discussion Groups

SEDIMENT

- Develop a section of the RSRs on sediment considering Transformation Workgroup's suggestions

ICs

- Create list of all current and new ELUR types to categorize them into specific institutional controls
- Consult with DPH on any risk concerns with Institutional Controls

RSR AMENDMENT PACKAGE
Wave 2

Internal Discussion Groups

DEFAULT CRITERIA

- Develop Recreational Criteria (Active and Passive) for DEC and VolC
- Create self-implementing option for volatilization in large building types (warehouse, hangar, etc.)

EARLY EXITS

- Develop RSR language for early exits

RSR AMENDMENT PACKAGE
Wave 2

Early Exits

- Purpose:
  - releases are cleaned up rapidly
  - without impact to sensitive receptors
  - formal administrative closure through written Certification without longer-term cleanup obligations

RSR AMENDMENT PACKAGE
Wave 2

Early Exits

- Results:
  - fewer open cases
  - higher costs associated with longer-term obligations avoided
  - risk to human and ecological receptors eliminated
  - prompt regulatory closure and certainty obtained

RSR AMENDMENT PACKAGE
Wave 2

Early Exits

- Applicability:
  - Available for all release types – contained, new, old
  - Available where risk to receptors eliminated
  - Available for releases fully remediated to default cleanup standards (Class A Cleanup)

- Not appropriate for the most complex release situations

RSR AMENDMENT PACKAGE
Wave 2

Early Exits

- Response Timing:
  - Contained and New Releases = 90 days
  - Old Releases = 1 year
  - Possible extension
- Certification:
  - By an individual with Early Exit Training
  - On a form prescribed by Commissioner

RSR AMENDMENT PACKAGE
Wave 2

Groundwater

- Wave 1 – reduction in post-remediation monitoring
- Wave 2 - for certain Contemporaneous Releases eligible for Early Exit, LTM requirements unnecessary

RSR AMENDMENT PACKAGE
Wave 2

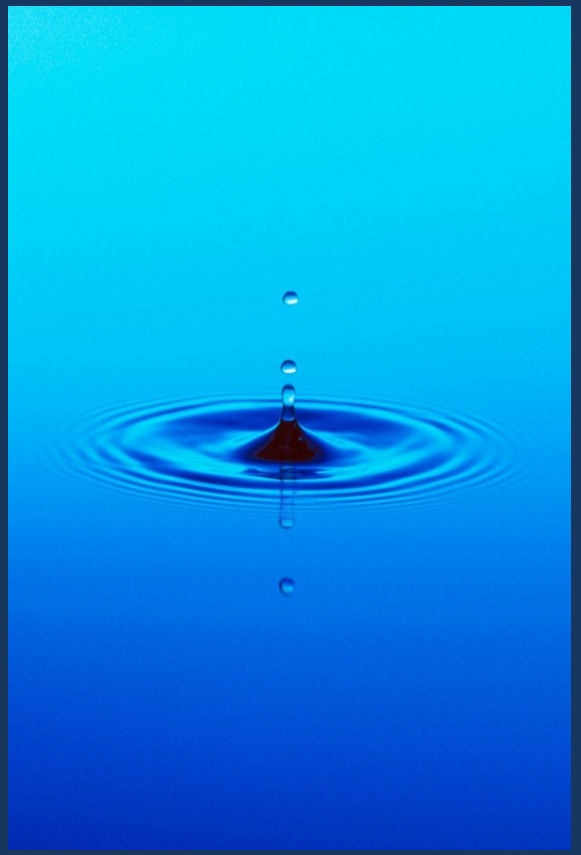
Groundwater

- Alternative GWPC
  - Purpose: To provide alternative options for meeting groundwater cleanup goals in a GA area
  - Based on reasonable assumptions regarding risk and known resource allocation
    - No current or future use for drinking water
    - Plume will ultimately reach GWPC
  - A multiplier of GWPC

RSR AMENDMENT PACKAGE
Wave 2

Groundwater

- Alternative GWPC
  - Applicability:
    - Alternative interim cleanup goal for dissolved-phase plume
    - Long-term attenuation through natural processes expected
    - No active remediation to ultimately achieve the GWPC



Groundwater

- Alternative GWPC Self-implementation

1. Meet plume location characteristics as shown on Department's Map of Potential Alternative GA Areas
   - Groundwater not used for public supply
   - No current use or future use for drinking purposes
   - Areas served by public water

Groundwater

- Alternative GWPC Self-implementation
  2. Meet site and plume characteristics
     - Releases to soil remediated to RSRs
     - Plume meets SWPC and Volatilization Criteria
     - Characterize 3-D and seasonal extent of plume
     - Plume has not migrated to bedrock aquifer
     - Diminishing state plume
     - Non-conforming Plume Registry

Groundwater

- Alternative GWPC Self-implementation
  3. Water Supply Well Receptor Survey
  4. And either:
     - public water available to all areas between the plume and downgradient surface water discharge point; or
     - where there is no surface water discharge point, public water is available within a buffer distance of plume terminus

RSR AMENDMENT PACKAGE
Wave 2

Groundwater

- Alternative GWPC Self-implementation:
  - LEP to provide Notice for use
  - Considered Class B Cleanup
  - With compliance with GWPC may change to Class A Cleanup

RSR AMENDMENT PACKAGE
Wave 2

Groundwater

- Alternative GWPC Commissioner Approval:
  - If above provisions cannot be met
  - LEP may request
  - Additional information will be needed

RSR AMENDMENT PACKAGE
Wave 2

Institutional Controls

- Currently only type of IC allowed under the RSRs is an ELUR
- Establish:
  - Additional types of IC for lower risk situations and increased self-implementation
  - New types restrictions to allow more flexibility

RSR AMENDMENT PACKAGE
Wave 2

Institutional Controls

- Proposed Types of ICs:
  - Deed Notice
    - Informational document
    - Filed in public land records
    - Enforceable
  - ELUR – additional situation for LEP Approval
- Existing ELUR (Commissioner approval) will remain

Institutional Controls - New Types of Restrictions

13 additional restrictions under evaluation, including:

- Self-implementing, limited exposure of inaccessible soil with LEP oversight and soil management plan
- Diminishing state groundwater plume which does not cross property line
- Exemption from volatilization criteria for sub-grade parking garage with natural or active venting
- Inaccessible soil - directly below asphalt or concrete if pollutants are limited to metals and PAHs
- Recreational restriction for recreational area DEC

RSR AMENDMENT PACKAGE
Wave 2

Institutional Controls

- Revisions to ELUR Regulations, including:
  - Stewardship
  - Mapping Requirements
  - Public Notice Requirements
  - Mechanics for new ICs and self-implementation

RSR AMENDMENT PACKAGE
Wave 2

Feedback opportunities prior to formal Public Hearing Draft

Connecticut Department of Energy and Environmental Protection

JAN CZECZOTKA

Questions / Comments

Please state your name and
speak loudly.

www.ct.gov/deep/remediationroundtable

REMEDIATION ROUNDTABLE

GENERAL Q&A

E-mail: DEEP.remediationroundtable@ct.gov

Web: www.ct.gov/deep/remediationroundtable

THANK YOU

Next meeting: August 13, 2013

Schedule and agenda on website
www.ct.gov/deep/remediationroundtable

Submit comments to Camille Fontanella at
DEEP.remediationroundtable@ct.gov