PFAS Drinking Water Standard (MCL) Development

Stakeholder Group Meeting

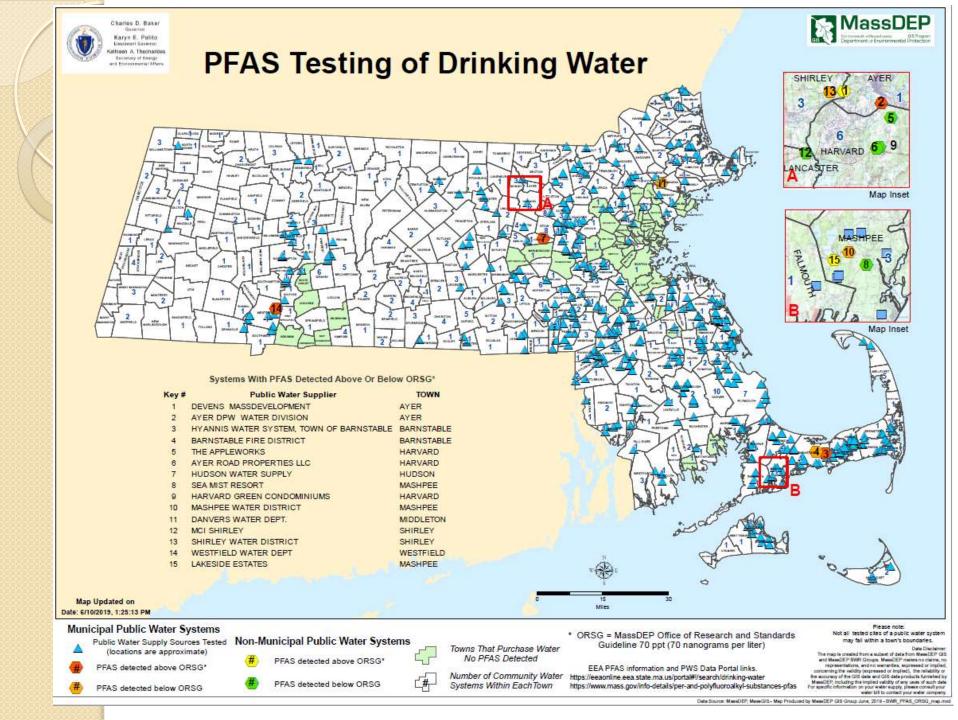
Thursday, June 20, 2019 (1:00-4:00) MassDEP, One Winter Street, Boston, MA

Welcome Introductions Agenda Preview Summary of MassDEP activities since last PFAS MCL Stakeholder Meeting

Stephanie Cooper Deputy Commissioner MassDEP

Today's Agenda

Time	Торіс	Presenter	
1:00 – 1:15	Welcome, introductions and summary of MassDEP activities since Meeting I (4/11/19)	Stephanie Cooper, Deputy Commissioner for Policy Doug Fine, Assistant Commissioner for Water Resources	
1:15 – 2:15	 Proposed Changes to the Waste Site Cleanup / Massachusetts Contingency Plan (MCP) Cleanup Standards for PFAS in Groundwater Presentation Questions/Comments/Discussion 	Paul Locke, Assistant Commissioner for Waste Site Cleanup C. Mark Smith, Director, Office of Research and Standards	
2:15 – 3:15	Discussion on PFAS Drinking Water MCL Components	Damon Guterman, Drinking Water Program	
3:15 – 3:45	Information gathering on a Drinking Water Treatment Technique approach	Doug Fine	
3:45 – 4:00	Next steps	Doug Fine	
4:00	Adjourn		



MassDEP PFAS Activities Update

- Continued support to PWS w/detections
- Voluntary sampling request to all PWS (6/12/2019)
- Request to all UCMR3 PWS with voluntary request for lab data with lower reporting levels (6/12/2019)
- Continuing sampling of all proposed new PWS sources
- Continuing sampling of residuals (new and renewed)
- Approved 6 laboratories under 310 CMR 22.11A(2) based on 3rd party certifications

Proposed Changes to the Massachusetts Contingency Plan (MCP) Cleanup Standards for PFAS in Groundwater

Paul W. Locke Assistant Commissioner MassDEP Bureau of Waste Site Cleanup One Winter Street Boston, MA 02108

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Paul.Locke@Mass.Gov

On the web:	https://www.mass.gov/topics/cleanup-of-sites-spills	
Video:	<u>https://www.youtube.com/massdep</u>	
Photos:	<u>https://www.flickr.com/photos/massdep/</u>	
Tweets:	https://twitter.com/MassDEP	

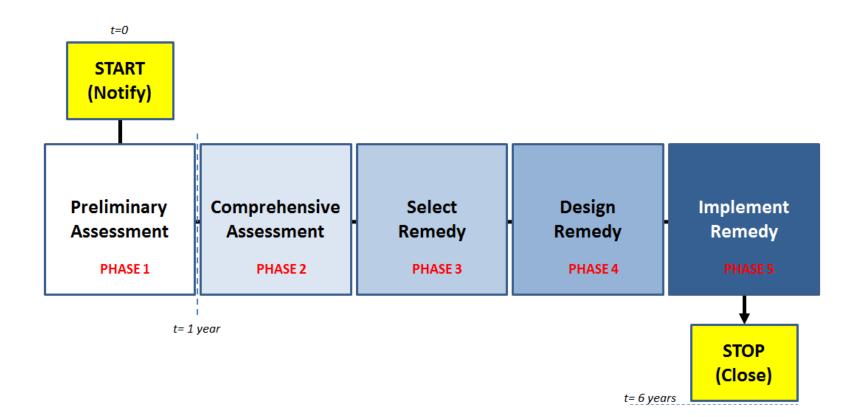
Proposed Changes to the Massachusetts Contingency Plan (MCP) Cleanup Standards for PFAS in Groundwater

Topics for Today's Discussion:

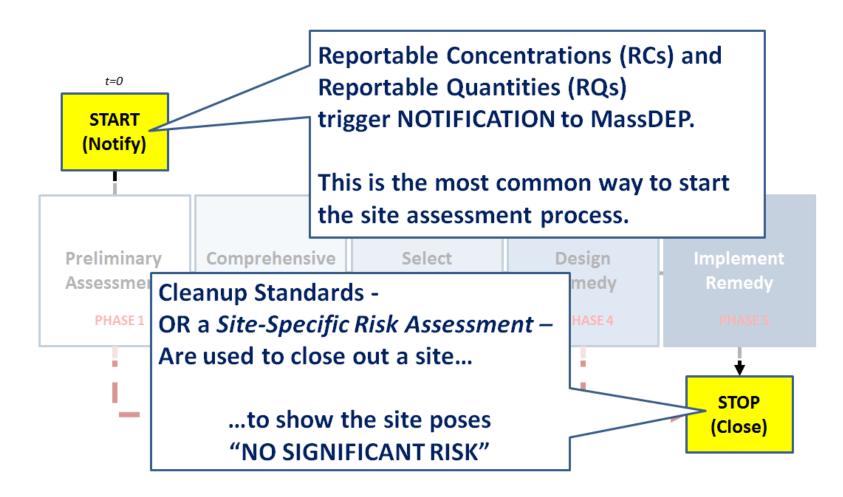
- I. What is the Waste Site Cleanup Program?
- 2. How are cleanup standards and Reportable Concentrations used?
- 3. How are cleanup standards and Reportable Concentrations developed (generally)
- 4. What is being proposed related to PFAS?
- 5. When are public comments due and what happens next?
- 6. What has MassDEP heard so far?

What is the Waste Site Cleanup Program

Massachusetts Contingency Plan, or "MCP" - 310 CMR 40.0000 https://www.mass.gov/lists/waste-site-cleanup-laws-and-regulations



How are cleanup standards and Reportable Concentrations used?



How are cleanup standards and Reportable Concentrations used?

The MCP provides 3 ways to evaluate risk posed by site contamination

Method 1

Standards in Soil and Groundwater

Method 2

Limited Modification of Method 1 Standards

Method 3

Site-Specific Risk Assessment

NOTE:

- Selection of Method governed by 310 CMR 40.0942
- Methods I & 2 are never required.
- Method 3 is sometimes required, but ALWAYS an option
- Method 3 <u>requires</u> meeting applicable drinking water MCLs where applicable (310 CMR 40.0993(3))

How are cleanup standards and RCs developed? (generally)

- Today, let's focus on Drinking Water-related criteria
- Groundwater considered "GW-I" is protected as either <u>current</u> or <u>foreseeable future</u> drinking water
- Standards for <u>soil</u> above GW-I groundwater must consider leaching to the underlying aquifer
- Waste Site Cleanup standards/RCs consider existing Drinking Water Program standards & guidelines

How are cleanup standards and RCs developed? (generally)

• <u>**GW-1**</u> (310 CMR 40.0932)

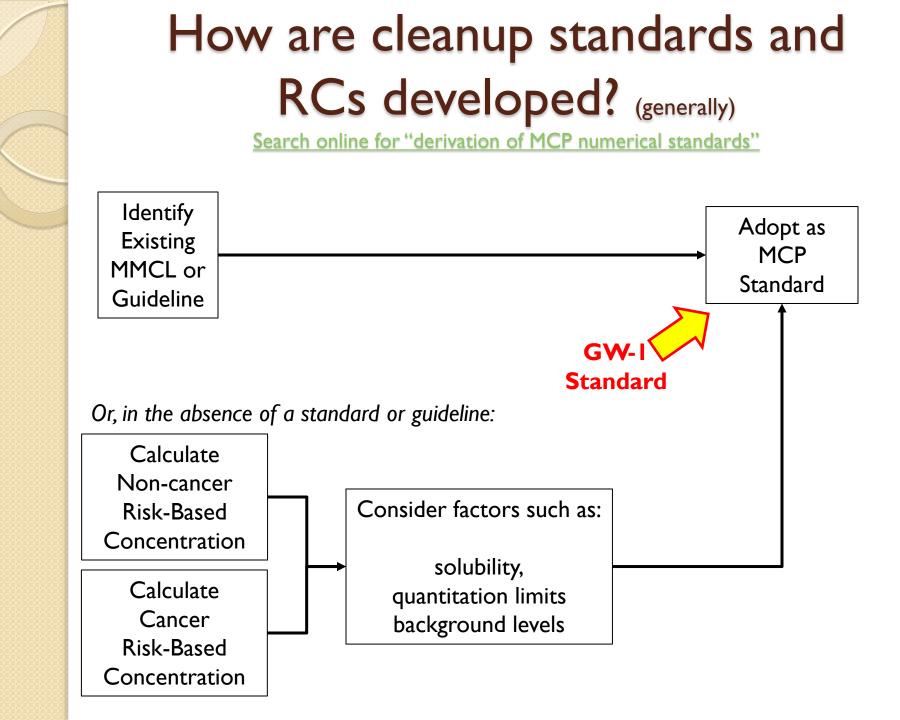
"Current Drinking Water Source Area" (310 CMR 40.0006)

- all Zone II's
- <u>all</u> Zone A's of Class A surface water bodies
- Interim Wellhead Protection Area (unless <u>officially</u> abandoned by <u>DEP</u>)
- within 500 feet of a private water supply well

"Potential Drinking Water Source Area" (310 CMR 40.0006)

- <u>all</u> areas more than 500 feet from water supply distribution pipeline
- <u>all</u> municipality-designated water supply protection area (not mapped - must check with city/town)
- within a "Potentially Productive Aquifer" not excluded as a "Non-Potential Drinking Water Source Area"

Exceptions may apply...



What is being proposed related to PFAS? (today's focus on drinking water-related criteria)

SEE https://www.mass.gov/lists/2019-proposed-mcp-revisions

- **RCGW-I Reportable Concentration = 20 ppt** applicable to the SUM of concentrations for PFDA, PFHpA, PFHxS, PFNA, PFOS & PFOA
- Method I GW-I Standard = 20 ppt applicable to the SUM of concentrations for PFDA, PFHpA, PFHxS, PFNA, PFOS & PFOA
- Method I S-I/GW-I, S-2/GW-I & S-3/GW-I
 Soil Standards, each = 0.0002 mg/kg (200 ng/kg) applicable to the SUM of concentrations for PFDA, PFHpA, PFHxS, PFNA, PFOS & PFOA (Soil standards that consider leaching to underlying groundwater)

What is being proposed related to PFAS? (today's focus on drinking water-related criteria)

Proposed regulations include a detailed "Note to Reviewers" with specific questions for which we are seeking comments/information. (Grossly summarized below)

- Is the proposed revision of the EPA RfD appropriate? Are reviewers aware of other critical data that MassDEP should consider?
- In light of the dearth of toxicity, epidemiology and pharmacokinetic data on PFHpA and PFDA, should these compounds be included, excluded or treated separately? Should additional compounds be included...why?
- Should MassDEP adopt an alternative approach to summing the 6 PFAS concentrations, such as (a) promulgate chemical-specific for each PFAS, or (b) promulgate chemical-specific standards AND a cumulative (possibly higher) standard which would also have to be met?
- How should the GW-1 standard consider Relative Source Contribution? Is the assumption that 20% of a person's exposure comes from drinking water sufficiently protective?
- Can the proposed standards be reliably quantified?

When are public comments due and what happens next?

- Written comments are due by C.O.B. on July 19, 2019
 - By email to: <u>BWSC.Information@Mass.Gov</u>

 By mail to: Elizabeth Callahan MassDEP One Winter Street Boston, MA 02108

- Comments received are being shared with MassDEP's Office of Research & Standards and the Drinking Water Program to inform their work on PFAS
- Final MCP regulations anticipated in Fall 2019

- The proposed limit is appropriate for cleanup;
- The proposed limit should recognize the margin of safety already built into the EPA number;
- Overly conservative standards have impacts as well that must be considered (e.g., diversion of resources);
- Concerns expressed that there are "no safe levels for this toxin";
- Concerns expressed about PFAS and possible "hot spots" of multiple sclerosis;

- Presume the safe level for PFAS chemicals as a class is between 1-10 ppt, but don't know if the science and technology is up to achieving this standard for 5000 PFAS chemicals;
- Given the EPA's use of a 300-fold safety factor in the RfD, is there a REAL difference between 20 ppt and 70 ppt? DEP's proposed EXTRA safety factor may be unnecessary;
- Support looking at 6 PFAS, would prefer at least the 14 seen in drinking water analyses, prefer the entire class – it would be worth the additional costs to be protective of public health;

- PFAS is known for not interacting with other chemicals, so while the functional group may bind to your blood, it may have little effect on a person's health, so a higher standard may be appropriate
- Is MassDEP prepared for what is to come if new standards take effect (i.e., number of new sites)?
- Contaminated ponds which recharge groundwater, should be protected like GW-1 water (the GW3 numbers are high);
- concerns expressed about potential ecological effects associated with the contamination in ponds;

- DEP actions, including details about the calculation of standards, should be transparent;
- Support for MCL, which would be enforceable;
- Support for money to be made available to towns to deal with PFAS
- Locations like Cape Cod which rely on a single aquifer should have higher protections;
- At a 20 ppt threshold, how will source partitioning (and liability) be determined? ...what comes from use of AFFF versus other sources?

- MassDEP should also be concerned about other media and affected populations... soil, sludge, effluent from WWTP, wild game, birds, surface waters, fish, vegetable, fruit... wherever there is water, there is PFAS
- Contaminated soil is of particular concern there are sites with greater than 100 ppb PFAS in soil;
- Recent Vermont study on background levels of PFAS in soil may be relevant to the MCP soil standards;

Basis of MassDEP Draft GW-I Standard for Select PFAS

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C. Mark Smith, PhD Director Office of Research and Standards MassDEP



Overview

- I. Health risk concerns
- 2. Current MA Drinking Water Guideline (ORSG)
- 3. Overview of drinking water derivation
- 4. Summary of drinking water values derived by various Agencies
- 5. Summary of key elements of the updated ORS assessment
- 6. Conclusions
- 7. Questions

PFAS Health Risk Concerns

- Crosses placenta; expressed in breast milk
- Slowly excreted from the body half lives of years (1 8+ for longer-chain)
- Potential developmental risks to fetus/infants
 - developmental delays; effects on bone development; mammary gland development; liver
 - reduced immune responses to vaccines in children; reductions in birth weight
- Endocrine Disruption
 - Thyroid hormone effects
- Cancers
 - Kidney, testes, pancreas



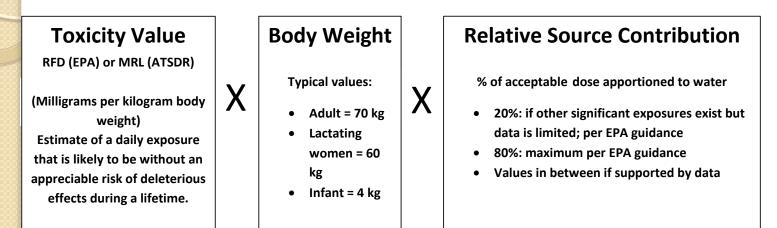
Current MA Drinking Water Guideline

 MassDEP Office of Research and Standards Guideline for Drinking Water (ORSG) Adopted June 12, 2018

- 70 ppt for PFOS, PFOA, plus PFHxS, PFHpA, PFNA
 - Relied on EPA Health Advisory value of 70 ppt for PFOS and PFOA
 - Extended to very closely related compounds that have less extensive data
 - Based on similarities in chemical structures; half lives; toxicity
 - Approach also used by CT;VT
 - Reviewed and unanimously endorsed by Health Effects Advisory Committee

Drinking Water Guideline Derivation Steps

Drinking water value =

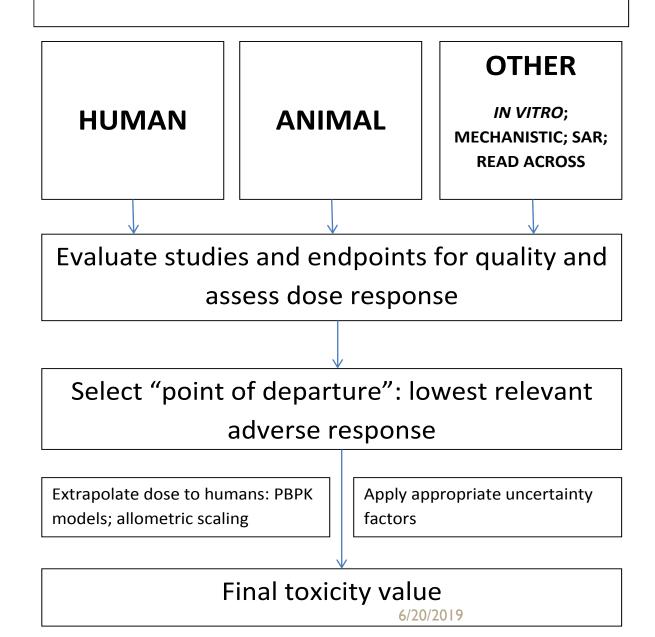


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Water Consumption Rate

Typical values: Adult = 2 liters a day Lactating Woman = 3.2 liters a day Infant = 0.7 liters a day

Derivation of Toxicity Values



Drinking Water Values for PFAS (parts per trillion; ppt) (6/18/19)

	PFOS	PFOA	PFNA	PFHxS	PFHpA	PFDA	
USEPA	70		NA	NA	NA	NA	
Health Advisories	Sum of two						
ATSDR Based on draft	7	11	10	70	NA	NA	
ATSDR toxicity values							
NY Recommended MCL	10	10	NA	NA	NA	NA	
NJ MCL or recommended	13	14	13	NA	NA	NA	
CA Notification levels	13	14	NA	NA	NA	NA	
VT Legislation	20 Sum of five						
MI Screening values	8	9	9	84	NA	NA	
MN Drinking water guidelines	15	35	NA	47	NA	NA	
NH Proposed MCL	70	38	23	85	NA	NA	
(reportedly will be lowered)							
CT Action Levels	70 Sum of five						
MA Current ORSG	70 (2018 ORSG) → 20 (proposed GW std)						
	Sum of five \rightarrow Sum of six (adds PFDA)						
Most other states (EPA value		70	NA	NA	NA	NA	
by default)							

Basis of MA GW-I Value: Selected Compounds

- Current ORSG
 - Covers 5 of 6 UCMR 3 PFAS
 - the longer chain compounds: PFOS; PFOA; PFNA; PFHpA; PFHxS
 - structural similarity; long half lives; similar toxic endpoints where data available
 - Update:
 - EPA Method 537.1 analytes
 - 6-8 carbon chain length (+/- 2 from PFOA/PFOS)
 - PFHxA not included as evidence indicates it is less toxic; exhibits shorter serum half-life
 - results in the original 5 plus PFDA

Basis of MA GW-I Value:Toxicity Values (RfD)

- Multiple effects reported at lower exposure levels than basis of USEPA RfD
 - PFOS

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- Immunotoxicity
- Liver effects
- Thyroid effects
- Developmental effects

PFOA

- Developmental effects (mammary gland, liver)
- Thyroid effects
- Liver effects

Updated Toxicity Values for PFOS and PFOA

 Several Agency's have derived RfDs lower (more stringent) than USEPA's

based on more sensitive toxicity data as POD

through application of additional UF (10 or its square root)

- ORS accounted for evidence of more sensitive endpoints via additional UF
 - applied to the USEPA RfD derivations
 - established approach used by several organizations for PFAS, including ATSDR
- ORS took this approach because:
 - multiple studies raise concerns about potential effects at lower levels of exposure
 - study uncertainties limit confidence in POD selection based on individual study data

RfD Values for Other Related PFAS

• PFNA

Limited human T 1/2 data, similar to PFOA; animal estimates longer Limited toxicity data, RfD consistent with PFOA and PFOS

• PFHxS

- T 1/2 data suggests longer vs PFOS and PFOA
- Toxicity data available but considerably less than for PFOA and PFOS Pending more robust data, RfD "read across" from PFOS

PFHpA

- T I/2 data very limited; likely shorter than PFOA
- Very little toxicity data; likely between PFHxA and PFOA
- Pending more robust data, RfD "read across" from PFOA

• PFDA

- T 1/2 data very limited; suggests longer than for PFNA, PFOA
- Little toxicity data, suggests similar to PFNA
- Pending more robust data, RfD "read across" from PFNA

Exposure Parameters, Relative Source Contribution Factor, Additivity

- Relied on values and approach used by USEPA in Health Advisory derivation for PFOS and PFOA
- Exposure parameters:
 - body weight and water intake of nursing mother
- Relative source contribution factor:
 - 0.2

Additivity:

extended additivity approach used by USEPA in Health Advisory for PFOS and PFOA across the subgroup of six

Conclusions

- Using revised toxicity value (RfD), USEPA exposure parameters and RSC, the derived drinking water value equals:
 - 20 ppt (rounded to I significant figure)
- Applicable to sum of PFOS, PFOA, PFNA, PFHxS, PFHpA, PFDA

Next Steps

- Soliciting input through MCP public comment process
- Technical input from Health Effects Advisory Committee
 - standing committee of scientists and public health experts
 - supported approach underlying current ORSG (applying PFOS/PFOA RfD to similar long-chain compounds; additivity)
 - recent meeting
 - continued support for approach; additional analysis and clarifications requested

Discussion on PFAS Drinking Water MCL Components

Damon Guterman Drinking Water Program Bureau of Water Resources MassDEP

MCL Rule Components

- Applicability
 - Should the MMCL be applicable to all three classes of PWSs (Community, Non-Transient, Non-Community and Transient Non-Community)?
 - Should the applicability vary by PWS size or source water (groundwater vs. surface water)?

- Monitoring
 - What should be the initial, routine, increased and reduced monitoring requirements?
 - Should monitoring waivers be allowed?
 - Are additional source protection measures needed?
 - Should "grandfathering" be allowed (e.g. use of older data, that meet current analytical standards, to meet initial monitoring requirements)?

- Analytical
 - Do the analytical methods currently available present any feasibility issues at the proposed Massachusetts Contingency Plan (MCP) concentration of 20 ppt for six PFAS?
 - Are there sufficient laboratories capable of performing the methods for identifying and quantifying the PFAS compounds of interest down to a reporting level of 5 ng/L (ppt)?
 - Are new methods available that improve sensitivity and/or scope?
 - Is there any concern with the current policy to require the reporting of the full scope of the current EPA methods 537 and 537.1 (i.e. 14 or 18 PFAS)?

- Compliance/Treatment
 - How should compliance with the MCL be calculated (average of initial and confirmation samples vs. running annual average)?
 - What are the Best Available Technologies to achieve compliance with the MCL?
 - Can the available treatment technologies support the proposed MCP concentration of 20 ppt for six PFAS?

- Notification
 - When should state and public notifications be required?
- Costs
 - Applicability, Monitoring, Treatment, etc.

Information gathering on a Drinking Water Treatment Technique approach

Douglas Fine Assistant Commissioner Bureau of Water Resources MassDEP

PFAS Petition: Treatment Technique for Entire Class of PFAS

- Conservation Law Foundation & Toxics Action Center petitioned under M.G.L. c. 30A, § 4 to establish a Treatment Technique (TT) for PFAS as a class (October 2018)
- MassDEP decided to promulgate an MCL for a group of PFAS (January 2019)
 - significant threat to human health
 - analytical methods exist
 - appropriate treatment techniques are available
- MassDEP also invited Public Comment on a TT approach and how such an approach could be implemented

Treatment Technique for Entire Class of PFAS

- Opportunity to provide new information that supports the need for and feasibility of implementing a PFAS Treatment Technique (TT)
 - New toxicological information
 - Input on how a TT would be implemented
 - Which Public Water Systems (PWS) should be subject to the TT and/or how a PWS would be triggered into having to comply
 - What monitoring would be used to trigger the TT or measure its performance
 - What laboratory capacity exists for this monitoring
 - What treatment technologies exist that could be specified for PFAS removal/destruction
 - What would be the cost of these technologies



Next Steps

- MCP comments due COB July 19, 2019
- Targeted PWS sampling
- Considering ORSG revision
- Exploration of treatment media disposal options/guidelines
- Laboratory Certification rule proposal anticipated Fall 2019
- MCL rule proposal anticipated by end of 2019
- Today's Materials & Video:

<u>https://www.mass.gov/lists/development-of-a-pfas-drinking-water-</u> <u>standard-mcl</u>

• Written Feedback:

program.director-dwp@mass.gov Subject: PFAS MCL