Remediation Roundtable

October 22, 2019

Connecticut Department of Energy and Environmental Protection: Remediation Division

Remediation Roundtable Webcast

- Basic directions provided on listserv email
- Detailed directions on website
  - www.ct.gov/deep/remediationroundtable

Remediation Roundtable Agenda

- **Announcements**
- **Updates**
  - Commissioner's 20 BY 20 Goals
  - UCONN's CT Brownfields Initiative
- **Presentations**
  - Document Online Search Portal
  - Zone of Influence and Monitoring Considerations for In Situ Remediation Permits (Part 2)
  - DOT Snow and Ice Control Guidelines
  - Connecticut PFAS Action Plan

Announcements – Web Updates

- PFAS information
  - Current Projects
  - CT Interagency PFAS Task Force
- Website migration: February 2020

Announcements

Dates for 2020

- March 17 (snow date March 24)
- June 16
- October 20

- Parking Lots in downtown Hartford

Update – Wave 2 RSRs and EURs

- Public Notice:
  - RSRs July 8 – Oct 7, extended Nov 12
  - EURs Sept 27 – Nov 12
- EUR Public Hearing: November 4, 2019 at 1:00 pm Auditorium, 79 Elm Street, Hartford
- Next Step: Hearing Officer's Report (responses to comments)

Questions or Comments?

Please Speak into Microphone
and State Your Name

www.ct.gov/deep/remediationroundtable

Departures

Retirements:

- Bill Warzecha

Denise Ruzicka

Moving on:

- Drew Kukucka

Tony Gyasi

Arrivals

- New Staff - Veronica Tanguay

Commissioner's 20 BY 20 Initiative

Jan Czeczotka
Director
Remediation Division

20 BY 20 Initiative

- Aimed at increasing **predictability**, **efficiency**, and **transparency** of DEEP's regulatory processes

20 Goals To Meet in 2020

Goal 1: Make Permitting Timeframes More Transparent

- Because businesses need to know what to expect

Goal 2: Enhance Pre-Application Assistance

- Because more information at start leads to a smoother permitting process

Goal 3: Reduce Number of Legacy Permits Pending

- Because closing out long-pending permits enhances environmental protection and regulatory certainty

Goal 4: Reduce Time for Transfer Act Audits

- Because property owners need certainty that remediation is complete

Goal 5: Finalize RSR and EUR regulations

- Because clear standards are needed for environmental cleanups

20 Goals To Meet in 2020

Goal 6: Fast Track Same-Same Renewal Time

- Because renewals without changes should take shorter time to process

Goal 7: Change Individual Permits to General Permits

- Because general permits are a better fit for some activities

Goal 8: Eliminate Some Permits and Move to "Permit By Rule"

- Because for some programs, regulations can take the place of permits, setting clear environmental standards while reducing administrative burden

Goal 9: Simplify Natural Diversity Database Determinations

- Because automation of the process can save businesses time and resources

20 Goals To Meet in 2020

Goal 10: Increase Efficiency of Grant Administration

- Because grant funds can't make positive impact until they hit the street

Goal 11: Agency-Wide Attrition Planning

- Because DEEP faces increased levels of attrition over the next 3 years that will reshape the agency

Goal 12: Establish Permitting Concierge Approach

- Because businesses should never have to wait too long for follow-up

Goal 13: Accelerate E-Governance Integration

- Because technology can create easier processes

20 Goals To Meet in 2020

Goal 14: Enhance Data Transparency

- Because businesses, academics, and the public need greater access to information for research, planning, and accountability

Goal 15: Develop Predictable Regulation Adoption Timeline

- Because stakeholders should know when key milestones for regulation adoption will be completed

Goal 16: Increase Stakeholder Engagement in Process Improvement Efforts

- Because input from stakeholders reveals new approaches

20 Goals To Meet in 2020

Four Goals Suggested by Staff and Stakeholders:

Goal 17: Increase the Transparency of Environmental Enforcement Activities

- Because businesses and the public should be aware of activities that may have an environmental impact on their communities

Goal 18: Seek Opportunities for Innovative Partnerships to Enhance Services

- Because engaging in collaborative partnerships can enhance achievement of our mission

20 Goals To Meet in 2020

Four Goals Suggested by Staff and Stakeholders:

Goal 19: Enhance Use and Ease of Financial Assurance Mechanisms as Part of Permitting and Enforcement

- Because robust and clear financial assurance mechanisms assist to ensure compliance with permits and orders, while ensuring consistency and predictability for regulated entities

Goal 20: Adopt Spill Reporting Regulations

- Because clear and concise spill reporting standards provide valuable data that is readily accessible for businesses and the public

➢ ***To receive updates on opportunities for stakeholder participation in 20BY20 initiatives, please register for our email list at www.ct.gov/DEEP/20BY20***

Questions or Comments?

Please Speak into Microphone
and State Your Name

www.ct.gov/deep/remediationroundtable

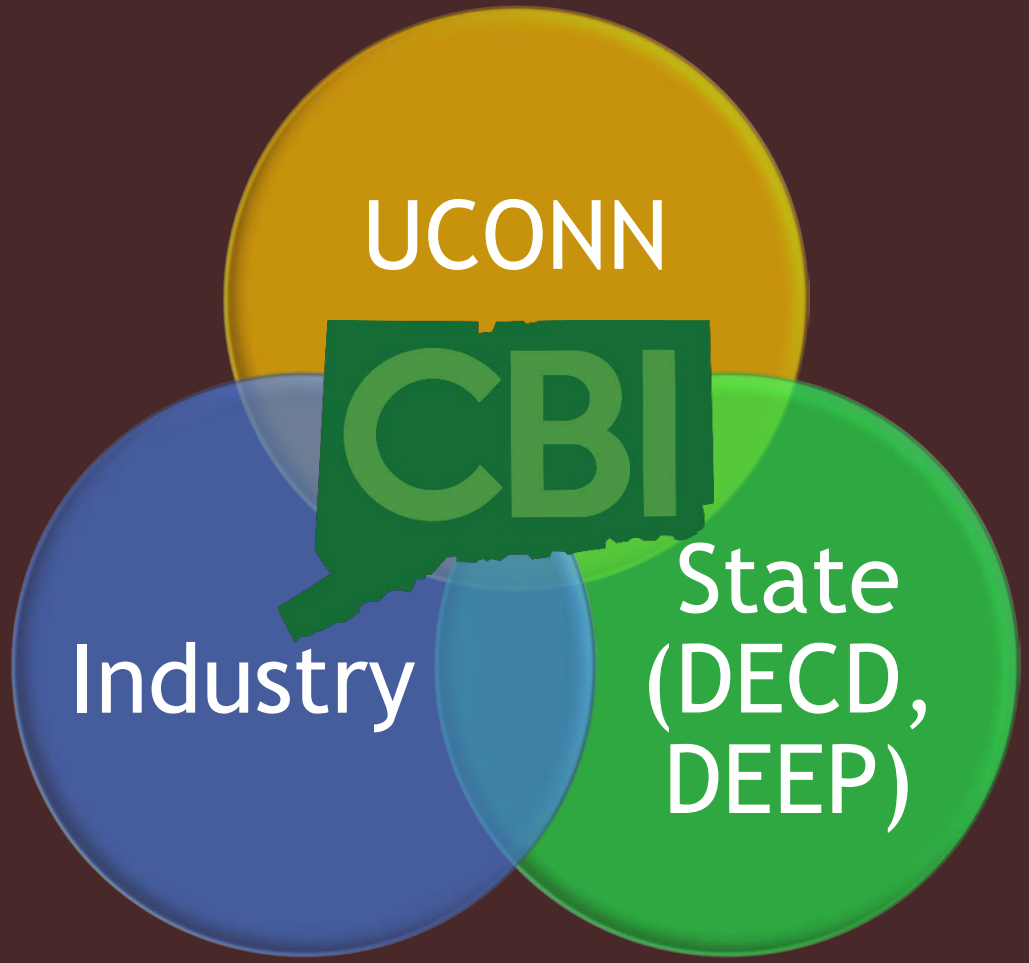
The Connecticut Brownfields Initiative

http://cbi.uconn.edu/

Maria Chrysochoou, Department Head,
Civil and Environmental Engineering

UCONN
SCHOOL OF ENGINEERING

Who are we?



What do we do?

Our mission is to be the foremost program for

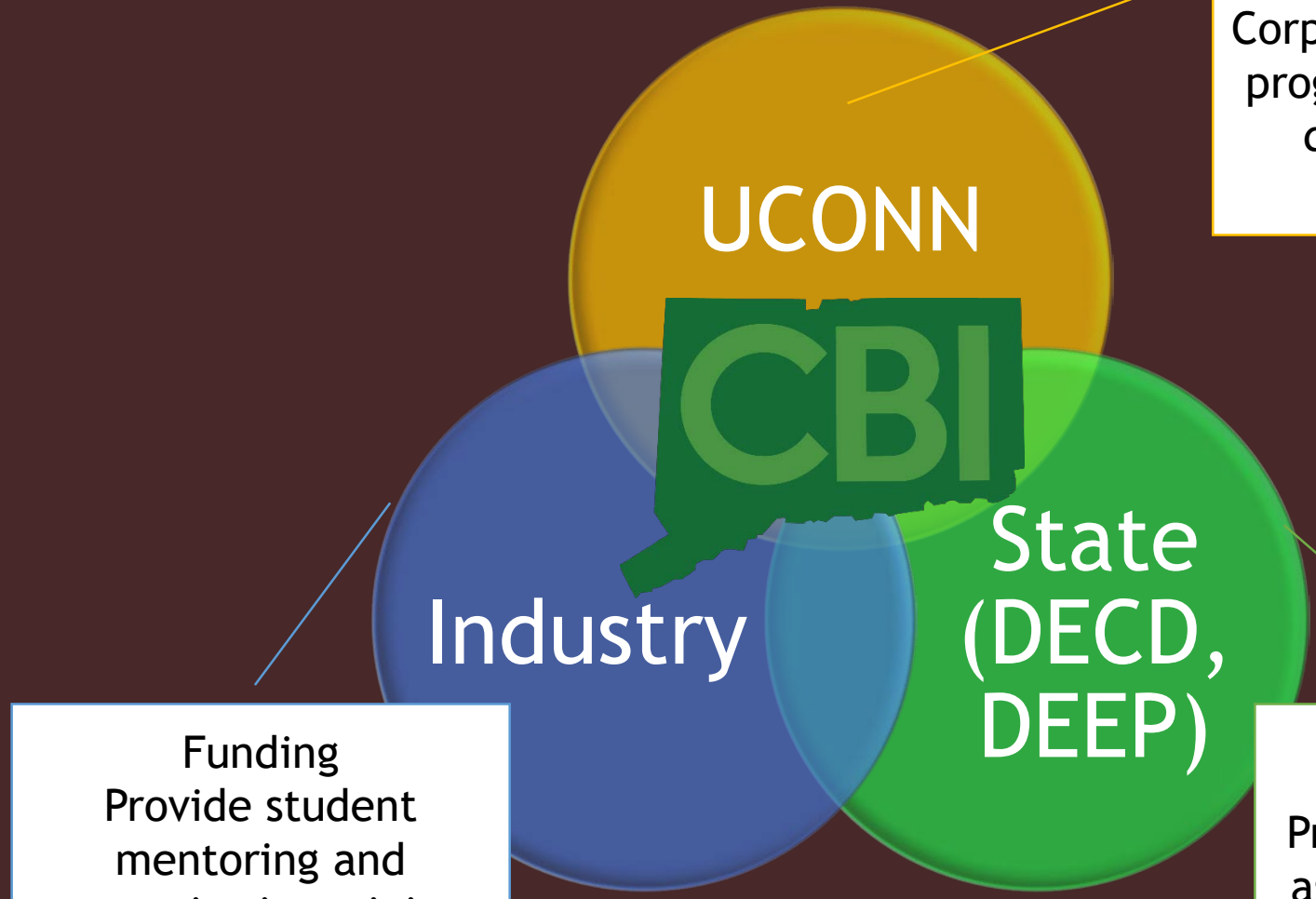
✓*education*

✓*technical assistance*

✓*networking opportunities*

on brownfields redevelopment in the State of Connecticut

What is the role of the partners?



We run the Brownfield Corps (student training program) and provide direct technical assistance

Funding
Provide student mentoring and expertise in training programs

Funding
Provide expertise and assistance to training program

Who do we serve?

All entities in the State of CT eligible for EPA brownfield grants

- Municipalities
- Regional Planning Organizations
- State-sanctioned Economic Development Agencies
- Other non-profits and non-profit community development entities (expanded eligibility under BUILD Act of 2018)

What services do we provide?
CBI Municipal Assistance Programs

Fall

Aug to Dec

Prepare EPA grant proposals
Community wide assessment
Site assessment
Site cleanup

Spring

Jan to May

Inventories
Phase I reports
Phase II Scope of Work
Site reuse planning
Community Engagement
Review of technical reports

Maria Chrysochoou

Who does the work?

UCONN Students in Service Learning courses
Brownfield Redevelopment (Fall)
Brownfield Practicum (Spring)

CBI Program Manager
Nefeli Bompoti
Assistant Research Professor

CBI Director
Maria Chrysochoou
Professor

Disclaimer

- We are not Licensed Environmental Professionals or Professional Engineers
- We are not authorized to submit proposals to EPA on behalf of a third party and we cannot sign formal reports
- Our assistance is meant to provide a head start to communities to further their brownfield projects

Our track record – Fall 2018

- Worked with 2 Councils of Government and 5 towns
- Prepared 7 proposals, 4 of which were submitted to EPA
- 1 proposal (Town of Stafford) was awarded $300K
- Fall 2019: working on 6 proposals

News Releases from Region 01

EPA announces the selection of $600,000 in funding for Brownfields assessment grants for contaminated properties in Connecticut

06/05/2019

Contact Information:
David Deegan (deegan.dave@epa.gov)
617-918-1017

HARTFORD - Today, the U.S. Environmental Protection Agency (EPA) is announcing that two grantees in the state of Connecticut have been selected to receive $600,000 in EPA Brownfields assessment funding and technical assistance. These funds will aid under-served and economically disadvantaged communities around the state in assessing and cleaning up abandoned industrial and commercial properties.

EPA intends to award Brownfields grants to the following groups for sites in Connecticut:

- The Connecticut Brownfield Land Bank Inc., with $300,000 for environmental site assessments and six cleanup plans for an area that includes Derby, Ansonia, Waterbury, and Torrington. Grant funds also will be used for cleanup and reuse planning and conducting community outreach activities, including outreach meetings, posting meeting notices on city websites, and distributing flyers in English, Spanish, and Polish.
- The Town of Stafford with $300,000 to conduct four environmental site assessments and prepare two cleanup plans. Grant funds also will be used to prepare a reuse plan or market analysis for two sites and conduct community outreach activities. The target area for this grant is the downtown and northeast areas of Stafford.

Our track record – Spring 2019

- 3 brownfield inventories (Hamden, Branford, Torrington)
- 1 Phase I report (Colchester)
- 1 site reuse and community engagement plan (Brookfield)
- 1 Phase II Scope of Work (Hartford)

Want to be involved?

http://Cbi.uconn.edu

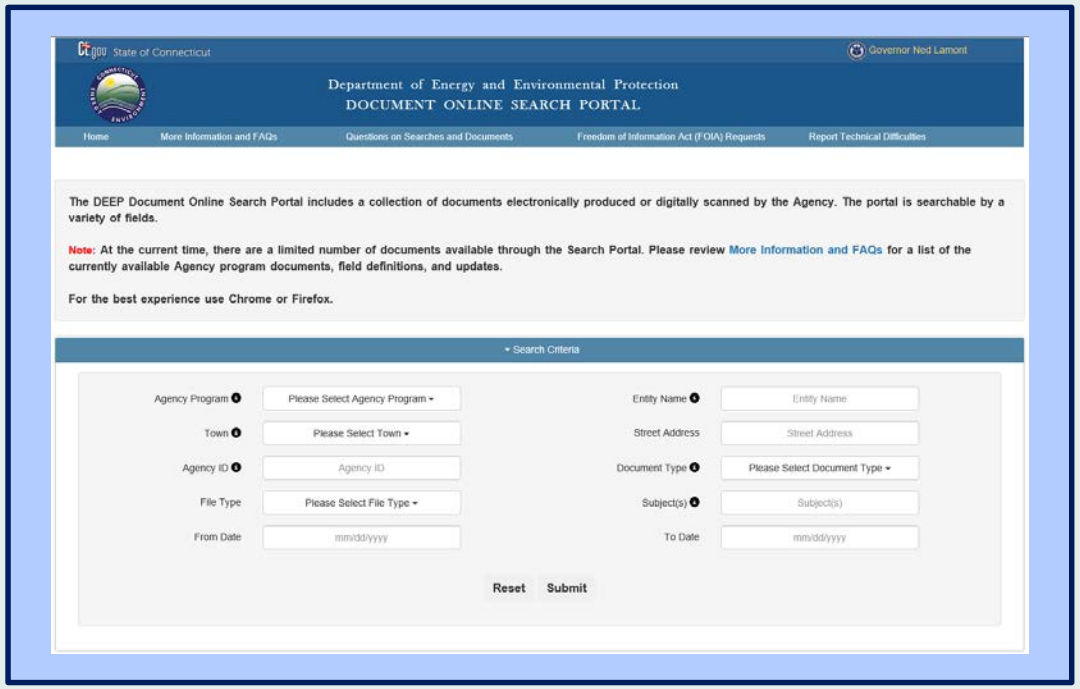
Information
Resources
Events
Join our email list

Questions or Comments?

Please Speak into Microphone
and State Your Name

www.ct.gov/deep/remediationroundtable

DOCUMENT ONLINE SEARCH PORTAL



DEMONSTRATION

Date: October 22, 2019

Presented by: David Madsen

Document Online Search Portal

What we will be covering in this Demonstration

- Why the new Document Search Portal
- How to access the Document Portal
- Records Available
- Portal Demonstration

David Madsen

Why a Document Online Search Portal?

- The Agency has been working hard to migrate records to our electronic repository
  - These efforts continue with the use of eGov solutions and bulk scanning initiatives
- This portal was created to make these electronic records available directly to the public
  - Goal is transparency reducing need for public to visit agency's Records Center or submit FOIA requests

Document Portal - Records Available

- Currently, there are a limited collection of documents available
- DEEP continues its efforts to digitize its paper records to add to those available online
- All 1,005,000 paper Hazardous Waste Manifests records now available

Document Portal - Records Available

- Next scanning project underway for remaining Emergency Incident Reports and related documents. Target completion: fall 2020
- DEEP is continually adding digital records manually so the number of documents and types of documents will increase
- There are also a number of additional efforts to create opportunities for the public to submit their documents electronically

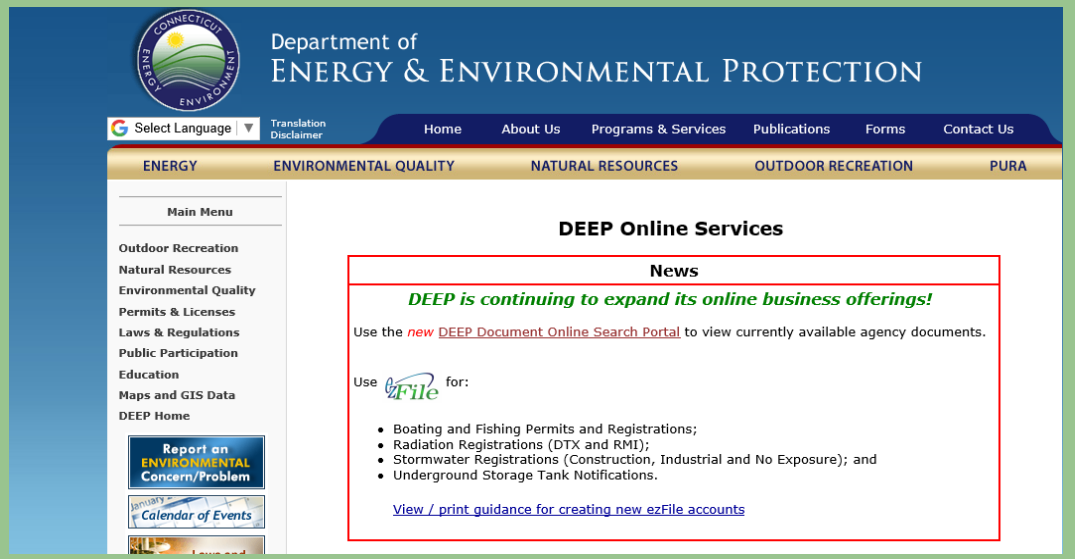
Where is the Document Online Search Portal

- The Portal is all web based so you just need the URL:

  https://filings.deep.ct.gov/DEEPDocumentSearchPortal/

- Or Navigate to “Online Services” on DEEP webpage

- No login required



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CT DEEP Remediation Roundtable
Zone of Influence and Monitoring Considerations for In Situ Remediation

Lucas Hellerich, PhD, PE, LEP – Woodard & Curran
lhellerich@woodardcurran.com
October 22, 2019

In situ remediation requires a robust understanding of technologies and monitoring program to confirm the zone of influence and remedy effectiveness

- Regulatory permits for in situ remediation and ZOI (*June 18, 2019*)
- Objectives and design of ZOI monitoring programs (*June 18, 2019*)
- Elements of an in situ remediation monitoring program
- Baseline monitoring
- Process monitoring and technology considerations
- Performance monitoring and measurement of progress and effects
- In situ remediation case study monitoring network (*June 18, 2019*)
- Summary
- Additional resources and references

Technologies

- **In situ anaerobic bioremediation**
- **In situ aerobic bioremediation / air sparging**
- **ISCO**
- **ISCR**
- **In situ thermal treatment**
- Activated carbon injectate
- In situ solidification

Zone of Influence is defined by changes in water quality and effects on the aquifer

"Zone of Influence" means the spatial area or volume of receiving water flow within which some degradation of water quality or use impairment is anticipated to occur as a result of a discharge (RSCA 22a-430-3(a)), and in this specific usage it is the volume of groundwater with a change in water quality resulting from the permitted discharge or its effects on the aquifer system. (CTDEEP, Instructions for Completing the Application for Emergency or Temporary Authorization to Discharge to Groundwater to Remediate Pollution, July 2012)

Summary Points from the June 18, 2019 Remediation Roundtable Meeting

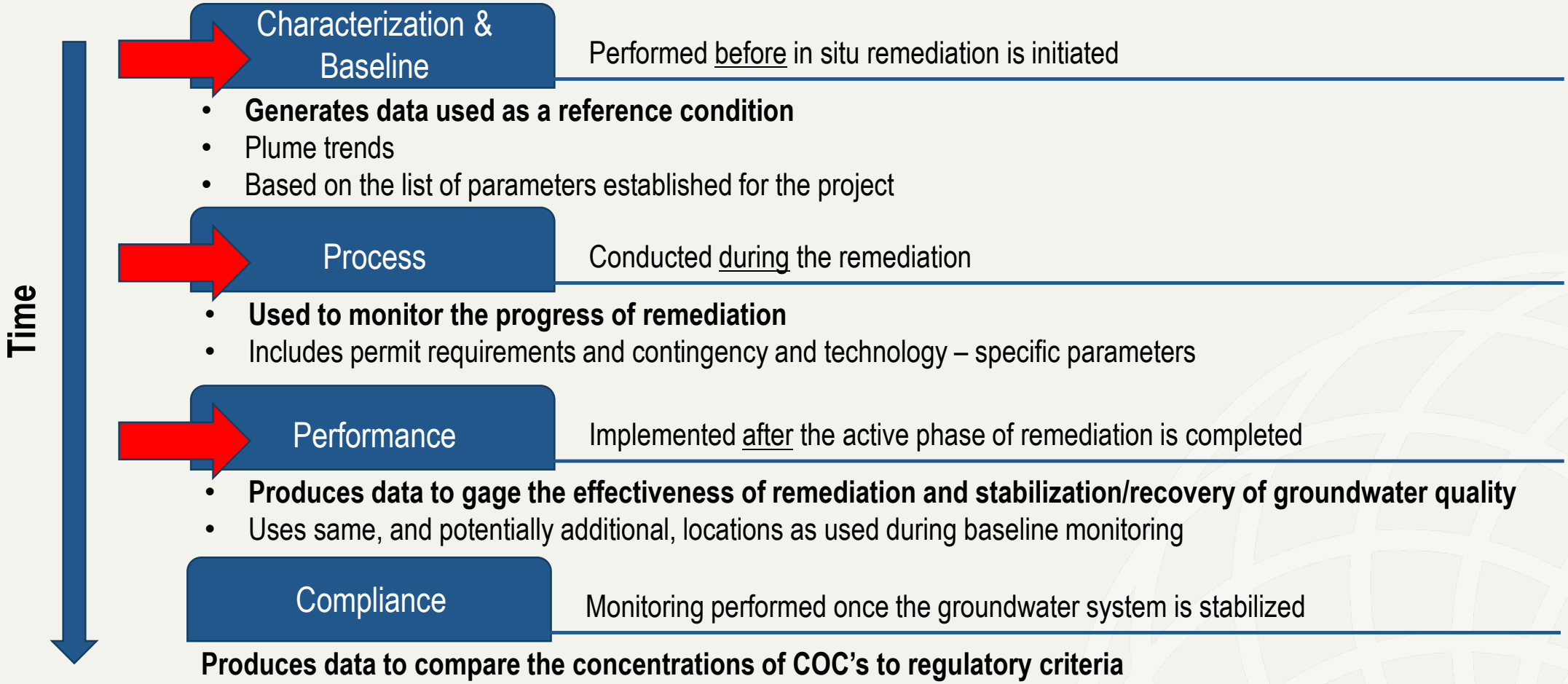
Determining the zone of influence is critical to meeting remediation objectives and achieving compliance with permitting requirements

- A complete understanding of the Conceptual Site Model is needed
- Remediation technologies will result in near-term and long-term hydrogeochemical changes
- An in situ remediation design should provide an expected assessment of the zone of influence based on the application and site conditions
- The zone of influence determination program needs to incorporate baseline, process, permit compliance, and performance monitoring considerations
- Planning for uncertainties and contingency actions is recommended
- A monitoring well network that encompasses a larger area helps to address uncertainties

Process and performance monitoring programs need to account for the Zone of Influence, spatially and temporally.

Elements of an In Situ Remediation Monitoring Program

Monitoring is performed for specific purposes throughout the lifecycle of the remediation



Baseline Monitoring

Baseline monitoring establishes the reference condition for the remediation

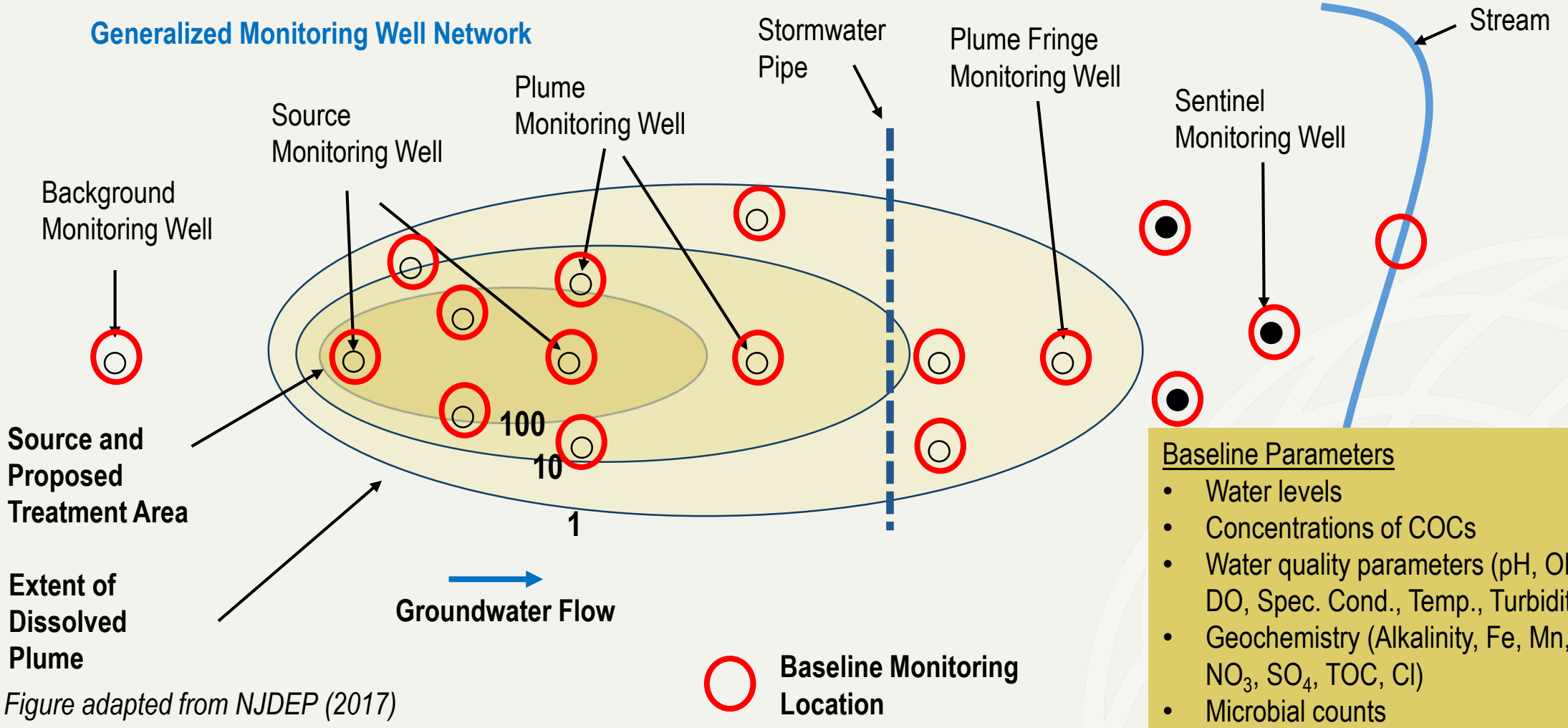


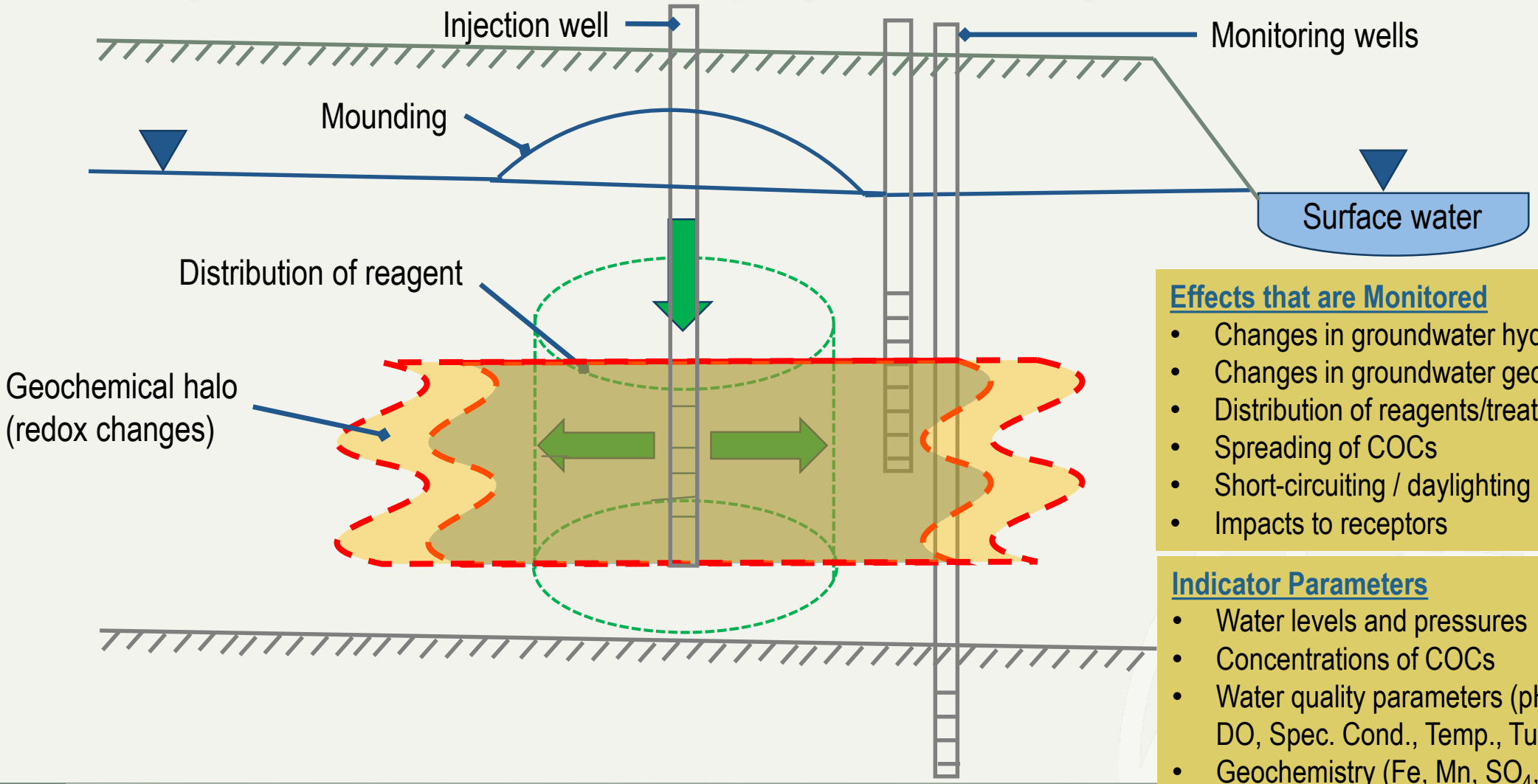
Figure adapted from NJDEP (2017)

Baseline Parameters

- Water levels
- Concentrations of COCs
- Water quality parameters (pH, ORP, DO, Spec. Cond., Temp., Turbidity)
- Geochemistry (Alkalinity, Fe, Mn, NO_3, SO_4, TOC, Cl)
- Microbial counts
- **Multi-level / multi-strata**

Process Monitoring and Technology Considerations

During in situ remediation, a number of hydrogeochemical changes occur in the subsurface



Effects that are Monitored

- Changes in groundwater hydraulics
- Changes in groundwater geochemistry
- Distribution of reagents/treatment
- Spreading of COCs
- Short-circuiting / daylighting
- Impacts to receptors

Indicator Parameters

- Water levels and pressures
- Concentrations of COCs
- Water quality parameters (pH, ORP, DO, Spec. Cond., Temp., Turbidity)
- Geochemistry (Fe, Mn, SO_4, TOC)
- Visual observations

Process Monitoring and Technology Considerations

Process monitoring is used to confirm the zone of influence, attainment of technology objectives (*i.e. distribution and chemistry*), and protection of potential receptors

Generalized Monitoring and Injection Well Network

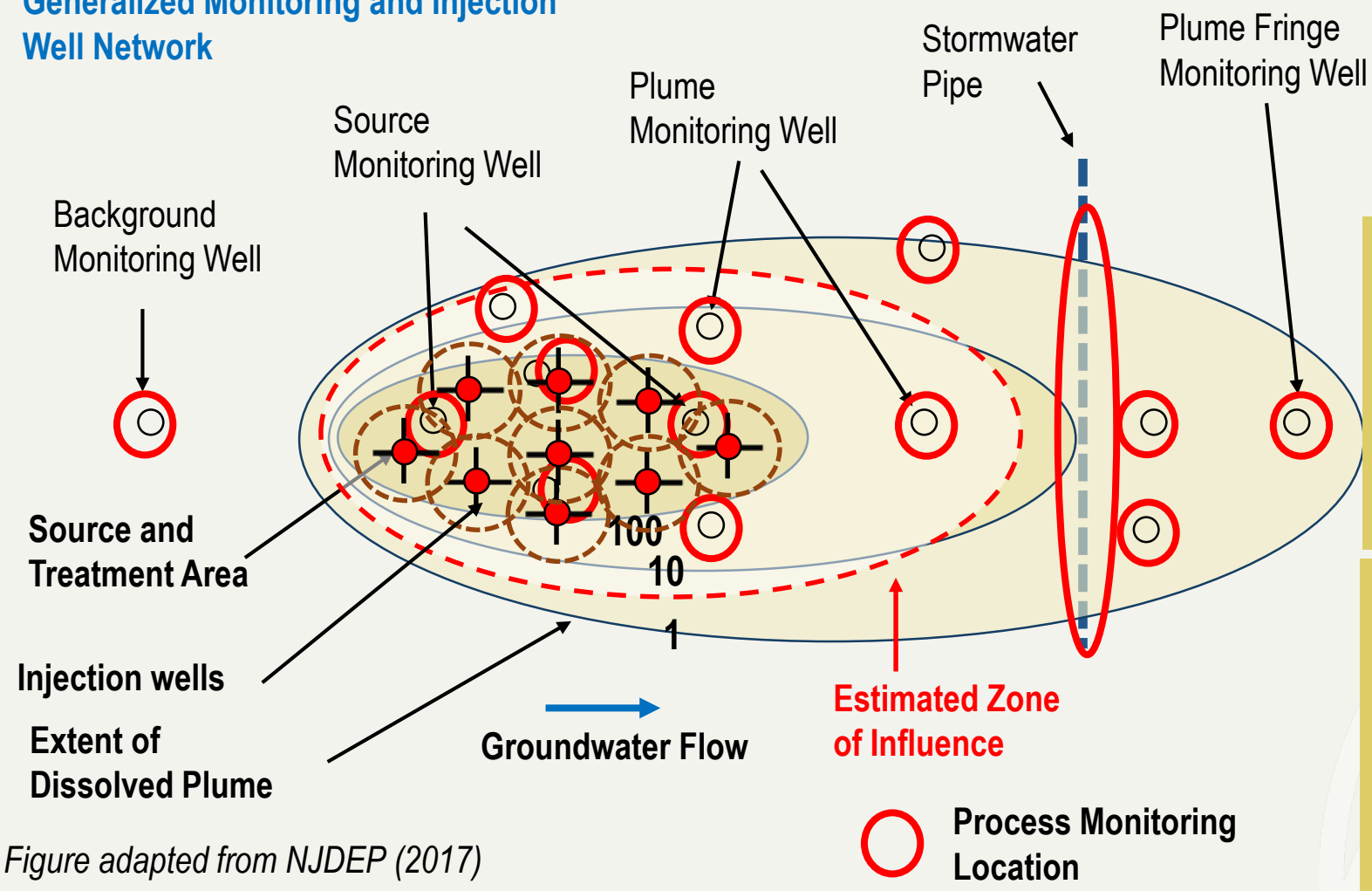


Figure adapted from NJDEP (2017)

Effects that are Monitored

- Changes in groundwater hydraulics
- Changes in groundwater geochemistry
- Distribution of reagents/treatment
- Spreading of COCs
- Short-circuiting / daylighting
- Impacts to receptors

Process Parameters

- Water levels and pressures
- Flowrates and volumes
- Concentrations of COCs
- Water quality parameters (pH, ORP, DO, Spec. Cond., Temp., Turbidity)
- Geochemistry (Fe, Mn, SO_4, TOC)
- Visual observations

Process Monitoring and Technology Considerations

Parameters measured during the in situ remediation implementation are used to evaluate the distribution of reagents and confirm attainment of chemistry

Parameter	Minimum Needed to Evaluate Distribution and Potential for Migration Beyond Zone of Influence	Additional for Evaluation of Technology	Potential for Impact to Receptors
Water levels and pressures Flowrates and volumes	■		■
Water quality (pH, ORP, DO, spec. cond., temp., turb.)	■		■
Visual (reagents, precipitates, turbidity)	■		■
COCs & breakdown products	■		■
Reagents (reductant, substrate, oxidant, TOC, Fe)		■	■
Geochemistry (Alk., As, Fe, Mn, Cr(VI), SO_4, S^{2-}, CH_4)		■	

** Additional parameters may be included depending on the particular site conditions, technology formulations, and cleanup objectives*

Process Monitoring and Technology Considerations

Parameters will behave differently depending on the technology used

Parameter		Anticipated changes during active remediation phase (i.e. injection, heating)				
		Aerobic bioremediation / Air sparging	Anaerobic bioremediation	ISCO	ISCR	Thermal remediation
Hydraulics	Water levels / pressures	↑	↑	↑	↑	↓↑
Water quality	pH	↔	↓	↓↑	↓↑	↔ ↓↑
	ORP / DO	↑	↓	↑	↓	↓
	Spec. Cond.	↓↑	↓↑	↓↑	↓↑	↑
	Temp.	↔	↔	↔ ↑	↔	↑
Visual	Reagents	↑	↑	↑	↑	
	Precipitates / turbidity	↑	↑	↑	↑	↔ ↑
Chemical	COCs & breakdown products	↓↑	↓↑	↓↑	↓↑	↓↑
Reagents	Oxidants and surrogates			↑		
	TOC		↑			↑
	Fe, reductants				↑	
Geochemical	Alk., As, Fe, Mn, TOC, CH_4, S^{2-}	↓	↑	↓	↑	↑
	SO_4		↓			↔ ↑
	Cr(VI)		↓	↔ ↑	↓	

↑ Increase
↓ Decrease
↔ Little change

Arrows are not shown if the parameter is not applicable to the technology

Process Monitoring and Technology Considerations

Monitoring frequencies depend on application pace, rates of change, analyses, and project duration (*Incorporates General Permit Requirements*)

Parameter (Examples included)		Typical monitoring frequencies (with transition steps)				
		Aerobic bioremediation / Air sparging	Anaerobic bioremediation	ISCO	ISCR	Thermal remediation
Hydraulics	Water levels / pressures Flowrates and volumes	Daily (first week) → Weekly				
Water quality	pH, ORP, DO, Spec. Cond., Temp.	Daily (first week) → Weekly				
Visual	Reagents, precipitates, turbidity	Daily (first week) → Weekly				
Chemical	COCs & breakdown products	Monthly → Quarterly	Weekly → Monthly			
Reagents	Reductants/ oxidants & surrogates, TOC, Fe	Monthly → Quarterly	Weekly → Monthly			N/A
Geochemical	As, Fe, Mn, TOC, SO_4, S^{2-}, Cr(VI), CH_4	Monthly → Quarterly	Weekly → Monthly			

** Additional parameters may be included depending on the particular site conditions, technology formulations, and cleanup objectives*

Performance Monitoring and Measurement of Progress and Effects

Performance monitoring is used to evaluate remediation effectiveness and the restoration of groundwater quality over time

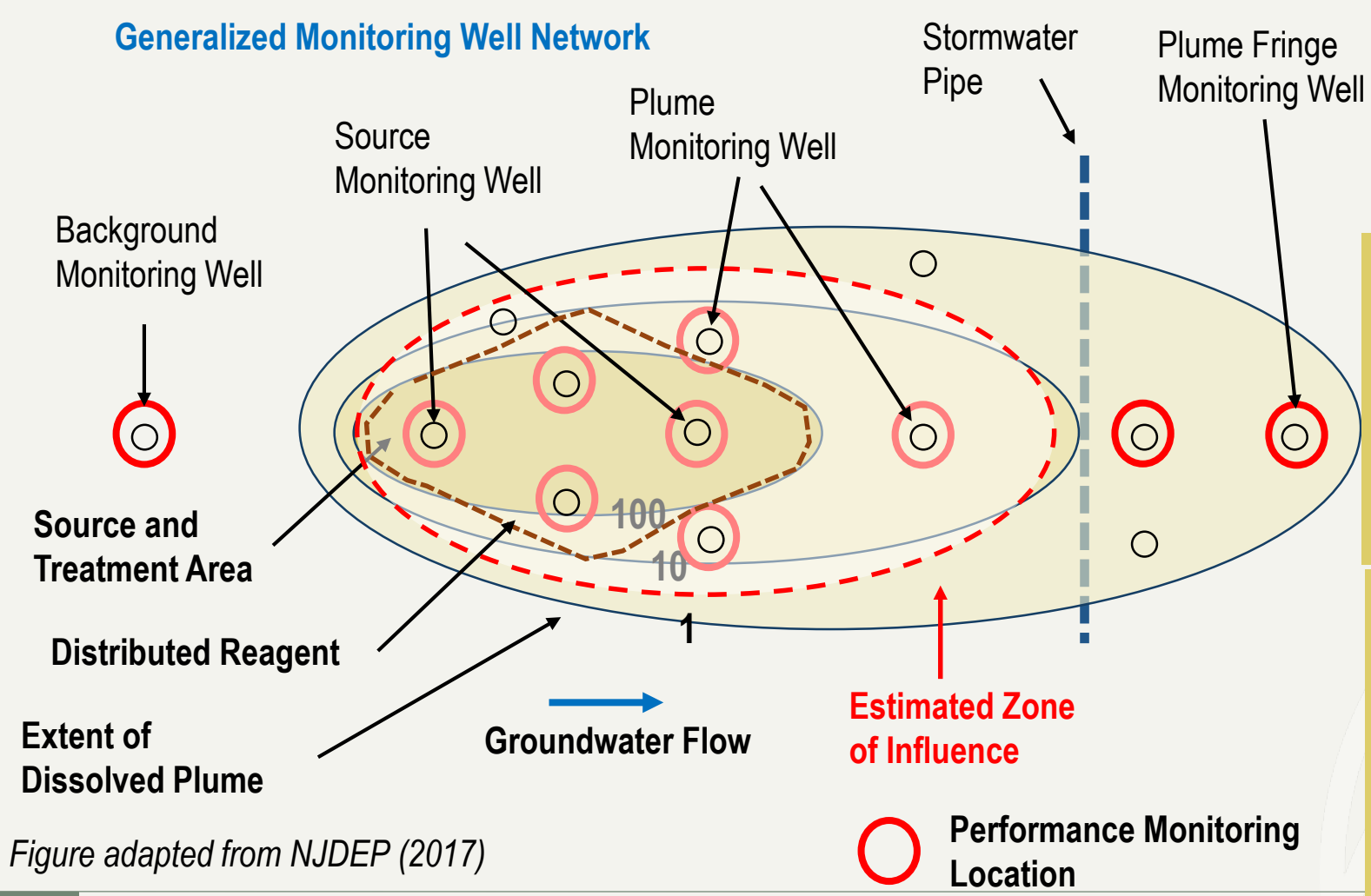


Figure adapted from NJDEP (2017)

Effects that are Monitored

- Changes in groundwater hydraulics
- Changes in groundwater geochemistry
- Distribution of reagents/treatment
- Spreading of COCs
- Short-circuiting / daylighting
- Impacts to receptors

Process Parameters

- Water levels and pressures
- Concentrations of COCs
- Water quality parameters (pH, ORP, DO, Spec. Cond., Temp., Turbidity)
- Geochemistry (Fe, Mn, SO_4, TOC)
- Visual observations

Performance Monitoring and Measurement of Progress and Effects

Parameters measured after the in situ remediation implementation are used to confirm the zone of influence and the stabilization of groundwater quality

Parameter	Minimum Needed to Evaluate Distribution and Potential for Migration Beyond Zone of Influence	Stabilization of Groundwater Quality	Potential for Impact to Receptors
Water levels and pressures	■		■
Water quality (pH, ORP, DO, spec. cond., temp., turb.)	■	■	■
Visual (reagents, precipitates, turbidity)	■		■
COCs & breakdown products	■		■
Reagents (reductant, substrate, oxidant, TOC, Fe)		■	■
Geochemistry (Alk., As, Fe, Mn, Cr(VI), NO_3, SO_4, S^{2-}, CH_4)		■	

** Additional parameters may be included depending on the particular site conditions, technology formulations, and cleanup objectives*

Performance Monitoring and Measurement of Progress and Effects

Parameters will recover as the groundwater system stabilizes

Parameter		Anticipated changes after active remediation phase is completed				
		Aerobic bioremediation / Air sparging	Anaerobic bioremediation	ISCO	ISCR	Thermal remediation
Hydraulics	Water levels / pressures	↓	↓	↓	↓	↓↑
Water quality	pH	↔	↑	↓↑	↓↑	↔ ↑↓
	ORP / DO	↓	↑	↓	↑	↑
	Spec. Cond.	↓↑	↓↑	↓↑	↓↑	↓
	Temp.	↔	↔	↔↓	↔	↓
Visual	Reagents	↓	↓	↓	↓	
	Precipitates / turbidity	↓	↓	↓	↓	↔ ↓
Chemical	COCs & breakdown products	↓↑	↓	↓	↓	↓
Reagents	Oxidants and surrogates			↓		
	TOC		↓			↓
	Fe, reductants				↓	
Geochemical	Alk., As, Fe, Mn, TOC, S^{2-}, CH_4	↑	↓	↑	↓	↓
	NO_3, SO_4		↑			↔ ↓
	Cr(VI)		↓	↔↓	↓	

↑ Increase
↓ Decrease
↔ Little change

Arrows are not shown if the parameter is not applicable to the technology

Performance Monitoring and Measurement of Progress and Effects

Post-remediation monitoring frequencies depend on the technology and the time required to achieve stable groundwater quality conditions (*Incorporates General Permit Requirements*)

Parameter (Examples included)		Typical monitoring frequencies (with transition steps)				
		Aerobic bioremediation / Air sparging	Anaerobic bioremediation	ISCO	ISCR	Thermal remediation
Hydraulics	Water levels / pressures	Weekly → Monthly → Quarterly				
Water quality	pH, ORP, DO, Spec. Cond., Temp.	Monthly → Quarterly				
Visual	Reagents, precipitates, turbidity	Weekly → Monthly → Quarterly				
Chemical	COCs & breakdown products	Quarterly				
Reagents	Reductants/ oxidants & surrogates, TOC, Fe	Quarterly				
Geochemical	Alk., As, Fe, Mn, NO_3, TOC, SO_4, S^{2-}, Cr(VI), CH_4	Quarterly				

** Additional parameters may be included depending on the particular site conditions, technology formulations, and cleanup objectives*

Summary

Performing the appropriate level of monitoring is critical to confirming the zone of influence, meeting remediation objectives, and achieving compliance with permitting requirements

- A complete understanding of the Conceptual Site Model is needed
  - Identifying preferential flow paths and potential receptors is key
  - A monitoring well network that encompasses a larger area helps to address uncertainties
- Monitoring is performed throughout the life-cycle of the remediation to meet evolving objectives
  - Baseline monitoring establishes the reference condition
  - Process monitoring is used to confirm the zone of influence, attainment of technology objectives (*i.e. distribution and chemistry*), and protection of potential receptors
  - Performance monitoring is used to evaluate remediation effectiveness and the stabilization of groundwater quality over time
- Compliance monitoring is performed *after* groundwater conditions have stabilized
- Planning for uncertainties and contingency monitoring actions is recommended
  - Potential plume migration
  - Potential impacts to receptors (e.g., drinking water wells, surface water, indoor air, subsurface utilities)

Additional Resources and References

Guidance documents are available for the design and analysis of in situ remediation monitoring programs

- ITRC - Optimizing In Situ Remediation Performance and Injection Strategies (*in development*)
- In Situ Treatment Performance Monitoring: Issues and Best Practices EPA-542-F-18-002 (April 2018)
- NJDEP In Situ Remediation: Design Considerations and Performance Monitoring Technical Guidance Document (October 2017)
- ITRCweb.org/Guidance
  - Bioremediation
  - Direct-Push Wells
  - Enhanced Attenuation of Chlorinated Organics
  - Geospatial Analysis for Optimization
  - In Situ Chemical Oxidation
  - Mass Flux and Mass Discharge
  - Remediation Management of Complex Sites
  - Remediation Process Optimization
  - Site Characterization and Monitoring
- Clu-In.org
  - Technologies – Remediation (Activated Carbon-Based Technology for In Situ Remediation, Air Sparging, Bioremediation, Combining Remedies, Environmental Fracturing, In Situ Chemical Reduction, In Situ Flushing, In Situ Oxidation, Nanotechnology, Thermal Treatment: In Situ)
  - Strategies and Initiatives (High-Resolution Site Characterization (HRSC) Focus Area, Optimizing Site Cleanups

Questions or Comments?

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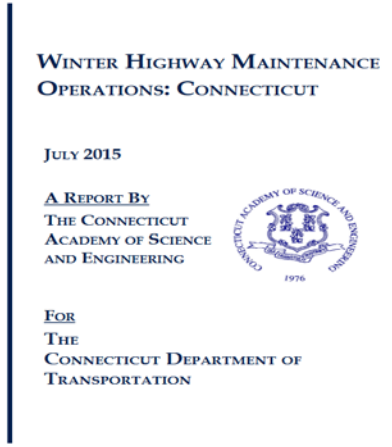
Department of Transportation – Snow & Ice Control Guidelines

Adam Fox, P.E.
Transportation Principal Engineer
Environmental Compliance
CTDOT

COMMON MYTH #1

- Why doesn't DOT just go back to using sand?
- 2006: Operational Change
  - 7 Sand:2 Sodium Chloride Mix to Sodium Chloride
    - Sand is just not as effective
    - Loses its abrasive properties fast
    - Sand has other effects:
      - drainage system maintenance
      - Wetland/surface water impacts
    - Use same amount of sodium chloride


WINTER HIGHWAY MAINTENANCE OPERATIONS: CONNECTICUT

JULY 2015

A REPORT BY
THE CONNECTICUT ACADEMY OF SCIENCE AND ENGINEERING

FOR
THE CONNECTICUT DEPARTMENT OF TRANSPORTATION

- 2015: Connecticut Academy of Science & Engineering Review
- State of the Art Operations – DOT wants to be the leader on Snow & Ice programs

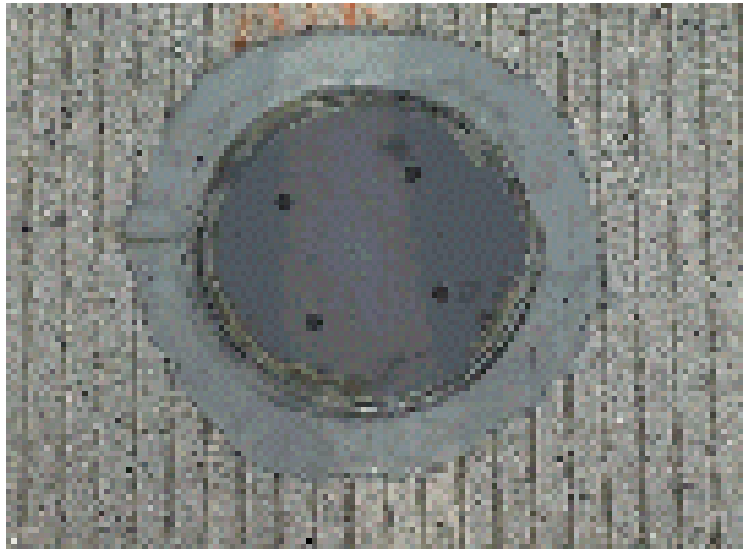
Adam Fox

Application Rates

- Based upon Field Conditions
  - Type of precipitation
  - Roadway/Pavement temperature
- Road Weather Information Systems (RWIS)
- Solid Material – Sodium Chloride
- Liquid Material
  - > 25°F pre-wet with sodium chloride (brine)
  - < 25°F pre-wet with magnesium chloride

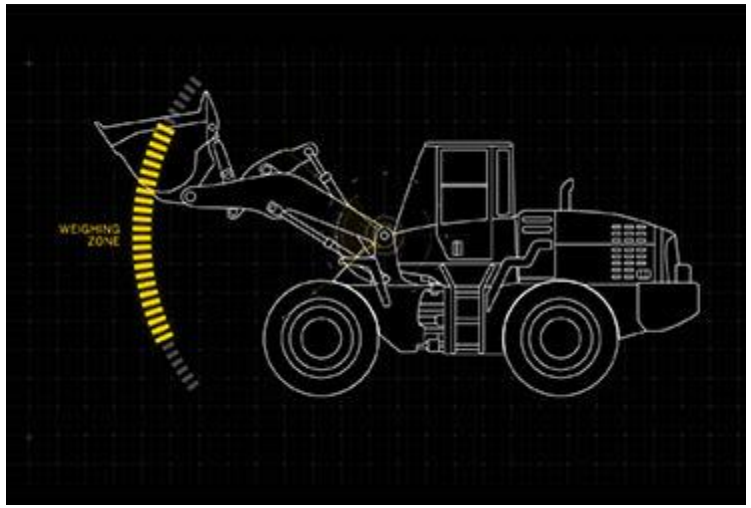
RWIS - Road Weather Information Systems

Pavement Sensors



Inventory Control

- Amount loaded onto trucks
  - Documented by Bucket
  - Loadrite® System
- Application Tracking by each storm route
  - Material Allotted – by storm conditions
  - Material Used
  - Material Returned
  - Supervisor Review



COMMON MYTH #2

- Why does DOT not use products with beet juice and molasses?
  - Still need a chloride source to melt snow
  - Wetland/surface water impacts

Adam Fox

Pre-Storm/Planning

- Calibration
  - Spreaders
  - Pre-wetting Systems
- Training
  - Annual Operator Training
  - Tailgate Talks

Adam Fox

COMMON MYTH #3

- Are those white lines the DOT puts down just over-applying salt?

Adam Fox

Pre-Treating/Anti-Icing

- Proactive strategy
  - maintains a sufficient quantity of ice control chemicals on the pavement surface
  - before or very soon after precipitation or ice formation begins
- Salt Brine (23%)
  - Bridge Decks
  - frost prone areas
    - Valleys
    - Shaded Areas
    - History

COMMON MYTH #4

- CTDOT should have reduced application zones just like neighboring states

State	Conditions	Application Rate (lbs/lane-mile)	Frequency
CONNECTICUT	Above 29°F	200	3 hours
	20-29°F		
	Below 20°F		
MAINE	Above 20°F	100-300	Unknown
	Below 20°F	300-800	
MASSACHUSETTS	All	240	Unknown
NEW HAMPSHIRE	Sleet/Freezing Rain	300	1.5 - 2 hrs - Interstate
	Snow: 20° F	250	2.5 - 3 hrs- State roads
	Snow: < 20° F	250	
NEW YORK	Above 32°F	160	Unknown
	23-32°F	225 - 275	
	15-23°F	275-360	
	Below 15°F	Abrasives	
VERMONT	Above 32°F	0 - 100	Unknown
	25-32°F	100 - 200	
	20-25°F	200 - 300	
	15-20°F	300 - 400	
RHODE ISLAND	All	320	Unknown

- ConnDOT does not have a bare and wet pavement policy

- Our state highway system should remain ***reasonably safe*** and in a ***passable*** condition by ***continuous plowing*** and ***judicious use*** of snow and ice materials

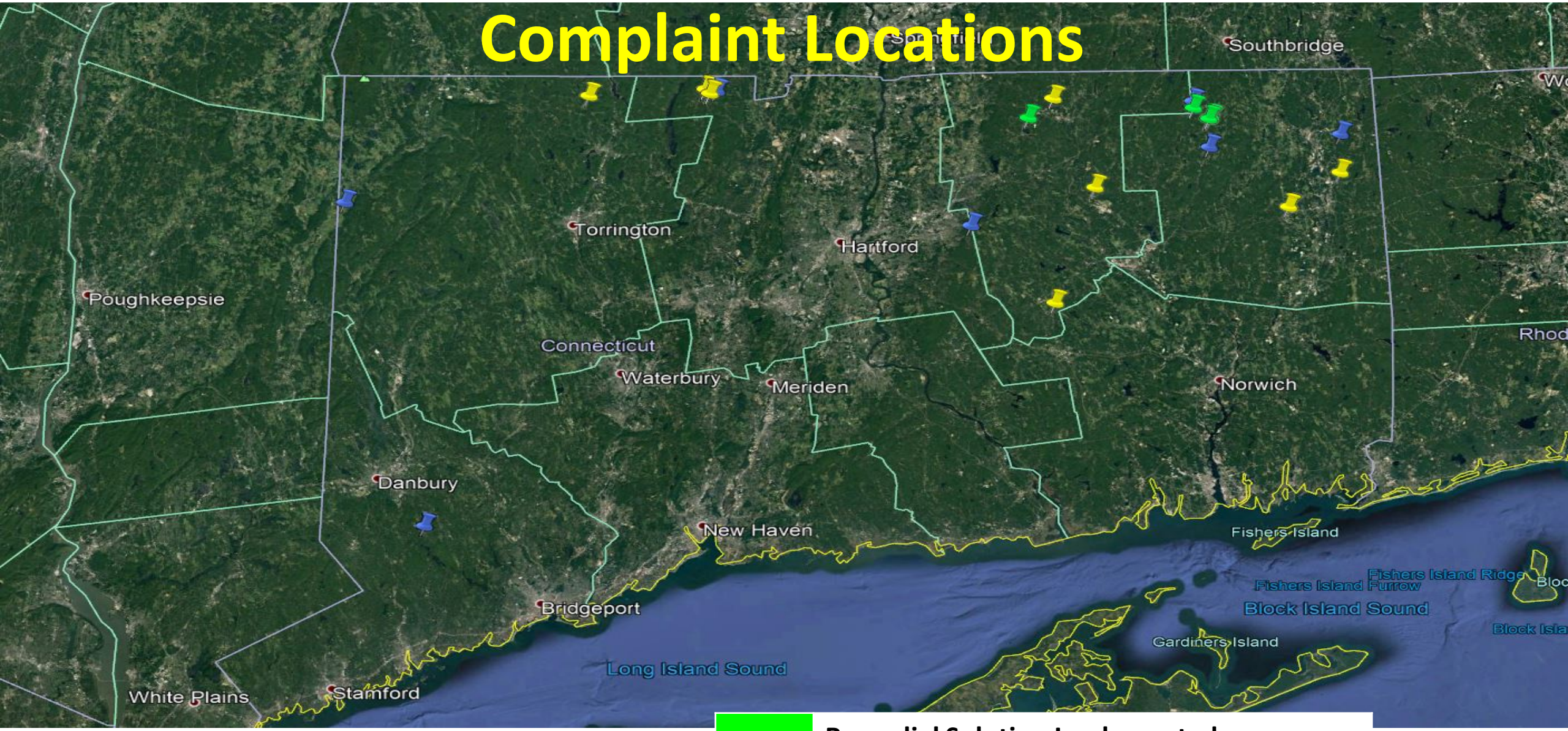
Adam Fox

Regional State Application Rates

State	Total Lane Miles	Winter 2016 - 2017					
		Liquid			Dry Materials		
		Liquid Materials applied (gallons)	Average Liquid Materials applied (gallons) per Lane Mile	Relative Rank	Dry Materials applied (tons)	Average Dry Materials applied (tons) per Lane Mile	Relative Rank
CONNECTICUT	10,870	1,606,170	148	3	188,610	17	4
MAINE	8,300	1,197,494	144	4	142,192	17	4
MASSACHUSETTS	16,000	3,340,000	209	2	516,327	32	1
NEW HAMPSHIRE	9,366	226,280	24	6	87,030	9	6
NEW YORK	43,716	1,537,170	35	5	1,090,000	25	2
VERMONT	6,511	2,833,669	435	1	127,382	20	3
RHODE ISLAND	3,300						

Adam Fox

Complaint Locations



Remedial Solution Implemented

Remedial Solution In Progress

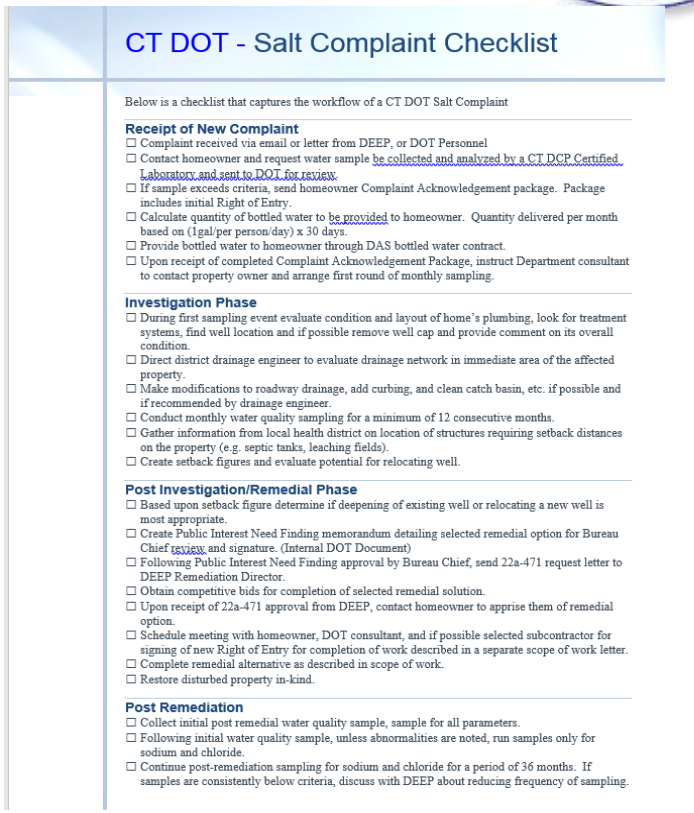
Initial Sampling in Progress

Complaint Procedures

- Complaints are typically received via:
  - Sister state agency (DEEP, DPH)
  - Directly from well owner
  - Local Health Department
  - Internal CTDOT units (e.g., CTDOT Maintenance).
- Property owner's initial water sample is reviewed by CTDOT
- Bottled water is provided to homeowner as an interim drinking supply
- CTDOT then conducts investigation to determine the appropriate remedial solutions

Process Developed

- Complaint Acceptance
- Investigation
- Drainage Improvements
- Remedial Options
- Scopes of Work for Drillers
- Public Interest Need Finding
- DEEP approval under 22a-471
- Homeowner Outreach
- Coordination with Office of Attorney General for Claims Commission documentation



CT DOT - Salt Complaint Checklist

Below is a checklist that captures the workflow of a CT DOT Salt Complaint

Receipt of New Complaint

- ☐ Complaint received via email or letter from DEEP, or DOT Personnel
- ☐ Contact homeowner and request water sample be collected and analyzed by a CT DCP Certified Laboratory and sent to DOT for review.
- ☐ If sample exceeds criteria, send homeowner Complaint Acknowledgement package. Package includes initial Right of Entry.
- ☐ Calculate quantity of bottled water to be provided to homeowner. Quantity delivered per month based on (1gal/per person/day) x 30 days.
- ☐ Provide bottled water to homeowner through DAS bottled water contract.
- ☐ Upon receipt of completed Complaint Acknowledgement Package, instruct Department consultant to contact property owner and arrange first round of monthly sampling.

Investigation Phase

- ☐ During first sampling event evaluate condition and layout of home's plumbing, look for treatment systems, find well location and if possible remove well cap and provide comment on its overall condition.
- ☐ Direct district drainage engineer to evaluate drainage network in immediate area of the affected property.
- ☐ Make modifications to roadway drainage, add curbing, and clean catch basin, etc. if possible and if recommended by drainage engineer.
- ☐ Conduct monthly water quality sampling for a minimum of 12 consecutive months.
- ☐ Gather information from local health district on location of structures requiring setback distances on the property (e.g. septic tanks, leaching fields).
- ☐ Create setback figures and evaluate potential for relocating well.

Post Investigation/Remedial Phase

- ☐ Based upon setback figure determine if deepening of existing well or relocating a new well is most appropriate.
- ☐ Create Public Interest Need Finding memorandum detailing selected remedial option for Bureau Chief review and signature. (Internal DOT Document)
- ☐ Following Public Interest Need Finding approval by Bureau Chief, send 22a-471 request letter to DEEP Remediation Director.
- ☐ Obtain competitive bids for completion of selected remedial solution.
- ☐ Upon receipt of 22a-471 approval from DEEP, contact homeowner to apprise them of remedial option.
- ☐ Schedule meeting with homeowner, DOT consultant, and if possible selected subcontractor for signing of new Right of Entry for completion of work described in a separate scope of work letter.
- ☐ Complete remedial alternative as described in scope of work.
- ☐ Restore disturbed property in-kind.

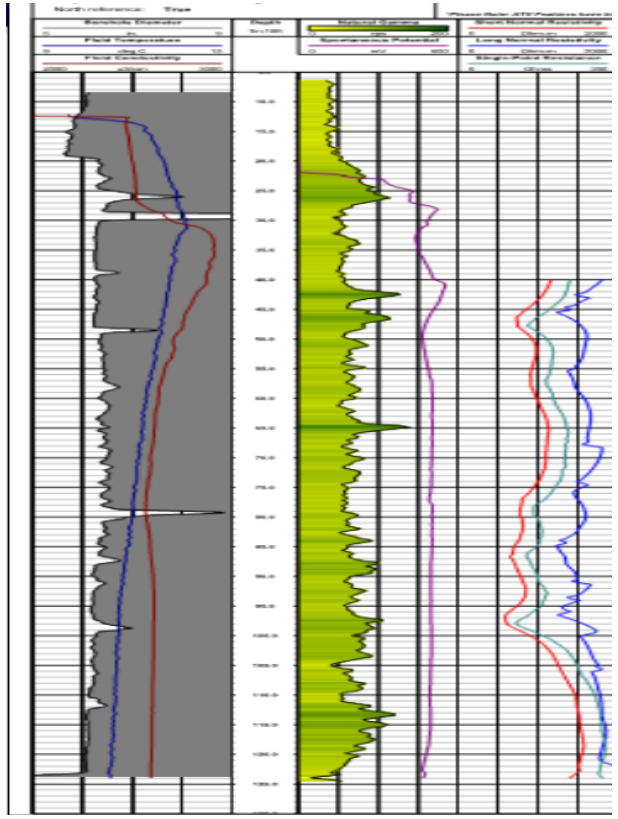
Post Remediation

- ☐ Collect initial post remedial water quality sample, sample for all parameters.
- ☐ Following initial water quality sample, unless abnormalities are noted, run samples only for sodium and chloride.
- ☐ Continue post-remediation sampling for sodium and chloride for a period of 36 months. If samples are consistently below criteria, discuss with DEEP about reducing frequency of sampling.

Adam Fox

Trends & Solutions

- Common issues with wells
  - Shallow overburden
  - Dug wells
  - Well zone of influence includes roadway network
- Well Siting
  - Near snow shelf
  - Near drainage
- Solutions are unique to each location



Adam Fox

Successes

Remedial Strategy	Installed & Connected	Field Work Scheduled/ In Progress	Bids Being Secured	Under Evaluation	Total
Connection to Watermain		1		1	2
New Well	2	2	5	2	11
Deepening of Wells	1	2			3
Reverse Osmosis System	1				1
Complaints in Investigation				8	8
Total					25

Adam Fox

Moving Forward

- Siting of new wells:
  - Recognize that roadways are a potential source of pollution and there should be a 75 foot minimum separation distance
  - Already within Public Health Code – Enforced by Health Departments
  - Emphasis was provided to CEHA
- Recognizing that private contractors are a large contributing factor
  - Green Snow Pro – New Hampshire Model
  - Liability Relief
- Training

UCONN T2 Training

- Training targeting municipalities – implemented by UCONN Technology Transfer Center
  - Similar to New Hampshire Green SnowPro Certification
- Promote reductions of total salt usage by Municipalities through calibration of equipment and other ConnDOT best practices
- UCONN T2 Center is implementing training

QUESTIONS

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Ray Frigon, Remediation Division Assistant Director
Lori Mathieu, Public Health Section Chief,
Connecticut Department of Public Health, Drinking Water Section

CONNECTICUT INTERAGENCY PFAS TASK FORCE

October 22, 2019
Remediation Roundtable

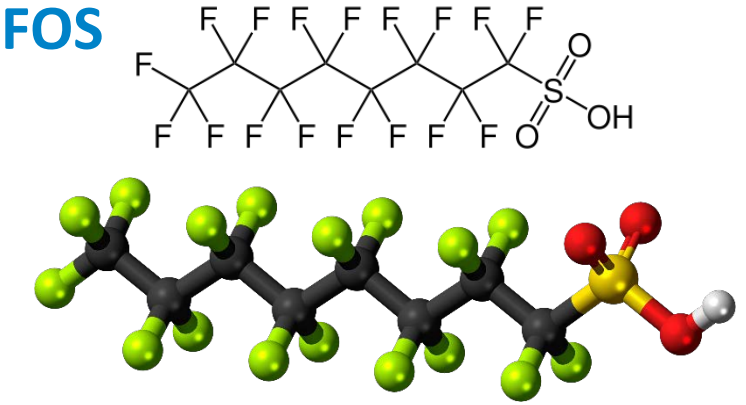
Led by the
DEPARTMENT *of* PUBLIC HEALTH
DEPARTMENT *of* ENERGY AND ENVIRONMENTAL PROTECTION

CONNECTICUT DEPARTMENT OF PUBLIC HEALTH

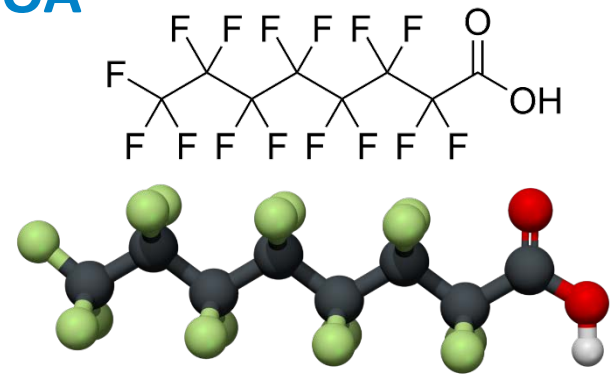
Overview

- Why is a Task Force needed?
- Task Force and Committee Meetings
- Key Take-Aways and Action Plan Recommendations
- Next Steps

PFOS



PFOA



PFAS

Connecticut Interagency PFAS Task Force

- Formation ordered by Governor Lamont on July 8, 2019
- PFAS Action Plan to include comprehensive strategy to:
  1. Minimize human health risk to CT residents
  2. Minimize future releases to the environment
  3. Identify, assess and cleanup historic releases
- Requested Action Plan submittal on October 1, 2019

Why is a PFAS Task Force Needed?

- The Federal government (US EPA) has been slow to act in regulating PFAS.
- Collaboration and cooperation among Agencies is necessary to protect the health and welfare of Connecticut's residents and our environment.
- Information needs to be shared among Agencies and stakeholders.

PFAS

Unique PFAS Management Challenges

Public Drinking Water

- No Safe Drinking Water Act enforceable standards

Health Standards

- Published research into health effects is moving faster than the government can act
- States acting in advance of EPA to protect their residents

Unique PFAS Management Challenges

Environmental Permitting and Site Remediation

- No EPA lab methods for PFAS testing in media other than drinking water
- Sampling is expensive and challenging (cross-contamination)
- Uncertain standards
- Universe of sites?
- Hazardous substance determination?
- Limited tools in existing regulatory toolbox
- Limited cleanup options

Sectors Potentially Affected by PFAS

- Drinking Water
- Wastewater Treatment
- Biosolids
- Solid Waste Disposal
- Agriculture/ Aquaculture
- Fire Protection
- Industry
- Site Cleanup/ Brownfields
- Consumer Products
- Building Management
- State Assets

State Agencies and Entities Represented

Co-Chairs	
Department of Energy and Environmental Protection	**Department of Public Health**
Office of the Governor	Office of the Attorney General
Connecticut Airport Authority	Department of Emergency Services and Public Protection
Department of Agriculture	Connecticut Military Department
Office of Planning and Management	Department of Transportation
Public Utilities Regulatory Authority	Department of Consumer Protection
Department of Correction	Department of Administrative Services
Department of Developmental Services	University of Connecticut
Connecticut State Colleges and Universities	

Evolution of PFAS Knowledge in CT

2013-2015

- EPA-mandated testing of large public drinking water systems

2016

- EPA Health Advisory and CT DPH Drinking Water Action Level
- EPA testing at two Superfund sites

2017

- Contamination in Westchester County, NY

2018

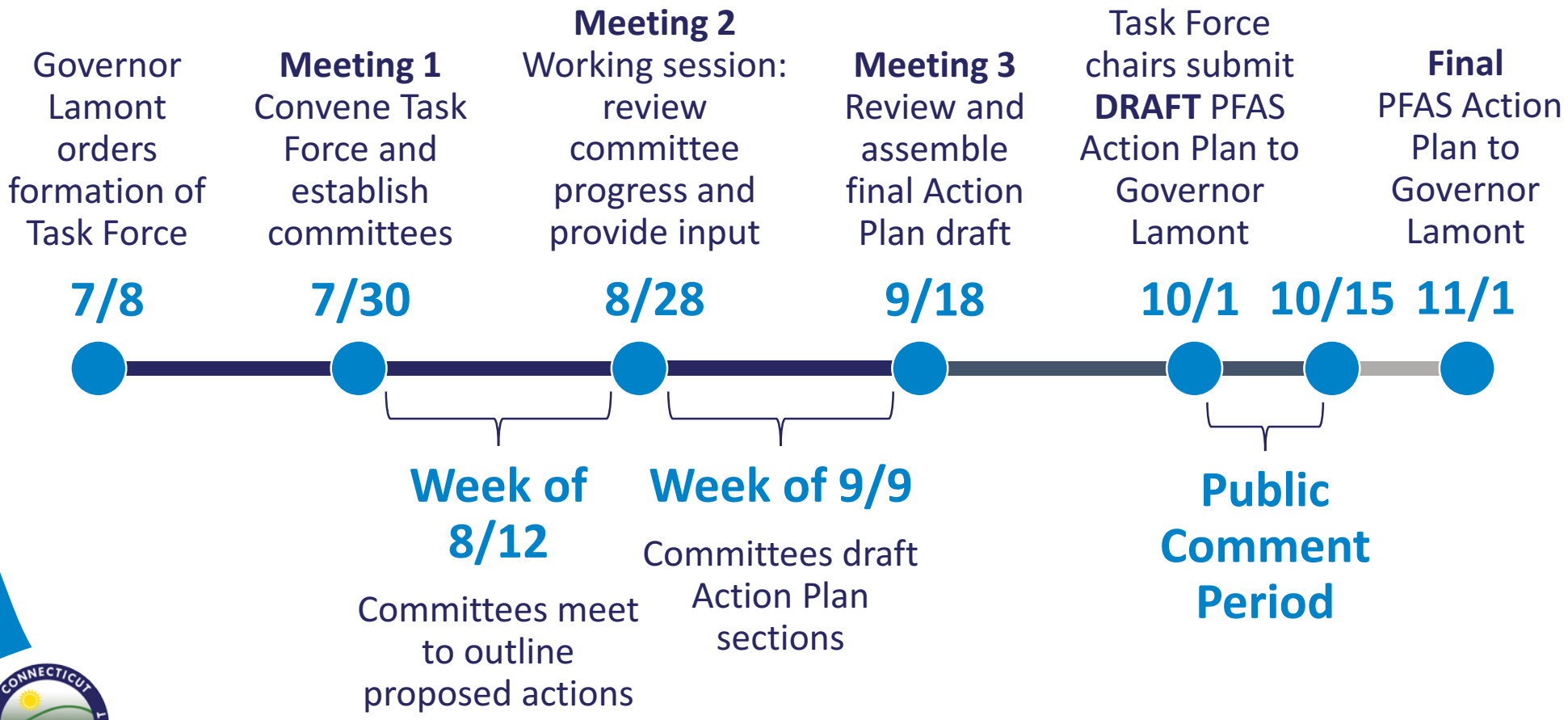
- Testing & public outreach in Greenwich
- Windham fire training area tested
- DPH requires land use risk assessments by 80 PWS
- DESPP and DEEP form committee to select alternative to AFFF

2019

- DPH requires testing at proposed public wells
- DEEP samples near MIRA landfills
- AFFF release at Bradley Airport hangar
- DESPP and DEEP issue AFFF Use Bulletin
- B-17 plane crash at Bradley

PFAS

Action Plan Timeline



PFAS

Task Force Meetings

- Three full Task Force meetings held monthly from late July through September
- Established Task Force Webpage and Email

www.ct.gov/CTPFASTaskForce

CTPFAS@ct.gov

Webinar – PFAS 101

- August 7, 2019
- DPH and DEEP staff provided a more detailed overview on PFAS.
- Webinar archived on Task Force webpage.

Task Force Committees

Human Health

Minimize human health risk and work to prevent human exposure

Meeting Dates:

August 16

September 10

Pollution Prevention

Minimize future releases of PFAS to the environment

Meeting Dates:

August 15

September 11

Remediation

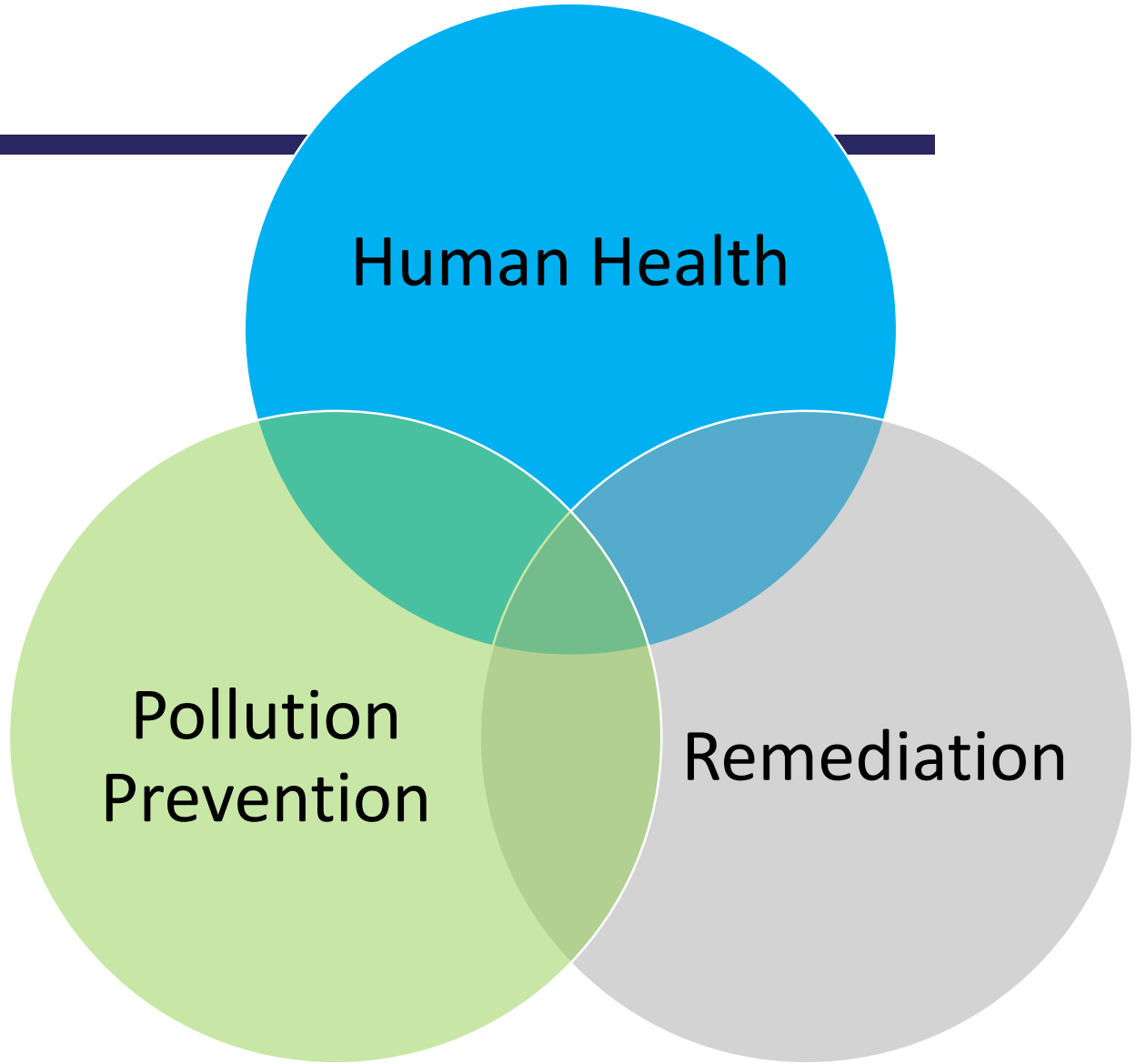
Identify, assess, and clean up historic releases of PFAS to the environment

Meeting Dates:

August 16

September 12

PFAS


Human Health
Pollution Prevention
Remediation

Human Health Committee

Key Take-Aways

- Communication – Clear and understandable information for all stakeholders
- Science-based decision making
- Need for testing drinking water, fish, shellfish, dairy, and other agricultural products, as well as consumer products
- Academia
- Laboratory capacity and standard methods

Action Plan: Strategic Focus 1 – Human Health

Protect the Health of CT Citizens

- Drinking Water Testing – public, private wells, bottled water
- Establish a Safe Drinking Water Advisory Council for Maximum Contaminant Levels
- Improve Laboratory Capacity
- Assess Food-Related PFAS Exposure Pathways
- Minimize Occupational Exposure
- Continue Communication and Technical Assistance

Pollution Prevention Committee

Key Take-Aways

- Importance of addressing AFFF
- Education, Outreach, and Communication about PFAS
- Need for understanding the universe of possible PFAS sources, including existing environmental discharges
- Need for establishing discharge limits for various media
- Concern about PFAS in consumer products and food packaging

Action Plan: Strategic Focus 2 – P2

Minimizing Future Releases

- Reduce or Prevent Future Releases of AFFF
- Determine of Universe of Potential Sources
- Establish Standards and Discharge Limits
- Evaluate Wastewater Treatment Plants, Biosolids, and Compost
- Consider PFAS-free Consumer Products for State Contracts

Remediation Committee

Key Take-Aways

- Determination of the Universe of Potential Sites
- Need for EPA test methods for all media
- Desire for understanding concentrations of PFAS in CT's environment
- Need for science-based cleanup standards for all media
- Communication of guidance to regulated community
- Need for safe cleanup technologies and disposal options

Action Plan: Strategic Focus 3 - Remediation

Identify & Clean Up Releases

- Develop GIS Database of Source Sites and Receptors
- Develop Sampling Strategy for Environmental Media
- Prioritize Airport, Firefighting Facility, and Landfill Sampling
- Establish Clean-up Standards for all Media
- Collaborate with Stakeholders on Remediation Technology

Action Plan: Strategic Focus 4

Cross Cutting Actions

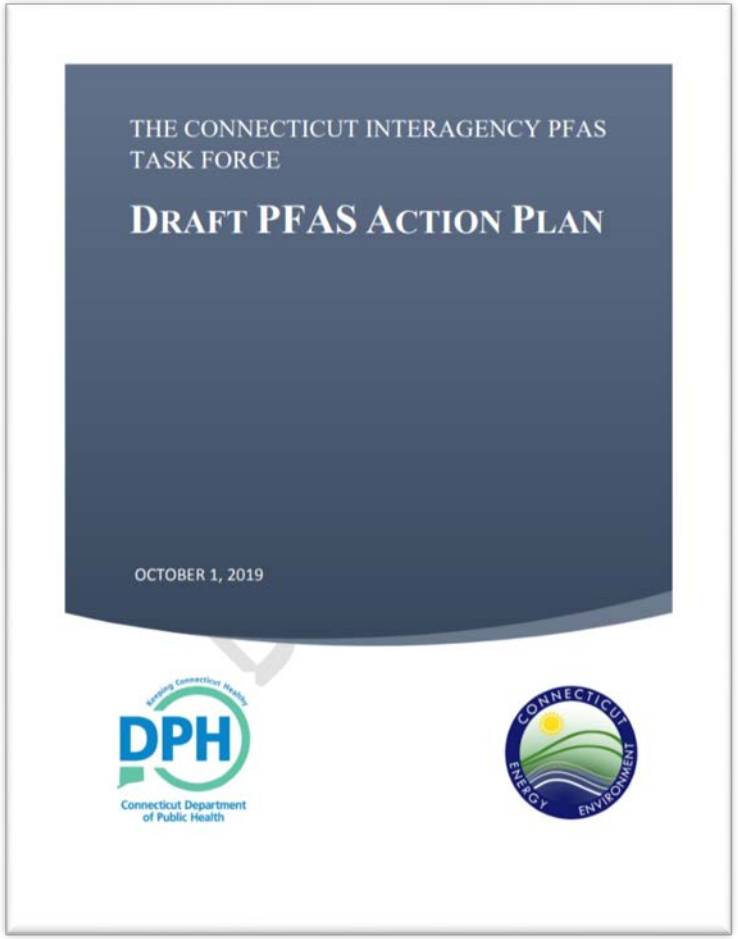
- Enhance Education, Outreach, and Communication
  - Form a public outreach team
  - Collaborate with local emergency response
  - Maintain knowledge and capacity for addressing PFAS

Action Plan: Potential Legislative Opportunities

- Establish an AFFF Take-Back program and consider legislation to reduce future releases of AFFF.
- Establish a Safe Drinking Water Advisory Council to make MCL recommendations for emerging contaminants, including PFAS.
- Require all water bottlers that sell bottled water in CT to test their products for PFAS.
- Evaluate whether the State can require manufacturers to disclose on SDSs and product labeling, and consider Extended Producer Responsibility Program.

Public Comment Period

- October 1 - 15, 2019
- Received 293 comments from 240 commenters
- Currently reviewing comments and will take into consideration prior to finalizing Action Plan – November 1



Questions

www.ct.gov/CTPFASTaskForce

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Remediation Roundtable

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Web: www.ct.gov/deep/remediationroundtable

Remediation Roundtable

Next meeting: March 17, 2020