

REMEDIATION ROUNDTABLE

February 14, 2012



Connecticut Department of Energy &
Environmental Protection
Bureau of Land Reuse and Water Protection
Remediation Division

WELCOME!



CAMILLE FONTANELLA

TODAY'S AGENDA

- Updates:
 - Roundtable Anniversary Highlights
 - Cleanup Transformation
 - Total Petroleum Hydrocarbon Criteria
 - Targeted Brownfield Remedy
- Short Presentations:
 - Brownfield Remediation and Revitalization Program
 - Groundwater Filtering Guidance
- Public Participation:
 - General Q&A

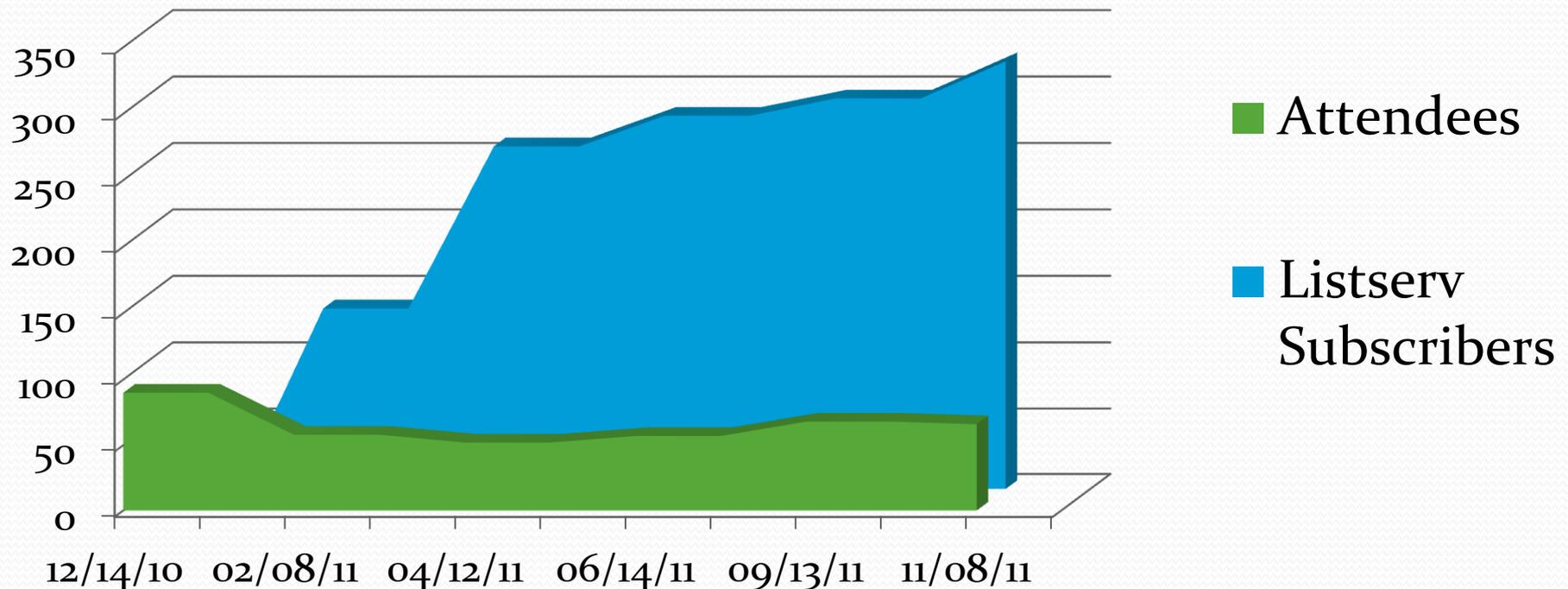
REMEDIATION ROUNDTABLE ANNIVERSARY HIGHLIGHTS



CAMILLE FONTANELLA

ROUNDTABLE ANNIVERSARY

- Attendance - 50-60 on average / 10 with perfect record
- Listserv – over 360 subscribers



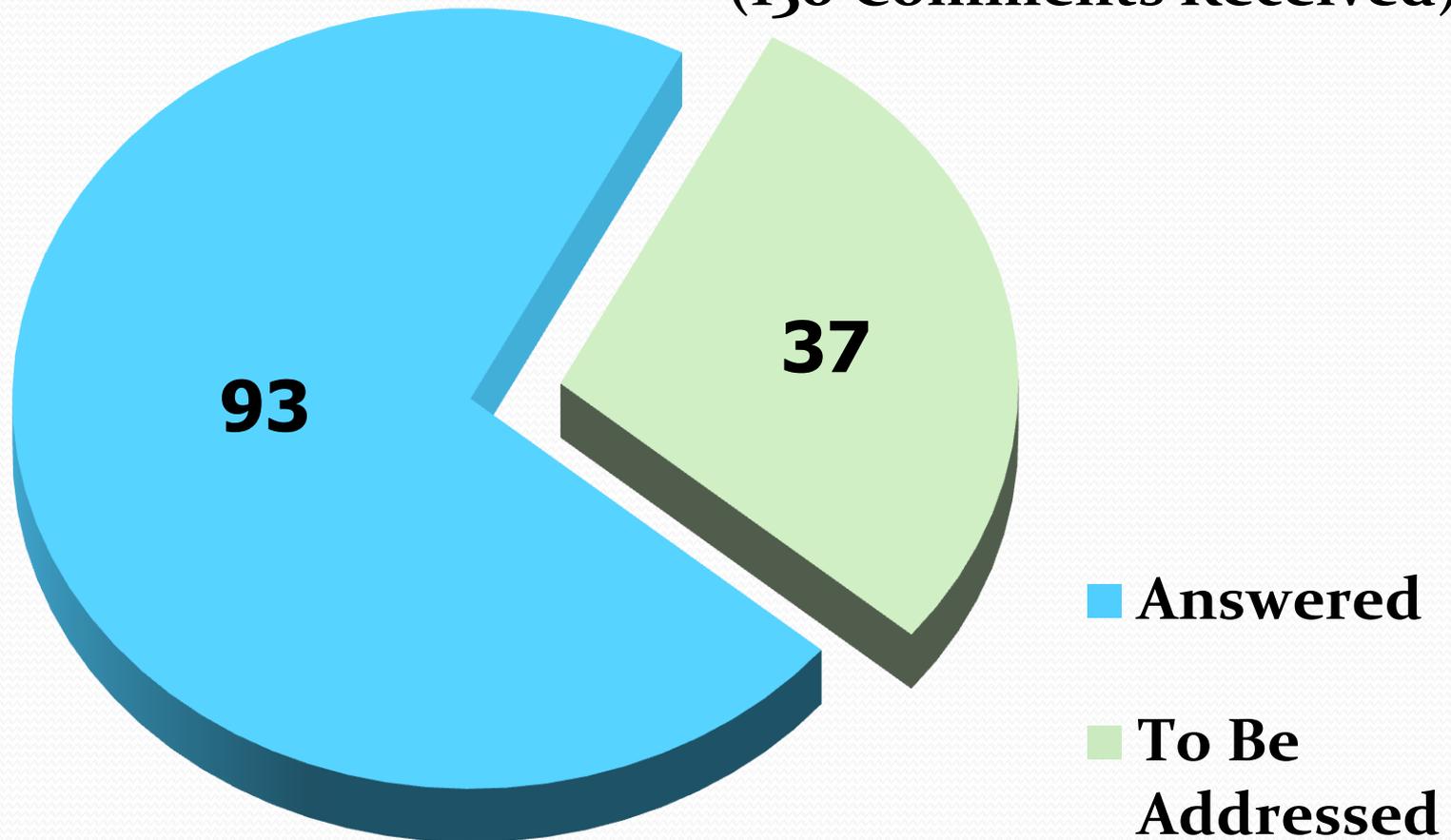
ROUNDTABLE ANNIVERSARY

- Newsletters - 6 issues of Q&A
 - APS and Alt Criteria
 - Brownfields
 - ELURs
 - Engineered Controls
 - Investigation and Remediation of sites
 - Property Transfer
 - Remediation Transformation
 - Verifications



Q&A NEWSLETTER

Written Comments
December 2010 – December 2011
(130 Comments Received)



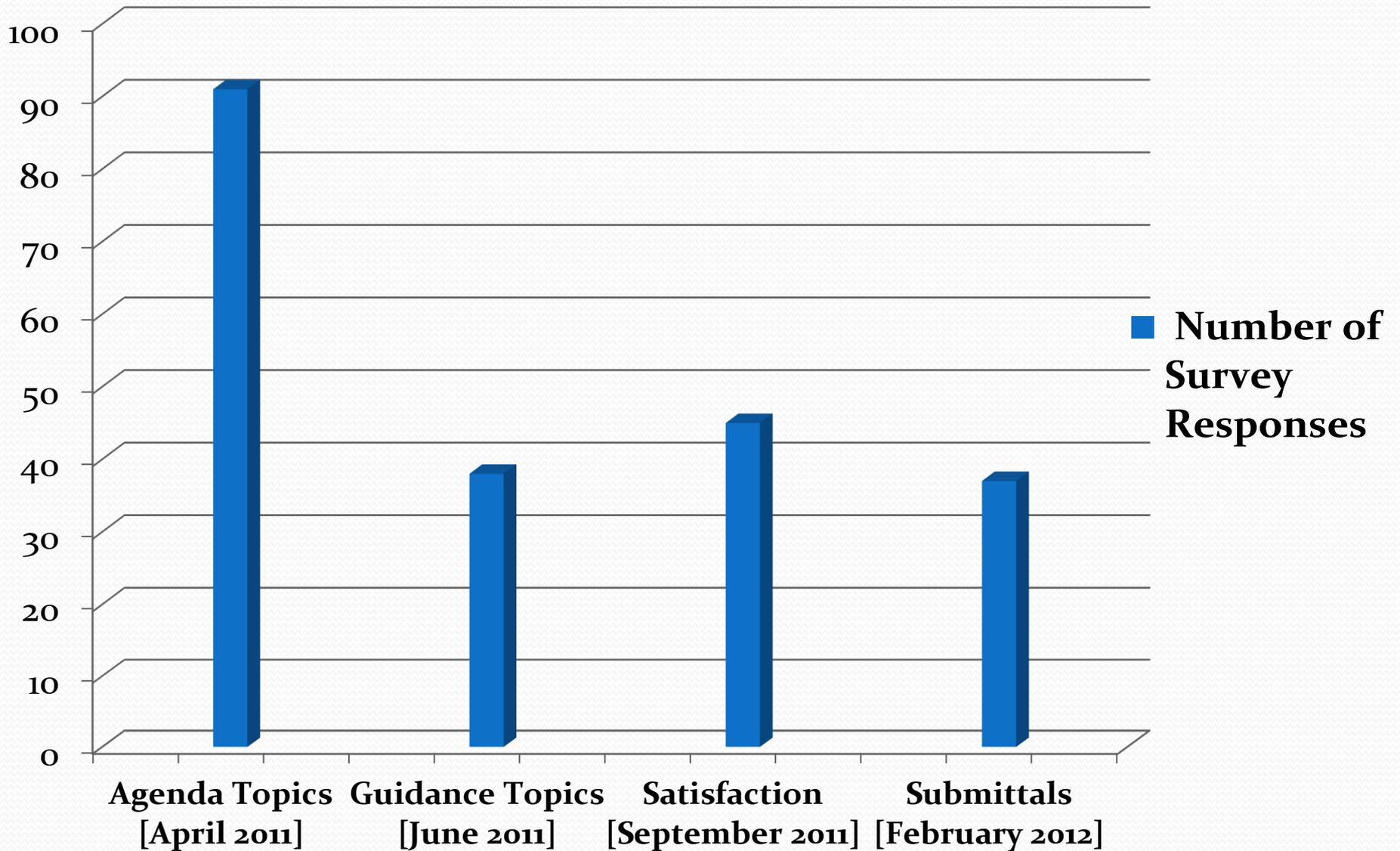
Q&A NEWSLETTER

- All back issues available on-line
- **NEW!** On-line spreadsheet
 - Topics sorted by tab
 - Links to referenced web pages
 - Distinction between verbal and written comments
 - Dates and volume #



www.ct.gov/dep/remediationroundtable

FOUR SURVEYS



GUIDANCE SURVEY RESULTS

- **15** topics generated by written comments you submitted
- Top **3** rated guidance topics:
 - Urban Fill - characterization and remediation strategies
 - Background – demonstration of conditions in soil and groundwater
 - Ecological Risk Assessment



SATISFACTION SURVEY RESULTS

- **12** questions about the usefulness of different aspects of the Roundtable
- Consensus:
 - Two-hour RT is a productive use of time
 - Answers given at the RT are useful
 - Q&A Newsletter is useful
 - Surveys are useful
 - Workgroups outside of RT more popular than breakout groups
 - Would like to hear from non-DEEP state agency speakers



SUBMITTALS SURVEY RESULTS

- Asked participants to estimate quantities of submittals in the coming year
- **7** categories of submittals
 - Variances
 - Verifications
 - Brownfields
 - Permits (TA / GP)
 - Property Transfer
 - Voluntary Remediation



SUBMITTALS SURVEY RESULTS

- Results posted at www.ct.gov/dep/remediationroundtable
- Increase in APS, ELURs, and Verifications
- Division will use this info to anticipate what types of requests will be submitted to better focus resources
- Any ideas for a new survey? Please let us know!

DEP.remедiationroundtable@ct.gov



WORKGROUPS



- Breakout group (April 2011) – Workgroup topics and logistics
- Workgroups (June 2011)
 - List of Contaminated Sites
 - Urban Fill
- Other Workgroups (on-going)
 - Technical Impracticability
 - Transformation

TI WORKGROUP UPDATE

- 4 sites approved in last 2 years
 - Draft guidance on eligibility available Summer 2012 for public feedback
 - Working on Fact Sheet
- 
- A large, faint, light blue water droplet splash is centered in the lower half of the slide, serving as a background element for the text.

LIST OF CONTAMINATED SITES WORKGROUP UPDATE

- Continuing to work with IT to accomplish goals set by workgroup
- Looking into obtaining external support for on-line searchable LCS
- Incorporating comments from Cleanup Transformation on ways to distribute data better
- Moving forward with on-line GIS component for remediation sites (3 month goal)

URBAN FILL

WORKGROUP UPDATE

- Bi-weekly Fall meetings - Subgroups established
- Subgroup recommendation reports soon to be finalized:
 - Definition, COCs, and COC maximums – data request
 - Fill characterization
 - Engineered Controls - standard forms with templates and beta EC database test drive
- Risk Assessment subgroup (report later) – on-going discussions with DPH on risk-based criteria

ROUNDTABLE

OPPORTUNITIES REALIZED

- **15** agenda topics (some more than once!)
- Transformation kick-off!
- Website Improvements
 - New Roundtable pages
 - New Transformation pages
 - New Brownfield pages
 - Improved criteria info



MORE OPPORTUNITIES REALIZED

- SEH materials updated
 - Fact sheets and FAQs on web
 - Form and Instructions
 - Electronic file room access for notifications and DEEP letters
- Guidance on Targeted Brownfield Remedy
- Proposed revisions to RSRs

MORE OPPORTUNITIES REALIZED

- Improved Verification Forms (coming soon)
- Guest speakers Commissioner Esty and Deputy Commissioner McCleary
- Criteria Processing Improvements - metrics

APS PROCESSING IMPROVEMENTS: Criteria Metrics



	Pre-Lean State	Future State: DEEP Recommended Criteria	Future State: New Criteria with Default Assumptions	Future State: New Criteria with Site-specific Assumptions
# of Steps	35	9	15	15
Minimum Time	20 weeks	2 weeks	8 weeks	14 weeks
Maximum Time	80 weeks	4 weeks	40 weeks	50 weeks
% Utilized	100%	50%	30%	20%

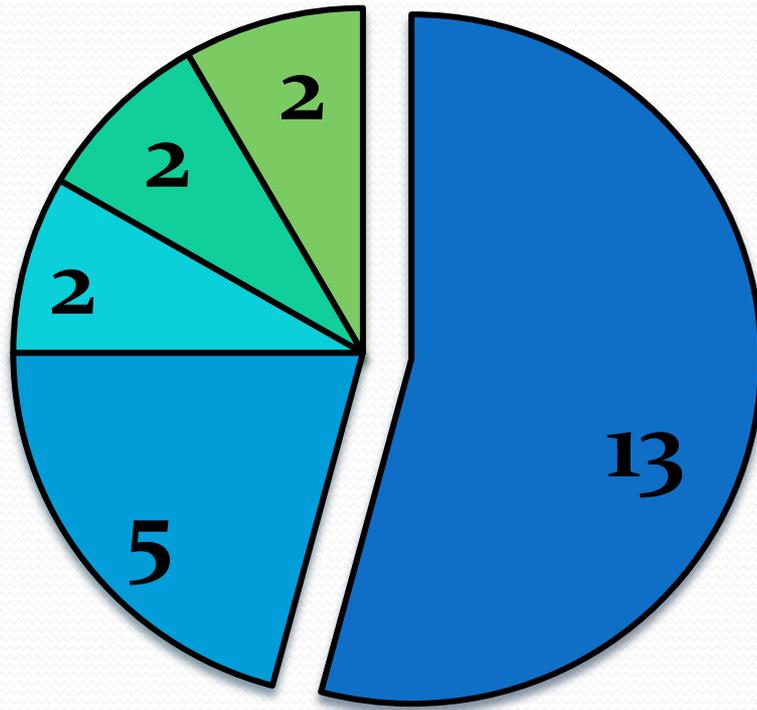
REMEDIATION APS REQUEST PROCESSING PROGRESS

Remediation currently processing requests for:

- 2003 Vol Criteria (as Alternative or APS)
- 1999 ETPH (as APS)
- 2008 EPH/VPH (as APS)
- 2008 criteria (as APS)
- 2005 criteria (APS transitional period ended)
- All other requests forwarded to Planning & Standards for review

PLANNING & STANDARDS APS REQUEST PROCESSING PROGRESS (January 2012)

Requests Received Before March 2011



Total Number of Requests=24

■ Complete

■ DEEP review complete, Approval Ltr Pending

■ Under Review by DEEP P&S

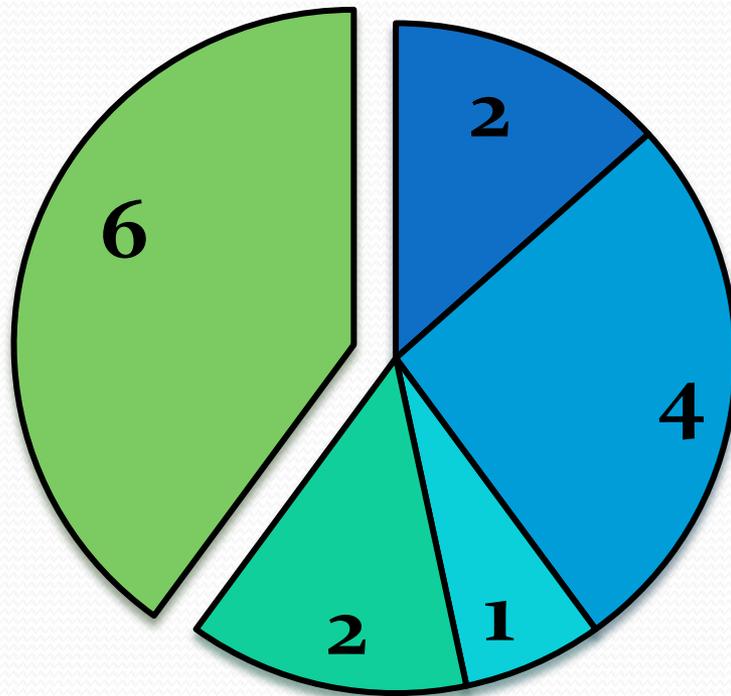
■ Under Review by DPH

■ Withdrawn

PLANNING & STANDARDS APS REQUEST PROCESSING PROGRESS (January 2012)

Requests Received

After March 2011



Total Number of Requests=15

- DEEP requested more information from Consultant
- Under Review by DEEP P&S
- To be sent to DPH for Review
- Under Review by DPH
- Review Complete, Response Letter Pending

Remediation APS Requests

(March 2011 to January 2012)

Type of Request	Number Received	Number Processed	Avg Turn Around Time (weeks)
2003 Vol Criteria	32	32	3
eTPH	143	143	3
ePH/vPH	8	8	2
2005 APS	75	71	5
2008 APS	32	32	3
Total	290	286	3

YEAR IN REVIEW

- Roundtable has improved communication between Remediation Division and Stakeholders
- Always looking for feedback



DEP.remediationroundtable@ct.gov
www.ct.gov/dep/remediationroundtable

LOOK FORWARD TO MORE

 Great communication

 New guidance

 Workgroups starting

 Guest speakers



ANNIVERSARY HIGHLIGHTS

Questions / Comments

Please state your name and
speak loudly.

www.ct.gov/dep/remediationroundtable

COMPREHENSIVE EVALUATION AND TRANSFORMATION UPDATE



GRAHAM STEVENS

WHY TRANSFORM

- Status quo is not good for:
 - Environment and Public Health – pollution remains and risks can increase with time
 - Economy – too much uncertainty and too much input to get outcomes
- Everyone has learned from the pros and cons of the current system
- Current system too cumbersome and too slow to yield results commensurate with risk quickly

WHAT WE NEED FROM YOU

- Your support for the new Connecticut Release Reporting and Remediation (R3) Program
- Your time to discuss the R3 Program
- Your support will:
 - Protect public safety and health
 - Restore our environment
 - Unlock property value
 - Build Connecticut's Economy
 - Protect "Greenfields" and preserve CT's character

WHAT HAS HAPPENED THUS FAR

- White Paper (January 2011)
- 2 years of dialogue on Release Reporting
- Visioning Session (June 2011)
- Stakeholder Evaluation Workgroups (September 2011)
- Report on Proposed Concept (December 2011)
- Public Feedback Meeting (January 2012)

WHAT WE PROPOSE TO CHANGE

From

- Multiple and Overlapping Programs
- Property-based and Release-based System
- Few Properties Exit Cleanup Program
- Command and Control System



To

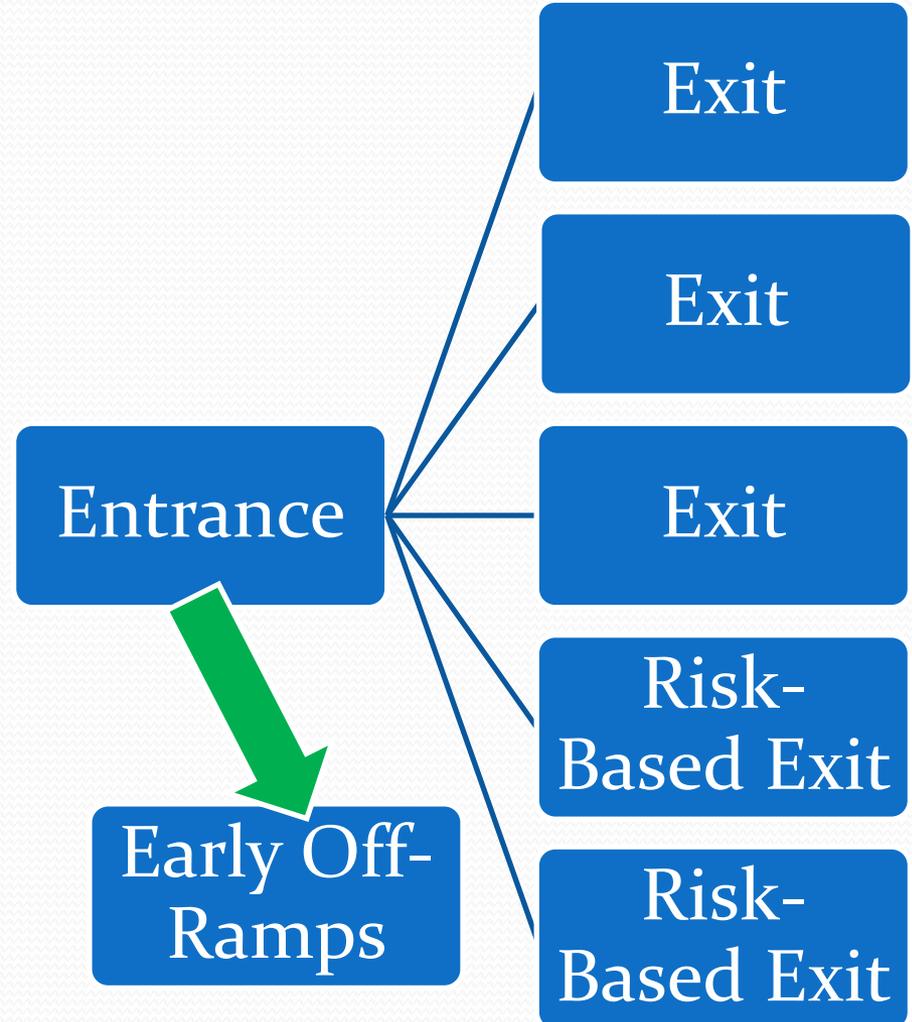
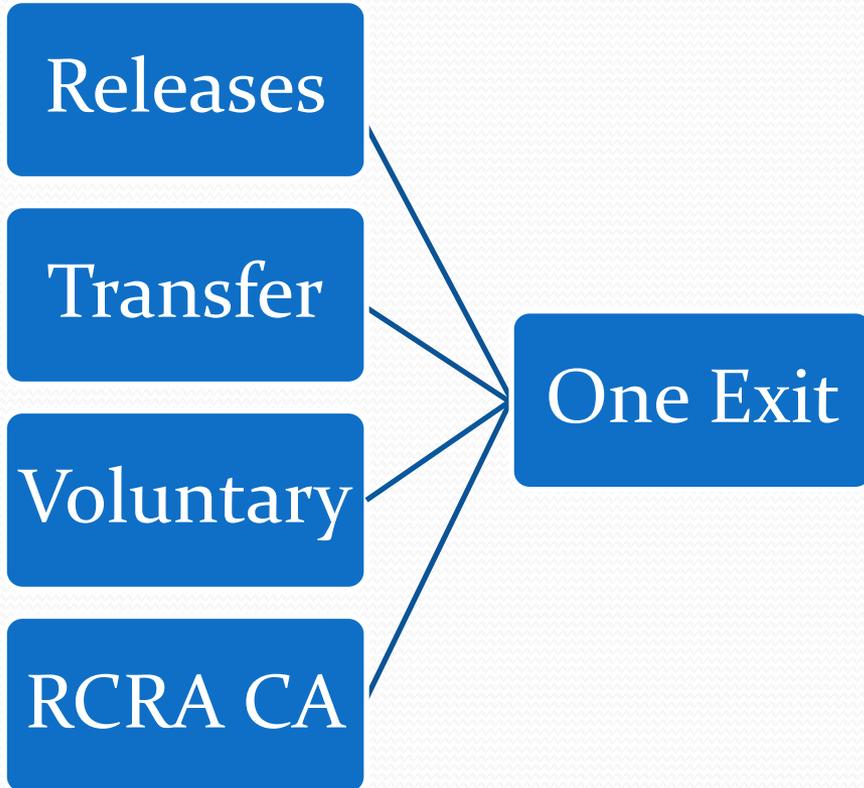
- Unified Program
- Primarily a Release-based System
- Earlier and Multiple Exits
- Self-Implementation and Clearer Obligations

HIGH ENVIRONMENTAL STANDARDS PRESERVED

Many Potential
Entrances & One
Exit



Clear Entrance,
Multiple Exits &
Early Off-Ramps



Future State of Cleanup in Connecticut Entry Point and EXITS

INCREASING PROPERTY VALUE

ENTRY

Address
Exposure

CLASS C
EXIT

CLASS B
EXIT

CLASS A
EXIT

INCREASING LEVEL OF CLEANUP

FUTURE STATE

Cause,
Know, or
Discover
Release

Notify
DEEP –
Immediate
Off-ramps

Timely
Eliminate
Potential
Exposures

Multiple
Tiered
EXITS
–
Timeframes

EXIT

Certain Releases
with *quick* cleanups
require no further
action

MULTI-LEVEL EXIT CLASSES



C I/II

- **Soil Cleanup Complete**
- **GW Remedy Operational**
- **Long-term Maintenance**



B I/II

- **Soil & GW Cleanup Complete**
- **Land-Use Controls**
- **Long-term Maintenance**



A

- **Soil & GW Cleanup Complete**
- **Unrestricted Reuse**

INCREASING LEVEL OF CLEANUP

CLEANUP EXIT SUBCATEGORIES

B-II or C-II

**Risk-Based and/or
Site-Specific Standards
and Approach**

B-I or C-I

**Default
Standards and
Approach**

INCREASING LEVEL OF CLEANUP



KEY TAKEAWAYS

- Release-based approach
- Self-implementing with robust auditing and enforcement
- Multiple, clear, and early exits
- Risk-based cleanup options
- Transparency and meaningful participation
- No more Transfer Act
- Level playing field for all businesses

WHAT STAKEHOLDERS SHOULD DO

- Review the Report
- Submit comments – DEEP is very interested in two types of comments:
 1. General response to the vision and concept
 2. Specific comments, concerns, and requests that DEEP can review as we work on the details of this proposal

WHAT DEEP WILL BE DOING

- Finish details document and host evening public feedback meeting
- Develop legislative concept bill to be raised by the Commerce Committee
 - Changes to Statutes
- Develop proposed revisions to Regulations to ensure new program can be implemented
- Continuing stakeholder process

COMPREHENSIVE EVALUATION AND TRANSFORMATION

Comments

Please state your name and
speak loudly.

DEP.Cleanup.Transform@ct.gov
www.ct.gov/dep/remediation-transform

REMEDIATION CRITERIA FOR TOTAL PETROLEUM HYDROCARBONS



TRACI IOTT

The Issue

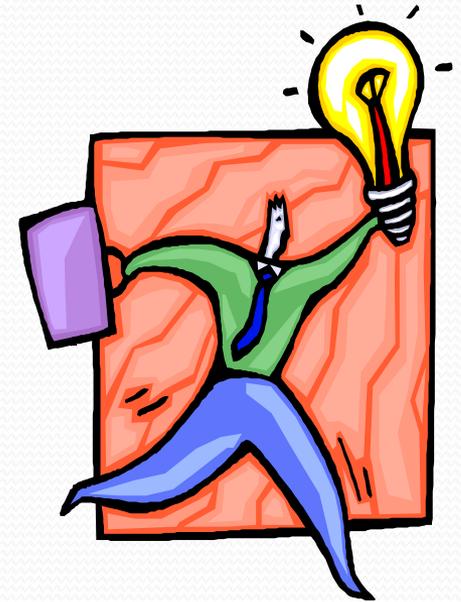
- 1996 RSRs
 - TPH criteria using EPA Method 418
 - Method no longer used
 - RSR Criteria no longer viable



- Current Condition
 - New analytical methods available
 - TPH one of most common pollutants but no criteria for self-implementation
 - TPH is now an Additional Polluting Substance

The Solution

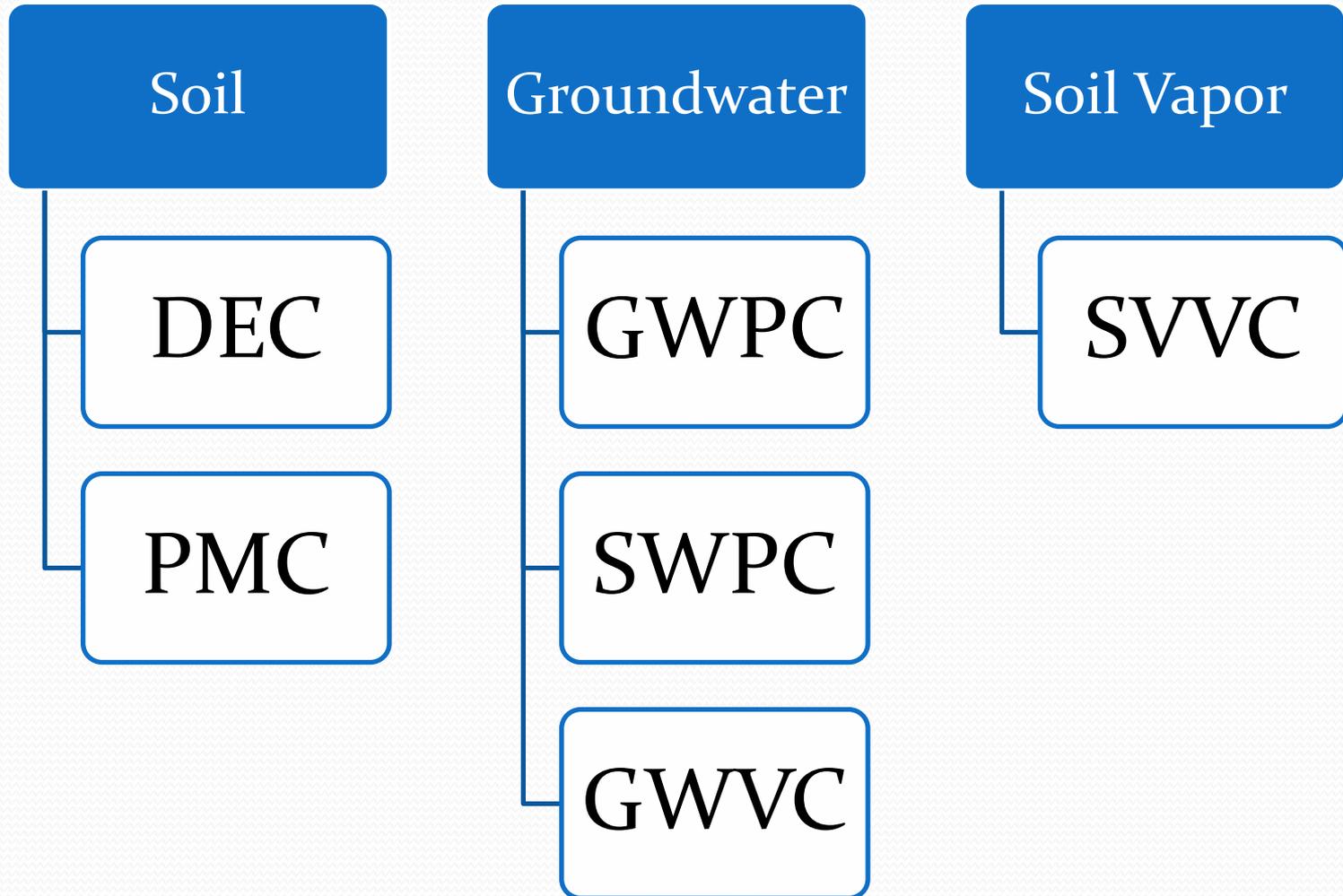
- Establish Updated Criteria for TPH
 - Risk based criteria using available analytical methods
 - Consistent with RSRs
 - Informed by MADEP MCP Criteria
- Update RSRs
 - Provide for self-implementation of updated criteria



Analytical Methods

Carbon Ranges	Analytical Methods	
C5-C8 – Aliphatic		vPH aPH
C9-C12 – Aliphatic		
C9-C10- Aromatic		
C9-C18 – Aliphatic	ePH CT ETPH	
C19-C36 – Aliphatic		
C11-C22 – Aromatic		

Criteria Types



TPH Criteria Status

- Criteria calculated – Internal Review
- Technical Support Document detailing Criteria Derivation drafted
- Formal release as part of RSR regulatory update
- Formal public comment period includes solicitation of comments on proposed criteria
- Sneak Peek – right now!
- Preliminary Draft of criteria to be posted on Roundtable Web Site

Connecticut Remediation
Criteria for Total
Petroleum Hydrocarbon
Fractions

Connecticut Department of Energy and Environmental Protection
Connecticut Department of Public Health
February 2012

Establish Toxicity Values

- Based on MADEP Approach
- Updated with EPA Values

Calculate Risk-Based Criteria

- 1996 RSR equations
- 2003 Volatilization Criteria Proposal

Analytical Adjustment

- Reporting Limits from RCP, updated

Policy Considerations

- Ceiling Concentrations
- Previous Values for CT ETPH

Final Criteria

- Available for Self-Implementation through Regs Change

Draft TPH Soil Criteria – mg/kg

	Direct Exposure Criteria		Pollutant Mobility Criteria	
	Residential	Industrial / Commercial	GA	GB
C5-C8 Aliphatics	500	1000	6	55
C9-C12 Aliphatics	500	1000	15	140
C9-C18 Aliphatics	500	1000	20	140
C19-C36 Aliphatics	1000	2500	20	200
C9-C10 Aromatics	500	1000	10	15
C11-C22 Aromatics	500	1000	20	30

Draft TPH Groundwater Criteria – ug/L

	Groundwater Protection Criteria	Surface Water Protection Criteria	Groundwater Volatilization Criteria	
			Residential	Industrial / Commercial
C5-C8 Aliphatics	280	250	100	215
C9-C12 Aliphatics	700	770	100	160
C9-C18 Aliphatics	700	770	100	155
C19-C36 Aliphatics	1000	530	Not Volatile	Not Volatile
C9-C10 Aromatics	100	250	450	3,300
C11-C22 Aromatics	140	250	1,750	12,300

Draft TPH Criteria for Indoor Air & Soil Vapor

	Target Indoor Air Concentrations - ug/m ³		Soil Vapor Volatilization Criteria	
	Residential	Industrial / Commercial	ug/m ³ (ppbV)	ug/m ³ (ppbV)
C5-C8 Aliphatics	130	330	100 (25)	450 (120)
C9-C12 Aliphatics	115	300	90 (15)	415 (85)
C9-C18 Aliphatics	115	300	Not in aPH Method	Not in aPH Method
C19-C36 Aliphatics	Not Volatile	Not Volatile	Not Volatile	Not Volatile
C9-C10 Aromatics	25	45	10 (5)	60 (15)
C11-C22 Aromatics	25	45	Not in aPH Method	Not in aPH Method

Draft CT ETPH Criteria	Units	Value
Direct Exposure Criteria: Residential	mg/kg	500
Direct Exposure Criteria: Industrial/Commercial	mg/kg	2500
Pollutant Mobility Criteria: GA Areas	mg/kg	500
Pollutant Mobility Criteria: GB Areas	mg/kg	2500
Groundwater Protection Criteria	ug/l	250
Surface Water Protection Criteria	ug/l	250
Groundwater Volatilization Criteria: Residential	ug/l	250
Groundwater Volatilization Criteria: Industrial/Commercial	ug/l	250

Other Criteria News: RSR Update

- Lead - Proposed Update for Consistency with EPA

Draft Direct Exposure Criteria for Lead mg/kg			
Residential		Industrial / Commercial	
Current	Proposed	Current	Proposed
500	400	1000	800

Other Criteria News: RSR Update

- Volatilization Criteria
 - **No change to existing criteria**
 - Proposal to include Soil Vapor Volatilization Criteria in both current ppm and as mg/m³
 - Request from LEP Community
 - Ease of comparison with monitoring results

$$\text{SVVC (mg/m}^3\text{)} = [\text{SVVC (ppm)} * (\text{Molecular Weight})] / 24.45$$

Questions?

Look for Preliminary Draft
TPH Criteria on
Roundtable Web Site

Traci Iott

860-424-3082

traci.iott@ct.gov



TARGETED BROWNFIELD REMEDY



JAN CZECZOTKA

TARGETED BROWNFIELD REMEDY

- An effective tool to facilitate the restoration of eligible contaminated sites in GB areas to productive use:
 - ✓ Alternative site characterization based on presumptive remedy
 - ✓ Reduces scale of investigation
 - ✓ Involves covering polluted soil
 - ✓ Meets the RSRs and RCRA Closure
 - ✓ For whole site or portion of site



TARGETED BROWNFIELD REMEDY

- Applies only to unsaturated soils in targeted area
- Important to assure the public that any risks will be addressed
- Expected that if property not already in a Remediation Program, the party conducting remediation / redevelopment will enter the Voluntary Remediation Program

TARGETED BROWNFIELD REMEDY

4 Documents to be posted by February 29, 2012:

1. TBR Fact Sheet
2. TBR Eligibility Checklist
3. TBR Characterization Guidance Document
4. Response to Comments

GUIDANCE FOR CHARACTERIZATION AND PROCESS DOCUMENTATION

- Intent is to facilitate thought process and aid EP in:
 - ✓ Designing an investigation in support of TBR
 - ✓ Determining significance of data gaps
 - ✓ Identifying pollution that will not be addressed by the standard TBR capping approach
 - ✓ Determining if supplemental investigation is necessary

GUIDANCE FOR CHARACTERIZATION AND PROCESS DOCUMENTATION

- Concept and goals of Site Characterization Guidance Document remain valid
- TBR Guidance is supplemental for this situation-specific alternative approach only
- Includes a checklist of characterization goals

TBR CHARACTERIZATION APPROACH

- Phase I is key in designing the TBR investigation
- Phase II - basic premise is that releases have occurred and require remediation
- DQOs may therefore be focused on support of the remedy

TBR CHARACTERIZATION APPROACH

- Streamlining of characterization would be most applicable for broad exterior release areas or releases beneath structure
 - Characterization of each individual release area may not be necessary
- General understanding of releases and the fate and transport components of COCs
- Understanding the lateral limits of the presumptive remedy

TBR CHARACTERIZATION APPROACH

- For proposed TB remedy area:
 - Use of field screening methods OK
 - Use of composite sampling may be appropriate



TBR CHARACTERIZATION APPROACH

The decreased level of certainty concerning the nature of releases and distribution of contaminants *will require a greater level of certainty regarding the absence of receptors.*

- Therefore, if groundwater is impacted, a receptor survey will be necessary.
- Receptor issues will need to be addressed.



TBR CHARACTERIZATION APPROACH/ REMEDIAL CONSIDERATIONS

- NAPL – The presence and remediation of NAPL cannot be addressed with the TBR approach.
- Mobility of Contaminants – TBR cap would need to render contaminants immobile/environmentally isolated.
- Any releases not subject to TBR will require standard approaches and remedial considerations.

TBR REMEDIAL APPROACH

- Specifically designed to address pollutant mobility, direct exposure, and volatilization issues via
 - EC variances
 - Isolation and inaccessibility beneath buildings or other structures
 - Vapor mitigation
- If other remedial measures are needed in addition to the TBR, they should be:
 - Implemented prior to the construction of the TBR, **OR**
 - Downgradient of TBR - do not want to disturb cap later, if avoidable

TBR REMEDIAL APPROACH

Guidance has a Remedial Approach Checklist that includes details that should be considered by stakeholders:

- TBR will not eliminate need for remediation of NAPL or GW
- Contaminants associated with non-targeted areas cannot adversely impact the integrity/operation of the TBR
- Failure of the TBR will not pose an unacceptable short-term health risk or create a Significant Environmental Hazard in the time required to identify and repair such a failure

ENGINEERED CONTROLS

No approval for TBR approach is necessary, except...

- **EC Part 1 and Part 2 applications still require Commissioner approval**
- Long-term program of inspection, maintenance and monitoring of the EC, accompanied by a financial surety mechanism

TARGETED BROWNFIELD REMEDY

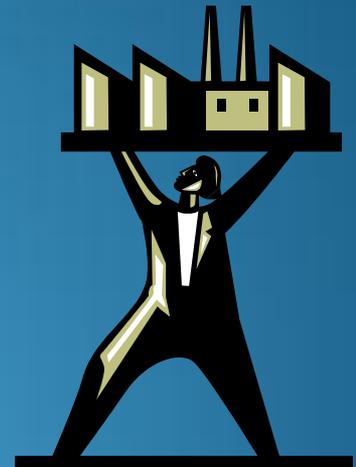
Questions / Comments

Please state your name and
speak loudly.

www.ct.gov/dep/remediation

BROWNFIELD REMEDIATION AND REVITALIZATION PROGRAM

Section 17 of Public Act #11-141
Effective July 1, 2011



PAUL JAMESON

PROGRAM HIGHLIGHTS

- Applicants only responsible for investigating and remediating on-site pollution.
- No obligation to address contamination migrating off-site, with certain exceptions.



PROGRAM HIGHLIGHTS

- Applicant not liable for any pollution migrating off-site, EXCEPT if:
 - Applicant caused or contributed to the release;
OR
 - DEEP determines:
 - Verification based upon false or misleading information;
 - New information confirms release occurred prior to entry into the program; and
 - Applicant unable to complete the remedial action.

PROGRAM HIGHLIGHTS

- Sites accepted into the program are transferable to other parties with all accorded benefits.
 - Transferor must be in compliance with schedule and transferee must meet all program eligibility requirements/obligations and pay required fee.
- Sites exempt from the Property Transfer Act
- Expedited review and processing of RSR variances

ELIGIBILITY CRITERIA

- The property is a Brownfield. (CGS Sec 32-9kk, as revised by Sec. 7 of PA#11-141)

“Brownfield” means any abandoned or underutilized site where redevelopment, reuse or expansion has not occurred due to the presence or potential presence of pollution in the buildings, soil or groundwater that requires investigation or remediation before or in conjunction with the restoration, redevelopment and reuse of the property.”

ELIGIBILITY CRITERIA

Applicant must meet 1 of 3 definitions when applying:

1. Bona fide prospective purchaser - Someone who acquires/plans to acquire ownership of a Brownfield property after July 1, 2011. Eligibility requirements apply.
2. Innocent landowner (Sec. 22a-452d CGS) - Anyone who acquired a property after it became contaminated or the property became contaminated through an act of God/war, act or omission by a third party.
3. Contiguous property owner
Eligibility requirements apply.

ELIGIBILITY CRITERIA

- Applicant did not establish, create or maintain a source of pollution on the property nor is responsible for such pollution pursuant to any state law.
- Applicant is not affiliated with any person responsible for the pollution.
- Property is not subject to any of the following:
 - Current federal or state enforcement actions
 - Federal NPL or State SPL lists
 - RCRA Corrective Action

SUBMITTAL REQUIREMENTS

Applications available at www.ctbrownfields.gov

[Enrollment dates determined & announced by DECD]

- ✓ Title Search
- ✓ Phase I ESA conducted by or for the applicant & prepared pursuant to DEEP's SCGD
- ✓ Current property inspection
- ✓ Documentation of compliance with eligibility criteria
- ✓ Information about site as it relates to the Statewide Portfolio Factors (Job creation & retention, readiness to proceed, etc.)

ACCEPTANCE INTO PROGRAM

Program eligibility is determined by DECD in consultation with DEEP and is based on the following:

STATEWIDE PORTFOLIO FACTORS

Job creation and retention	Sustainability
Readiness to proceed	Geographic distribution of projects
Complexity	Project size
Support for principles of smart growth and transit-oriented development	Duration and degree to which the property has been unused or underused
Population of the municipality	Projected increase to municipal grand list
Consistency with municipal or regional planning objectives	Other factors as may be determined by the Commissioner

ACCEPTANCE INTO PROGRAM

- Program limit of 32 properties per year
- Applicants are eligible for funding under any local, state or federal grant or loan program
- Acceptance into program does not guarantee approval or awarding of any requested funding

PROGRAM REQUIREMENTS

- Applicants need only investigate and remediate pollution within property boundaries.
- Establishments in BRRP are exempt from the Property Transfer Act, including all subsequent transfers, provided there is compliance with the investigation and remediation schedule.
- Automatic delegation to an LEP.



PROGRAM REQUIREMENTS

- Deliverables due after receipt of DECD approval letter:

BRRP Submittal Due Dates	
BF Investigation Plan and Remediation Schedule	Within 180 days
Final Investigation Report (transmittal form)	Within 2 years
RAP (transmittal form) and initiation of remediation	Within 3 years
Public Notice Requirements	As required by RSRs
Verification/Interim Verification	Within 8 years

- Audit Requirements - within 60 days DEEP will issue notice of audit or no audit letter

PROGRAM FEES

- **5%** fee based on the assessed value of the land
- **2** installments to DEEP:
 - 1st installment - 50% due within 180 days from date of DECD approval letter.
 - 2nd installment – Balance due within 4 years from date of approval letter.
 - Reductions/exemptions are available if certain criteria are met.
- All deposited fees are set aside to help offset costs associated with any potential need to address off-site contamination issues



APPLICATIONS SO FAR...

- **1st Round - 8** Applications received (10/14/11)
 - **5** Sites Approved:
 - 1730 State Street, Bridgeport
 - Former Norwich State Hospital, Preston
 - Keating Ford Property, 1055-1111 Stratford Avenue, Stratford
 - 800 Old County Circle, Windsor Locks
 - Steel Pointe Harbor, Bridgeport
 - **1** Denied because under order
 - **1** Additional Information Requested
 - **1** Under Discussion
- **2nd Round - 6** Applications received (2/3/12)



PROGRAM CONTACTS

Connecticut Office of Brownfield Remediation and Development

www.ctbrownfields.gov

- Lilia Kieltyka, DECD, 860-270-8193
- Ned Moore, DECD, 860-270-8148
- Paul Jameson, DEEP, 860-424-3765

BROWNFIELD REMEDIATION AND REVITALIZATION PROGRAM

Questions / Comments

Please state your name
and speak loudly.

www.ct.gov/dep/remediation

USE OF FILTERS FOR GROUNDWATER SAMPLING

Technical Memorandum



LISANDRO SUAREZ

DOCUMENT OBJECTIVES

Purpose:

- Guide the environmental professional through the thought process of determining whether a filter is needed
- Provide DEEP's technical expectations for use of this non-standard approach

BACKGROUND

- Turbidity can produce a non-representative sample of potentially contaminated groundwater
- Filtration could produce a false negative analytical test result
- Can introduce problems with data interpretation and representativeness

BACKGROUND

- Using filters for groundwater sampling ignores issues related to:
 - a) Colloid transport
 - b) Precipitation of dissolved solids upon exposure to oxygen
 - c) Particulate transport in fractured bedrock

RSRS AND REPRESENTATIVENESS

- RSRS require that any compliance data set be representative of the environmental conditions
- Use of filtered groundwater samples for compliance monitoring is generally considered inappropriate...BUT
- Filtering MAY be needed under certain conditions specified in Filtering Guidance...

RECOMMENDATIONS BEFORE FILTERING

A filter should be used **only if all** avenues to reduce turbidity have been exhausted.

- Major recommendations / considerations:
 - 1) stratigraphy and constituents of concern
 - 2) well design and construction
 - 3) well development
 - 4) the use of low-flow as a sampling technique

RECOMMENDATIONS BEFORE FILTERING

- By knowing the reason for turbidity, the EP should be able to optimize well performance and reduce turbidity levels without filtration
- DEEP available to discuss applicability of filtration

RECOMMENDATIONS AFTER FILTERING

- If filtration is performed, the EP should be prepared to:
 - Provide rationale for its use
 - Provide an evaluation of potential false negatives
 - Demonstrate best efforts to reduce turbidity:
 - Well Design, Construction, and Development,
 - Appropriate sampling

EXPECTATIONS

- Filtering is never appropriate for:
 - Landfill Monitoring and Solid Waste disposal areas
 - Potable Water Sampling



TECHNICAL BACKGROUND

- **Turbidity**
 - Total Suspended Solids
 - Turbidity Measurement Readings
 - Sources of Turbidity in Wells
- **Contaminant Fate and Transport**
 - Adsorption/Dissolution Processes
 - Contaminant Mobility

TECHNICAL CONSIDERATIONS

- Use Guidance Recommendations (Appendix A):
 - Stratigraphy
 - COCs
 - Monitoring Methods
 - Well Construction, Design, Development and Sampling

GUIDANCE RECOMMENDATIONS

APPENDIX A. CHECKLIST

ITEMS TO BE ADDRESSED WHEN EVALUATING THE USE OF FILTERS IN GROUNDWATER SAMPLING.

SECTION I.-STRATIGRAPHY

Subsurface	
1.-	Have you documented the stratigraphy seen in the well?
2.-	Are the problematic monitoring wells located in areas of known or suspected contamination?
3.-	Are any potential affected supply wells located in areas of known or suspected contamination?
4.-	Is the soil subsurface rich in iron?
5.-	Is the soil subsurface anaerobic?
6.-	Is there a clay layer or other low permeability layer?
	lenses?

SECTION II.- CONSTITUENTS OF CONCERN

Detection	
1.-	Were metals detected in unfiltered groundwater?
2.-	Were SVOCs detected in unfiltered groundwater?
3.-	Was ETPH detected in unfiltered groundwater?
4.-	Is urban fill present near the screened interval?
5.-	Are PCBs a Constituent of Concern?

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SECTION III.- MONITORING METHODS

IIIA.- Turbidity	
1.-	Are turbidity levels for the wells you seek to filter above 5 NTUs?
IIIB.- Purge Method	
1.-	Has Low-Flow sampling been used in any of the turbid wells?
2.-	Does the use of Low-Flow sampling result in samples above 5NTUs?
	unfiltered samples?

SECTION IV.- WELL CONSTRUCTION, DESIGN, DEVELOPMENT

IVA. - Construction	
1.-	Has a well construction diagram been submitted?
2.-	Is the well construction diagram representative of all the wells?
3.-	Is the well producing an acceptable yield?
4.-	Were the wells constructed using a Geoprobe?
5.-	Is the filter pack and screen size appropriate for this formation? If so, did you use in the design?
6.-	Were the grouts/seals placed carefully to isolate the screen?
7.-	Did you follow the manufacturer's guidelines on the hydraulic conductivity?
8.-	Was the hydraulic conductivity determined for the formation?

IVB. - Design	
1.-	How did you determine that development was complete?
2.-	Was a surge block used in the development?
3.-	How was it determined that the development was complete?

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IVC. - Development/Sampling

1.-	Have the well purge and sampling rates been recorded?
2.-	Did you observe any erratic water level reading? When?
3.-	Did you record any sudden changes in turbidity or purging behavior during sampling?
4.-	Was any water remaining in the casing purged between sampling periods?
5.-	Was the stagnant water purged at flow rates below those used in the development?
6.-	Were bailers or air-lift arrangements used in developing or sampling the well?
7.-	Are you planning to use an in-line filter?
8.-	Was the well pumped dry during development or sampling? If so, what was the recovery rate?
9.-	Did you use the Low-Flow sampling technique?

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CONCLUSIONS

- Generally not appropriate to use filters
- EP should optimize well performance and reduce turbidity levels without filtration
- A filter should be used **only if all** avenues to reduce turbidity have been exhausted
- Use low flow technique before filtering
- The key is to understand the cause of turbidity
- Ultimately, the EP must use professional judgment in deciding to use a filter to obtain representative samples.
- If filtration is used, rationale must be provided

USE OF FILTERS FOR GROUNDWATER SAMPLING

Technical Memorandum

Questions?

Please state your name and
speak loudly.

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REMEDIATION ROUNDTABLE

- An open forum for the exchange of ideas and information on CT's Remediation Programs
- Next meeting: May 8, 2012
- Schedule and agenda on website
www.ct.gov/dep/remediationroundtable
- Submit comments to Camille Fontanella at
DEP.remедiationroundtable@ct.gov

PUBLIC PARTICIPATION

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