MassDEP Response to Comments

Proposed PFAS Drinking Water Maximum Contaminant Level (MCL)

July 2020

Hyperlinks to MassDEP Responses to Public Comments

Hyperlinks to MassDEP Responses to Public Comments (cont.)

Jennifer Pedersen, Massachusetts Water Works Association

Paige Brochu, Doctoral Student, Boston University School of Public Health/Dept of Environmental Health

Sean D. Osborne, OSD Engineering Consultants

Alexa Friedman, Beth Haley, Doctoral Students, Boston University School of Public Health

James Occhialini, James Todaro, Alpha Analytical

Oyebode A. Taiwo, 3M

Stephen P. Risotto, American Chemistry Council

Guildford Mooring, Town of Amherst

Caredwen Foley, Boston University School of Public Health

Carolyn Hoffman, Boston University School of Public Health

Charley Leonard, Boston University School of Public Health

Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade, Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council

Heather Miller, Charles River Watershed Association

Emily Hammel, Boston University School of Public Health

Paul F. Gabriel/Ryan J. Trahan, Environmental Partners Group, Inc.

Gerry Connell, Connell Property Consulting

Grace Jimenez, Boston University School of Public Health

Greylin Nielsen/Jennifer Oliver, Boston University School of Public Health

John Velis, MA State Senator, former State Representative

Kate Lila Wheeler

Katie McCann, Boston University School of Public Health

Laura Buckley, Boston University School of Public Health

Molly Jacobs/David Kriebel/Polly Hoppin, Lowell Center for Sustainable Production, Department of Public Health, University of Massachusetts Lowell

Hyperlinks to MassDEP Responses to Public Comments (cont.)

Linda L. Segal

Michele Paul/Wendy Rundle, LSP Association, Inc.

Madeline Isenberg, Boston University School of Public Health

Philip D. Guerin, Massachusetts Coalition for Water Resources Stewardship

Geoffrey C. Beckwith, Massachusetts Municipal Association

David W. Coppes, Massachusetts Water Resources Authority

Janine Burke-Wells, North East Biosolids & Residuals Association

Phil Brown, Martha Powers, Marina Atlas, Grace Poudrier / Alissa Cordner / Jennifer Liss Ohayon / Lauren Richter, Social Science Environmental Health Research Institute at Northeastern University / Whitman College / Silent Spring Institute / Rhode Island

Jeffrey Longsworth, Tammy Helminski, Fredric Andes, The PFAS Regulatory Coalition

Robert Rutkowski

Stephen G. Zemba / Russell H. Abell / Harrison Roakes / Matthew P. Heil, Sanborn Head & Associates, Inc.

Deb Pasternak / Clint Richmond, Massachusetts Sierra Club

Kathryn Rodgers / Laurel Schaider, Silent Spring Institute

Rainer Lohmann, Philippe Grandjean, Laurel Schaider, University of Rhode Island, Harvard University, Silent Spring Institute: Sources, Transport, Exposure and Effects of PFAS Superfund Research Program

Stephanie Grady, Boston University Department of Environmental Health

Thomas Webster, Boston University School of Public Health, Department of Environmental Health

Tracy Stewart, Safe Healthy Fields Coalition

Wendy Heiger-Bernays, Boston University School of Public Health, Department of Environmental Health

Davis Billips, Francis Cain, Heather Stayton, Steven Fernandes, City of Westfield DPW Water Division

Kristen Mello, Westfield Residents Advocating for Themselves

Christopher Clark, Westfield Residents Advocating for Themselves

Lena Entin, Claire Miller, Sylvia Broude, Ashley Hammell, Megan Stokes, Toxics Action Center

Brendan Shea

Hyperlinks to MassDEP Responses to Public Comments (cont.)

Chris Matera, Diane Cotter, Gretel Munroe, Lawrence Spatz, Mark Cason-Snow, Ann Cason-Snow, Pat Weatherlow, Robert Ladino, Sarah McKee, Stephen Scalese, Abby Yanow, Alan Ticotsky, Al Blake, Alice Trexler, Alisa Knight, Alvin Blake, Amy Schneider, Amy Sophia Marashinsky, Andi Gibson, Ann Asnes, Daniel Asnes, Ann Spanel, Barbara Adner, Betsy Sowers, Blithe Hogan, Bonnie Gorman, Brenda Roberts, Brita Lundberg, Carol Baker, Carol Berkeley, Carol Walker, Carolyn Villanova, Cheryl Souza, Chris Aldrich, Christine Lazar, Constance Graham, Cynthia Martin, Danielle DeLuca, Debbie R Goodman, Dennis Rogers, Dennis Vieira, Diane Ritsher, Don Ogden, Dorothy Anderson, Edward Miller, Elana Katz Rose, Elizabeth Bish, Elizabeth Saulnier, Emily Lewis, Emily Welsh, Eva Cashdan, Francoise La Monica, Gail McArdle, Gayle DeBay, Gayle Mulrooney, George Borden, Gerda Brown, Ginny Ansbergs, Glenora Chaves, green589@comcast.net, harpo52@netzero.net, Hayden Hall, Heather Tausig, Heidi Leonard, H. Fleishon, H. Hardouf, hooppole@gmail.com, Jack Fanton, Jack Hillier, Julie Hillier, Jamie Banks, Janet Kolodner, Jeffrey Nissenbaum, Jennifer Kay, Jim Conlon, jmogilnicki@hotmail.com, Joanne Lemelin Pappas, Jodie Dow, Jodi Rodar Rodar, John Cohen, John Gittins, Joyce Coleman, Judith Karlin, Karen Chin, Karen Marshall, Kate Cloud, Kathleen Belitsky, Kathleen Kilcoyne, Kathy Mullins, Katie Goldrick, Kendra Murray, Ken Kipen, Ethel Kipen, lauradubester@gmail.com, Laura Opie, Laurel Facey, Lee Courtemanche, Linda Hsu, Linda Richard, lizthomson38@gmail.com, Louise Berliner, Louise Quigley, Louise Yohalem, Lynn Bengston, Lynn Crystoff, Marcia Cooper, Marc Laverdiere, Margaret Haight, Margie Phillips, Marie-Louise Jackson-Miller, Marjorie Greville, Mary Elloian, Mary Reynold, Masha Kogan, M B Justice, mbrooks3144@gmail.com, mdicarli@live.com, Megan Stokes, Melanie Pahigian, michele@bolagranola.com, Milo Cason-Snow, Mindy Maxwell, Miriam Kurland, Mike Kurland, Monica Lisafeld, Nancy McRae, Natalie Henrich, Nicole Gardner, Nima Rosepiper, paigeleh@yahoo.com, Patrick Leonard, Pauline Hokanson, Paul Schofield, Peggy Kocoras, Regina Galat-Skey, Richard Hassinger, Richard Sirull, Robyn Bagley, Ronald Cabral, Ron Riggert, Karen Riggert, Roxy Gray, rpstevens@gmail.com, Sarah Beerman, Sara Sezun, scoutperry@gmail.com, sethro_tull@yahoo.com, Sharon Pickering, Sophie Higgs, Sosi Toomajanian, Stephanie Abundo, Stephen O'Hara, Steve Wineman, Susan Fasten, Susan Lozoraitis, Susan Mirsky, Susan OGrady, Susan Ringler, Susie_d@yahoo.com, Susi Westwood, Suzette Abbott, Tanja Ryden, Tedric Eiseman, Tien Lum, Timothy Havel, Tom Kilday, Tom Rickenbacker, Tracy Manzella, Tracy Wallace, Vincent Carolan, Virginia Jastromb, Virginia Leeman, Virginia Robinson

Leslie Lawrence

Robert Ladino

Margaret Haight

Tedric Eiseman

Lynn Langton, Dianne Plantamura, Karen Martin, Keith Connors, Kate McHugh

Deborah Pacini, Rebecca Feldman, Renee Scott

Hyperlinks to MassDEP Responses to Public Comments (cont.)

Darin LaFalam, David Lucey, Dennis Morton, Andrew L. Reid, Bob Benlien, Carolyn Capodilupo, Edward Dowling, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra, William Chapman, Thomas Knowlton, Craig Crocker, Neal Merritt, Brian Antonioli, Marisa Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas Gaughan, Randy Swigor, David Condrey, Richard Mattson, Thomas Orcutt, Chris Allen, Daniel O'Neill, Edward Rondeau, Mark Warren, Maurice Goulet, Ryan Mouradian, Steve Rafferty, Todd Melanson

Marisa Picone-Devine, Sarian Company, Inc.

Randy Swigor, Whitinsville Water Company

Daniel O'Neill, Lynn Water & Sewer Commission

Nicholas Jones, Whately Water District

Steve Rafferty, Town of Falmouth

Harvey LeSueur

Lisa Campe, Woodward & Curran

Ted Conna

Michael Moore, Massachusetts State Senator

Maureo Fernández y Mora, Clean Water Action

Link to MassDEP's Technical Support Document Per- and Polyfluoroalkyl Substances (PFAS): An Updated Subgroup Approach to Groundwater and Drinking Water Values (December 2019):
https://www.mass.gov/files/documents/2019/12/27/PFAS%20TSD%202019-12-26%20FINAL.pdf

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Diane Cotter		Consider PFAS-treated textiles.	Outside the scope of the drinking water regulations.
Kyla Bennett	Public Employees for Environmental Responsibility	Regulate PFAS as a class of 5000+ chemicals.	Based on its assessment as presented in the Technical Support Document (TSD), MassDEP has concluded that its approach to addressing the overall toxicity database for the longer-chain PFAS is appropriately health protective and reflective of the current data. Given the available scientific data MassDEP chose specific PFAS that could be included in this subclass. As explained in the TSD, there are technical limits on how many and which PFAS could be treated similarly.
Kyla Bennett	Public Employees for Environmental Responsibility	Proposed MCL is too high. Unclear if MassDEP took new dermal exposure data into account.	MassDEP disagrees. MassDEP's inclusion of six PFAS is a protective approach to public health with respect to the regulated subgroup and, as explained in the TSD, is based on a robust consideration of the toxicological data of these compounds. Dermal absorption of the longer chain PFAS attributable to public water supply uses is generally

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			thought to be low and guidance values derived by other Agencies for this exposure pathway are far above MassDEP's proposed drinking water standard of 20 ppt.
Kyla Bennett	Public Employees for Environmental Responsibility	Set individual and cumulative MCLs for PFOA and PFOS of 10 ppt in addition to including them in the proposed MCL.	MassDEP considered this approach but concluded, as explained in the TSD, that a subclass approach is preferable.
Kyla Bennett	Public Employees for Environmental Responsibility	Regulate the sources of PFAS (e.g. biosolids, landfill leachate, artificial turf, pesticides).	Outside the scope of the drinking water regulations.
Kyla Bennett	Public Employees for Environmental Responsibility	Consider issuing a "Do Not Eat" advisory for fish, fowl and game caught near contaminated areas.	Outside the scope of the drinking water regulations.
Kyla Bennett	Public Employees for Environmental Responsibility	Consider requiring manufacturers disclose the use of PFAS in all goods sold to consumers.	Outside the scope of drinking water regulations.
Ashley Higgs Hammell	Toxics Action Center	Set PFAS MCL of 1 ppt for total PFAS.	1 ppt is below the achievable reporting limit for PFAS as determined by MassDEP's laboratory and thus cannot be reliably quantified in drinking water at that level. As detailed in the TSD, MassDEP has concluded that the proposed drinking water standard is protective of public health based on current information.

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Ashley Higgs Hammell	Toxics Action Center	Use EPA Method 533.	MassDEP will consider including EPA Method 533 in a subsequent amendment.
Ashley Higgs Hammell	Toxics Action Center	Reevaluate the MCL annually or after a few years and give MassDEP the ability to revise at will.	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Ashley Higgs Hammell	Toxics Action Center	Have labs test down to at least 2 ppt.	This is what is established in the rule.
Ashley Higgs Hammell	Toxics Action Center	Include detections under the detection limit and include as many PFAS as possible.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
Ashley Higgs Hammell	Toxics Action Center	Immediately alert the public of all detections, not just those above the MCL.	PFAS detections that are reported to MassDEP are made available to the public via the EEA Data Portal (http://eeaonline.eea.state.ma.us/portal#!/home) as soon as they have been reviewed, determined to have met quality control requirements and entered into the MassDEP's data systems.
Ashley Higgs Hammell	Toxics Action Center	Hold hearings outside the work day, in locations affected by PFAS contamination and accessible by public transit.	MassDEP attempted to accommodate as many people and different circumstances as

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			feasible in scheduling our public hearings. This included hearings in all four MassDEP regional offices, a live-streamed hearing in Boston and an evening event in Boston.
Gary Martin		Adopt an MCL in the range of a few ppt.	Due to reporting limits being approximately 2 ppt, when summing across the six compounds addressed by MassDEP, this recommendation is currently infeasible.
Grace Hall		Endorses proposed MCL.	MassDEP notes this support.
Constance Glore	North Parish Climate Justice	Proposed MCL is too high. Should be 1 ppt.	1 ppt is below the achievable reporting limit for PFAS as determined by MassDEP's laboratory and thus cannot be reliably quantified in drinking water at that level. As detailed in the TSD, MassDEP has concluded that the proposed drinking water standard is protective of public health based on current information.
Jim Starbard	RCAP Solutions	Concern for rounding results that the lab can't quantify.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.

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Jim Starbard	RCAP Solutions	Having Transient Non-Community systems test but not have a standard is confusing and opens the regulation to legal challenge. MassDEP's potential response to such detections is unclear and not a fair process. Having pre-established acceptable thresholds for different classes of TNCs would be better.	Pre-established thresholds have not been derived due to the wide range of potential water intakes across this highly variable group of water supplies.
Michael Delaney	Laboratory Consultant/former MWRA Director of Laboratory Services	Drop "Total PFAS" term as it is misleading and will vary over time.	MassDEP has modified its terminology to refer to the regulated subgroup as PFAS6.
Michael Delaney	Laboratory Consultant/former MWRA Director of Laboratory Services	Use individual MCLs to allow the science to revise them as needed.	As described in the TSD, MassDEP considered this approach but concluded that a subclass approach is preferable. Addressing the compounds as a subgroup does not preclude updates.
Michael Delaney	Laboratory Consultant/former MWRA Director of Laboratory Services	Total PFAS and Running Quarterly Average definitions are inconsistent in that the former does not include estimated values and the latter does. Several comments related to the proposed treatment of detections below the MRL were made: require a calibration standard at 1/3MRL if using detections below the MRL; do labs need to determine their DLs; 1/2MRL substitution for results between the MRL and 1/3MRL is fabrication; In UCMR3 EPA considered results below the MRL as zero	Comments regarding the 1/3 MRL criteria originally proposed by MassDEP are now moot. Based on public comments and the lower MRLs currently achievable for the regulated PFAS, MassDEP has modified its approach regarding detections below the MRL. Instead, MassDEP will require PFAS-approved laboratories to determine the detection limits (MDLs as specified in EPA

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			Methods 537 and 537.1) for the regulated PFAS. Laboratories will be required to either report estimated (qualified) numeric PFAS analytical results when values fall between less than the MRL and greater than or equal to the MDL or to otherwise identify when analyte concentrations fall within this range for MA drinking water samples. MassDEP also notes that the original proposal to use 1/2 the MRL for detections below the MRL in statistical analysis for < MRL data points is an established approach in environmental analytical chemistry research, not data "fabrication."
Michael Delaney	Laboratory Consultant/former MWRA Director of Laboratory Services	There is little public health benefit to considering these small detections.	MassDEP disagrees. "These small detections" (PFAS concentrations levels < MRL but above the detection limit) provide useful information for planning purposes regarding future risk of exceedances for individual water supplies, and thus are useful with respect to monitoring decisions and planning purposes.

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Michael Delaney	Laboratory Consultant/former MWRA Director of Laboratory Services	Method Blank and Field Blank samples should not be evaluated below the MRL.	The EPA PFAS Methods 537 and 537.1 (as well as other new EPA methods for other emerging contaminants) specify that laboratory reagent blanks (i.e., method blanks) and field reagent blanks must meet the < 1/3 MRL criteria for all method target PFAS. Under the original proposal, there would have been no need to calibrate down to 1/3 MRL since MassDEP was not requiring laboratories to quantitate (i.e., report unqualified numeric analytical results) below the MRL. MassDEP was simply requiring laboratories to determine if a drinking water sample that is < MRL also meets the < 1/3 MRL criteria of a laboratory or field reagent blank as specified in EPA Methods 537 and 537.1 by extrapolation from the curve. If a < MRL drinking water sample also meets the < 1/3 MRL criteria of a blank, MassDEP concluded that such a sample could logically be considered to contain zero PFAS concentrations for risk assessment purposes.

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Michael Delaney	Laboratory Consultant/former MWRA Director of Laboratory Services	Commenter suggests other methods to deal with non-detects.	The suggested approaches, while not without merit, are complex and would be difficult, perhaps impossible, to effectively implement consistently by the regulated community. Accordingly, MassDEP did not adopt them.
Michael Delaney	Laboratory Consultant/former MWRA Director of Laboratory Services	Labs may not be able to meet 2 ng/L MRLs for all PFAS in each method and should limit this requirement to the 6 in the MCL.	MassDEP Division of Environmental Laboratory Sciences (DELS)/Wall Experiment Station (WES) has reviewed new LC/MS/MS instrumentation from several manufacturers and has determined that these new instruments are capable of achieving target PFAS MRLs < 2 ng/L for the regulated compounds. As proposed the 2 ng/L MRL requirement only applies to the six regulated PFAS.
Laurie S. Nehring	People of Ayer Concerned About the Environment	Supports 20 ppt for PFAS6 but emerging science may point to lowering this standard.	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).

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Laurie S. Nehring	People of Ayer Concerned About the Environment	Consider adding in more PFAS to the MCL as the science evolves.	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Laurie S. Nehring	People of Ayer Concerned About the Environment	Recommend funding one FTE at MassDEP to follow emerging PFAS science.	Outside the scope of the drinking water regulations.
Laurie S. Nehring	People of Ayer Concerned About the Environment	Review this standard at least every three years.	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Laurie S. Nehring	People of Ayer Concerned About the Environment	Mandate testing for full list of PFAS labs are capable of measuring.	The proposed regulation already requires that PFAS testing cover the full scope of the selected method (see 22.07G(12)(b)).
Laurie S. Nehring	People of Ayer Concerned About the Environment	Include workers at TNC systems in consumer notification requirements.	If a TNC system was found to have PFAS contamination, MassDEP could use existing authority in 310 CMR 22.03(8) to address this contamination and, on the basis of a health assessment, require such notifications.

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Laurie S. Nehring	People of Ayer Concerned About the Environment	Require that consumer notices be understandable using non-jargon, non-scientific language and delivered in multiple languages and multiple formats (e.g. print, electronic, social media, public meetings).	The content of this notice is subject to MassDEP review and approval and multilingual requirements have been added.
Laurie S. Nehring	People of Ayer Concerned About the Environment	Establish a fund to educate healthcare providers about PFAS, especially in the vicinity of affected communities working with local Boards of Health.	Outside the scope of the drinking water regulations.
Laurie S. Nehring	People of Ayer Concerned About the Environment	Require more than one round of sampling at TNCs.	MassDEP believes that one sample from each TNC will provide adequate initial information concerning the extent of PFAS contamination affecting TNCs.
Laurie S. Nehring	People of Ayer Concerned About the Environment	Provide funding for laboratories to perform clinical testing of blood samples.	Outside the scope of the drinking water regulations.
Laurie S. Nehring	People of Ayer Concerned About the Environment	Emphasize to all communities that early voluntary action is better than waiting for the proposed staggered implementation.	MassDEP has continued to encourage and offer funds for systems to conduct voluntary PFAS monitoring ahead of this regulation.
Laurie S. Nehring	People of Ayer Concerned About the Environment	Take action to remediate and/or stabilize existing hot spots to avoid further groundwater contamination and to keep contaminated groundwater from migrating into drinking water sources.	Outside the scope of the drinking water regulations.
Laurie S. Nehring	People of Ayer Concerned About the Environment	Hold hearings in the evening and weekends in the affected communities.	MassDEP attempted to accommodate as many people and different circumstances as

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			feasible in scheduling our public hearings. This included hearings in all four MassDEP regional offices, a live-streamed hearing in Boston and an evening event in Boston.
Sue Phelan	Green Cape	We would welcome future information and public comment opportunities in a community location at a time convenient for those who have been exposed to PFAS through the public water supply over several decades. Ideally this would occur in the early evening at a location well known to the Hyannis community such as the town hall on Main St.	MassDEP attempted to accommodate as many people and different circumstances as feasible in scheduling our public hearings. This included hearings in all four MassDEP regional offices, a live-streamed hearing in Boston and an evening event in Boston.
Sue Phelan	Green Cape	Many PFAS chemicals have been detected in Hyannis water due to the use of AFFF, but only 6 PFAS out of thousands have been addressed in this regulation; MassDEP should consider entire class of PFAS approach.	The basis of MassDEP's selection of compounds to address in this regulation are detailed in the TSD. At this point the Department has concluded that it is not appropriate to treat all PFAS compounds the same as a class. This is due to differences in chemical structure and reported differences in toxicity and serum half-lives across the range of PFAS. The rationale for MassDEP's selection of compounds to include in the regulated subgroup is explained in the TSD. Briefly, MassDEP

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			addressed PFAS included in USEPA analytical methods 537 and 537.1 for drinking water that are most highly similar in chemical structure. However, MassDEP shares the commenter's concerns regarding other PFAS, and will review and consider addressing additional compounds or subgroups as necessary in the future.
Sue Phelan	Green Cape	Concerned about results of emerging developmental epidemiological studies. Based on the reported studies could a Relative Source Contribution of 0.20 for a person's PFAS exposure from drinking water be sufficiently protective of pre-natal exposure that has occurred over several generations?	The RSC is used to account for other sources of exposure (such as from food) to a compound that may "use up" a portion of the target maximal daily dose (i.e., the RfD). It is not designed to account for potential multigenerational toxicity effects. A value of 0.20 is the lowest RSC value under USEPA guidance and standard methodologies used to derive drinking water standards and is applied by MassDEP to account for other sources of exposure to the subgroup of compounds addressed in this regulation, including to infants and children.
Sue Phelan	Green Cape	Experts suggest a much lower PFAS standard based on cancer endpoint.	MassDEP is following the developing science and could

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			propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3). The potential carcinogenicity of these compounds as well as appropriate approaches to modeling potential lower-dose cancer risk are a matter of debate due the reported non-genotoxicity of the tested PFAS. Thus, as discussed in the TSD, MassDEP has focused on non-cancer risks.
Sue Phelan	Green Cape	PFBS has similar toxicity as PFOS and should be considered in the MCL regulation.	PFBS has a much shorter half-life (a month) in humans compared to PFOS (years) and the available data indicate that it is less toxic than PFOS on an applied dose basis. Although MassDEP has not proposed standards for this compound, values derived by USEPA and other agencies are consistent with its being less potent that PFOS.
Sue Phelan	Green Cape	In a preliminary study in zebra fish embryo, 300 different PFAS identified in legacy AFFF found to be 7-10 times more toxic than PFOS alone supporting entire class of PFAS approach.	MassDEP will review the cited study data when finalized and published.

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Sue Phelan	Green Cape	Use of EPA Method 533 could be an additional means of measuring complex PFAS mixtures.	MassDEP will consider including EPA Method 533 in a subsequent amendment.
Sue Phelan	Green Cape	Employ methods such as the Total Oxidizable Precursor Assay and the determination of Total Organic Fluorine to better characterize contaminated sites and assess treatment effectiveness so that the public is better informed of their exposure.	MassDEP relies on standardized testing methodologies when promulgating drinking water regulations. As methodologies such as these mature they could be proposed for use in future regulations.
Sue Phelan	Green Cape	Require consumer notification whenever results are above the MCL prior to the system being in violation.	The proposed regulation would require such notice when levels are confirmed above the MCL and prior to a violation.
Sue Phelan	Green Cape	Oppose MassDEP's current practice of incinerating AFFF collected in MA due to reports of inadequate destruction of PFAS via these methods/facilities.	Outside the scope of the drinking water regulations.
Sue Phelan	Green Cape	Urge MassDEP to monitor for PFAS in other areas (under landfills) and in other media (biosolids, sludge, wastewater, artificial turf, fish/shellfish, wild game/birds, vegetable/fruit/honey).	Outside the scope of the drinking water regulations but MassDEP is working on several areas identified.
Sue Phelan	Green Cape	MassDEP should track the developing PFAS research and update the regulation as needed.	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).

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Sue Phelan	Green Cape	Sole source and similarly sensitive aquifers should be monitored more frequently.	The proposed regulation includes authority to modify the standard monitoring requirements taking into account operational considerations.
Sue Phelan	Green Cape	PFAS that are not removed via GAC (e.g. short chain replacements) that are in the treated water should be reported to the public.	The proposal requires reporting all PFAS within the scope of the approved methods. If treatment was not effective at removing any of these PFAS and they are detected in the treated water these detections would be required to be included in the annual Consumer Confidence Report (CCR).
Lynn McGregor		Lower the proposed MCL, possibly to 1 ppt. Adopt a standard that is protective for sensitive subgroups.	1 ppt is below the achievable reporting limit for PFAS as determined by MassDEP's laboratory and thus cannot be reliably quantified in drinking water at that level. As detailed in the TSD, MassDEP has concluded that the proposed drinking water standard is protective of public health based on current information.
Lynn McGregor		Monitor for replacement PFAS that are currently in use (GenX, PFBS and other short-chain PFAS).	The proposal requires that all PFAS within the scope of the analytical method be analyzed and reported.

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Joseph Favaloro	MWRA Advisory Board	Supports proposed MCL.	MassDEP notes the support.
Joseph Favaloro	MWRA Advisory Board	Urges more government financial resources be made available to communities for PFAS and other water/wastewater needs.	Outside the scope of the drinking water regulations. Note: the State has made funding available for limited sampling as well as reimbursement for the design of PFAS treatment. The Drinking Water State Revolving Fund administered by the Clean Water Trust also has funding specifically to address PFAS contamination via low interest loans.
Bob Worthley	Foxborough Water Dept	"J" value results are unreliable and should not be used. Incorporates comments from Elizabeth Denly (TRC).	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
Susan Chapnick	New Environmental Horizons, Inc.	The Reliably and Consistently (R&C) definition leaves room for interpretation ("wide variations", "close to the MCL") - recommend using RPD/RSD calculations and 2xMCL threshold.	The definition of "Reliably and Consistently Below the MCL" in 310 CMR 22.00 follows the federal National Primary Drinking Water Regulations (40 CFR 141) and is being applied in the PFAS proposal consistent with these prior uses, subject to stylistic and grammatical edits. The intent of an R&C determination is to allow for a

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			relaxation in monitoring requirements. Use of a threshold above the MCL would be inconsistent with this objective.
Susan Chapnick	New Environmental Horizons, Inc.	What is the definition of MRL and how should the lab derive it; if MRL=MDL then results below this level are not valid.	The definition of, and determination procedure for, the MRL are provided in both EPA Methods 537 and 537.1. The MDL and MRL should never be the same. Under both of these methods, the MRL should be set higher than the calculated MDL in order to avoid the likelihood of repeated failure of on-going QC requirements and of reporting false positives for PFAS analytes that commonly occur as background contaminants.
Susan Chapnick	New Environmental Horizons, Inc.	Can any PFAS detection trigger increased monitoring during initial monitoring or is this limited to the six PFAS in the MCL?	MassDEP will clarify these situations by using "PFAS6" where only the six regulated PFAS are being discussed and "PFAS" where any compound in the scope of the method is meant. Initially, all PFAS detections must be confirmed but subsequent detections must have PFAS6 over 10 ppt to trigger action.

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Susan Chapnick	New Environmental Horizons, Inc.	In calculating Total PFAS are non-detects summed as zero?	MassDEP will replace the term Total PFAS with PFAS6 to more accurately reflect what is being regulated and help clarify this usage. Non-detects (results <MRL) will be summed as zero.
Susan Chapnick	New Environmental Horizons, Inc.	How are confirmation results compared to their corresponding initial results (RPD?)	An initial result and its confirmation are averaged; no other direct comparison is made. Both analytical results are reviewed to ensure they passed the required QA/QC metrics.
Susan Chapnick	New Environmental Horizons, Inc.	Disagrees with using 1/3MRL as the criterion to determine if "J" value results should be considered; disagrees with using a default of 1/2MRL; if "J" value passes data validation (e.g. blank review) use as is without substitution.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
Susan Chapnick	New Environmental Horizons, Inc.	Can language allow for future methods without a regulation change.	MassDEP is subject to and revises regulations in accordance with the requirements of the State Administrative Procedure Act.
Elizabeth Denly	TRC Companies	"J" or "B" "often" require resampling should be changed to "occasionally"; always resampling "B" is too stringent.	Commenter has submitted comments that relate to a MassDEP guidance issued on January 27, 2020. As such, some of these comments have no corresponding language in the proposed regulation against which they can be applied. This is one of those comments.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Elizabeth Denly	TRC Companies	Method 537 does not require the reporting of "J" values so this will introduce inconsistent reporting; no difference between <1/3MRL and >1/3MRL at these levels.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
Jennifer Schlezinger	Boston University School of Public Health	MassDEP's use of animal studies to determine RfDs is appropriate and takes advantage of the state of PFAS science. There are always challenges in translating results in animal models to human physiology; however, even liver endpoints in rodent models can provide important information for estimating health protective limits on exposure to PFAS. Liver While peroxisome proliferation and hepatocellular carcinoma do not occur in humans exposed to PPARα ligands such as PFAS, hepatosteatosis and subsequent liver enlargement occurs in mice expressing either mouse or human PPARα that have been exposed to PFAS. In an exposure scenario that generated an approximately steady state body burden, mice expressing human PPARα mice were more susceptible to hepatic steatosis than mice expressing rodent PPARα. These results are in line with increasing epidemiological evidence of the association between liver dysfunction and PFAS exposure in humans. Furthermore, the liver is a critical organ for	MassDEP notes the support.

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		maintaining cholesterol and lipid homeostasis, and strong epidemiological evidence supports the conclusion that PFAS exposure is associated with cholesterol and lipid dyshomeostasis. Bone The biological significance of the loss of bone quality induced by PFAS in animal models has been called into question. However, there is strong epidemiological support for bone a target organ of PFAS. First, PFAS have been measured in human bone. Second, PFAS body burden is associated with reduced bone quality in humans. What is particularly concerning and supports the use of studies that examine PFAS-induced effects on bone quality in the determination of RfDs is that decrements in bone quality associated with PFAS exposure are being detected in children and adolescents. Maximizing bone acquisition and density in adolescence is critical (i.e., as important minimizing bone loss at menopause) to reducing the risk of osteopenia and osteoporosis.	
Jennifer Schlezinger	Boston University School of Public Health	The additivity grouping approach proposed by MassDEP to regulate the six PFAS together is scientifically supported. This approach has been called into question for several reasons, which are not scientifically justified.	MassDEP notes the support.

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		Differences in the half lives of the six PFAS (PFOA, PFNA, PFHpA, PFDA, PFOS, PFHxS) are all within 5-fold (approx. 900-4500 days), with the exception of PFHpA (approx. 300 days). These half-lives are based largely on studies of both occupationally exposed and environmentally exposed individuals in multiple countries. The least robust data are for PFDA, which come from a single study. The sex-difference in PFAS elimination in humans is much less prominent than in some animal models (e.g., rats). There is evidence of a longer half-life for several PFAS in men and older women than in young women, as a result of elimination of PFOA via menstruation. This is contrast to the dramatically different half lives in female and male rats, which results from differential expression of kidney transporter proteins. Importantly, the RfDs are based on serum PFAS concentrations, rather than administered dose, thus minimizing uncertainties related to variability in pharmacokinetics across sexes and species. There are multiple molecular initiating events (MIEs) that are triggered by PFAS, but, they are shared by PFAS examined to date. All six PFAS activate human PPARα in reporter assays and induce PPARα gene expression in human hepatocytes. All six PFAS activate CAR-	

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		dependent gene transcription in human hepatocytes. PFAS do not activate CAR in reporter assays because they are indirect CAR activators, thus data from reporter assays should not be used to assess the ability of PFAS to activate CAR. All six PFAS bind to human L-FABP. Last, PFOA and PFOS both downregulate HNF4α in human hepatocytes; the other PFAS have not been examined for this outcome. It is likely that the carboxylic acids versus the sulfonic acids may favor certain MIEs over others, but, based on the current state of the science, it is appropriate to conclude that the six PFAS are likely to share the spectrum of MIEs.	
Jennifer Schlezinger	Boston University School of Public Health	The half-lives of the six PFAS selected by MassDEP are long and supported by epidemiologic studies. The weight of evidence across eleven, population-based studies, supports the use of a PFOA half-life on the order of 1200 days. The clinical, PFOA exposure in terminally ill patients does not constitute an appropriate or generalizable model for determining the half-life of PFOA in humans. Glomerular filtration rate (GFR) and its potential influence on urinary elimination of long chain PFAS is not relevant in humans. The	MassDEP notes the reviewer's evaluation and support.

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		vast majority of elimination of long chain PFAS in humans is biliary, not urinary.	
Kirsten King	New England Water Works Association	Allow EPA to take the lead on addressing the regulation of PFAS.	MassDEP believes it is appropriate to consider promulgating health-protective standards in the absence of federal action.
Kirsten King	New England Water Works Association	Follow the federal rulemaking protocol for all emerging contaminants.	MassDEP is subject to and revises regulations in accordance with the requirements of the State Administrative Procedure Act.
Kirsten King	New England Water Works Association	Develop compound-specific standards rather than a cumulative standard due to different toxicity endpoints, different uncertainty factors between humans and mammal toxicities, different reference dosages, differences in half-lives and bioaccumulation. There are also treatment and operational considerations that could be more challenging if the compounds are considered cumulatively.	MassDEP considered this approach but concluded, as explained in the TSD, that a subclass approach is preferable.
Kirsten King	New England Water Works Association	Strike the electronic reporting requirement until such time as the state's information technology infrastructure can reliably support such a directive.	eDEP's infrastructure has already been demonstrated capable of supporting such mandated electronic reporting. eDEP went live in 2006 and since 2016 has accepted drinking water reports from 1200+ PWSs (~71%) each year. In 2019 eDEP saw 30 labs upload 435,793 reports across 15 different water quality reports.

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Kirsten King	New England Water Works Association	Require quarterly sampling rather than monthly samples when PFAS6 is above 10 ppt due to expense, capacity (lab, utility and state), uncertainty about acute effects and uncertainty about month-to-month variability.	MassDEP proposed to determine compliance with the PFAS6 MCL quarterly to ensure that corrective actions are taken as soon as possible to limit short-term exposure risks for sensitive consumers. Basing violations on three monthly samples is more reliable than doing so on a single quarterly sample and its confirmation. However, the monthly monitoring requirement includes a provision for a system to reduce the cost of monthly monitoring after the first quarter by seeking MassDEP approval to use the first monthly sample of each quarter to identify subsequent violations. This provision lowers the cost to that of quarterly monitoring.
Kirsten King	New England Water Works Association	Do not report or use results below the MRL.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
Kirsten King	New England Water Works Association	Allow for sample invalidation due to PFAS sources in sampling lines, human error or markedly different confirmation results.	The proposal includes provisions for identifying alternative sampling locations which would include situations where an

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			existing sample line is suspected or can be demonstrated to be a source of PFAS. MassDEP does not agree that human error could alter the results of PFAS sampling in a way that would not also alter the field reagent blank that is a required part of every sampling event. A field reagent blank that fails QC would invalidate the associated field sample. Quality control measures are used to evaluate both initial and confirmation samples such that each can be individually determined to be acceptable for compliance use. MassDEP's experience to date does not support the premise that confirmation samples are likely to be markedly different from initial samples but these situations would be evaluated on a case-by-case basis.
Kirsten King	New England Water Works Association	Supports use of historical data and monitoring waivers.	MassDEP notes the support.
Kirsten King	New England Water Works Association	Allow for monitoring flexibility during emergencies, when lab capacity is insufficient or when a utility has operational issues that preclude such monitoring.	MassDEP has allowed for such flexibility at its discretion within 22.07G(15).

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Kirsten King	New England Water Works Association	Factor in treatment challenges when enforcing the MCL.	MassDEP's enforcement practices currently allow for negotiated compliance timelines for specific challenges at each utility (e.g., the availability of funding, access to engineering services and the time to obtain and construct treatment units).
Kirsten King	New England Water Works Association	Make funding available for monitoring or system upgrades including grants.	Outside the scope of the drinking water regulations. Note: the state has made funding available for sampling at all Public Water Systems as well as reimbursement for the design of PFAS treatment. The Drinking Water State Revolving Fund administered by the Clean Water Trust also has funding specifically to address PFAS contamination via low interest loans.
Kirsten King	New England Water Works Association	Add services and treatment components to the state bid list to streamline procurement.	Outside the scope of the drinking water regulations.
Kirsten King	New England Water Works Association	Develop risk communication materials addressing likely health concerns, state MCL vs. federal advisory vs. guidelines/standards in other states, other PFAS exposure pathways.	The proposal's public notice and consumer confidence requirements include health effects language. In addition, MassDEP has developed communication materials that are available on the web. These note other exposure pathways.

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Kirsten King	New England Water Works Association	Focus the consumer notification language on the sensitive subpopulation.	Depending on the length of exposure, health risks could be of concern for the general population not just sensitive subgroups and as such the consumer notice would be tailored to the specific situation.
Kirsten King	New England Water Works Association	Provide consumer information on PFAS-free bottled water and effective Point of Entry/Point of Use (POE/POU) treatment.	Although MassDEP does not regulate bottled water, MassDEP has solicited and made available on our web page testing results from bottled water companies. Publicly available treatment options for homeowners, to the extent available, have also been posted.
Kirsten King	New England Water Works Association	Identify a definitive timeline to launch a BWSC investigation when a PWS is found to be contaminated.	Outside the scope of the drinking water regulations.
Kirsten King	New England Water Works Association	Provide technical and compliance assistance to PWSs.	Outside the scope of the drinking water regulations. Note: MassDEP has done so in the past and intends to continue to do so.
Alex Papali		Consider a PFAS MCL of 1 ppt for as many PFAS as possible.	1 ppt is below the achievable reporting limit for PFAS as determined by MassDEP's laboratory and thus cannot be reliably quantified in drinking water at that level. As detailed in the TSD, MassDEP has concluded that the proposed

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
			drinking water standard is protective of public health based on current information.
Andrew Gottlieb	Association to Preserve Cape Cod	Supports the proposed requirement that all water supply operators conduct sampling to monitor for the presence of PFAS, and that such sampling occur on a regular basis.	MassDEP notes this support.
Andrew Gottlieb	Association to Preserve Cape Cod	Supports additive MCL for PFAS6.	MassDEP notes this support.
Andrew Gottlieb	Association to Preserve Cape Cod	Doesn't think the proposed notification requirements go far enough. Suggests a Do Not Drink notice be issued for all consumers until PFAS6 levels are in compliance.	The proposal does not preclude a public health order, such as a Do Not Drink, being part of a response to elevated PFAS6 levels in appropriate circumstances.
Andrew Gottlieb	Association to Preserve Cape Cod	Recommends that MassDEP commit itself to being responsive to emerging science on this issue and to revisiting the appropriate MCL for PFAS—as well as potentially expanding the number of PFAS chemicals covered by the regulation—as more is understood about these contaminants.	MassDEP is tracking the developing PFAS science and could amend this regulation in the future if necessary.
Donald DiMartino	Town of Bellingham, DPW	Why is it necessary to move ahead of federal action on PFAS?	MassDEP believes it is appropriate to consider promulgating health-protective standards in the absence of federal action.
Donald DiMartino	Town of Bellingham, DPW	Establishing a state MCL below EPA's Lifetime Health Advisory makes compliance more expensive.	MassDEP believes the proposed MCL is necessary to protect public health and, as such, additional costs are justified.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Donald DiMartino	Town of Bellingham, DPW	Should include a cost-benefit analysis. Delay this regulation until full costs are known based on statewide Community PWS preliminary testing.	MassDEP is subject to and revises regulations in accordance with the requirements of the State Administrative Procedure Act.
Donald DiMartino	Town of Bellingham, DPW	Entry point sampling should not require that all sources that feed the entry point be on-line at the same time.	The proposed requirement is not to turn on all sources for each sample; rather, for multiple source entry points: "If all sources are not operated simultaneously under normal operating conditions, then additional samples shall be collected representing each source that is operated alone and/or each combination of sources that are operated together." This is the same requirement as all other SDWA rules that require entry point monitoring.
Donald DiMartino	Town of Bellingham, DPW	The sampling requirements are confusing and need to be made clear especially the triggers for confirmation sampling.	The proposal contains four situations where confirmation sampling is required: (1) an initial detection of any PFAS, (2) a subsequent detection during initial monitoring where PFAS6 exceeds 10 ppt, (3) a subsequent detection during routine monitoring where PFAS6 exceeds 10 ppt, and (4) receipt of a result that does not fall within

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			the usual range of ongoing results. MassDEP plans to train systems on these requirements.
Donald DiMartino	Town of Bellingham, DPW	When and how much source sampling is required at manifolded entry points that have detections?	The proposal requires a single set of source samples for each multiple source entry point found to be contaminated.
Donald DiMartino	Town of Bellingham, DPW	Does not support the use of results below the MRL.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
Charles Estabrook		Supports MCL; Disputes Convertino et al. (2018) study; explains concerns about quality and interpretation of the study.	MassDEP notes the support and critique of the Convertino study. MassDEP notes that it did not rely on the Convertino study.
Charles Estabrook		This should not be the last step in providing safe water for Massachusetts residents.	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Connor Read	Town of Easton	The proposed rule appears likely to create unfunded liabilities of unknown scope and scale for public water suppliers and consumers.	MassDEP acknowledges that the statewide costs to PWSs will depend upon the outcome of statewide monitoring. Based on experiences in other states, however, MassDEP does not anticipate widespread PFAS

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			contamination. MassDEP also acknowledges that the cost to an individual PWS will depend upon the extent of PFAS contamination at that PWS. MassDEP believes the proposed MCL is necessary to protect public health and, as such, additional costs are justified.
Connor Read	Town of Easton	Expand eligibility of existing FY19 supplemental PFAS funding to include direct financial support for engineering and design, not just testing.	Outside the scope of this proposal. Note: the state has made funding available for limited sampling as well as reimbursement for the design of PFAS treatment. The Drinking Water State Revolving Fund administered by the Clean Water Trust also has funding specifically to address PFAS contamination via low interest loans.
Connor Read	Town of Easton	Advocate to legislature for continuous PFAS funding appropriations and/or borrowing authorizations to make direct funds / grants available to cities and towns for construction, rather than only SRF loans.	Outside the scope of the drinking water regulations.
Connor Read	Town of Easton	Prioritize funding for communities like Easton which have demonstrated a proactive and achievable corrective action plan.	Outside the scope of the drinking water regulations.
Connor Read	Town of Easton	Support appropriate Commonwealth regulatory agency review and possible regulation of PFAS and PFAS alternatives (of which there are	Outside the scope of the drinking water regulations.

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		thousands) in manufacturing if such regulatory activity could reduce the prevalence of these compounds in consumer products which are reasonably expected to contribute to PFAS contamination in public water supplies and/or reduce the likelihood of a regulatory-catch-up dynamic where DEP and PWSs are forced to continually revise and expand upon the proposed rule as PFAS manufacturers simply adjust their supply to a comparable PFAS alternative which is not regulated.	
Connor Read	Town of Easton	Encourage interagency cooperation to identify and, if appropriate, reduce and/or eliminate PFAS products from Commonwealth agency use which may be reasonably expected to impact water resources or finished public water supplies.	Outside the scope of the drinking water regulations.
Connor Read	Town of Easton	Understand that, should a stricter standard than 20 PPT, or an expanded list of combined PFAS/PFOAs or chemicals of comparable composition be added to the proposed sum of six PFAS now or in the future, that PWSs will find themselves responding to one set of rules only to possibly fail to meet future, broader standards and that the financial impact to communities would, absent substantial direct financial support from the state, be devastating.	PFAS science continues to develop and MassDEP will continue to evaluate the need for future regulatory actions.
Connor Read	Town of Easton	USEPA states that there are “limitations and uncertainties” pertaining to the PFAS removal treatment technologies currently available. Treatment and disposal techniques vary in	MassDEP will continue to provide the best information available about both PFAS treatment and disposal of

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		capital and operating cost and effectiveness based on multiple factors including which type of PFAS is being filtered. To the extent possible, DEP should make available technical resources to guide and recommend best practices for future PFAS filtration and treatment technologies, particularly as it pertains to effective removal processes (granular activated carbon and others) and disposal of PFAS waste following removal.	treatment media and waste streams.
Connor Read	Town of Easton	Make available technical resources to assist PWSs and localities regarding alternative products to substitute PFAS chemical compounds, if their use is reasonably expected to impact water resources or public water supplies, such as fire foam, and make funding available to effectuate the replacement of such supplies.	MassDEP, working across state government, will continue to track and share information about PFAS-free alternatives as it becomes available.
Connor Read	Town of Easton	Continue to provide public information regarding the latest PFAS research and regulatory processes on centralized DEP page.	MassDEP plans to do so.
Ellen Latsko	MPH Candidate, Boston University School of Public Health	I strongly support this revision, but also believe that the language regarding Consumer Notice (Consumer Confidence Reports and more) could be strengthened by translation into languages appropriate to the affected community, if it is known that a high proportion of the population is English isolated and by translation into language easily understood by residents unfamiliar with legal and scientifically technical language.	The proposed consumer notice requires the use of "a Department approved explanation of the health effects of PFAS and steps consumers can take to reduce exposure to PFAS in drinking water;" MassDEP notes the suggestions to require the use of foreign and lay language and routinely requires such steps in

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			communications with the public such as in the public notification rule (310 CMR 22.16(5)(c)2.). Multilingual requirements have been added.
Cheryl Osimo	Massachusetts Breast Cancer Coalition	MBCC continues to be concerned that there are many more PFASs beyond these six compounds that also need to be addressed. MBCC urges MassDEP to consider additional approaches that will address PFAS as a class.	Based on its assessment as presented in the TSD, MassDEP has concluded that its approach to addressing the overall toxicity database for the longer-chain PFAS is appropriately health protective and reflective of the current data. Given the available scientific data MassDEP chose specific PFAS that could be included in this subclass. As explained in the TSD, there are technical limits on how many and which PFAS could be treated similarly.
Cheryl Osimo	Massachusetts Breast Cancer Coalition	MBCC also urges MassDEP to be vigilant in making sure that its regulations and standards keep pace with emerging science.	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Jennifer Pedersen	Massachusetts Water Works Association	Supports development of a federal MCL; concerned that state process is not as robust as the federal one; consider the same components that EPA considers in its process and implement	MassDEP believes it is appropriate to consider promulgating health-protective standards in the absence of

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		standards only after the scientific and public health merits of doing so have been methodically and carefully considered.	federal action. Based on its assessment as presented in the TSD, MassDEP has concluded that its approach to addressing the overall toxicity database for the longer-chain PFAS is appropriately health protective and reflective of the current data.
Jennifer Pedersen	Massachusetts Water Works Association	Premature to regulate prior to having more information on a wide set of issues (background, sources, occurrence, human health impacts at proposed level).	In light of the very long serum half-lives of the compounds, wide range of serious toxicities and risk to children MassDEP disagrees that actions to address exposures attributable to drinking water should be delayed.
Jennifer Pedersen	Massachusetts Water Works Association	Public health is not protected when only DW is regulated.	Regulation of other exposure pathways is outside the scope of the drinking water regulations.
Jennifer Pedersen	Massachusetts Water Works Association	Need more comprehensive database on occurrence to know the likelihood of detection at the proposed standard and thereby the need for response actions. Suggest monitoring DCR's climate response network wells.	MassDEP believes the best path forward at this time is to require sampling at public water systems rather than delaying it and extending public exposures within contaminated systems.
Jennifer Pedersen	Massachusetts Water Works Association	Data on human health effects and at what level those effects occur is needed.	As discussed in the TSD and references cited therein, human health effect data exist and support MassDEP’s actions.
Jennifer Pedersen	Massachusetts Water Works Association	Establishing standards based on the "abundance of caution" principle is overly conservative, untenable and irresponsible.	The proposed MCL is well supported by science and is both tenable and responsible. In fact,

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			MassDEP has concluded that it is critically important to move forward in light of the very long half-lives of these compounds, wide range of serious toxicities and risk to children.
Jennifer Pedersen	Massachusetts Water Works Association	Commenter attached a research paper for ORS to review.	This is a recent paper that was not considered in the technical review. However, the issue addressed in the paper provided was considered in the TSD and the data presented in the paper provided further supports the conclusions reached.
Jennifer Pedersen	Massachusetts Water Works Association	Regulation should cover many other exposure pathways.	Outside the scope of the drinking water regulations.
Jennifer Pedersen	Massachusetts Water Works Association	The underlying science continues to evolve; process should be documented and transparent, rely on a strong scientific foundation of peer-reviewed studies.	The proposed MCL is based on a strong scientific foundation as transparently documented in the TSD. The science continues to evolve but there is sufficient information to warrant the proposed actions.
Jennifer Pedersen	Massachusetts Water Works Association	Involve key stakeholders, including those with differing views.	MassDEP's process involved a stakeholder group that included representatives from environmental advocacy groups, utilities and industry.
Jennifer Pedersen	Massachusetts Water Works Association	Evaluate cost-benefit and evaluate effectiveness of the proposal in achieving better health outcomes.	MassDEP is subject to and revises regulations in accordance

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			with the requirements of the State Administrative Procedure Act.
Jennifer Pedersen	Massachusetts Water Works Association	Human toxicology must be determined.	Consistent with scientific practice, MassDEP has based the proposed MCL on available toxicity data. While epidemiological studies can be informative, they are typically restricted with respect to their statistical power to detect effects of concern. None-the-less, published epidemiological studies support MassDEP's concern regarding these compounds.
Jennifer Pedersen	Massachusetts Water Works Association	Analytical and treatment feasibility must be evaluated.	Analytical and treatment feasibility at the proposed standard for the subgroup of regulated compounds is well established.
Jennifer Pedersen	Massachusetts Water Works Association	State action ahead of federal action causes confusion and concern among the public and undermines public confidence.	MassDEP believes it is appropriate to consider promulgating health-protective standards in the absence of federal action.
Jennifer Pedersen	Massachusetts Water Works Association	MWWA urges MassDEP not to act based on what other states may do.	MassDEP's reviews take the work of other states into consideration but they do not drive the proposed regulation.
Jennifer Pedersen	Massachusetts Water Works Association	Don't apply an excessively conservative factor to a number not supported by sound science.	MassDEP's proposed MCL is supported by sound science and is not excessively conservative.

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Jennifer Pedersen	Massachusetts Water Works Association	Add definitions for Consumer Notification, PFAS Detection, J-Value, Method Detection Limit, Sub-chronic exposure and use full MRL definition from 537.1.	22.02 includes terms that appear in the corresponding federal drinking water regulation (40 CFR 141) or that, in general, appear in multiple parts of 22.00 and, as such, benefit from a centralized definition. "Consumer Notice" and "PFAS Detection" appear only in 22.07G. Neither "J-value" nor "Sub-chronic exposure" appear in the regulations. "Method Detection Limit" is defined in 310 CMR 42.00 and while it is used in the regulations it does not appear in the current proposal. MassDEP will consider replicating it in 310 CMR 22.02 in a future amendment. "Minimum Reporting Level" is already defined in 310 CMR 42.00 and was proposed to be added to 22.02. This is a general concept in analytical chemistry and tying its definition to the language used in one method would not be appropriate.
Jennifer Pedersen	Massachusetts Water Works Association	Questions if IT can support electronic reporting - strike requirement.	eDEP's infrastructure has already been demonstrated capable of supporting such mandated electronic reporting. eDEP went

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			live in 2006 and since 2016 has accepted drinking water reports from 1200+ PWSs (~71%) each year. In 2019 eDEP saw 30 labs upload 435,793 reports across 15 different water quality reports.
Jennifer Pedersen	Massachusetts Water Works Association	Add units to the EEA portal and be consistent in how data is shown.	Units have always been shown in the Detail page of the EEA Data Portal but were missing from the Results page and the Excel export. This was recently corrected. The change from ug/L to ng/L was intentional and is designed to make it easier for the public to understand results by eliminating leading zeros.
Jennifer Pedersen	Massachusetts Water Works Association	Why would monitoring apply to TNCs but not the MCL?	Exposure estimates in a TNC workplace would not be the same as those used in COM and NTNC settings and so applying the proposed MCL to TNCs would not be appropriate. The proposed single round of sampling at TNCs is intended to identify PFAS contamination in parts of the state that lack COM and NTNC systems and so inform statewide site discovery efforts. Should this test identify levels of PFAS that could be significant for a TNC employee or other consumers at

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			the system MassDEP can use existing authority under 22.03(8) to evaluate the health risk and the need for corrective actions on a case-by-case basis.
Jennifer Pedersen	Massachusetts Water Works Association	Mandate private well testing	Outside the scope of the drinking water regulations. Note: MassDEP provides guidance for such homeowners and local Boards of Health to encourage protective actions and the establishment of local requirements if appropriate.
Jennifer Pedersen	Massachusetts Water Works Association	PFAS detections should be limited to the six being regulated and only levels at or above the MRL.	PFAS detections are distinct from determining PFAS6 MCL compliance in 22.07G(10). The former includes detections of any PFAS in the scope of the method which in some cases can trigger a regulatory action (e.g. 22.07G(7)(a)(1)). The latter only covers detections of PFAS6 – the six compounds included in the MCL. Due to co-occurrence of PFAS compounds, MassDEP feels it is appropriate to evaluate detections of any PFAS in the scope of the available analytical method so as to best characterize the nature and potential source of any contamination.

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Jennifer Pedersen	Massachusetts Water Works Association	Develop individual MCLs due to underlying data differences (toxicity endpoints, uncertainty factors, Reference Doses, half-lives, bioaccumulation, etc.).	MassDEP considered this approach but concluded, as explained in the TSD, that a subclass approach is preferable.
Jennifer Pedersen	Massachusetts Water Works Association	Concerned with suggested 1 ppt MCL.	1 ppt is below the achievable reporting limit for PFAS as determined by MassDEP's laboratory and thus cannot be reliably quantified in drinking water at that level. As detailed in the TSD, MassDEP has concluded that the proposed drinking water standard is protective of public health based on current information.
Jennifer Pedersen	Massachusetts Water Works Association	MCL is unnecessarily lower than EPA's Lifetime Health Advisory (LHA) of 70 ppt which is protective for both non-cancer and cancer effects without added benefit.	MassDEP disagrees with this statement. As documented in the TSD, MassDEP has concluded that the EPA LHA is not sufficiently protective for PFOA and PFOS and fails to address the other highly similar PFAS included in the proposed MCL, especially with respect to risks to sensitive groups including pregnant women, fetuses and children.
Jennifer Pedersen	Massachusetts Water Works Association	Use of 1/2MRL between 1/3MRL and MRL is unprecedented and inappropriate.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site

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			characterization but not for compliance.
Jennifer Pedersen	Massachusetts Water Works Association	Treatment is not one-size-fits-all but the additive MCL makes this difficult to operate and potentially inefficient.	Analytical and treatment feasibility at the proposed standard for the subgroup of regulated compounds is well established.
Jennifer Pedersen	Massachusetts Water Works Association	MWWA is concerned that low parts per trillion accuracy will be difficult to achieve and may cause inefficient use of resources such as requiring an excessive number of PFAS samples to ensure accurate results.	Analytical and treatment feasibility at the proposed standard for the subgroup of regulated compounds is well established.
Jennifer Pedersen	Massachusetts Water Works Association	Insufficient information to regulate PFHpA.	As discussed in the TSD, MassDEP concluded that is appropriate to regulate PFHpA because it is highly similar in chemical structure to the other longer-chain PFAS addressed under the MCL.
Jennifer Pedersen	Massachusetts Water Works Association	Conduct thorough review of toxicological and epidemiological studies.	MassDEP scientists completed a thorough review of the available science and assessments. This is extensively detailed in the TSD.
Jennifer Pedersen	Massachusetts Water Works Association	First month sampling may cause lab capacity issues.	The first month sampling requirement is designed to shorten timelines between monitoring and potential consumer notification when PFAS6 levels exceed the MCL. Lab capacity issues can be addressed by MassDEP using the

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			flexibility provided for in 22.07G(15).
Jennifer Pedersen	Massachusetts Water Works Association	MWWA understands that temperature and hold times could potentially cause precursors to oxidize into PFAS compounds and that has the potential to impact PFAS results.	Prior to publication and approval for use in drinking water, analytical methods are evaluated to establish appropriate sample storage temperatures and holding times to ensure accurate results. It is MassDEP's long standing practice not to accept sample results that do not comply with a method's handling requirements.
Jennifer Pedersen	Massachusetts Water Works Association	Move initial implementation date to 7/1/21.	MassDEP has adjusted the proposed staggered implementation dates but the suggested date would unnecessarily delay the identification and remediation of public exposures.
Jennifer Pedersen	Massachusetts Water Works Association	Define "existing source" when discussing reactivation. How does this apply to seasonal sources or sources that were off-line when the quarter begins?	The proposed language captures sources that do not currently appear on a system's sample schedule (e.g. inactive and emergency sources). MassDEP has added language such that sources brought back on-line or seasonal systems that open after the commencement of initial monitoring will have to begin monitoring in the first month that they serve water to the public.

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Jennifer Pedersen	Massachusetts Water Works Association	Outline waiver criteria for initial monitoring waiver.	Beyond obtaining two rounds of initial monitoring with all results <MRL, the criteria to obtain this waiver is included in 22.07G(5)(c): "there is no known or suspected PFAS contamination in the vicinity of the Public Water System or its sources of water."
Jennifer Pedersen	Massachusetts Water Works Association	Change routine waiver criteria from "potential" to "obvious" sources of contamination.	MassDEP has modeled this proposal on corresponding requirements for SOCs and VOCs. The existing language for comparable monitoring waivers covering SOCs and VOCs (in 22.07A(4)(b) and 22.07B(3)(a)2.b., respectively) is "potential" sources of contamination.
Jennifer Pedersen	Massachusetts Water Works Association	In section (7)(b), amend this language to state that "Any PFAS detection above the MRL..."	"PFAS Detection" is already defined as such in 22.07G(3).
Jennifer Pedersen	Massachusetts Water Works Association	Require extraction of field blanks at the same time as sample is extracted.	Absent requiring a laboratory to follow the analytical methods specified in these regulations, this level of detail is beyond the scope of the drinking water regulations nor is this a requirement of either EPA Method 537 or 537.1. MassDEP would consider evidence that same-day extraction of a field sample and a field blank is necessary to ensure accurate

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			analytical results if provided and possible incorporation of such a requirement into MassDEP's laboratory certification requirements.
Jennifer Pedersen	Massachusetts Water Works Association	Establish criteria to compare initial and confirmation samples allowing for additional confirmation and use of best matched samples.	MassDEP relies on quality control samples and practices to independently verify the usability of every sample. Both initial and confirmation samples and their corresponding QC samples must pass all these checks to be considered for compliance. MassDEP's experience to date does not support the premise that confirmation samples are likely to be markedly different from initial samples but these situations would be evaluated on a case-by-case basis.
Jennifer Pedersen	Massachusetts Water Works Association	If contamination can be linked to plumbing components and is remediated prior to confirmation then the initial result should be invalidated.	The proposal includes provisions for identifying alternative sampling locations which would include situations where an existing sample line is suspected or can be demonstrated to be a source of PFAS. However, remediation of a tap that does represent water quality being delivered to the public does not

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			justify invalidation of prior results.
Jennifer Pedersen	Massachusetts Water Works Association	Allow for additional time to confirm a sample result based on MassDEP's discretion.	MassDEP has allowed for an extension of time.
Jennifer Pedersen	Massachusetts Water Works Association	Link source sampling requirement to entry point results above 10 ppt in any combination of the six regulated PFAS.	The criteria to trigger source sampling is based on three distinct situations described in 22.07G(a)1., 2. and 3. The latter two already require that PFAS6 concentrations be above 10 ppt. Requiring source samples after an initial PFAS detection of any concentration (as per 22.07G(a)1.) is sensible in that this information can point to operational changes that provide the fastest route to lowering or eliminating PFAS exposure. In addition, depending on operational conditions (i.e. the number of contributing sources, the amount of water pumped from each source) a blended entry point sample below 10 ppt could be masking individual source concentrations well above this level. Such individual source measurements also inform site discovery activities.
Jennifer Pedersen	Massachusetts Water Works Association	How will manifolded sources be sampled.	Sampling will follow MassDEP's standard practice as laid out in

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			22.07G(4)(b). Entry point samples representing blended sources are the routine monitoring locations. Source sampling is addressed in 22.07G(7)(d).
Jennifer Pedersen	Massachusetts Water Works Association	Consumer notification does not comport with the notification required under any other drinking water standard.	The proposed consumer notification requirement can be compared to the public education requirements of the Lead and Copper Rule. Both requirements share the intended outcome that consumers take action to limit their exposure to the water.
Jennifer Pedersen	Massachusetts Water Works Association	Amend the consumer notification language to state that the notice specifies the concerns for PFAS levels at 20 ppt relate only to the sensitive subpopulations.	Depending on the length of exposure, health risks could be of concern for the general population not just sensitive subgroups and as such the consumer notice would be tailored to the specific situation.
Jennifer Pedersen	Massachusetts Water Works Association	Modify repeat consumer notification requirements to allow for web and/or CCR notices.	MassDEP does not believe that web posting or the annual CCR is adequate to keep the public informed of an ongoing contamination issue in their drinking water.
Jennifer Pedersen	Massachusetts Water Works Association	Replace monthly monitoring requirement with quarterly monitoring.	MassDEP proposed to determine compliance with the PFAS6 MCL quarterly to ensure that corrective actions are taken as soon as

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			possible to limit short-term exposure risks for sensitive consumers. Basing violations on three monthly samples is more reliable than doing so on a single quarterly sample and its confirmation. However, the monthly monitoring requirement includes a provision for a system to reduce the cost of monthly monitoring after the first quarter by seeking MassDEP approval to use the first monthly sample of each quarter to identify subsequent violations. This provision lowers the cost to that of quarterly monitoring.
Jennifer Pedersen	Massachusetts Water Works Association	Monthly monitoring should only apply if PFAS6 is detected and not any other PFAS within the scope of the method.	22.07G(8)(a)1.a. already limits the applicability of monthly monitoring to those detections where PFAS6 is confirmed greater than 10 ppt.
Jennifer Pedersen	Massachusetts Water Works Association	Provide a simplified monitoring flowchart.	MassDEP will consider providing such a chart as guidance.
Jennifer Pedersen	Massachusetts Water Works Association	Allow for sample invalidation due to materials at the sampling point and/or sampling errors.	The proposal includes provisions for identifying alternative sampling locations which would include situations where an existing sample line is suspected or can be demonstrated to be a source of PFAS. MassDEP does

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			not agree that human error could alter the results of PFAS sampling in a way that would not also alter the field reagent blank that is a required part of every sampling event. A field reagent blank that fails QC would invalidate the associated field sample. Quality control measures are used to evaluate both initial and confirmation samples such that each can be individually determined to be acceptable for compliance use. MassDEP's experience to date does not support the premise that confirmation samples are likely to be markedly different from initial samples but these situations would be evaluated on a case-by-case basis.
Jennifer Pedersen	Massachusetts Water Works Association	Concerns with the availability of data below the MRL, processes for labs to identify such data, the use of a default value for all such data and the use of such data in compliance calculations. Concerns as well with the precedent and the potential for subsequent expansion of PFAS6 MCL to include so many additional PFAS that a violation could occur without a single PFAS detection above an MRL.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.

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Jennifer Pedersen	Massachusetts Water Works Association	Potentially Responsible Parties will likely contest liability based on estimated detections.	Outside the scope of the drinking water regulations.
Jennifer Pedersen	Massachusetts Water Works Association	There appears to be an additional interpretation of results below an MRL in existing MassDEP guidance that does not appear in the proposed regulation.	When the proposed regulation is finalized MassDEP will adjust its guidance to align with it.
Jennifer Pedersen	Massachusetts Water Works Association	Allow use of EPA Method 533; allow use of future methods now.	MassDEP will consider including EPA Method 533 in a subsequent amendment. MassDEP is subject to and revises regulations in accordance with the requirements of the State Administrative Procedure Act.
Jennifer Pedersen	Massachusetts Water Works Association	Exclude reporting of samples from sentinel monitoring, process optimization or investigatory purposes.	The proposed language is consistent with current requirements at 22.03(10), "All water quality data for contaminants listed in 310 CMR 22.00, including additional and voluntary samples, shall be submitted to the Department, unless otherwise specified by the Department."
Jennifer Pedersen	Massachusetts Water Works Association	Allow for use of historic data that may not have met 2 ppt MRLs.	Historic data that showed PFAS detections at levels above the MRL used by the lab would be acceptable for use in 22.07G(14) as these results are not affected by the less sensitive analysis. However, historic PFAS results of non-detections analyzed using

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			a less sensitive MRL would not be acceptable for use in 22.07G(14) as they would not support the proposal's requirement to measure down to 2 ppt.
Jennifer Pedersen	Massachusetts Water Works Association	Require MRLs of 5 not 2.	MassDEP Division of Environmental Laboratory Sciences (DELS)/Wall Experiment Station (WES) has reviewed new LC/MS/MS instrumentation from several manufacturers and has determined that these new instruments are capable of achieving target PFAS MRLs < 2 ng/L for the regulated compounds. As proposed the 2 ng/L MRL requirement only applies to the six regulated PFAS.
Jennifer Pedersen	Massachusetts Water Works Association	Review interlaboratory variation with split samples.	MassDEP will consider conducting such a comparison.
Jennifer Pedersen	Massachusetts Water Works Association	Public Notice health language should specify the sensitive population rather than "some people."	Depending on the length of exposure, health risks could be of concern for the general population not just sensitive subgroups and as such the consumer notice would be tailored to the specific situation.

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Jennifer Pedersen	Massachusetts Water Works Association	Consumer Confidence Report (CCR) table should list individual PFAS rather than the total.	The MCL is applicable to the group and this is consistent with how other group MCLs (e.g. THM and HAA5) are listed in this table.
Jennifer Pedersen	Massachusetts Water Works Association	If CCR only includes quantified detections yet the use of ½ MRLs pushes the total over the MCL the public will see conflicting information.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
Jennifer Pedersen	Massachusetts Water Works Association	Include consumer products and septic systems in major sources in drinking water and discuss ubiquitous nature of PFAS.	MassDEP is not aware of any evidence that consumer products and septic systems are significant overall sources of contamination of drinking water at the proposed regulatory levels.
Jennifer Pedersen	Massachusetts Water Works Association	Indicate that health effects are based on animal studies and that human health studies are ongoing.	The CCR table is not the appropriate venue to discuss the basis of the standard. The basis of the proposed standard is clearly documented and discussed in the TSD as is the fact that research on PFAS is ongoing.
Jennifer Pedersen	Massachusetts Water Works Association	Will the CCR require reporting of the unregulated PFAS in the scope of the method.	Yes, if detected.
Jennifer Pedersen	Massachusetts Water Works Association	Unregulated CCR table should include all PFAS in the scope of the different methods being used.	The proposal covers all the PFAS in EPA Methods 537 and 537.1.
Jennifer Pedersen	Massachusetts Water Works Association	Health risk language is needed for the unregulated PFAS.	MassDEP has not adopted health effects language for the

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			unregulated PFAS as the science is still evolving. However, MassDEP has provided such language in CCR guidance available on the MassDEP website.
Jennifer Pedersen	Massachusetts Water Works Association	Cross contamination concerns should allow for sample invalidation.	If cross contamination has occurred it will be evident in the analysis of the field reagent blank which will lead to sample invalidation.
Jennifer Pedersen	Massachusetts Water Works Association	Provide technical assistance to systems on sample collection.	In addition to written guidance, MassDEP has held in-person sampling training and will continue to do so. A sampling video has also been made available at: https://www.youtube.com/watch?v=zrwhwSI-R9M&feature=youtu.be.
Jennifer Pedersen	Massachusetts Water Works Association	State-owned land should be made available for new source development.	Outside the scope of the drinking water regulations.
Jennifer Pedersen	Massachusetts Water Works Association	Take engineering, funding and procurement timelines into consideration when considering enforcement timelines.	MassDEP's enforcement practices currently allow for negotiated compliance timelines for specific challenges at each utility (e.g., the availability of funding, access to engineering services and the time to obtain and construct treatment units).

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Jennifer Pedersen	Massachusetts Water Works Association	Streamline the new technology review process to more quickly grant approvals.	Outside the scope of the drinking water regulations.
Jennifer Pedersen	Massachusetts Water Works Association	Where the installation of PFAS treatment increases the treatment classification of a system, provide compliance forbearance and flexibility for the operators to obtain the necessary licenses.	MassDEP's enforcement practices currently allow for negotiated compliance timelines for specific challenges at each utility (e.g., the availability of funding, access to engineering services and the time to obtain and construct treatment units).
Jennifer Pedersen	Massachusetts Water Works Association	Better guidance is needed for alternative sources of water (e.g., Point of Use and bottled water) and MassDEP should certify POU devices if they are being suggested as an option for consumers.	Although MassDEP does not regulate bottled water, MassDEP has solicited and made available on our web page testing results from bottled water companies. Publicly available treatment options for homeowners, to the extent available, have also been posted. Manufacturers of POUs can apply for new technology approvals via existing permits.
Jennifer Pedersen	Massachusetts Water Works Association	Allow the use of impacted sources to meet demand or due to the cost of other alternatives while permanent solutions are implemented.	Typically, MassDEP does not prohibit the use of impacted sources as long as monitoring, consumer notification and/or public notification requirements are met during these periods.
Jennifer Pedersen	Massachusetts Water Works Association	BWSC site discovery timelines should be in regulation.	Outside the scope of the drinking water regulations.

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Jennifer Pedersen	Massachusetts Water Works Association	Ensure adequate staffing in the Drinking Water Program and the BWSC to implement PFAS rules.	Outside the scope of the drinking water regulations.
Jennifer Pedersen	Massachusetts Water Works Association	Enforce state MCLs at federal CERCLA sites.	Outside the scope of the drinking water regulations. Note: State MCLs are addressed at CERCLA sites via the federal ARAR process under CERCLA.
Jennifer Pedersen	Massachusetts Water Works Association	Address need for standards/actions by other MassDEP programs (air, landfills).	Outside the scope of the drinking water regulations.
Jennifer Pedersen	Massachusetts Water Works Association	Determine if statutory changes are needed to procurement laws to streamline the ability of systems to obtain treatment technologies.	Outside the scope of the drinking water regulations.
Jennifer Pedersen	Massachusetts Water Works Association	Can the state purchase and stockpile common treatment equipment to make them available to systems?	Outside the scope of the drinking water regulations.
Jennifer Pedersen	Massachusetts Water Works Association	Add services/equipment to the state bid list to assist system procurement.	Outside the scope of the drinking water regulations.
Jennifer Pedersen	Massachusetts Water Works Association	Develop risk communication materials that include other exposure pathways.	The proposal's public notice and consumer confidence requirements include health effects language. In addition, MassDEP has developed communication materials that are available on the web. These note other exposure pathways.
Jennifer Pedersen	Massachusetts Water Works Association	Advocate with Administration and Finance, the Clean Water Trust and the Legislature to provide more funding to address PFAS contamination including appropriating funds to	Outside the scope of the drinking water regulations.

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		the matching grant program for PWSs to join the MWRA or other regional supplies.	
Paige Brochu	Doctoral Student, URBAN Trainee Boston University School of Public Health Department of Environmental Health	I support the proposed standard requiring the sum of the included PFAS (PFOA, PFOS, PFNA, PFHxS, PFHpA, and PFDA) not to exceed 20 ppt. To support this new regulatory standard I have provided the following evidence: 1. Cumulative approach to regulate PFAS in drinking water is consistent with USEPA's additive approach of the Health Advisory (HA) for PFOA and PFOS. 2. Similar additive method used in Connecticut and Vermont supported by the National Toxicology Program (NTP, 2018). 3. Treating 6 PFAS as a group is appropriate due to similar chemical structure, critical endpoints, and persistence in the body.	MassDEP notes the support.
Sean D. Osborne	OSD Engineering Consultants	Develop compound-specific standards for each of the PFAS compounds and do not employ a cumulative approach due to different toxicity endpoints, different uncertainty factors between humans and mammal toxicities, different reference dosages, differences in half-lives, bioaccumulation, etc. There are also treatment and operational considerations that could be more challenging if the compounds are considered cumulatively.	MassDEP considered this approach but concluded, as explained in the TSD, that a subclass approach is preferable.
Sean D. Osborne	OSD Engineering Consultants	Require quarterly rather than monthly monitoring as monthly monitoring may be	MassDEP proposed to determine compliance with the PFAS6 MCL

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		infeasible due to lab turn around times, confirmation timelines, uncertainty that monthly samples will vary and cost.	quarterly to ensure that corrective actions are taken as soon as possible to limit short-term exposure risks for sensitive consumers. Basing violations on three monthly samples is more reliable than doing so on a single quarterly sample and its confirmation. However, the monthly monitoring requirement includes a provision for a system to reduce the cost of monthly monitoring after the first quarter by seeking MassDEP approval to use the first monthly sample of each quarter to identify subsequent violations. This provision lowers the cost to that of quarterly monitoring.
Sean D. Osborne	OSD Engineering Consultants	Exclude detections below the MRL in determining compliance; do not assign a default value to such detections.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
Sean D. Osborne	OSD Engineering Consultants	Strike the electronic reporting requirement.	eDEP's infrastructure has already been demonstrated capable of supporting such mandated electronic reporting. eDEP went live in 2006 and since 2016 has accepted drinking water reports

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			from 1200+ PWSs (~71%) each year. In 2019 eDEP saw 30 labs upload 435,793 reports across 15 different water quality reports.
Sean D. Osborne	OSD Engineering Consultants	Allow for sample invalidation if the Public Water System demonstrates that results were influenced by products used in the piping or plumbing of the sample location, involved human error, or if confirmatory sample results are markedly different than the initial results.	The proposal includes provisions for identifying alternative sampling locations which would include situations where an existing sample line is suspected or can be demonstrated to be a source of PFAS. MassDEP does not agree that human error could alter the results of PFAS sampling in a way that would not also alter the field reagent blank that is a required part of every sampling event. A field reagent blank that fails QC would invalidate the associated field sample. Quality control measures are used to evaluate both initial and confirmation samples such that each can be individually determined to be acceptable for compliance use. MassDEP's experience to date does not support the premise that confirmation samples are likely to be markedly different from initial samples but these situations

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			would be evaluated on a case-by-case basis.
Sean D. Osborne	OSD Engineering Consultants	Do not remove leading zeros from results in the CCR.	This is consistent with federal requirements for CCR reporting.
Sean D. Osborne	OSD Engineering Consultants	Extend MassDEP's risk communication materials to include other consumer goods, the relative risks of other exposure routes and better indicate the at-risk populations.	MassDEP's risk communication is routinely reviewed to include new information as it becomes available and already notes other exposure pathways. Depending on the length of exposure, health risks could be of concern for the general population not just sensitive subgroups and as such the consumer notice would be tailored to the specific situation.
Alexa Friedman, Beth Haley	Doctoral Students, Boston University School of Public Health	Support regulating the six proposed PFAS chemicals as a group based on similar structures, persistence in the environment and humans, health outcomes, target organs and chemical half-lives.	MassDEP notes the support.
James Occhialini, James Todaro	Alpha Analytical	Would not recommend reporting below the MRL; 1/3 MRL is not stored in a lab's LIMS making reporting <1/3 MRL a manual task slowing lab response and increasing cost and uncertainty.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
James Occhialini, James Todaro	Alpha Analytical	If data <MRL and >MDL is necessary it should be 1/2MRL or if not an option then "J" values.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site

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			characterization but not for compliance.
James Occhialini, James Todaro	Alpha Analytical	Simplify the reporting form to eliminate the two check boxes <MRL and <1/3 MRL allow the result field to capture a quantified result or ND (for results <MRL).	MassDEP's PFAS form will reflect the final version of this regulation.
Oyebode A. Taiwo	3M	Proposed MCLs do not reflect the best available science regarding these substances. MassDEP is merely going through the motions of rulemaking and is not undertaking the critical evaluation of science and public comments necessary for rulemaking. The proposed MCL is identical to the cleanup standard for groundwater. The technical support document is the same for both rulemakings despite their different purposes. The rule anticipates implementation by the regulated community one month after comments on the draft MCL are due. All of these factors suggest MassDEP intends to adopt the MCL as proposed regardless of any comments received.	This is incorrect. MassDEP is open to, and is in fact, revising elements of the proposed regulations for drinking water in response to public comments. In addition, as was stated in the public hearings, the proposed implementation dates were placeholders that would be updated based on public comment and the time it takes to move through the promulgation process.
Oyebode A. Taiwo	3M	The technical support document underlying the proposed PFAS MCL Amendment is replete with unscientific assumptions and errors in data comparison. For example, MassDEP's approach to perfluorohexanesulfonic acid (PFHxS) rests on faulty data comparisons, inconsistent conclusions, and flawed assumptions. Section 3.1 of the Technical Document acknowledges that there is "more limited available data to support derivation of candidate RfDs" for	We disagree. The scientific basis of MassDEP'S toxicity assessment is fully explained and supported in the TSD. There are no "unscientific assumptions" or "errors in data comparison." 3M has not identified any valid "faulty data comparisons, inconsistent conclusions, and flawed assumptions," in support

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		PFHxS as compared to PFOA and PFOS. Nonetheless, MassDEP claims that because the RfD for PFHxS overlaps the "range of values derived for PFOA and PFOS," the majority of RfDs derived for PFHxS are "within 2-fold of the RfD" for PFOA and PFOS," and the differences are "within the range of uncertainty inherent in all RfDs," its decision "to include these compounds in an equipotent subgroup" is appropriate.	of its scientist's objections to MassDEP's interpretations of the data. Although the toxicological database for PFHxS is less extensive, MassDEP's assessment of the data that is available, as well as other agencies' assessments of this data, supports MassDEP's approach.
Oyebode A. Taiwo	3M	MassDEP claims to use "toxicologically similar chemicals as surrogates for less studied members of the PFAS subgroup." In so doing, MassDEP assumes PFHxS is "equipotent" to PFOA and PFOS despite the fact that it has a different chain length, different physical properties (such as solubility), and different functional groups (carboxylate versus sulfonate). Any one of these differences is sufficient to call into question an assumption of similar toxicity values. Given all of these differences, however, it is patently clear that such an assumption is devoid of scientific merit.	Relying on toxicity information from closely related chemical compounds to inform decisions regarding the toxicity of less-tested or untested compounds, a procedure known as "read across," is a scientifically accepted approach. ECHA (European Chemicals Agency). 2017. Read Across Assessment Framework (RAAF). March 2017. ECHA-17-R-01-EN. First published in May 2015, updated March 2017. MassDEP does not claim the compounds are identical. The issue is whether they are sufficiently similar to treat them as a subgroup. MassDEP concluded, based on an extensive assessment, that the six compounds addressed, are.

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			MassDEP limited the subgroup regulated to include only compounds within +/- two carbons in chain length, and only those with the same functional subgroups, as compared to PFOS and PFOA. Notably, although different compounds, USEPA has concluded that PFOS and PFOA should be considered equipotent and additive in toxicity. In addition to chemical similarity, toxicity studies demonstrate effects in the same organ systems at similar concentrations, given the variability within and across testing systems.
Oyebode A. Taiwo	3M	MassDEP ignored differences in the RfD for PFHxS it relies on from Minnesota. MassDEP claims to rely on the RfD Minnesota derived for PFHxS but ignores the fact that there is a three-fold difference between the Minnesota RfD for PFHxS and PFOS. MassDEP obfuscates that difference by stating that because the difference falls within the enormous range of values across compounds, which varies by 10-fold, its conclusions are reasonable.	MassDEP recognizes that there are differences between PFHxS, PFOA and PFOS. However, they are very similar in chemical structure. The question is whether the data are sufficiently similar to treat them the same or sufficiently dissimilar to warrant assigning them different potency estimates. Upon consideration of the available data, MassDEP adopted the former interpretation. The rationale for this decision is clearly and extensively presented

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			in the TSD. The commenter has failed to provide new data that would change this conclusion. The commenter is incorrect in that MassDEP did not rely on individual values derived by Minnesota. The RfDs derived and selected by different organizations for each PFAS do differ. This reflects reasonable interpretations and decisions made regarding data limitations, significance and applicability by different scientists given the information available to them. USEPA states that an RfD is "[a]n estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime." The three- fold difference in RfDs estimated by MN for PFHxS and PFOA/PFOS may represent a real difference in the "true" potency, or it may not. It is however, within the range of uncertainty

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			recognized by USEPA as possible for an RfD value.
Oyebode A. Taiwo	3M	MassDEP committed similar errors for other PFAS in the Technical Document. The Technical Document notes that, for perfluoroheptanoic acid (PFHpA), "no agency has derived a compound specific toxicity value due to a lack of toxicity data." Despite this lack of data, the MassDEP concluded it is appropriate to consider PFHpA to be "equipotent" to PFOA based on "read-across" even though "toxicity data are not available to assign a compound specific or relative potency value for PFHpA or to conclude that it is toxicologically dissimilar to the other compounds in the subgroup." It is not scientifically sound to rely on a lack of information that a compound is toxicologically dissimilar when there is likewise no information that the compound is toxicologically similar. MassDEP should not simply assume a toxicological profile for a compound, as it appears to do here for PFHpA. As with PFHpA, it is inappropriate to assume a toxicological profile for PFDA where data is lacking or unreliable. MassDEP simply assumed toxicity similarities for at least three of the six substances it aims to regulate. This approach layers assumptions and	"Read-across" approaches are used to address toxicological data gaps for related chemicals. Read-across is "a technique for predicting endpoint information for one substance (target substance), by using data from the same endpoint from (an)other substance(s), (source substance(s))." ECHA (European Chemicals Agency). 2017. Read Across Assessment Framework (RAAF). March 2017. ECHA-17-R-01-EN. First published in May 2015, updated March 2017. It is not scientifically sound to assume a compound that lacks toxicological data has zero toxicity when it is chemically very closely related to compounds with extensive data demonstrating substantial toxicity.

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		uncertainty factors on top of each other numerous times to reach a conclusion that is not supported by any science cited by the agency.	
Oyebode A. Taiwo	3M	MassDEP has made a series of assumptions that lack scientific rigor and result in an overly conservative MCL. There is no scientifically sound basis to assume two of those five substances shares toxicity characteristics with the other substances in MassDEP's subgroup.	The noted similarities are not "assumed" but are clearly evident in the chemical structures of all six compounds and, where information exists, in the toxicological data.
Oyebode A. Taiwo	3M	The basis MassDEP identified for adding an additional uncertainty factor, that there is "considerable and convincing evidence associating exposures to these compounds with adverse responses in laboratory animals at levels of exposure lower than those relied upon by USEPA in its 2016 RfD derivations for PFOS and PFOA." But this is not a basis to add an uncertainty factor given the extensions and assumptions MassDEP has already relied upon and the addition of four other substances to a total value based on EPA's assessment for two substances.	MassDEP disagrees. As discussed in the TSD there is considerable and convincing evidence supporting the application of the additional database uncertainty factor.
Oyebode A. Taiwo	3M	MassDEP indicated during a February 20, 2020 "listening session" that the April 1, 2020 implementation date is a "placeholder." The regulated community and the public has not been properly informed that the implementation date is a placeholder. MassDEP must leave a sufficient amount of time from the end of a comment period until final proposal of a rule and then implementation.	MassDEP has received comments on what would be an appropriate start date and will respond to those comments when finalizing the regulation.

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Oyebode A. Taiwo	3M	MassDEP should not use the same assumptions of water intake for non-transient non-community (NTNC) and Community water systems. Using the same water intake assumptions for both types of public water systems results in double counting water intake for individuals who rely on a Community water system for residential consumption and a NTNC water system for the work day, for example.	NTNC systems serve the same set of consumers each day and, in some cases, individuals may consume most or all of their daily drinking water intake while on site.
Oyebode A. Taiwo	3M	Section 310 CMR 22.07G(3) would require a level of precision that is not supportable by the science. This section requires calculation of the Running Quarterly Average by rounding to two significant figures when available science, as acknowledged by MassDEP on page VI of its Technical Support Document, only allows for rounding to one significant figure.	Analytical values, regulatory standards and toxicity values are not the same, have different levels of precision and are used differently. The final MCL is a regulatory standard not a toxicity value. Analytical measurements used to determine compliance with the standard have a level of precision independent of the toxicity data used to develop the standard.
Stephen P. Risotto	American Chemistry Council	Revisions to the USEPA RfD for PFOA and PFOS are not justified by the available data. In assessing the health effects of PFOS and PFOA, MassDEP discusses evidence from additional rodent studies suggesting that adverse health effects may occur at levels below those established by USEPA for the development of its lifetime health advisory (LHA). USEPA considered all but one of the studies cited by MassDEP as part of its 2016 analysis, however,	MassDEP disagrees. The revisions are well justified as described in detail in the TSD. MassDEP reviewed analyses by other regulatory agencies as well as individual studies and risk assessment methods. The statement that USEPA considered all but one study evaluated by MassDEP is incorrect. As

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		and chose not to incorporate these data into the LHA derivation. The sixth study by Koskela *et al.* (2016) was derived from one of the other studies reviewed by USEPA and suffers from many of the same limitations that will be discussed below.	discussed in the TSD, MassDEP considered additional studies. For example, USEPA did not consider the results of the NTP 28-day study (National Toxicology Program (NTP). Toxicity Studies of Perfluoroalkyl Sulfonates (Perfluorobutane Sulfonic Acid, Perfluorohexane Sulfonate Potassium Salt, and Perfluorooctane Sulfonic Acid) Administered by Gavage to Sprague Dawley (Hsd:Sprague Dawley SD) Rats. (TOX-96). August 2019. US Department of Health and Human Services. NTP. Toxicity Studies of Perfluoroalkyl Carboxylates (Perfluorohexanoic Acid, Perfluorooctanoic Acid, Perfluorononanoic Acid, and Perfluorodecanoic Acid) Administered by Gavage to Sprague Dawley (Hsd:Sprague Dawley SD) Rats. (TOX-96). August 2019. US Department of Health and Human Services. NTP. TR-598: Technical Report Pathology Tables and Curves, Pathology Tables, Survival and

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			Growth Curves from NTP. General Study Information and Long-Term Studies. US Department of Health and Human Services.) as the data was not available to USEPA at the time of its assessment.
Stephen P. Risotto	American Chemistry Council	MassDEP concludes that the data suggest potentially more sensitive endpoints than those selected by USEPA and applies a data base uncertainty factor (UF_D) of 3 to USEPA's reference dose (RfD). The decision appears to be based on analyses conducted by other regulatory agencies, and not on MassDEP policy. According to USEPA guidance, a UF_D is generally applied when reproductive and developmental toxicity studies are missing since they have been found to provide useful information for establishing the lowest no adverse effect level. The EPA guidance notes that, for a reference dose (RfD) based on animal data, a factor of 3 is often applied if either a prenatal toxicity study or a two-generation reproduction study is missing, or a factor of 10 may be applied if both are missing. In deciding whether to apply an UF_D, EPA advises that the assessor should consider both the data lacking and the data available for particular organ systems as well as life stages. For PFOA and PFOS, the reproductive and development database is robust and does not suggest the need	The additional UF_D of 3 is not based on any single endpoint, study or assessment by other regulatory agencies, but instead reflects MassDEP's evaluation of the weight of the evidence. USEPA guidance (USEPA. 2002. A Review of the Reference Dose and Reference Concentration Processes. Risk Assessment Forum, U.S. Environmental Protection Agency. Washington, DC 20460. (EPA/630/P-02/002F)) uses reproductive and developmental studies as examples of the types of exposures (e.g., in utero), and endpoints that may occur at lower exposure levels, but are not included in standard protocols for sub-chronic and chronic bioassays (USEPA 2002). As noted in the review of testing protocols, effects in the nervous,

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		to account for an incomplete characterization of toxicity. The evidence for developmental effects for PFOA are contradicted by other research and not suggestive of an adverse effect. Similarly, the potential immunotoxic effects of PFOS have been studied in both laboratory animals and humans and fail to demonstrate consistent evidence of an adverse effect. While ACC/CPTD appreciates the proposal to apply a lower UF_D of 3, the available data indicate that no uncertainty factor is necessary for either substance.	immune, cardiovascular and endocrine systems are frequently lacking, as well as evaluation of effects in aged animals, especially after early life exposure (USEPA 2002). Consistent with USEPA (2002) guidance, MassDEP considered the available data, as well as the lacking data, when selecting the value for the UF_D to apply to the RfDs for PFOA and PFOS. The cited Dourson publication, Dourson ML *et al.* (1996) Evolution of science-based uncertainty factors in noncancer risk assessment. *Regul Toxicol Pharmacol* 24:108–120 (1996), is not USEPA guidance but a paper evaluating the uncertainty factors that were applied during development of RfDs available at the time the paper was written (i.e., 1996). Even if this were guidance, it is not prescriptive and does not preclude applying UF_D for other endpoints, or selection of other values for UF_D. As discussed in the TSD, MassDEP does not agree with the commenter that a UF_D is unnecessary. MassDEP

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			also notes that many other agencies (*e.g.* NJ, NH, MN and MI) that have recently reviewed the available data have also concluded that more stringent RfDs are needed than those adopted by USEPA (these are noted in the TSD). As presented in the TSD, MassDEP's evaluation of the available evidence supports application of a database uncertainty factor of $10^{1/2}$ for both PFOA and PFOS.
Stephen P. Risotto	American Chemistry Council	MassDEP's analysis describes reports of developmental and liver effects in animals exposed to PFOA in support of the application of a UF_D of 3. Two of the reports come from a study with the adult offspring of C57BL/6/Bkl mice exposed to PFOA in their diet through gestation. Both studies include a small number of animals and a single-dose which severely limits their value as critical studies for evaluating low-dose exposures to PFOA.	MassDEP has independently evaluated and critiqued developmental and liver toxicity studies. MassDEP has identified and discussed the individual study limitations, which raise questions regarding their use as a basis for alternative Point of Departures (PODs) in RfD derivation. Thus, MassDEP did not rely on any of the individual studies critiqued by the commenter. Instead MassDEP considered the evidence together and concluded that the weight of the evidence regarding developmental and liver toxicity

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			support the adjustment of the USEPA RfD downward.
Stephen P. Risotto	American Chemistry Council	In the study by Onishchenko *et al.* (2011), mild sex-related differences in exploratory behavior patterns in offspring were reported after 5 weeks of age. PFOA-exposed males were more active, while PFOA-exposed females were less active, than their respective controls. The study by Koskela *et al.* (2016) reported mild alterations in bone morphometry and mineral density of femurs and tibias in mice while noting that the biomechanical properties of the bones were not affected. Based on the absence of an impact on mechanical function, the biological significance of bone geometry and mineral density alterations reported by Koskela *et al.* is uncertain and may suggest a nontreatment-related adverse effect. Notably, no statistically significant increases in the occurrence of malformations/variations compared with controls were observed in similar studies conducted with rats. Koskela *et al.* also appear to have conducted their statistical analysis on a per-fetus basis. This is scientifically unjustified. In reproductive/ developmental studies, statistical analysis should be performed on each litter rather than on each pup in a litter as	The Onishchenko *et al.* (2011) and the Koskela *et al.* (2016) mouse studies served as the bases of the draft ATSDR PFOA MRL (ATSDR 2018a). The neurobehavioral-developmental effects reported by Onishchenko *et al.* (2011) were also selected by the Michigan Science Advisory Workgroup (MISAW) (MISAW. Health Based Drinking Water Value Recommendations for PFAS in Michigan. Report developed for the Michigan PFAS Action Response Team, Lansing, Michigan. June 27, 2019.) as the POD for their PFOA RfD. MassDEP independently evaluated and critiqued both these studies and also reviewed other supporting neurotoxicity studies described in various PFOA assessments (see TSD). Based on this review, MassDEP decided that results from these studies were informative and concerning but inadequate to provide alternative PODs for RfD derivation, in part

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		advised by EPA's guidelines for assessing developmental toxicity. Lau *et al.* (2006) also reported skeletal effects in the offspring of mice exposed to PFOA by gavage, but the effects did not change in a dose-related manner. Consequently, the effects noted by Lau *et al.* would generally not be considered relevant to PFOA exposure. In noting the striking difference between their result and the minor effects reported in the two-generation study in rats by Butenhoff *et al.* (2004), Lau *et al* (2006) suggest that they are most likely related to pharmacokinetic differences between the two species.	for some of the issues noted by the commenter. Koskela *et al.* (2016) evaluated changes in bone 13 and 17 months after *in utero* and lactational exposure, providing time for the impacts of early life exposure to be expressed during the developmental process. The Staples *et al.* (1984), Butenoff *et al.* (2004), and Lau *et al.* (2006) studies evaluated skeletal effects in pups at term or after weaning and thus do not provide data for comparison with the effects observed in the Koskela *et al.* (2016) study. The Koskela *et al.* (2016) statistical analysis appears appropriate as it was conducted on a per pup basis, with each pup coming from a different litter. Koskela *et al.* (2016) state that they selected one or two pups per dam (n=6) for evaluation at 13 months (n=5 pups) and 17 months (n=5 pups), thus, each pup appears to represent one litter.

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			The Lau *et al*. (2006) study results were reviewed and used by USEPA. USEPA determined that the effects reported in that study were relevant and they were used as the POD in the Agency's RfD derivation for PFOA. Interspecies differences may account for some of the observed differences in study results. However, this does not negate concerns over the effects reported. MassDEP noted the limitations of the Koskela *et al.* (2016) study in the TSD and decided not to rely on these endpoints as a POD. Instead MassDEP views this study as contributing to the overall database regarding lower dose effects of concern and thus supportive of the use of an additional UF for database uncertainty in the RfD derivation. More recent epidemiological studies provide additional evidence of PFOA decreasing

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			bone mineral density measured in mid-childhood (Rachel Cluett, Shravanthi M. Seshasayee, Lisa B. Rokoff, Sheryl L. Rifas-Shiman, Xiaoyun Ye, Antonia M. Calafat, Diane R. Gold, Brent Coull, Catherine M. Gordon, Clifford J. Rosen, Emily Oken, Sharon K. Sagiv, and Abby F. Fleisch. Per- and Polyfluoroalkyl Substance Plasma Concentrations and Bone Mineral Density in Midchildhood: A Cross-Sectional Study (Project Viva, United States). *Environmental Health Perspectives* **127(8),** August (2019)), adults (Hu Y, Liu G, Rood J, Liang L, Bray GA, de Jonge L, Coull B, Furtado JD, Qi L, Grandjean P, Sun Q. 2019. Perfluoroalkyl substances and changes in bone mineral density: A prospective analysis in the POUNDS-LOST study. Environmental Research 179: 108775) and young men (Di Nisio, A., De Rocco Ponce, M., Giadone, A. *et al.* Perfluoroalkyl substances and bone health in young men: a pilot study. *Endocrine* **67,** 678–684

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			(2020)), providing evidence that PFOA may impair bone health. The results of these studies support MassDEP's decision to consider effects on bone when determining the database uncertainty factor in the RfD derivation.), providing evidence that PFOA may impair bone health. The results of these studies support MassDEP's decision to consider effects on bone when determining the database uncertainty factor in the RfD derivation.
Stephen P. Risotto	American Chemistry Council	MassDEP also points to reports of delayed mammary gland development in the offspring of female mice exposed by gavage during pregnancy. In fact, the results in the mouse studies support a peroxisome proliferator activated receptor alpha (PPARα)-activated mechanism in mice. While the cited study reported a delay in mammary gland development in CD-1 mice, Albrecht *et al.* (2013) did not find alterations in mammary gland development in offspring of wild type, PPARα-null, or PPARα humanized mice following *in utero* exposure to PFOA by gavage. In a multi-generational study with CD-1 mice exposed to PFOA (gavage and drinking water) conducted by White et al (2011), no clear	PFAS cause adverse effects in genetically engineered PPARα knockout animals. This demonstrates that this mechanism cannot be solely responsible for PFAS toxicity. The significance of the mammary gland effects, and some of the reported liver effects, is a matter of ongoing scientific debate and not all scientists agree on how this data should be interpreted. MassDEP finds the noted effects to be concerning but has not relied on the cited studies or these effect

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		dose-response was reported and the investigators noted that the delay in mammary gland development did not appear to affect lactational support based on normal survival and growth of the second generation (F2) offspring.	classes to derive a POD for RfD derivation.
Stephen P. Risotto	American Chemistry Council	MassDEP also points to evidence that hepatic effects noted in animals exposed to PFOA may not be solely dependent on PPARα and, therefore, may be relevant to humans. Increased relative liver weight is a common effect of PFOA in animal studies that has been reported to occur at lower levels of exposure than those causing effects on other organ systems. The C8 Health Project is a large epidemiological study conducted in communities surrounding a manufacturing facility in Parkersburg, West Virginia that used PFOA from the 1950s until 2002. The study included over 32,000 adult residents and facility workers. The Science Panel formed as part of this project concluded that "there is not a probable link between exposure to C8 (also known as PFOA) and liver disease." The conclusions of the C8 Science Panel are supported by the recent work of Convertino *et al.* (2018) who reported no differences in clinical measures (including triglycerides, urea, glucose, serum AST, GGT, alkaline	MassDEP agrees that liver effects are commonly reported in animals exposed to PFAS. In some, but not all studies, these effects are reported at lower levels of exposure than other effects. The liver is an important organ for maintaining cholesterol and lipid homeostasis. Therefore, the conclusion by the C8 Science Panel that there is a probable link between PFOA and high cholesterol, supports concerns about liver effects in people exposed to PFOA. The cited Covertino study involved a limited number of very ill cancer patients and is thus not generalizable to the overall population.

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		phosphatase, total bilirubin, fibrinogen, PTT and aPTT) at weekly PFOA doses as high as 1200 milligrams (about 16 milligrams/kilogram or mg/kg), among a sensitive sub-population of cancer patients.	
Stephen P. Risotto	American Chemistry Council	The results noted by MassDEP, moreover, come from short-term studies lasting only 14 to 17 days. Although increases in hepatocellular hypertrophy and liver weight were observed at slightly lower doses in these studies, the study by Perkins *et al.* (2004) is the more relevant for assessing hepatic effects since it included dietary exposure durations of up to 13 weeks. In addition, Perkins *et al.* is one of the few studies to report a no observed adverse effect level (NOAEL). Most of the other studies did not identify a NOAEL and could only report a lowest observed adverse effect level (LOAEL) which means that further mathematical conversions (safety factors) to derive a NOAEL send the resulting level lower than necessary.	The Perkins *et al.* (2004) 13-week study exposing male rats to PFOA does not evaluate effects following *in utero* exposure; thus it is not an appropriate study for comparison with the developmental studies we concluded were relevant to humans and supported a lower RfD than developed by USEPA (as described in the TSD) for PFOA. While developmental studies have relatively short exposure durations, generally 17 days during gestation for mice, this exposure period occurs during critical periods of development of an animal that cannot be captured in longer studies that typically begin exposures once the animal is an adolescent or adult.
Stephen P. Risotto	American Chemistry Council	MassDEP points to the reports of immune effects in animals exposed to PFOS as the basis for adding a UF_D of 3 to USEPA's RfD. The results of the available immune effect studies	The risk assessment process separates the hazard identification process, determining that a health effect is associated with an

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		are conflicting, however, and led both USEPA and Health Canada to express concerns about the significance of these data to assessing the risk to humans. Several studies have investigated potential effects on the immune system ─ natural killer (NK) cell activity and plaque forming cell (PFC) response in mice exposed to PFOS. Although the studies reported effects on components of the immune system, USEPA concluded that the differences in the levels at which effects were reported (and conflicts in the direction of the effects) "highlight the need for additional research to confirm the NOAEL and LOAEL for the immunological endpoints." Health Canada reached a similar conclusion noting that "[f]urther exploration should be performed to address the nearly two orders of magnitude difference in LOAELs in the studies before these endpoints can be reliably considered as a basis for risk assessment."	exposure in humans and/or animals, from the quantitative process where an RfD is determined. Thus, as described in the TSD, the conclusions of the NTP systematic review, that there is sufficient human and animal evidence to presume that PFOS is an immune hazard, and Health Canada (HC) acknowledging the association of PFOS and increased risk of immunologic effects observed in the epidemiologic studies, represent hazard identification. The ability of the available studies (data) to confidently identify a POD, is a separate consideration and part of the quantitative process. MassDEP's evaluation of the evidence for immune effects concluded that the overall evidence regarding immunotoxicity is convincing and sufficient to support a lower RfD for PFOS than derived by USEPA (as described in the TSD). However, as also discussed in the TSD, and noted by USEPA, ATSDR, and HC,

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			various issues regarding the individual studies raise questions about their utility for providing an alternative POD. Therefore, MassDEP accounted for the overall evidence by including an additional UF for database uncertainty in the RfD derivation.
Stephen P. Risotto	American Chemistry Council	While Dong *et al.* reported a NOAEL of 0.0167 milligrams per kilogram (mg/kg) per day, resulting in an average serum levels of 2.36 milligrams per liter (mg/L) for decreased PFC response in male C57BL/6 mice exposed to PFOS by gavage, a dietary study involving B6C3F1 mice did not find a change in PFC response in males exposed to 0.25 mg/kg per day for 28 days, resulting in serum PFOS levels of 12 mg/L. In the only study designed to measure immune system effects on components of the immune system in rats, the NOAEL (for serum IgG levels) was several orders of magnitude higher than some of the LOAELs from mouse studies. The point of departure derived from both the B6C3F1 mouse and rat studies are significantly higher than that used by USEPA.	Most of these studies are addressed in the TSD. The studies noted by the commenter and not addressed in the TSD include Qazi (2010; 2009) and Lefebvre (2008). These had higher exposure concentrations, *e.g.*, 1 mg/kg-day, and therefore are not informative of lower dose toxicity.
Stephen P. Risotto	American Chemistry Council	Sensitivity to immunological effects in the animal studies appears to be dependent on several factors – including species (mice vs rat), route of exposure (gavage vs diet), and exposure duration. In addition, a study with	MassDEP noted these issues in the TSD and concurs that additional research is warranted. However, as discussed in the TSD, MassDEP concluded that

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		PPARα-null 129/Sv mice suggests that immunomodulation in mice is partially dependent on PPARα and may be rodent-specific. Consequently, USEPA and Health Canada have stressed the need for more research.	the overall evidence is sufficient to conclude that lower dose effects are of concern and to necessitate the additional UF applied.
Stephen P. Risotto	American Chemistry Council	Human studies generally report no increase in infection rates in children or adults exposed to PFOS and both USEPA and Health Canada have questioned whether the small variations in the antibodies observed in the available studies are sufficient to result in adverse health effects in humans. As the National Toxicology Program (NTP) noted in its review of PFOS the "effects on diverse endpoints such as suppression of the antibody response and increased hypersensitivity may be unrelated."	As described in the TSD, the conclusions of the NTP review state, "[t]he NTP concludes that exposure to PFOS is *presumed to be an immune hazard to humans* based on a high level of evidence that PFOS suppressed the antibody response from animal studies and a moderate level of evidence from studies in humans (Table 9). Although the strongest evidence for an effect of PFOS on the immune system is for suppression of the antibody response, there is additional, although weaker, evidence that is primarily from studies in experimental animals that PFOS suppresses disease resistance and natural killer (NK) cell activity. The evidence indicating that PFOS suppresses multiple aspects of the immune system supports the overall conclusion that PFOS alters immune function in

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			humans. Although the mechanism(s) of PFOS-associated immunotoxicity is not well understood, suppression of the antibody response and NK cell function are both potential mechanisms by which PFOS may reduce disease resistance."
Stephen P. Risotto	American Chemistry Council	MassDEP has proposed applying a single drinking standard to the sum of six PFAS that vary significantly in the availability of potential adverse health effects information and metabolism patterns and kinetics. While the use of a single value for multiple PFAS may be useful for screening purposes, it is not appropriate for establishing a regulatory standard. Much is known about PFOS and PFOA, but considerably less data are available for the other four substances. Even in the case of PFOS and PFOA, the mechanism by which exposure to these substances causes adverse health effects in laboratory animals is unknown.	MassDEP disagrees. While there is considerable variability in the extent of health effects information for these compounds it is clear is that they share very similar chemical structures and cause similar types of effects. USEPA concluded that the two most studied compounds in this group, PFOA and PFOS, should be considered to have additive and equipotent effects. As discussed in the TSD, MassDEP has extended this approach to an additional four compounds within +/- two carbons of PFOA and PFOS and containing the same functional groups. It is logical and scientifically appropriate to treat PFAS in subgroups in order to address exposure limits due to the subgroup member's highly similar structural determinants

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			and similarities in toxicity test outcomes.
Stephen P. Risotto	American Chemistry Council	The grouping of substances under a single standard is justified only when the substances are believed to cause adverse health effects by the same mechanism of action. This is clearly not the case for the six substances identified by MassDEP. Although the USEPA's lifetime Health Advisories (LHAs) for PFOS and PFOA are based on developmental effects, the critical developmental endpoints identified by EPA do not suggest a common mechanism. Similar evaluations of the potential adverse health effects of exposure to PFHxS, PFHpA, PFNA, or PFDA are not available from EPA, and the draft evaluations for PFHxS and PFNA from the Agency for Toxic Substances and Disease Registry (ATSDR) indicate that a very limited amount of data exist for these substances – particularly data related to mechanism of action. Moreover, in the case of both PFDA and PFHpA, ATSDR concluded that "insufficient data are available for derivation" of minimum risk levels.	MassDEP does not agree with this statement. Although the mechanism(s) of action of these compounds is unknown, these compounds are known to interact similarly with a variety of cellular receptors, exhibit well established structural similarities, and cause similar biological effects. Following USEPA's approach to PFOA and PFOS, based on the above, MassDEP has concluded that it is appropriately health protective to treat these compounds as being additive. MassDEP notes that USEPA does not require that chemicals have the same demonstrated mechanism of action when applying dose additivity across all programs (*e.g.* see the drinking water rules for disinfection byproducts). MassDEP also notes that since the publication of the TSD, a scientific committee of the European Food Safety Authority

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			(EFSA) published a scientific opinion that toxicologically treats four of the six longer-chain PFAS addressed by MassDEP additively and as a subgroup (EFSA CONTAM Panel (EFSA Panel on Contaminants in the Food Chain), Schrenk 53 D, Bignami M, Bodin L, Chipman JK, del Mazo J, Grasl-Kraupp B, Hogstrand C, Hoogenboom LR, Leblanc 54 J-C, Nebbia CS, Nielsen E, Ntzani E, Petersen A, Sand S, Vleminckx C, Wallace H, Barregård L, Cravedi 55 J-P, Haldorsson TI, Haug LS, Johansson N, Knutsen HK, Rose M, Roudot A-C, van Loveren H, Vollmer 56 G, Mackay K, Riolo F and Schwerdtle T, 20YY. Scientific opinion on the risk for human health related to the presence of perfluoroalkyl substances in food. EFSA Journal 20YY; volume(issue):NNNN, 460 pp. 58 doi:10.2903/j.efsa. 20YY.NNNN)
Stephen P. Risotto	American Chemistry Council	MassDEP's conclusions are based on the results of 28-day *in vivo* studies with five of the six PFAS conducted by NTP which reported liver and thyroid effects. In considering these effects,	As described in the TSD, MassDEP did not base its conclusions on the results of the 28-day studies, but instead based

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		NTP notes that research suggests that the mechanism for many of the two-year study findings [for PFAS] could be related to PPARα activation, which has questionable relevance for human health. In other cases, the human health impacts of NTP's findings may not be known.	its conclusions on an evaluation of the overall toxicological data. However, the results of the 28-day studies do provide supporting evidence of effects occurring in the same organ systems at similar serum concentrations and human equivalent doses (HEDs) for the five longer-chain PFAS included in that study. MassDEP also did not base its conclusions on the results of the NTP 2-year study findings. Furthermore, as noted in the TSD, considerable evidence demonstrates that PPARα activation is insufficient to explain PFAS toxicities.
Stephen P. Risotto	American Chemistry Council	For two of the six PFAS included in the proposal – PFHpA and PFDA – MassDEP notes that sufficient toxicity data are lacking and its analysis is dependent on a "read across" analysis to estimate toxicity. Based on this analysis, in fact, MassDEP concludes that "the data on [PFHpA] are sufficient to conclude that it is not appropriate to consider it as being toxicologically equivalent to the other compounds." It is not clear why PFHpA remains in the current proposal.	The commenter's statement incorrectly quotes the conclusions for PFHpA from the MassDEP TSD. The correct quote is, "[w]ith respect to the remaining compound in the targeted group, PFHxA, the available data demonstrate that it exhibits a much shorter serum half-life and is substantially less toxic on an applied dose basis than the other compounds. MassDEP ORS has

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			concluded that the data on this compound are sufficient to conclude that it is not appropriate to consider it as being toxicologically equivalent to the other compounds." (MassDEP 2019, page v). The correct conclusions for PFHpA state, "MassDEP ORS continues to conclude that this [considering PFHpA to be equipotent to PFOA] is an appropriate approach as toxicity data are not available to assign a compound specific or relative potency value for PFHpA or to conclude that it is toxicologically dissimilar to the other compounds in the subgroup" (MassDEP 2019, page v).
Stephen P. Risotto	American Chemistry Council	Existing calculations of the health risks associated with exposure to PFAS are highly dependent on estimates of the terminal elimination half-lives of the substances. In the case of the PFAS identified by MassDEP, significant differences exist. While the terminal elimination half-life of PFHxS in humans is estimated to be on the order of 5 to 8 years, the terminal elimination half-life for PFHpA is estimated to be much shorter, on the order of 70	MassDEP notes that the half-life estimates, when available for individual people, vary considerably and overlap across compounds. The half-life data for PFHpA, while consistent with a shorter duration, are very limited. One study estimated a human half-life of about 1 year based on urinary excretion. A second

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		days, and the limited data for PFDA and PFNA do not allow for a robust estimate of their respective terminal elimination half-life.	study, based on a small number of adult male ski wax applicators, estimated half-lives ranging from approximately 1 - 4 months. The limited extent of this data precludes firm conclusions regarding the typical range of half-lives in the general population for this compound. The limited data on PFDA indicate that it is likely to exhibit a human serum half-life comparable to PFOA and PFOS.
Stephen P. Risotto	American Chemistry Council	MassDEP assumes a relative source contribution (RSC) of 20 percent. Although 20 percent is often used as a default assumption for the exposure resulting from drinking water, the available evidence suggest that other sources of potential exposure to the two major substances -- PFOA and PFOS -- have declined drastically. According to data collected by the Center for Disease Control and Prevention (CDC), mean serum levels of PFOS declined by 85 percent in the US population between 1999 and 2016. According to CDC, mean serum levels of PFOA declined by 60 percent over the same time frame. Given those dramatic declines, it is inappropriate to assume that 80 percent of exposure to these substances comes from sources other than drinking water. While a few other states have assumed an RSC of 50 or 60	MassDEP has concluded that the 20% RSC it has applied is appropriate. This value is the same as that used by USEPA in deriving its drinking water health advisories for PFOA and PFOS, a decision made in light of uncertainties about other sources of exposure. This RSC is the most conservative value recommended under current guidance (USEPA, 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). Office of Water, Office of Science and Technology. Washington, DC.

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		percent, it is likely that the contribution of drinking water to overall exposure is even higher – particularly in areas where drinking water contamination has been detected.	EPA-822-B-00-004). It was applied to account for other possible sources of exposure, in particular to sensitive populations, including uncertain and variable exposures from: the diet (including infant exposure attributable to breast milk); consumer products and indoor dust related to these; and, existing body burdens, including to the fetus.
Stephen P. Risotto	American Chemistry Council	MassDEP further assumes a water intake rate of 0.054 liters per kilogram body weight per day (L/kg-day) which corresponds to the 95th percentile "for the first year of life." However, the reference dose of 0.00002 mg/kg per day developed by US EPA for both PFOA and PFOS, and used by MassDEP, is based on developmental effects. As a result, the more appropriate water intake rate should be the EPA recommended value of 0.038 L/kg-day for pregnant women.	For calculating the PFAS MCL, MassDEP has applied the exposure parameters used by USEPA to develop the PFOA and PFOS Drinking Water Health Advisories. USEPA used exposure factors based on a lactating woman to derive the Health Advisories because infants were identified as a sensitive subgroup for PFAS. MassDEP also notes that there is no requirement for the use of the same exposure factors for all MassDEP MCLs.
Stephen P. Risotto	American Chemistry Council	The Department has not provided information on how many public water supplies will be affected by the proposal or an estimate of the cost of compliance for the individual suppliers	MassDEP is subject to and revises regulations in accordance with the requirements of the Administrative Procedures Act.

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		or for the state. Estimates developed by other states indicate that the capital and maintenance costs of treatment technology can be considerable, and none have attempted to estimate the cost for compliance with a standard based on the sum of multiple PFAS. Before moving ahead, it is critical that MassDEP provide the public with information on the estimated costs and benefits of its proposal. Since these capital and maintenance costs will ultimately be passed onto the customers (i.e., ratepayers) of the water systems, it is imperative that MassDEP also evaluate how these costs would impact the households served by the systems. In addressing the costs for individual households, EPA's National Drinking Water Advisory Council (NDWAC) recommends that a given drinking water standard be considered affordable if the annual cost per customer to meet the standard does not exceed 1.0% of the median household income for the median system in each drinking water system size category. Without estimating the increased cost to households served by the affected water systems, [we] cannot determine whether the proposed MCLs will or will not cause economic harm.	MassDEP did provide, as part of the public hearing presentation the number of PWSs that are affected by the proposal (695 COM and NTNC systems and 792 TNC systems).
Guilford Mooring	Town of Amherst	Let EPA take the lead on addressing regulation of PFAS.	MassDEP believes it is appropriate to consider promulgating health-protective

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			standards in the absence of federal action.
Guilford Mooring	Town of Amherst	Develop compound-specific standards for each of the PFAS compounds due to differences in: toxicity endpoints, uncertainty factors between humans and mammal toxicities, reference dosages, half-lives and bioaccumulation. A cumulative approach could make treatment and operational considerations more challenging.	MassDEP considered this approach but concluded, as explained in the TSD, that a subclass approach is preferable.
Guilford Mooring	Town of Amherst	Exclude results below the MRL and do not use a default value for such results. Use of these results could lead to legal challenges when identifying a responsible party.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
Guilford Mooring	Town of Amherst	Allow for sample invalidation due to: materials at the sample tap, human error or markedly different confirmation results.	The proposal includes provisions for identifying alternative sampling locations which would include situations where an existing sample line is suspected or can be demonstrated to be a source of PFAS. MassDEP does not agree that human error could alter the results of PFAS sampling in a way that would not also alter the field reagent blank that is a required part of every sampling event. A field reagent blank that fails QC would invalidate the associated field sample. Quality control measures

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			are used to evaluate both initial and confirmation samples such that each can be individually determined to be acceptable for compliance use. MassDEP's experience to date does not support the premise that confirmation samples are likely to be markedly different from initial samples but these situations would be evaluated on a case-by-case basis.
Guilford Mooring	Town of Amherst	Consider the complexity, timing and cost of treatment design, permitting and construction when enforcing the MCL.	MassDEP's enforcement practices currently allow for negotiated compliance timelines for specific challenges at each utility (*e.g.*, the availability of funding, access to engineering services and the time to obtain and construct treatment units).
Guilford Mooring	Town of Amherst	Add necessary services and common treatment components to the state bid list.	Outside the scope of the drinking water regulations.
Guilford Mooring	Town of Amherst	Provide appropriate risk communication materials.	The proposal's public notice and consumer confidence requirements include health effects language. In addition, MassDEP has developed communication materials that are available on the web. These note other exposure pathways.

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Guilford Mooring	Town of Amherst	Ensure that the consumer notice is specific to the sensitive subpopulation.	Depending on the length of exposure, health risks could be of concern for the general population not just sensitive subgroups and as such the consumer notice would be tailored to the specific situation.
Guilford Mooring	Town of Amherst	Provide context to relative PFAS exposures in drinking water versus other pathways.	MassDEP has developed communication materials that are available on the web. These already note other exposure pathways.
Guilford Mooring	Town of Amherst	Provide guidance on PFAS-free bottled water and point-of-use filters.	Although MassDEP does not regulate bottled water, MassDEP has solicited and made available on our web page testing results from bottled water companies. Publicly available treatment options for homeowners, to the extent available, have also been posted.
Guilford Mooring	Town of Amherst	Establish a definitive timeline for BWSC site discovery actions.	Outside the scope of the drinking water regulations.
Guilford Mooring	Town of Amherst	Identify additional grant funding for treatment.	Outside the scope of this proposal. Note: the State has made funding available for limited sampling as well as reimbursement for the design of PFAS treatment. The Drinking Water State Revolving Fund administered by the Clean Water

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			Trust also has funding specifically to address PFAS contamination via low interest loans.
Guilford Mooring	Town of Amherst	Provide technical and compliance assistance.	Outside the scope of the drinking water regulations. Note: MassDEP has done so in the past and intends to continue to do so.
Caredwen Foley	Boston University School of Public Health	It is laudable that MassDEP will subject PFAS to an enforceable standard with respect to public water supplies, and particularly that the proposed standard is intended to protect even sensitive sub-populations. I support MassDEP's proposed 20 ng/L standard for the sum of the six designated PFAS species with reservations.	MassDEP notes the support.
Caredwen Foley	Boston University School of Public Health	Concerned whether the standard is adequately protective of infants and developing fetuses. While the Technical Support Document describes the significance of in utero and nursing exposures and highlights the enhanced protectiveness of the 20 ng/L standard for sensitive subgroups, I am unconvinced that a standard that protects pregnant or lactating persons is *a fortiori* sufficiently protective for developing fetuses and nursing infants. For this reason, I would encourage MassDEP to revisit its exposure assumptions and reevaluate whether 20 ng/L is indeed adequately protective for these populations. The propensity of PFOS and PFOA to bind to plasma proteins results in	As discussed in the TSD, the RfD applied to the subgroup reflects developmental effects, and thus addresses in utero exposures. Estimates of the degree to which exposures to the breast fed infant exceed maternal exposures are variable but generally support elevated exposures early in life. MassDEP has concluded that the 20% RSC it has applied is appropriate. This value is the same as that used by USEPA in deriving its drinking water health

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		disproportionately high transplacental exposure to the developing fetus. The partitioning of PFAS in breastmilk also results in doses received by nursing infants over four times higher than the doses received by the breastfeeding parent, particularly in the first few weeks of life when PFAS excretion in breastmilk is at its highest; ratios as high as 15-fold have been modeled. A standard that ensures that an adult woman has sufficiently low PFAS serum concentrations to protect her from adverse health effects may still allow her to accumulate a body burden of PFAS that yields breastmilk contaminated enough to present risks to her child. MassDEP indicates in the Technical Support Document that the presumed drinking water relative source contribution of 20% is intended to protect against potentially higher exposures incurred through nursing or transplacental exposure. The 20% RSC has been substantiated by studies examining PFAS plasma concentrations in adults exposed to tap water. But without corroboration that this RSC is applicable to breastfeeding infants, applying a fivefold RSC may not represent adequate protection, since PFAS doses received from breastmilk may be four to fifteen times the doses received from drinking water.	advisories for PFOA and PFOS, a decision made in light of uncertainties about other sources of exposure. This RSC is the most conservative value recommended under current guidance (USEPA, 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). Office of Water, Office of Science and Technology. Washington, DC. EPA-822-B-00-004). It was applied to account for other possible sources of exposure, in particular to sensitive populations, including uncertain and variable exposures from: the diet (including infant exposure attributable to breast milk); consumer products and indoor dust related to these; and, existing body burdens, including to the fetus. MassDEP is following research on this issue.

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		Revisit the toxicokinetic literature concerning transplacental and lactational PFAS exposure – particularly the Minnesota Department of Health model developed by Goeden et al., (2019) – and reconsider whether a 20 ng/L standard sufficiently accounts for the disproportionate partitioning of PFAS in breastmilk and the placenta, and the attendant increases in fetal and infant exposure through these routes (particularly given the susceptibility of these populations to PFAS's developmental effects)	
Caredwen Foley	Boston University School of Public Health	Concerned that setting a cumulative standard may place MassDEP in a challenging position as more is learned about the toxicity of currently-unregulated PFAS species. If research eventually reveals that additional species have toxicological profiles similar to the six PFAS included in this standard, how would MassDEP revise a summed standard without either 1.) including new species in the same cumulative limit, potentially reducing limits for each species below the detection limits of available approved methods and implying that the toxicity of individual previously-included species is lower than previously thought, or 2.) including new species and raising the total cumulative limit to a higher value, loosening the entire standard and undermining the rationale that mechanistic similarities between PFAS species justify summing exposures to them.	MassDEP will evaluate new studies as they become available and if regulation of additional PFAS is warranted would consider the most appropriate way to do so. MassDEP notes that the number of compounds that could potentially be included in the subgroup, based on chain length and functional group, is limited. In addition, if additional compounds within this subgroup were to be regulated similarly, because the number of potential additional compounds in this subgroup is limited and not all the compounds co-occur, MassDEP does not anticipate that there

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		Publish additional clarification about: a. The types kind of evidence MassDEP would need to see about a particular PFAS species to consider adding that species to the 20 ng/L MCL, as well as the circumstances under which MassDEP might instead set an individual standard for any particular species; b. How residents and communities should interpret potential future inclusions of additional PFAS species in the 20 ng/L standard (i.e., emphasizing the importance of treating this class of compounds as a group, in order to counter the notion that including more species would imply that the safe threshold for any single species is decreasing).	would be issues with respect to analysis and summation. However, even if issues with the application of the proposed cumulative standard were to arise if additional compounds beyond the subgroup are ultimately demonstrated to have similar potencies and act additively, adoption of this standard would not preclude the possibility of establishing additional cumulative standards, individual standards or some other combination of standards in the future, as appropriate.
Caredwen Foley	Boston University School of Public Health	Is the protocol for quantifying non-detects (i.e., treating samples with values of 1/3MRL < *x* < MRL as 1/2MRL) appropriate for very low, cumulative MCLs that apply to potentially-increasing numbers of species.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
Carolyn Hoffman	Boston University School of Public Health	I do not support the established MassDEP PFAS regulations that set a drinking water standard of 20 ng/L for the sum of six specific PFAS because I do not think the regulations go far enough to protect public health. Set a drinking water standard of 0.1 ng/L for perfluorooctanoic acid (PFOA) and 0.4 ng/L for	As detailed in the TSD, MassDEP has concluded that the proposed drinking water standard is protective of public health based on current information. MassDEP is aware of the potential carcinogenicity of PFOS and PFOA and notes that data for the

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		perfluorooctane sulfonate (PFOS). These values were developed as reference levels for concentrations of PFOA and PFOS in drinking water that would not pose more than one-in-a-million cancer risk over a lifetime by the Office of Environmental Health Hazard Assessment of California.	other compounds are not available and that, in light of the lack of data demonstrating genotoxicity, appropriate approaches to estimating the potential low dose carcinogenic potency of these compounds is a matter of ongoing investigation and discussion. MassDEP notes that the lower drinking water standards proposed by the reviewer are below current analytical limits.
Charley Leonard	School of Public Health, Boston University	Many states have already established drinking water standards, of which several have stricter standards than Massachusetts.	MassDEP acknowledges that some states have adopted lower limits or guidelines for individual PFAS compounds. However, these are not directly comparable to the MassDEP standards, which are applied to a subclass of compounds.
Charley Leonard	School of Public Health, Boston University	MassDEP should consider expanding the standard to include the vast majority of PFAS and include an evaluation process in which MassDEP reviews data on PFAS every two years to inform possible additions to the MCL.	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).

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Charley Leonard	School of Public Health, Boston University	According to Linda Birnbaum an expert in PFAS research, the safe dose of PFOA is 0.1 ppt. Setting a more stringent standard would be the best course of action for public health.	0.1 ppt is below the achievable reporting limit for PFAS as determined by MassDEP's Wall Experimental Station and thus cannot be reliably quantified in drinking water at that level. As detailed in the TSD, MassDEP has concluded that the proposed drinking water standard is protective of public health based on current information.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	The proposed MCL standards are an important step forward in protecting Massachusetts communities from exposure to PFAS.	MassDEP notes the support.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	Not protective of developing fetuses, infants and children.	MassDEP disagrees. The standard is based on developmental endpoints with appropriate adjustments to account for uncertainties and as such is protective of this population. The proposed standard offers similar, or greater, overall protection than other state standards or guidelines and is substantially more protective than the USEPA health advisories addressing PFAS compounds.

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Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	The proposed MCL does not address other PFAS in the environment.	In determining which PFAS to address, MassDEP focused on a subset of structurally similar longer-chain PFAS compounds as these exhibit similar toxicity and long serum half-lives. Currently, there is insufficient toxicological basis for establishing a standard for all PFAS as a class as PFAS that are more structurally divergent are more likely to exhibit different toxicological properties. MassDEP is following scientific developments, on an ongoing basis, regarding approaches to addressing these.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	The monitoring requirements are not sufficient. The complexity could lead to noncompliance. Simplify the monitoring protocols while making them more robust. Provide systems and customers a summary of the monitoring requirements and a decision tree that lays out actions depending on test results.	MassDEP believes that the combination of initial monitoring followed by either increased monitoring, based on the presence of PFAS; or routine monitoring, based on its absence; establishes an appropriate balance between the cost of monitoring and the frequency necessary to identify contamination in a timely manner. MassDEP provides PWSs with a monitoring schedule as a technical assistance tool to avoid noncompliance. This schedule is available to the

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			public. MassDEP intends to provide a flowchart to illustrate how test results can change a system's monitoring requirements as part of planned guidance.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	The public notification requirements are not sufficient.	MassDEP disagrees. The combination of consumer notification and public notification triggers along with consumer confidence reporting exceeds the SDWA standard.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	The MCL should be 1 ppt or, if this is not possible, at the most stringent level technologically achievable for all detectable PFAS.	1 ppt is below the achievable reporting limit for PFAS as determined by MassDEP's Wall Experiment Station and thus cannot be reliably quantified in drinking water at that level. As detailed in the TSD, MassDEP has concluded that the proposed drinking water standard is protective of public health based on current information.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	If MassDEP decides to promulgate an MCLG in the future it should be zero on based on the known and potential carcinogenicity and non-carcinogenetic toxicity of PFAS.	As detailed in the TSD, MassDEP has concluded that the proposed drinking water standard is protective of public health based on current information. MassDEP is aware of the potential carcinogenicity of PFOS and PFOA and notes that data for the

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			other compounds are not available and that, in light of the lack of data demonstrating genotoxicity, appropriate approaches to estimating the potential low dose carcinogenic potency of these compounds is a matter of ongoing investigation and discussion.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	Establish a treatment technique for the entire class of PFAS.	Based on its assessment as presented in the TSD, MassDEP has concluded that its approach to addressing the overall toxicity database for the longer-chain PFAS is appropriately health protective and reflective of the current data. Given the available scientific data MassDEP chose specific PFAS that could be included in this subclass. As explained in the TSD, there are technical limits on how many and which PFAS could be treated similarly. For these reasons, MassDEP chose to regulate a subclass of PFAS as opposed to establishing a treatment technique.
Alyssa Rayman-Read/Elizabeth	Conservation Law Foundation/Clean Water Action/Toxics	Require a Do Not Drink order when the MCL is exceeded.	The proposal does not preclude a public health order, such as a Do Not Drink, being part of a

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Saunders/Shaina Kasper/Anna Reade	Action Center/National Resources Defense Council		response to elevated PFAS6 levels in appropriate circumstances.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	MassDEP must take action in the absence of federal safeguards.	MassDEP believes it is appropriate to consider promulgating health-protective standards in the absence of federal action.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	Assumptions used to derive the MCL are not sufficiently conservative and the RfD should be lower. Specifically, there are several health endpoints, including immunotoxicity and developmental harms, that occur at doses lower than those selected by the EPA. The $10^{1/2}$ UF proposed by MassDEP is not sufficient to cover the difference in dose of these endpoints.	MassDEP disagrees. MassDEP concluded that its RfD is appropriately conservative for the reasons set forth in the TSD. The application and selection of the additional database UF to account for evidence of lower dose toxicity is explained in the TSD. MassDEP continues to believe this value is appropriate. MassDEP's evaluation of the evidence for immune effects concluded that the overall evidence regarding immunotoxicity is convincing and sufficient to support a lower RfD for PFOS than derived by USEPA (as described in the

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			TSD). However, as discussed in the TSD, and noted by USEPA, ATSDR, and HC, various issues regarding the individual studies raise questions about their utility for providing an alternative POD. Therefore, MassDEP accounted for the overall evidence by including an additional UF for database uncertainty in the RfD derivation.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	[T]he National Academy of Sciences has recommended the use of an additional uncertainty factor of 10 to ensure protection of fetuses, infants and children who often are not sufficiently protected from toxic chemicals such as pesticides by the traditional intraspecies (human variability) uncertainty factor.	Such an additional UF is not appropriate because the point of departure for the RfD is based on developmental effects. The NRC committee "emphasize[d] that this is not a new, additional uncertainty factor but, rather, an extended application of a uncertainty factor now routinely used by the EPA for a narrower purpose."
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	Consumption rate should be based on the higher intake by infants. In establishing a reference dose for PFAS, we also recommend that MassDEP consider accounting for a pre-existing body burden through placental transfer.	As noted by the commenter, there are a number of parameters that go into the calculation of a drinking water level. After careful consideration of the sensitive populations and their exposure pathways, MassDEP concluded that the water ingestion rate of a lactating woman and the relative

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			source contribution factor of 20% were appropriate for deriving the MCL. The ingestion rate of a lactating woman is greater than a pregnant woman and thus protects both. MassDEP has concluded that the 20% RSC it has applied is appropriate. This value is the same as that used by USEPA in deriving its drinking water health advisories for PFOA and PFOS, a decision made in light of uncertainties about other sources of exposure. This RSC is the most conservative value recommended under current guidance (USEPA, 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). Office of Water, Office of Science and Technology. Washington, DC. EPA-822-B-00-004). It was applied to account for other possible sources of exposure, in particular to sensitive populations, including uncertain and variable exposures from: the diet (including infant exposure attributable to breast

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			milk); consumer products and indoor dust related to these; and, existing body burdens, including to the fetus.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	Although MassDEP's combined standard may offer greater protection in some instances, the numeric component of the proposed PFAS MCL—20 ppt—will result in individuals being exposed to unsafe levels of PFAS in other instances. In fact, several states have adopted or have proposed to adopt MCLs that are more protective than the proposed MCL for some PFAS.	MassDEP acknowledges that some states have adopted lower limits or guidelines for individual PFAS compounds. However, these are not directly comparable to the MassDEP standard because the MassDEP's standard is applied to a subclass of compounds rather than to individual compounds. As noted in the TSD, a range of RfDs and associated drinking water levels have been derived and selected by different organizations for each individual PFAS. This range reflects different interpretations and decisions made regarding data quality, significance and applicability by different scientists given the information available to them. USEPA states that an RfD is "[a]n estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to the human population (including

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			sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime." As explained in the TSD, MassDEP scientists have concluded that the selected RfD is appropriate based on the available toxicity information.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	The standard should require regular review.	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	Require additional PFAS compounds be included in the MCL as they become detectable.	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	Require all four quarters of initial monitoring. Do not offer a waiver for the third and fourth quarter.	MassDEP believes the initial monitoring waiver option strikes an appropriate balance between the cost of monitoring and the need to assess PFAS occurrence. Additionally, such waivers are not automatic and depend upon a MassDEP determination that there is no known or suspected

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			PFAS contamination in the vicinity of the Public Water System or its sources of water.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	The routine monitoring frequency is not health protective. Annual monitoring should be the least frequent requirement.	MassDEP disagrees. PWSs on routine monitoring frequency have not found any PFAS detections during either initial monitoring or after three years of annual monitoring.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	Waivers from routine monitoring is not health protective.	MassDEP disagrees. PWSs who are eligible for such waivers would not have found any PFAS detections during initial monitoring, or three years of annual monitoring. In addition, these PWSs would need to have at least one subsequent round of clean routine monitoring. These PWSs would also have been subject to MassDEP's review of source protection measures and land uses to confirm that PFAS do not present a risk of contamination of their sources.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National	Monitoring waivers are problematic in that they are granted at MassDEP's sole discretion, the proposed regulation does not provide guidance on the process, they are not subject to public review and if conditions change during a waiver they are not likely to be detected/treated.	MassDEP is the regulatory body charged with overseeing PWSs including determining appropriate monitoring frequencies for contaminants. The public's opportunity to review these

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	Resources Defense Council		practices lies in commenting on proposed regulations such as this one. 22.07G(6)(c)3. lays out the criteria that are used to determine if a monitoring waiver would be granted. The Department notes that the grant of a monitoring waiver would relieve a system only from its monitoring obligation. It must still maintain source protection activities, monitor the areas that contribute water to its sources and to inform MassDEP of any changes to land uses in these areas. In addition, a PWS would still be subject to inspections and the Department would still review monitoring at any nearby systems along with information gathered from other regulatory programs. All this information may inform whether a monitoring waiver remains appropriate.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	The proposed monitoring schedule is inconsistent with standard monitoring for other chemicals including annual monitoring following initial monitoring and a six-year limitation on monitoring waivers. Cites 40 CFR 141.24(f)(5), (f)(11)(iv) and (f)7.	As stated in 40 CFR 141.24(f) the commenter refers to a section that applies to volatile organic contaminants listed at 40 CFR 141.61(a)(1) though (21). The MassDEP PFAS proposal was modeled on the requirements for

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
			synthetic organic contaminants (SOCs) listed at 40 CFR 141.61(c)(1) through (33). The corresponding standard monitoring requirements for SOCs are contained in 40 CFR 141.24(h) which, following initial monitoring, allow for a monitoring frequency of one or two samples in one year of each compliance cycle, allow for waivers without imposing a six-year limit provided that systems reapply for waivers each compliance period. MassDEP's proposal is consistent with this approach.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	Require monitoring beyond PFAS6.	22.07G(12)(b) requires that all PFAS within the scope of the selected method be analyzed and 22.07G(13) requires that all analyzed PFAS be reported.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	MA DPH should regulate PFAS in bottled water.	Outside the scope of the drinking water regulations.

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Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	Supports use of ½ MRL for detections below the MRL but at or above 1/3 MRL.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
Alyssa Rayman-Read/Elizabeth Saunders/Shaina Kasper/Anna Reade	Conservation Law Foundation/Clean Water Action/Toxics Action Center/National Resources Defense Council	Massachusetts, through its Attorney General, should hold chemical manufacturers and polluters that have contributed and are contributing to the PFAS pollution crisis accountable for the harm they have caused.	Outside the scope of the drinking water regulations.
Heather Miller	Charles River Watershed Association	Establish a maximum contaminant level of 1 ppt for all quantifiable PFAS.	1 ppt is below the achievable reporting limit for PFAS as determined by MassDEP's laboratory and thus cannot be reliably quantified in drinking water at that level. As detailed in the TSD, MassDEP has concluded that the proposed drinking water standard is protective of public health based on current information.
Heather Miller	Charles River Watershed Association	Extend monitoring to all quantifiable PFAS chemicals.	The proposed regulation requires that all PFAS within the scope of the approved method be monitored and reported to MassDEP.

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Heather Miller	Charles River Watershed Association	Establish a treatment technique for PFAS.	Based on its assessment as presented in the TSD, MassDEP has concluded that its approach to addressing the overall toxicity database for the longer-chain PFAS is appropriately health protective and reflective of the current data. Given the available scientific data MassDEP chose specific PFAS that could be included in this subclass. As explained in the TSD, there are technical limits on how many and which PFAS could be treated similarly. For these reasons, MassDEP chose to regulate a subclass of PFAS as opposed to establishing a treatment technique.
Heather Miller	Charles River Watershed Association	Require a Do Not Drink notice for all drinking water with PFAS contamination above the MCL.	The proposal does not preclude a public health order, such as a Do Not Drink, being part of a response to elevated PFAS6 levels in appropriate circumstances.
Heather Miller	Charles River Watershed Association	Require public notices be sent in multiple language where appropriate.	The public notification requirements at 310 CMR 22.16(5)(c)2. already include multilingual requirements when appropriate.

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Heather Miller	Charles River Watershed Association	Set PFAS surface water quality standards	Outside the scope of the drinking water regulations.
Emily Hammel	Boston University School of Public Health	Supports the proposed revisions to develop a drinking water standard for six PFAS. The decision to use developmental toxicity as the critical endpoint in determining the MCL for PFAS is appropriate given the important role drinking water standards play in protecting sensitive populations, including developing children. Data exist on other potentially more sensitive health endpoints, like suppressed immune function. As immunotoxic effects in humans become better characterized, I urge MassDEP to consider a point of departure (POD) based on a more sensitive endpoint. Until the toxicological data is more robust, it is necessary to apply an uncertainty factor that reflects the gap in the toxicological data. Studies indicate adverse health effect occur at doses below the RfD proposed by the EPA based on developmental endpoints, therefore the database uncertainty factor (UF_D) must be applied to the developmental RfD to adequately protect sensitive populations. MassDEP's decision to apply a UF_D of 10^1/2 is appropriate. The proposed approach to sum the six PFAS based on toxicokinetic similarities (e.g. similar	MassDEP notes the support.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
		half-lives) and equipotency across the compounds, as well as selecting EPA methods 533, 537 and 537.1, is appropriate.	
Emily Hammel	Boston University School of Public Health	Will new compounds be added to the proposed subgroup based, similarly, on toxicokinetics and equipotency? Or if additional compounds exhibit similar mechanisms of action but different toxicities, will a new subgroup and corresponding standard be developed? MassDEP should consider future regulations of additional PFAS and the burden on water suppliers to adhere to modified standards. The basis for classification may create challenges down the road. MassDEP might consider developing new subgroups for additional PFAS based on unique attributes that distinguish these compounds from those proposed in the current standard. Treating the compounds individually would create unreasonable delays and ultimately interfere with the protection of public health. Consider outlining the approach for updating standards based on best available science and most feasible practices.	MassDEP will evaluate new studies as they become available and if regulation of additional PFAS is warranted would consider the most appropriate way to do so. MassDEP notes that the number of compounds that could potentially be included in the subgroup, based on chain length and functional group, is limited. In addition, if additional compounds within this subgroup were to be regulated similarly, because the number of potential additional compounds in this subgroup is limited and not all the compounds co-occur, MassDEP does not anticipate that there would be issues with respect to analysis and summation. However, even if issues with the application of the proposed cumulative standard were to arise if additional compounds beyond the subgroup are ultimately demonstrated to have similar potencies and act additively, adoption of this standard would

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			not preclude the possibility of establishing additional cumulative standards, individual standards or some other combination of standards in the future, as appropriate.
Paul F. Gabriel/ Ryan J. Trahan	Environmental Partners Group, Inc.	Let EPA take the lead on addressing regulation of PFAS.	MassDEP believes it is appropriate to consider promulgating health-protective standards in the absence of federal action.
Paul F. Gabriel/ Ryan J. Trahan	Environmental Partners Group, Inc.	Develop compound-specific standards for each of the PFAS compounds due to differences in: toxicity endpoints, uncertainty factors between humans and mammal toxicities, reference dosages, half-lives and bioaccumulation. A cumulative approach could make treatment and operational considerations more challenging.	MassDEP considered this approach but concluded, as explained in the TSD, that a subclass approach is preferable.
Paul F. Gabriel/ Ryan J. Trahan	Environmental Partners Group, Inc.	Require quarterly sampling rather than monthly samples when PFAS6 is above 10 ppt due to expense and uncertainty about month-to-month variability.	MassDEP proposed to determine compliance with the PFAS6 MCL quarterly to ensure that corrective actions are taken as soon as possible to limit short-term exposure risks for sensitive consumers. Basing violations on three monthly samples is more reliable than doing so on a single quarterly sample and its confirmation. However, the monthly monitoring requirement

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			includes a provision for a system to reduce the cost of monthly monitoring after the first quarter by seeking MassDEP approval to use the first monthly sample of each quarter to identify subsequent violations. This provision lowers the cost to that of quarterly monitoring.
Paul F. Gabriel/ Ryan J. Trahan	Environmental Partners Group, Inc.	Exclude results below the MRL and do not use a default value for such results. Use of these results could lead to legal challenges when identifying a responsible party.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
Paul F. Gabriel/ Ryan J. Trahan	Environmental Partners Group, Inc.	Allow for sample invalidation due to: materials at the sample tap, human error or markedly different confirmation results.	The proposal includes provisions for identifying alternative sampling locations which would include situations where an existing sample line is suspected or can be demonstrated to be a source of PFAS. MassDEP does not agree that human error could alter the results of PFAS sampling in a way that would not also alter the field reagent blank that is a required part of every sampling event. A field reagent blank that fails QC would invalidate the associated field sample. Quality control measures

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			are used to evaluate both initial and confirmation samples such that each can be individually determined to be acceptable for compliance use. MassDEP's experience to date does not support the premise that confirmation samples are likely to be markedly different from initial samples but these situations would be evaluated on a case-by-case basis.
Paul F. Gabriel/ Ryan J. Trahan	Environmental Partners Group, Inc.	Supports use of historical data and monitoring waivers.	MassDEP notes the support.
Paul F. Gabriel/ Ryan J. Trahan	Environmental Partners Group, Inc.	Allow for monitoring flexibility during emergencies, when lab capacity is insufficient or when a utility has operational issues that preclude such monitoring.	MassDEP has allowed for such flexibility at its discretion within 22.07G(15).
Paul F. Gabriel/ Ryan J. Trahan	Environmental Partners Group, Inc.	Update Policy 90-04 to address PFAS treatment piloting requirements.	Outside the scope of the drinking water regulations.
Paul F. Gabriel/ Ryan J. Trahan	Environmental Partners Group, Inc.	Consider the complexity, timing and cost of treatment design, permitting and construction when enforcing the MCL.	MassDEP's enforcement practices currently allow for negotiated compliance timelines for specific challenges at each utility (e.g., the availability of funding, access to engineering services and the time to obtain and construct treatment units).
Paul F. Gabriel/ Ryan J. Trahan	Environmental Partners Group, Inc.	Add necessary services and common treatment components to the state bid list.	Outside the scope of the drinking water regulations.

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Paul F. Gabriel/ Ryan J. Trahan	Environmental Partners Group, Inc.	Provide context to relative PFAS exposures in drinking water versus other pathways.	The proposal's public notice and consumer confidence requirements include health effects language. In addition, MassDEP has developed communication materials that are available on the web. These note other exposure pathways.
Paul F. Gabriel/ Ryan J. Trahan	Environmental Partners Group, Inc.	Establish a definitive timeline for BWSC site discovery actions.	Outside the scope of the drinking water regulations.
Gerry Connell	Connell Property Consulting	Does anyone have a good handle on the best available technology (BAT) for treatment and how to handle treatment wastes. Are there treatment technologies that handle multiple contaminants?	MassDEP has listed BATs known to remove PFAS at 22.13(7)(g) of this proposal but ultimately each system must evaluate co-occurring contaminants, existing water quality parameters and waste disposal options (including their costs) to identify what will work best in their case. Many of these technologies will remove a wide range of contaminants.
Grace Jimenez	Boston University School of Public Health	Supports summing six PFAS rather than establishing individual standards due to them having similar effects and the increased risk when multiple PFAS are found in a water source.	MassDEP notes the support.
Grace Jimenez	Boston University School of Public Health	Supports consumer notice upon confirmed PFAS6 over the MCL to provide sensitive consumers the information needed to make an informed decision about avoiding consumption.	MassDEP notes the support.

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Greylin Nielsen/Jennifer Oliver	Boston University School of Public Health	Supports the proposal to develop a drinking water standard for six PFAS. Supports MassDEP's selected point of departure. The animal toxicity studies selected for PFOA and PFOS rely on sensitive developmental effects observed in rodents. The lowest observed adverse effect level and the no observed adverse effect level from Lau et al. 2006 and Luebker et al. 2005 are consistent with numerous studies finding developmental, immune, kidney, and hepatic effects occurring at similar doses. As a result, US EPA and multiple state agencies all rely on these studies as the basis for their reference doses. Supports MassDEP's application of an additional uncertainty factor to account for effects occurring at lower doses. Although adverse effects are observed consistently in the dose range selected by MassDEP for the PoD, mounting evidence in animal toxicity studies and human epidemiological studies shows concerning effects occurring at lower doses. In the absence of an appropriate study of low-dose effects, the use of an uncertainty factor for database uncertainty is appropriate.	MassDEP notes the support.
John Velis	MA State Senator, Former State Representative	Supports creating an MCL of 20 ppt.	MassDEP notes this support.

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John Velis	MA State Senator, Former State Representative	Don't forget about Westfield residents when spending PFAS appropriations.	Outside the scope of the drinking water regulations. Note: MassDEP considers all MA residents when using PFAS funds, subject to applicable law.
John Velis	MA State Senator, Former State Representative	Don't hold residents accountable for something they had nothing to do with.	Outside the scope of the drinking water regulations.
Kate Lila Wheeler		Supports creating an MCL of 20 ppt for PFAS6.	MassDEP notes this support.
Kate Lila Wheeler		Add a provision to review PFAS within two to three years and regulate additional PFAS as necessary.	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Kate Lila Wheeler		Apply test methods to detect total PFAS.	MassDEP has proposed to require all PFAS within the scope of the approved methods be reported, beyond PFAS6, whenever PFAS is being monitored.
Katie McCann	Boston University School of Public Health	Supports promulgation of PFAS6 standard.	MassDEP notes this support.
Katie McCann	Boston University School of Public Health	Supports public notification requirements but they should be expanded to ensure that the information is made available in the languages that members of a community speak, and that in addition to sending mail notifications to residents, that public meetings are required to	The public notification requirements at 310 CMR 22.16(5)(c)2. already include multilingual requirements when appropriate. While the public notification rule does not require MassDEP to hold public

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		be held with language interpretation and any necessary accommodations.	meetings, MassDEP has participated in locally scheduled public meetings in the past and continues to be willing to do so as appropriate.
Katie McCann	Boston University School of Public Health	There should be a requirement for landlords and management companies to provide written notice to tenants in the language that the tenant speaks within 30 days of receiving any notice from MassDEP indicating the results of any testing for PFAS in the water of any residential rented building.	Public Notice requirements fall on the PWS itself and these include multilingual requirements (at 310 CMR 22.16(5)(c)2.) and best effort requirements to reach non-bill paying consumers (at 310 CMR 22.16(15)).
Laura Buckley	Boston University School of Public Health	Consider bioaccumulation and environmental persistence when deciding which PFAS to regulate.	MassDEP has used a deliberative process as described in the TSD to identify which PFAS to include in this subclass. This process considered serum half-lives as they related to toxicity and internal exposure metrics, but did not consider bioaccumulation, which is not directly related to drinking water exposures and is more appropriate to potential exposures from other pathways and to ecological risk issues. All perfluorinated compounds are highly persistent in the environment, which is one reason why MassDEP and other regulatory agencies have

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			prioritized efforts to address these compounds.
Laura Buckley	Boston University School of Public Health	Standards must be protective of and responsive to the growing body of research on adverse health outcomes.	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Laura Buckley	Boston University School of Public Health	Consider regulating shorter chain PFAS varieties within the proposed MCL as they have grown in use and share similar characteristics (bioaccumulation, persistence, toxicity) as PFAS6.	Based on its assessment as presented in the TSD, MassDEP has concluded that its approach to addressing the overall toxicity database for the longer-chain PFAS is appropriately health protective and reflective of the current data. Given the available scientific data MassDEP chose specific PFAS that could be included in this subclass. As explained in the TSD, there are technical limits on how many and which PFAS could be treated similarly.
Laura Buckley	Boston University School of Public Health	Supports an MCL based on the sum of PFAS6 rather than individual standards.	MassDEP notes this support.
Laura Buckley	Boston University School of Public Health	Consider dropping the proposed waiver options during initial and routine monitoring to test for seasonality and to avoid missing contamination between infrequent sampling events.	MassDEP believes these options are necessary and appropriate to balance the cost of monitoring against the likelihood of PFAS

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			contamination in selected PWSs. No waiver is offered without an evaluation of existing monitoring data, known land uses in the area and existing source protection measures.
Laura Buckley	Boston University School of Public Health	Supports consumer notification requirement prior to violations to allow sensitive consumers to avoid consumption.	MassDEP notes this support.
Laura Buckley	Boston University School of Public Health	Supports CCR requirements.	MassDEP notes this support.
Molly Jacobs/David Kriebel/Polly Hoppin	Lowell Center for Sustainable Production, Department of Public Health, University of Massachusetts Lowell	Agree that it is important and appropriate to use additional lines of evidence, such as read-across, to justify including additional PFAS compounds in the MCL.	MassDEP notes this support.
Molly Jacobs/David Kriebel/Polly Hoppin	Lowell Center for Sustainable Production, Department of Public Health, University of Massachusetts Lowell	Include language in the regulation that within 3 years the Department will consider additional PFAS in light of new scientific evidence (e.g. Carcinogenicity, toxicological assessments of short chain PFAS) and new analytical testing methods (e.g. total fluorine, non-targeted analyses) and amend as necessary.	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Molly Jacobs/David Kriebel/Polly Hoppin	Lowell Center for Sustainable Production, Department of Public Health, University of	Concerned that the proposed MCL is 20x higher than selected studies suggest is a level of concern (1 ppt).	1 ppt is below the achievable reporting limit for PFAS as determined by MassDEP's laboratory and thus cannot be reliably quantified in drinking

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	Massachusetts Lowell		water at that level. As detailed in the TSD, MassDEP has concluded that the proposed drinking water standard is protective of public health based on current information.
Linda L. Segal		Publicly announce information about state funds available for testing and remediation.	Outside the scope of the drinking water regulations. Note: MassDEP has made known the availability of state funds for PFAS testing at PWSs through direct communications with systems. Those communications are publicly available at https://www.mass.gov/lists/communication-to-public-water-suppliers. The grant program for the design of PFAS treatment is described at https://www.mass.gov/news/baker-polito-administration-announces-new-grant-program-to-address-pfas-contamination and https://www.mass.gov/info-details/water-resources-grants-financial-assistance#pfas-treatment-grant-.
Linda L. Segal		MassDEP should not allow a water supplier to combine or blend test data so that each PFAS exceedance at individual active and inactive	Compliance samples are typically those that represent water quality being delivered to the public. Such samples can represent a

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		wells ends up not specifically and clearly identified to the public.	blend of multiple wells. When PFAS is detected at a blended entry point, the proposed regulation at 22.07G(7)(d) requires PWSs to collect individual samples from wells that feed the blended entry point. All PFAS test results are made publicly available at the EEA Data Portal (http://eeaonline.eea.state.ma.us/portal#!/home).
Linda L. Segal		Continue considering a lower MCL and covering more PFAS as the science develops.	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Michele Paul/Wendy Rundle	LSP Association, Inc.	Supports the intent of a TNC MCL.	MassDEP has not proposed a TNC MCL at this time.
Michele Paul/Wendy Rundle	LSP Association, Inc.	Add clarification noting that owners and operators of community, NTNC and TNC systems are exempt from the reporting requirements of the MCP (310 CMR 40.0317(11)).	Outside the scope of the drinking water regulations.
Michele Paul/Wendy Rundle	LSP Association, Inc.	The staggered implementation schedule should include the estimate of PWSs in each group. This would better demonstrate the number of lab samples in each group and thereby whether challenges exist with the proposed schedule.	MassDEP considered these estimates when developing the proposal. MassDEP's regulatory presentation prior to each public hearing included these PWS

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			estimates which were also posted along with the proposed regulation on MassDEP's website.
Michele Paul/Wendy Rundle	LSP Association, Inc.	The staggered implementation schedule appears to deemphasize the risk to public health at smaller PWSs.	Staggered schedules that start with large systems and end with small ones are standard practice under the SDWA to allow small systems more time to gather the resources necessary to implement new regulations and to allow the laboratory community time to gear up for the larger number of compliance samples required for such systems.
Michele Paul/Wendy Rundle	LSP Association, Inc.	Incorporate PFAS into eDEP as soon as possible and communicate to all stakeholders when eDEP is prepared to receive submittals.	MassDEP is currently incorporating PFAS into eDEP and expects to complete the process shortly. MassDEP will notify all PWSs and existing eDEP users when PFAS results can be submitted electronically.
Michele Paul/Wendy Rundle	LSP Association, Inc.	Concerned that consumer notice is triggered using only two samples. Wait for conclusive MCL violations.	MassDEP believes an early notice based on two samples is warranted to inform affected consumers who may wish to take early action.
Michele Paul/Wendy Rundle	LSP Association, Inc.	Would initial and confirmatory sample need to agree within a reasonable amount (e.g. by using a relative percent difference calculation)?	MassDEP's experience to date has not included any examples of confirmation samples varying significantly from initial samples.

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			However, should such an example come to light the Department has existing authority at 310 CMR 22.03(2) to require additional samples to investigate the specific case.
Michele Paul/Wendy Rundle	LSP Association, Inc.	Does not support the use of results below the MRL or the assignment of ½ MRL to those results at or above 1/3 MRL. Instead use validated "J" values.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
Michele Paul/Wendy Rundle	LSP Association, Inc.	Further clarification is needed on the definition and derivation of the MRL.	The MRL is defined in 22.02 consistent with the definition in 310 CMR 42.00. The derivation of MRLs can be found in the approved methods (EPA 537 and EPA 537.1).
Michele Paul/Wendy Rundle	LSP Association, Inc.	Concerned with modifications to the definition of "Reliably and Consistently Below the MCL." Recommend use of relative percent difference or relative standard deviation acceptance criteria.	MassDEP is not substantively altering the definition. The changes are grammatical and stylistic in nature (*e.g.*, capitalization, agreement of tense).
Michele Paul/Wendy Rundle	LSP Association, Inc.	Does "no PFAS" refer to any PFAS or just PFAS6? Can action be triggered by detections of PFAS outside of PFAS6?	As clarified, "no PFAS" means no detection of any PFAS in the scope of the approved method. In some cases, a detection of PFAS outside of those included in PFAS6 can trigger actions. For example, these include the

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			collection of a confirmation sample after an initial detect of any PFAS, and having to remain on annual sampling for as long as any PFAS are being detected.
Michele Paul/Wendy Rundle	LSP Association, Inc.	Can language be added to allow for the use of additional analytical methods without having to amend this regulation?	MassDEP anticipates adding any additional methods that may be appropriate only by amending this regulation consistent with the State Administrative Procedure Act.
Madeline Isenberg	Boston University School of Public Health	Supports the proposed MCL based on the summation of PFAS6 and the use of an additional UF to adjust EPA's RfD.	MassDEP notes the support.
Madeline Isenberg	Boston University School of Public Health	Amend Mass. Gen. Laws Ch. 111, §160D, to include PFAS in the disclosure form that landlords/sellers are required by law to disclose if there is lead, manganese, etc. in drinking water.	Outside the scope of the drinking water regulations.
Philip D. Guerin	Massachusetts Coalition for Water Resources Stewardship	Rather than promulgating the proposed MCL, adopt the federal guideline of 70 ppt as the state MCL to allow time for more data gathering/analysis and then propose a more informed MCL.	MassDEP believes sufficient data is available now to justify the proposed MCL.
Philip D. Guerin	Massachusetts Coalition for Water Resources Stewardship	Concerned that many more PWSs will find PFAS than estimated and most will need to install costly treatment at the expense of other necessary system upgrades and maintenance.	While MassDEP acknowledges that there remain uncertainties as to the extent of PFAS contamination, the current regulation will help address them. In the meantime, MassDEP believes it is appropriate to

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			promulgate the PFAS6 standard to address the risk posed to public health.
Philip D. Guerin	Massachusetts Coalition for Water Resources Stewardship	The need for legal action to recoup PFAS treatment costs suggest that the Commonwealth should cover the cost of all such treatment and then take action against those parties deemed responsible.	Outside the scope of the drinking water regulations.
Philip D. Guerin	Massachusetts Coalition for Water Resources Stewardship	What disposal options will exist if wastewater treatment plants stop accepting landfill leachate, sewage sludge, septage and drinking water treatment plant residuals out of concern that these are potential PFAS sources. Same issue if incinerators and landfills restrict domestic solid waste due to concerns that it contains PFAS household goods.	Outside the scope of the drinking water regulations.
Philip D. Guerin	Massachusetts Coalition for Water Resources Stewardship	Establishing drinking water limits based on an abundance of caution principle driven by public perception rather than science is not supported. There is a lack of compelling scientific evidence that a MCL of 20 parts per trillion is warranted. The 20 ppt MCL standard was not derived through strong scientific evidence of harm being done at or near that level. Rather, the 20 ppt limit is the result of the application of multiple uncertainty factors applied to results of lab animal tests, which themselves were subject to various interpretations. The variation in interpreting data, applying uncertainty factors and otherwise selecting supporting data by the	MassDEP disagrees with these statements. The 20 ppt MCL for PFAS6 was established based on strong scientific evidence and was derived using established toxicological and risk assessment approaches. The use of animal bioassay data and uncertainty factors (UFs) are well established approaches for assessing toxicological data and risk. The selection of UFs depends on detailed assessment of the available data and selection of points of departure for

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		handful of state agencies pursuing their own PFAS limits is truly breathtaking.	determining toxicity values. The basis of MassDEP's decisions regarding selection of toxicity data and application of uncertainty factors is detailed in the TSD and are appropriately health protective in light of the wide range of serious toxicities observed, the very long serum half-lives of these compounds and the fact that infants are most at risk. Notably although there is variation in the final values selected, as discussed in the TSD, many states, other federal agencies (i.e., ATSDR), and international agencies (e.g., EFSA) that have completed recent evaluations have concluded that the USEPA RfD and HA for longer-chain PFAS are not sufficiently protective.
Philip D. Guerin	Massachusetts Coalition for Water Resources Stewardship	Apparently lactating women drink a lot more water than the general population (3.2 liters per day) yet the State still used a 20% source contribution for deriving the MCL. The 20% value is a default value with no apparent basis. It would seem that if lactating women are the target for the MCL and they consume 60% more water than the 2 liters per day typically assumed for the general population then the %	The relative source contribution (RSC) factor, which is explained in the TSD and at many locations online, accounts for sources of exposure other than those directly attributable to drinking water which contribute to the daily exposure limit (the RfD). MassDEP has concluded that the

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		source contribution should likewise be higher than 20%.	20% RSC it has applied is appropriate. This value is the same as that used by USEPA in deriving its drinking water health advisories for PFOA and PFOS, a decision made in light of uncertainties about other sources of exposure. This RSC is the most conservative value recommended under current guidance (USEPA, 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). Office of Water, Office of Science and Technology. Washington, DC. EPA-822-B-00-004). It was applied to account for other possible sources of exposure, in particular to sensitive populations, including uncertain and variable exposures from: the diet (including infant exposure attributable to breast milk); consumer products and indoor dust related to these; and, existing body burdens, including to the fetus.
Philip D. Guerin	Massachusetts Coalition for Water	Lack of data or understanding of PFAS total exposure and sources of exposure for the	There is compelling evidence that demonstrates that drinking water

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
	Resources Stewardship	general population remains a significant gap in data. Without that information it is not possible to determine whether an MCL of 20 ppt or any other value is protective of public health. Various published studies suggest associations between PFAS blood levels and consumption of fish or fast food, use of certain dental floss, paper cups and Gore-Tex goods to name just a few.	is the most significant source of exposure for individuals consuming contaminated water and, as discussed in the TSD, that 20 ppt is protective for those individuals. While there are other sources of exposure as cited by the commenter they are not regulated by programs implemented by MassDEP.
Philip D. Guerin	Massachusetts Coalition for Water Resources Stewardship	Do not count J-values toward the sum of 6.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
Geoffrey C. Beckwith	Massachusetts Municipal Association	Supports the waiver option for the third and fourth quarters of initial monitoring.	MassDEP notes this support.
Geoffrey C. Beckwith	Massachusetts Municipal Association	Supports the allowance to submit existing monitoring data.	MassDEP notes this support.
Geoffrey C. Beckwith	Massachusetts Municipal Association	Ask that the implementation of this regulation not result in new unfunded mandates.	Outside the scope of the drinking water regulation. Note: MassDEP supported the Legislature's and Governor's appropriation of PFAS-specific funding in the recent Supplemental Budget to support free testing, treatment design

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			grants and low interest loans via the State Revolving Fund.
Geoffrey C. Beckwith	Massachusetts Municipal Association	New state funding to support municipal capital infrastructure needs and other financial and technical assistance associated with PFAS testing, monitoring, and remediation will be necessary.	Outside the scope of the drinking water regulations.
David W. Coppes	Massachusetts Water Resources Authority	The definition of "PFAS Detection" seems out of place in 22.07G(3).	22.07G is the only section of the Drinking Water Regulations that uses this term and as such, consistent with similar single-use terms, the definition is within the relevant section.
David W. Coppes	Massachusetts Water Resources Authority	Replace the term "Total PFAS" with "PFAS6."	MassDEP has made this change.
David W. Coppes	Massachusetts Water Resources Authority	The definition of "Total PFAS Detection" seems out of place in 22.07(3) and appears contradictory to other language in this section.	MassDEP agrees and has rewritten the subsection.
David W. Coppes	Massachusetts Water Resources Authority	Only include results above the MRL in compliance calculations and reporting requirements.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
David W. Coppes	Massachusetts Water Resources Authority	The term "calculated to two significant figures" is confusing and subject to misinterpretation. Use the same phrasing as exists elsewhere in 310 CMR 22.00.	The most common usage in 310 CMR 22.00 is "rounded to the same number of significant figures as the Maximum Contaminant Level" and is used in the context of determining compliance rather than in

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			identifying the MCL. As such, MassDEP will rephrase this term and insert it into 22.07G(10)(a).
David W. Coppes	Massachusetts Water Resources Authority	Simplify 22.07G(5) and (6)	These sections reflect provisions MassDEP has incorporated to accommodate stakeholders including staggered implementation dates and monitoring waivers. MassDEP intends to provide guidance on monitoring requirements.
David W. Coppes	Massachusetts Water Resources Authority	What does “PFAS detections” mean in 22.07G(5)? Change all such references in (5)(a) to "PFAS6.”	“PFAS Detections” has the meaning ascribed to it in 22.07G(3)(b). As clarified in 22.07G(5), initial monitoring applies only to those cases listed in (5)(a); one based on PFAS levels and two based on PFAS6 levels.
David W. Coppes	Massachusetts Water Resources Authority	Stagger the months where monitoring is required to reduce laboratory burden.	MassDEP selected the initial month of each quarter so as to minimize the time between a confirmed PFAS6 detection above the MCL and consumer notice of this event. If laboratory capacity emerges as an issue the Department can vary monitoring requirements under 22.07G(15).
David W. Coppes	Massachusetts Water Resources Authority	Allow systems that have not had PFAS6 detections during initial monitoring to move into routine monitoring rather than requiring	MassDEP believes that a triennial monitoring frequency is not appropriate for a system that is

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		them to be free of PFAS6 and unregulated PFAS detections.	detecting any PFAS. Detections of unregulated PFAS indicate that these chemicals are in the drinking water source's protection area and more frequent monitoring is prudent to track this contamination.
David W. Coppes	Massachusetts Water Resources Authority	How will (7)(a)4. be implemented as this involves MassDEP making a determination as to the historic range for the affected system?	MassDEP will make these determinations upon its receipt of PFAS laboratory reports and will so notify the affected PWS.
David W. Coppes	Massachusetts Water Resources Authority	The seven day reporting timeline for PFAS detections in (7)(a)1 is not typical and should be changed to only those PFAS6 detections that exceed the MCL.	MassDEP notes that existing rules covering organic contaminants do include this same reporting timeline for detections below MCLs. See 22.07A(5) for SOC detections and 22.07B(4) for VOC detections. MassDEP chose to extend this to all PFAS due to the likelihood of co-occurrence.
David W. Coppes	Massachusetts Water Resources Authority	The consumer notice provision is a Tier 2 public notice requirement without an underlying violation which may confuse the public. If retained it should refer to the public notification requirements rather than creating something new.	MassDEP believes a notification to the public designed to inform sensitive consumers of a risk to their health is appropriate prior to the determination of a PFAS6 MCL violation. This can be equated to public education under the LCR which is also triggered without an underlying violation.

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David W. Coppes	Massachusetts Water Resources Authority	Clarify that (8)(a) applies to PFAS6 detections over 10 ppt.	MassDEP has done so.
David W. Coppes	Massachusetts Water Resources Authority	Confirm that resampling following invalidation only applies to PFAS6.	MassDEP has done so.
David W. Coppes	Massachusetts Water Resources Authority	Only include results above the MRL.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
David W. Coppes	Massachusetts Water Resources Authority	Only use numeric results that can be traced back to a laboratory report.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
David W. Coppes	Massachusetts Water Resources Authority	PFAS compliance is being determined based on a quarterly average and not a running quarterly average. The definition should reflect this use.	MassDEP has reworded the compliance calculation and deleted the proposed definition of Running Quarterly Average.
David W. Coppes	Massachusetts Water Resources Authority	Supports compliance based on quarterly average but would strike requirement throughout the proposal to sample in the first month of the quarter.	It is unclear how this recommendation would match up to a quarterly compliance calculation. For example, if a system were to sample in the second month of a calendar quarter MCL compliance could be based on results from only two months or could be deferred until after the first month of the following calendar quarter.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
			MassDEP however, to simplify implementation, and to ensure that compliance is based on three months of results where possible, instead adopted an approach of sampling in the first month in order that compliance calculations could occur at the end of each calendar quarter.
David W. Coppes	Massachusetts Water Resources Authority	Should (10)(b) only apply to PFAS6 detections?	MassDEP agrees.
David W. Coppes	Massachusetts Water Resources Authority	The MRL performance requirement in (16) should be moved to 310 CMR 42.00.	MassDEP disagrees. 310 CMR 22.00 typically includes laboratory performance requirements as MDL requirements. (*See, e.g.*, 22.06B(10)(a)1.c., 22.07A(8) and 22.07B(6) including tables of detection limits.)
David W. Coppes	Massachusetts Water Resources Authority	Accept MRLs as high as 2.5 ppt.	MassDEP Division of Environmental Laboratory Sciences (DELS)/Wall Experiment Station (WES) has reviewed new LC/MS/MS instrumentation from several manufacturers and has determined that these new instruments are capable of achieving target PFAS MRLs < 2 ng/L for the regulated compounds.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
			As proposed the 2 ng/L MRL requirement only applies to the six regulated PFAS.
David W. Coppes	Massachusetts Water Resources Authority	The Health Effects and Major Sources language for public notification is too wordy and would benefit from a review and simplification by health communication specialists.	MassDEP disagrees. The Health Effects language is consistent in complexity and length with that required for other contaminants such as PCBs and chlorite and shorter than others such as fluoride and lead. MassDEP believes the Major Sources language is necessary to relate the ubiquitous nature of these contaminants.
David W. Coppes	Massachusetts Water Resources Authority	The last sentence of the definition of Running Quarterly Average is unclear and should be moved to (10).	MassDEP has deleted this definition.
Janine Burke-Wells	North East Biosolids & Residuals Association	The proposed MCL for PFAS is based on the highly conservative health risk calculations performed by the Office of Research and Standards.	The health risk calculations are explained in the TSD and, rather than being overly conservative, reflect a careful analysis of the available toxicological data on the compounds being addressed.
Janine Burke-Wells	North East Biosolids & Residuals Association	It is inappropriate to set such low groundwater standards without understanding of PFAS background levels in groundwater.	Drinking water standards do not consider background levels in groundwater. Note: data from several states demonstrate that the background concentrations of PFAS6 in groundwater in those states are well below MassDEP's proposed standard.

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Janine Burke-Wells	North East Biosolids & Residuals Association	There are excessive, multiple layers of uncertainty factors and conservative assumptions in the MassDEP health risk calculations.	MassDEP disagrees with this assertion. MassDEP's calculations are explained in the TSD and are consistent with standard practice. As noted in the TSD, other states and federal agencies have derived similar, or in some cases lower, drinking water values for PFAS in the subclass addressed in these regulations.
Janine Burke-Wells	North East Biosolids & Residuals Association	There are potential unintended or unanticipated impacts on myriad beneficial environmental and public health programs including beneficial reuse and landfilling of biosolids.	Outside the scope of the drinking water regulations.
Janine Burke-Wells	North East Biosolids & Residuals Association	There is a potential for very high costs to not only drinking water systems, but also to systems and programs managing wastewater, septage, residuals (sludge, biosolids, digestates, composts) and landfill leachate.	Experience has demonstrated that PFAS6 compounds can be effectively controlled using existing technologies at costs that are similar to those incurred to control other drinking water contaminants. The balance of the comment is outside the scope of the drinking water regulations.
Janine Burke-Wells	North East Biosolids & Residuals Association	There is a lack of calculation of the marginal costs and marginal benefits to the Commonwealth and its residents gained through adjusting the standards downward from 70 ppt	MassDEP has determined that this standard is necessary to be protective of public health as explained in the TSD and has revised the regulations in

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		for 2 PFAS combined to 20 ppt for six PFAS combined.	accordance with the requirements of the State Administrative Procedure Act.
Janine Burke-Wells	North East Biosolids & Residuals Association	By setting such a low MCL, MassDEP may be unable to maintain options for solids management in the Commonwealth, leading to irresponsible exportation of biosolids and other residuals, setting back the years of efforts to remove organics from landfills and advance renewable energy from anaerobic digestion. This leads to a loss of the climate benefits of recycling organics.	Outside the scope of the drinking water regulations.
Janine Burke-Wells	North East Biosolids & Residuals Association	How will MassDEP apply the new regulations and how will municipalities and utilities which receive PFAS – but are not sources of PFAS – be assured that they will not be liable for cleanup costs.	These regulations apply to Public Water Systems. The balance of the comment is outside the scope of the drinking water regulations.
Phil Brown, Martha Powers, Marina Atlas, Grace Poudrier / Alissa Cordner / Jennifer Liss Ohayon / Lauren Richter	Social Science Environmental Health Research Institute at Northeastern University / Whitman College / Silent Spring Institute / Rhode Island School of Design	We applaud the State for drafting what are currently some of the strongest existing standards in the nation for PFAS, an ever-expanding and complex group of chemicals. However, we urge MassDEP to consider taking a stronger stance by continuing to recognize the best available, newly developed science including PFOA/PFOS carcinogenicity and new and developing epidemiological studies of PFAS exposure and its relationship with various adverse health outcomes.	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Phil Brown, Martha Powers, Marina Atlas, Grace Poudrier	Social Science Environmental Health Research	Commit to reviewing the MCL every three years.	MassDEP is following the developing science and could propose changes to this regulation

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/ Alissa Cordner / Jennifer Liss Ohayon / Lauren Richter	Institute at Northeastern University / Whitman College / Silent Spring Institute / Rhode Island School of Design		in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Phil Brown, Martha Powers, Marina Atlas, Grace Poudrier / Alissa Cordner / Jennifer Liss Ohayon / Lauren Richter	Social Science Environmental Health Research Institute at Northeastern University / Whitman College / Silent Spring Institute / Rhode Island School of Design	Evaluate replacements; regulate as a class.	Based on its assessment as presented in the TSD, MassDEP has concluded that its approach to addressing the overall toxicity database for the longer-chain PFAS is appropriately health protective and reflective of the current data. Given the available scientific data MassDEP chose specific PFAS that could be included in this subclass. As explained in the TSD, there are technical limits on how many and which PFAS could be treated similarly.
Jeffrey Longsworth, Tammy Helminski, Fredric Andes	The PFAS Regulatory Coalition	Support the State's efforts to identify potential sources of those individual PFAS that pose risks to human health and the environment, and to prioritize the protection of drinking water sources for vulnerable populations.	MassDEP notes this support.
Jeffrey Longsworth, Tammy Helminski, Fredric Andes	The PFAS Regulatory Coalition	Urges State regulators to ensure that final standards are scientifically supported, cost-effective, and achievable.	MassDEP notes this comment.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Jeffrey Longsworth, Tammy Helminski, Fredric Andes	The PFAS Regulatory Coalition	Encourages Massachusetts to work towards supporting the federal rulemaking process to help ensure national uniformity.	MassDEP believes it is appropriate to consider promulgating health-protective standards in the absence of federal action. MassDEP would evaluate potentially supporting any proposed federal standard in light of the state standard.
Jeffrey Longsworth, Tammy Helminski, Fredric Andes	The PFAS Regulatory Coalition	The scientific understanding of how PFAS impacts people and the environment is still developing and, for thousands of PFAS compounds, much remains unknown. From a toxicological perspective, regulatory agencies must have adequate science for determining health-based values before promulgating individual compound standards, limits, and related regulations.	MassDEP has explained the scientific basis of this proposal in our TSD.
Jeffrey Longsworth, Tammy Helminski, Fredric Andes	The PFAS Regulatory Coalition	In every instance in which Massachusetts has proposed to deviate from basic EPA findings or determinations, it should clearly state its authority for such deviation.	MassDEP's authority to establish standards includes MGL c.111 s.160 which reads in part, "It may make rules and regulations and issue such orders as in its opinion may be necessary to prevent the pollution and to secure the sanitary protection of all such waters used as sources of water supply and to ensure the delivery of a fit and pure water supply to all consumers."

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Jeffrey Longsworth, Tammy Helminski, Fredric Andes	The PFAS Regulatory Coalition	The RfD used appears to be the most stringent in the country, implying that the State has far more disproportionately sensitive populations than any other state. This "outlier" approach needs to be well explained and supported, including with appropriate cost-benefit analyses.	MassDEP disagrees with the commenter's suggested implication because an additional UF was applied to account for database deficiencies not for other reasons. This results in the lower RfD.
Jeffrey Longsworth, Tammy Helminski, Fredric Andes	The PFAS Regulatory Coalition	Massachusetts should reevaluate the "summing approach" in this MCL rulemaking or, in the alternative, provide more specific scientific justification for treating the toxicity or human health impacts of the six different PFAS compounds as if they were interchangeable	The read-across is described in the TSD.
Jeffrey Longsworth, Tammy Helminski, Fredric Andes	The PFAS Regulatory Coalition	Foresee challenges to states that choose to develop their own unique and varying drinking water standards due to legislative mandates on not being more stringent than EPA and anti-backsliding provisions.	MassDEP notes the comment. Note: Massachusetts has no statutory prohibitions such as the commenter suggests and, in fact, has promulgated both more stringent MCLs for federally regulated contaminants and an MCL for one other contaminant that lacks a federal standard.
Jeffrey Longsworth, Tammy Helminski, Fredric Andes	The PFAS Regulatory Coalition	Recommends that the State base any rulemaking on any forthcoming national primary drinking water standards, rather than the draft ATSDR report.	MassDEP believes it is appropriate to consider promulgating health-protective standards in the absence of federal action.
Jeffrey Longsworth, Tammy Helminski, Fredric Andes	The PFAS Regulatory Coalition	Supports the proposed rulemaking's specificity in identifying which PFAS compounds are regulated and recommends that the regulation of individual PFAS substances reflect peer-	MassDEP notes this support.

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		reviewed science regarding the physical, chemical, and toxicological properties of each compound. Recommends against including any combined PFAS standards or limits unless science clearly demonstrates that the mixture of the PFAS compounds subject to the combined limit results in bioaccumulation in hazardous concentrations.	
Jeffrey Longsworth, Tammy Helminski, Fredric Andes	The PFAS Regulatory Coalition	Regulate only those PFAS compounds for which there are validated analytical test methods.	PFAS6 is covered by validated methods.
Jeffrey Longsworth, Tammy Helminski, Fredric Andes	The PFAS Regulatory Coalition	Consider the capabilities and reliability of laboratories that test for PFAS. There is anecdotal evidence of highly variable results from split sampling assessments.	MassDEP is reviewing all the associated quality control data to ensure that compliance samples meet our data quality objectives. Note: MassDEP recently promulgated laboratory certification regulations to implement direct oversight of laboratories doing PFAS analytical work in the Commonwealth.
Jeffrey Longsworth, Tammy Helminski, Fredric Andes	The PFAS Regulatory Coalition	Recommends that in regions where testing capacity is limited that the rule provide for a delayed effective date or phased implementation that allows for laboratories to develop the expertise necessary to reliably accommodate the increased testing that the rule will require.	MassDEP has proposed a staggered implementation schedule.
Jeffrey Longsworth, Tammy Helminski, Fredric Andes	The PFAS Regulatory Coalition	Support the development of EPA's interim guidance documents on the disposal of spent filters, membranes, resins, granular carbon, and	Outside the scope of the drinking water regulations.

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		other waste from water treatment prior to independently establishing MCLs.	
Jeffrey Longsworth, Tammy Helminski, Fredric Andes	The PFAS Regulatory Coalition	Consider the variable costs of treatment systems, the handling of byproducts and in cleaning up remediations sites (MCLs can be Applicable or Relevant and Appropriate Requirements) in setting the MCL.	Outside the scope of the drinking water regulation.
Robert Rutkowski		MassDEP needs to go further, evidence suggests a safe level for PFOA of 0.1 ppt.	0.1 ppt is below the achievable reporting limit for PFAS as determined by MassDEP's laboratory and thus cannot be reliably quantified in drinking water at that level. As detailed in the TSD, MassDEP has concluded that the proposed drinking water standard is protective of public health based on current information.
Robert Rutkowski		Regulate PFAS as a class.	Based on its assessment as presented in the TSD, MassDEP has concluded that its approach to addressing the overall toxicity database for the longer-chain PFAS is appropriately health protective and reflective of the current data. Given the available scientific data MassDEP chose specific PFAS that could be included in this subclass. As explained in the TSD, there are technical limits on how many and

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
			which PFAS could be treated similarly.
Robert Rutkowski		Shut down the multiple sources of PFAS contamination from industrial, military, and waste streams.	Outside the scope of the drinking water regulations.
Stephen G. Zemba, Russell H. Abell, Harrison Roakes, Matthew P. Heil,	Sanborn Head & Associates, Inc.	The commenters calculated a background exposure estimate of 1×10^{-6} mg/kg-d for the six PFAS based on serum blood concentration data and argues that this value supports a higher RSC of 80% rather than the 20% applied by MassDEP.	MassDEP has concluded that the 20% RSC it has applied is appropriate. This value is the same as that used by USEPA in deriving its drinking water health advisories for PFOA and PFOS, a decision made in light of uncertainties about other sources of exposure. This RSC is the most conservative value recommended under current guidance (USEPA, 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). Office of Water, Office of Science and Technology. Washington, DC. EPA-822-B-00-004). It was applied to account for other possible sources of exposure, in particular to sensitive populations, including uncertain and variable exposures from: the diet (including infant exposure attributable to breast

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			milk); consumer products and indoor dust related to these; and, existing body burdens, including to the fetus. MassDEP notes that several of the noted exposures were not accounted for in the derivations provided by the commenter.
Stephen G. Zemba, Russell H. Abell, Harrison Roakes, Matthew P. Heil,	Sanborn Head & Associates, Inc.	The commenters states that the revised RfD, by their calculations, should be 6 X 10^{-6}.	The revised RfD value is not equal to the USEPA RfD divided by 3. As described in the TSD (*see* Table 6 and its accompanying discussion), uncertainty factors are assigned a value of 10 or the square root of 10. During the calculation of the total uncertainty factor value to apply, a single uncertainty factor of the square root of 10 is rounded down to a value of 3 while two such UFs equal a value of 10. See also TSD Appendix 1, Table 1.
Deb Pasternak, Clint Richmond	Massachusetts Sierra Club	Massachusetts should set a limit for total PFAS in drinking water.	Based on its assessment as presented in the TSD, MassDEP has concluded that its approach to addressing the overall toxicity database for the longer-chain PFAS is appropriately health protective and reflective of the current data. Given the available

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
			scientific data MassDEP chose specific PFAS that could be included in this subclass. As explained in the TSD, there are technical limits on how many and which PFAS could be treated similarly.
Deb Pasternak, Clint Richmond	Massachusetts Sierra Club	Supports the additive subgroup approach.	MassDEP notes this support.
Deb Pasternak, Clint Richmond	Massachusetts Sierra Club	Establish lower individual MCLs for PFOA at 8 ppt, PFOS at 10 or 8 ppt and PFNA at 6 ppt.	MassDEP considered this approach but concluded, as explained in the TSD, that a subclass approach is preferable.
Deb Pasternak, Clint Richmond	Massachusetts Sierra Club	Consider adding other PFAS from EPA Method 533 that would fit into the proposed subgroup such as PFHpS.	Although MassDEP is gathering input on the use of EPA Method 533, it was not included in this proposal. Other PFAS could be considered for regulation in the future, if appropriate.
Deb Pasternak, Clint Richmond	Massachusetts Sierra Club	Establish individual MCLs for short-chain PFAS that have MCLs in other states such as PFBS at 420 ppt and HFPO-DA at 140 ppt.	MassDEP is aware of and is following regulatory actions in other states and this proposal does not preclude future proposals covering other PFAS. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Deb Pasternak, Clint Richmond	Massachusetts Sierra Club	Establish a safety threshold for organic fluorine (*e.g.,* TOF) that would trigger additional monitoring and treatment.	MassDEP is unaware of toxicological data that would support derivation of such a safety threshold. MassDEP will

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			follow developments in this area and will consider these types of approaches in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Deb Pasternak, Clint Richmond	Massachusetts Sierra Club	Require annual monitoring for PFAS at all COM and NTNC systems.	MassDEP believes the proposal strikes an appropriate balance between frequency and cost of monitoring. The path to monitoring less than once per year includes sufficient safeguards to ensure that this frequency is appropriate.
Deb Pasternak, Clint Richmond	Massachusetts Sierra Club	Supports cost recovery for testing and treatment from fluorochemical manufacturers/users.	Outside the scope of the drinking water regulations.
Deb Pasternak, Clint Richmond	Massachusetts Sierra Club	Develop a source reduction program for non-essential uses such as food packaging and cosmetics.	Outside the scope of the drinking water regulations.
Kathryn Rodgers, Laurel Schaider	Silent Spring Institute	Supports development of an MCL for PFAS6 and the use of read-across to include PFDA and PFHpA.	MassDEP notes this support.
Kathryn Rodgers, Laurel Schaider	Silent Spring Institute	Use EPA's Distributed Structure-Searchable Toxicity (DSSTox) Database to identify and regulate additional "similar" PFAS (e.g. 287 can be considered similar to PFOA and PFOS).	DSSTox is a useful tool in identifying compounds that exhibit similar structural features associated with certain toxicities but currently does not allow for determinations of toxicological equivalency.
Kathryn Rodgers, Laurel Schaider	Silent Spring Institute	Prioritize regulating other PFAS that are frequently found in drinking water such as	MassDEP is aware of and following the emerging data on

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		short-chain PFAS that could be added to the proposed subgroup using equivalency factors or by creating a separate subgroup.	other PFAS and this proposal does not preclude future proposals covering other PFAS. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Kathryn Rodgers, Laurel Schaider	Silent Spring Institute	The proposal erroneously lists the CASRN for perfluorohexane sulfonic acid as 335-46-4, when it is actually 355-46-4.	MassDEP notes this correction.
Kathryn Rodgers, Laurel Schaider	Silent Spring Institute	Consider additional analytical methods that are available or may become so in the future including those that measure the total impact from PFAS (*e.g.*, TOP).	This approach has merit but is limited at this time by uncertainties in the reproducibility of TOP assay outputs and it is unclear what an appropriate screening level would be for either the TOP or TOF assays. MassDEP believes it is appropriate to focus on measurements of PFAS directly and notes that it has proposed to require all PFAS within the scope of the approved methods be reported, beyond PFAS6, whenever PFAS is being monitored. MassDEP will follow developments in this area and will consider these approaches in future revisions of the regulations.

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Kathryn Rodgers, Laurel Schaider	Silent Spring Institute	Incorporate new science as it becomes available such as carcinogenicity and breast development. An annual review would be appropriate.	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Kathryn Rodgers, Laurel Schaider	Silent Spring Institute	Want to reiterate that PFOA's liver effects appear to occur independently of the PPAR-alpha mechanism in mice. This is important to note because it is contrary to the idea that PFOA's effects on liver toxicity are irrelevant to humans because the PPAR-alpha receptor is activated to a lesser degree in humans.	MassDEP notes the support.
Kathryn Rodgers, Laurel Schaider	Silent Spring Institute	Evaluate whether individual MCLs for PFOA and PFOS should be set below 20 ppt.	MassDEP considered this approach but concluded, as explained in the TSD, that a subclass approach is preferable.
Kathryn Rodgers, Laurel Schaider	Silent Spring Institute	Use a different term than "Total PFAS."	MassDEP concurs and will be using PFAS6.
Kathryn Rodgers, Laurel Schaider	Silent Spring Institute	Clarify whether "PFAS detections" in 22.07G(5)(a) means PFAS6 or any PFAS in the scope of the method.	"PFAS Detections" has the meaning ascribed to it in 22.07G(3)(b). As clarified in 22.07G(5), initial monitoring applies only to those cases listed in (5)(a); one based on PFAS levels and two based on PFAS6 levels.
Kathryn Rodgers, Laurel Schaider	Silent Spring Institute	Use of ½ MRL for results between 1/3 MRL and the MRL is reasonable.	MassDEP has modified its approach regarding detections below the MRL. These detections

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			will be used for site characterization but not for compliance.
Rainer Lohmann, Philippe Grandjean, Laurel Schaider	University of Rhode Island, Harvard University, Silent Spring Institute: Sources, Transport, Exposure and Effects of PFAS Superfund Research Program	We agree that there are serious health concerns arising from the exposure of the general public to PFASs, and that the reference doses (RfDs) developed by EPA for PFOS and PFOA are not adequately protective.	MassDEP notes the support.
Rainer Lohmann, Philippe Grandjean, Laurel Schaider	University of Rhode Island, Harvard University, Silent Spring Institute: Sources, Transport, Exposure and Effects of PFAS Superfund Research Program	Use a different term than "Total PFAS."	MassDEP concurs and will be using PFAS6.
Rainer Lohmann, Philippe Grandjean, Laurel Schaider	University of Rhode Island, Harvard University, Silent Spring Institute: Sources, Transport, Exposure and Effects of PFAS Superfund Research Program	Clarify whether "PFAS detections" in 22.07G(5)(a) means PFAS6 or any PFAS in the scope of the method.	"PFAS Detections" has the meaning ascribed to it in 22.07G(3)(b). As clarified in 22.07G(5), initial monitoring applies only to those cases listed in (5)(a); one based on PFAS levels and two based on PFAS6 levels.
Rainer Lohmann, Philippe Grandjean, Laurel Schaider	University of Rhode Island, Harvard University, Silent Spring Institute:	Add a phrase to 22.07G(6)(c)3.b. that covers industrial and commercial facilities where PFAS-containing products are frequently used,	This is a partial list of sources of contamination and the term "manufacturing" covers both the makers and users of PFAS.

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	Sources, Transport, Exposure and Effects of PFAS Superfund Research Program	such as metal platers, paper manufacturers, textile mills, and fabric/leather treaters.	
Rainer Lohmann, Philippe Grandjean, Laurel Schaider	University of Rhode Island, Harvard University, Silent Spring Institute: Sources, Transport, Exposure and Effects of PFAS Superfund Research Program	Exposure during prenatal or infancy development can cause lasting impairment of organ functions with associated disease risks. This concern suggests that further lowering of the MCLs is needed.	As discussed in the TSD MassDEP derived the RfD for the subclass of PFAS addressed based on a reduction of the USEPA RfD for PFOA and PFOS. This reduction is based on consideration of lower dose effects that included developmental effects. MassDEP is following scientific developments in this area.
Rainer Lohmann, Philippe Grandjean, Laurel Schaider	University of Rhode Island, Harvard University, Silent Spring Institute: Sources, Transport, Exposure and Effects of PFAS Superfund Research Program	Current evidence on rodent models has shown that low-dose PFOA exposures can impair mammary gland development, and we are glad to see that DEP considered this evidence in applying an extra database uncertainty factor to account for additional low-dose effects.	MassDEP notes this support.
Rainer Lohmann, Philippe Grandjean, Laurel Schaider	University of Rhode Island, Harvard University, Silent Spring Institute: Sources, Transport, Exposure and Effects of PFAS Superfund Research Program	Supports the proposed MCL as the sum concentrations of PFOS, PFOA, and four additional PFAS compounds.	MassDEP notes this support.

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Rainer Lohmann, Philippe Grandjean, Laurel Schaider	University of Rhode Island, Harvard University, Silent Spring Institute: Sources, Transport, Exposure and Effects of PFAS Superfund Research Program	There is ample evidence that MCLs ought to be considered for PFUnDA (C11) and PFDoDA (C12).	These compounds fall outside of the carbon chain cut-off (+/- 2 carbons compared to the best studied PFAS compounds, PFOA and PFOS) used by MassDEP to define the PFAS subgroup addressed in this regulation. The rational for this cutoff is discussed in the TSD. Briefly, MassDEP selected the carbon chain cutoff for inclusion based on analytical method considerations and to ensure that the compounds included are very closely related structurally. MassDEP will follow developments regarding the toxicity of these compounds going forward. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Rainer Lohmann, Philippe Grandjean, Laurel Schaider	University of Rhode Island, Harvard University, Silent Spring Institute: Sources, Transport, Exposure and Effects of PFAS Superfund Research Program	Select short-chain alternatives continue to be produced and are being detected in drinking water. They may bioaccumulate to the same extent or to a greater degree than PFOA or PFOS, may be equally toxic compared to legacy compounds after adjusting for differences in toxicokinetics and while they have half-lives in the serum of weeks to months, they are associated with similar types of health effects	While MassDEP agrees that shorter chain PFAS are likely to exhibit toxicity and persistence, the available data suggest that many are likely to exhibit lower applied dose toxicity. MassDEP concluded that deriving toxicity equivalency factors at this time is not feasible due to data

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		and could be regulated in drinking water by including equivalency factors or creating a separate subgroup.	limitations and limitations in scientific understanding of mechanisms of action. MassDEP is following scientific developments in this area.
Rainer Lohmann, Philippe Grandjean, Laurel Schaider	University of Rhode Island, Harvard University, Silent Spring Institute: Sources, Transport, Exposure and Effects of PFAS Superfund Research Program	Supports the applicability of the 20% default relative source contribution.	MassDEP notes this support.
Rainer Lohmann, Philippe Grandjean, Laurel Schaider	University of Rhode Island, Harvard University, Silent Spring Institute: Sources, Transport, Exposure and Effects of PFAS Superfund Research Program	To the extent possible, PFAS should be considered as a class, or relevant subclasses, rather than attempting to regulate them one at a time.	As described in the TSD, MassDEP considered other approaches but concluded that a subclass approach is preferable.
Rainer Lohmann, Philippe Grandjean, Laurel Schaider	University of Rhode Island, Harvard University, Silent Spring Institute: Sources, Transport, Exposure and Effects of PFAS Superfund Research Program	While setting a total PFAS standard will be difficult to establish, it would be advisable to include a measure of total PFAS on a regular basis to be able to assess how abundant non-targeted PFASs are. This approach would allow MassDEP to be alerted to the presence of other PFASs that might become threats to public health.	The proposed regulation requires the measurement and reporting of all PFAS within the scope of the approved method being used.

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Rainer Lohmann, Philippe Grandjean, Laurel Schaider	University of Rhode Island, Harvard University, Silent Spring Institute: Sources, Transport, Exposure and Effects of PFAS Superfund Research Program	Use of ½ MRL for results between 1/3 MRL and the MRL is reasonable.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
Rainer Lohmann, Philippe Grandjean, Laurel Schaider	University of Rhode Island, Harvard University, Silent Spring Institute: Sources, Transport, Exposure and Effects of PFAS Superfund Research Program	We think that it is appropriate to add Method 533 to the list of acceptable methods.	MassDEP will consider including EPA Method 533 in a subsequent amendment.
Rainer Lohmann, Philippe Grandjean, Laurel Schaider	University of Rhode Island, Harvard University, Silent Spring Institute: Sources, Transport, Exposure and Effects of PFAS Superfund Research Program	One analytical method that could complement existing EPA methods is the total oxidizable precursor assay, or TOP assay, which is a commercially available method for evaluating the presence of precursor compounds. MassDEP could incorporate total organofluorine measurements into an MCL rule by creating a screening level that would require additional testing for individual PFAS.	This approach has merit but is limited at this time by uncertainties in the reproducibility of TOP assay outputs and it is unclear what an appropriate screening level would be for either the TOP or TOF assays. MassDEP believes it is appropriate to focus on measurements of PFAS directly and notes that it has proposed to require all PFAS within the scope of the approved methods be reported, beyond PFAS6, whenever PFAS is being

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
			monitored. MassDEP will follow developments in this area and will consider these approaches in future revisions of the regulations.
Rainer Lohmann, Philippe Grandjean, Laurel Schaider	University of Rhode Island, Harvard University, Silent Spring Institute: Sources, Transport, Exposure and Effects of PFAS Superfund Research Program	MassDEP could include a provision to consider additional analytical methods as they become available.	MassDEP anticipates adding any additional methods that may be appropriate only by amending this regulation consistent with the State Administrative Procedure Act.
Rainer Lohmann, Philippe Grandjean, Laurel Schaider	University of Rhode Island, Harvard University, Silent Spring Institute: Sources, Transport, Exposure and Effects of PFAS Superfund Research Program	Supports the inclusion of NTNC systems.	MassDEP notes this support.
Stephanie Grady	Boston University Department of Environmental Health	Supports MCL as the sum of six PFAS.	MassDEP notes this support.
Stephanie Grady	Boston University Department of Environmental Health	Replace "Total PFAS" with "sub-class" or "sub-group."	MassDEP concurs and will be using PFAS6.
Stephanie Grady	Boston University Department of	Add short-chain PFAS to this subgroup.	Given the available scientific data MassDEP chose specific PFAS

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
	Environmental Health		that could be included in this subclass. There are limits on how many and which PFAS could be treated similarly.
Thomas Webster	Dept. Environmental Health, Boston University School of Public Health	Water can be the dominant route of exposure in communities with substantial drinking water contamination. For the general public in other areas, it provides a smaller percentage of the contribution. The best empirical data we have for the USA now supports a relative source contribution of 20%. This supports DEPs use of the default value of 20%.	MassDEP notes the support.
Thomas Webster	Dept. Environmental Health, Boston University School of Public Health	The half-life of PFAS in the human body is important for animal to human extrapolation and for the summing approach used by MassDEP for six PFAS.	MassDEP notes the support.
Thomas Webster	Dept. Environmental Health, Boston University School of Public Health	Claims have been made that estimates including those reviewed in the TSD for the human half-life for PFOA are too large. Two reasons were given but both are incorrect. First, it was claimed that the standard estimates are biased upwards because they do not take into account background exposure. For example, the C8 studies estimated the human half-life of PFOA following installation of water filters in the WV/OH area. The people involved in the study are more highly exposed by water than the average American. It is straightforward to show that "background exposure" (e.g., from food) would contribute at most a very small upward bias to this estimate. In addition, we empirically	MassDEP notes the support.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
		examined the relationship between serum and water levels of PFOA in this area. The ratio was well predicted by pharmacokinetic models incorporating the standard half-life. Second, that pharmacokinetic data based on extremely highly exposed, terminally ill cancer patients deliberately exposed to PFOA show a much shorter half-life. Such data, even if accurate in this setting, cannot be generalized to the general population because 1) the patients are very ill, meaning that their elimination of PFOA may have been altered from that seen in the general population, ii) the pharmacokinetics may be different at such very high doses. This certainly does not outweigh the other evidence on the length of the PFOA half-life. Agrees with MassDEP's conclusions about the length of half-lives and selection of PFAS – in part on the basis of similar half-lives and resultant serum concentrations.	
Thomas Webster	Dept. Environmental Health, Boston University School of Public Health	MassDEP's reasoning in adding an additional safety factor to take into account new data indicating that effect levels might be lower and that the suite of effects observed in the animal models are developmental effects is appropriate and scientifically supported. As more toxicology data becomes available, the reference dose may need to be lowered.	MassDEP notes the support.
Thomas Webster	Dept. Environmental Health, Boston	MassDEPs drinking water standard, based on animal data with uncertainty factors, needs to be protective of human health in susceptible	MassDEP notes the support.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
	University School of Public Health	populations with an adequate margin of safety. It is similar in magnitude to that of EFSA, derived using different methods and data, and is thus scientifically supported.	
Thomas Webster	Dept. Environmental Health, Boston University School of Public Health	A number of elements go into the decision to set the MCL based on the sum of PFAS6. 1) These six PFAS have similar, long half-lives, leading to accumulation and long periods of internal exposure. Internal doses will reflect external exposure in the same way, i.e., they can be treated together from a pharmacokinetic point of view. Pharmacokinetics can be used to calculate human effective doses. 2) Their target organs overlap and all are developmentally toxic. 3) Animal toxicology data have critical effect doses in similar ranges. There is not strong evidence that their potencies differ. As a result of these considerations, we can therefore assume that concentration addition is applicable. PFAS are typically found as mixtures in water, e.g., with AFFF as a source, leading to simultaneous exposure that should be taken into account. MassDEP's decision to use the sum of the six PFAS is scientifically justified as a policy for water regulation. Similarly, EFSA (2020) applied their TWI to the sum of four PFAS (PFOA, PFOS, PFNA, PFHxS); they restricted to these four compounds in part because they are typically the most abundant in human serum.	MassDEP notes the support.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Tracy Stewart	Safe Healthy Fields Coalition	Supports proposed MCL.	MassDEP notes this support.
Tracy Stewart	Safe Healthy Fields Coalition	It is important to acknowledge some factors that could contribute to drinking water contamination from an artificial turf carpet (the plastic blades and/or backing).	The proposed regulation takes potential PFAS sources into consideration when, for example, MassDEP considers a monitoring waiver.
Tracy Stewart	Safe Healthy Fields Coalition	Add a provision that allows for MassDEP to review the list of PFAS chemicals again within one year	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Tracy Stewart	Safe Healthy Fields Coalition	Apply test methods to detect total PFAS contamination in water.	MassDEP is aware of two assays for total PFAS: TOP and TOF. These methods have merit but are limited at this time by uncertainties in reproducibility of assay outputs. In addition, it is unclear what an appropriate screening level would be for either assay. At this time, MassDEP believes it is appropriate to focus on measurements of the subgroup of longer chain PFAS directly and notes that it has proposed to require all PFAS within the scope of the approved methods be reported, beyond PFAS6,

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
			whenever PFAS is being monitored. MassDEP will follow developments in this area and will consider these approaches in future revisions of the regulations.
Tracy Stewart	Safe Healthy Fields Coalition	Regulate additional PFAS compounds in order to protect our drinking water from the contamination source.	Based on its assessment as presented in the TSD, MassDEP has concluded that its approach to addressing the overall toxicity database for the longer-chain PFAS is appropriately health protective and reflective of the current data. Given the available scientific data MassDEP chose specific PFAS that could be included in this subclass. As explained in the TSD, there are technical limits on how many and which PFAS could be treated similarly.
Wendy Heiger-Bernays	Dept. of Environmental Health, Boston University School of Public Health	Supports the proposed drinking water standard for six PFAS.	MassDEP notes this support.
Wendy Heiger-Bernays	Dept. of Environmental Health, Boston University School of Public Health	The proposed MCL is robust, based on scientific data and incorporates a margin of protection.	MassDEP notes this support.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Wendy Heiger-Bernays	Dept. of Environmental Health, Boston University School of Public Health	Cited studies provide evidence of adverse health effects occurring at exposures below the Point(s) of Departure selected by MassDEP and EPA in deriving reference doses. It is entirely consistent with state of the practice to recognize the low dose effects occurring in these cited studies with the application of an additional uncertainty factor of $10^{1/2}$ for database uncertainty.	MassDEP notes this support.
Wendy Heiger-Bernays	Dept. of Environmental Health, Boston University School of Public Health	MassDEPs drinking water standard, based on animal data with uncertainty factors, needs to be protective of human health in susceptible populations with an adequate margin of safety. It is similar in magnitude to that of the European Food Safety Authority, derived using different methods and data, and is thus scientifically supported.	MassDEP notes the support. Note: The EFSA draft evaluation, published after MassDEP completed is assessment, supports a lower RfD than that derived by USEPA and proposes an additive, equal potency approach for four of the six compounds regulated by MassDEP, based on human epidemiological data.
Wendy Heiger-Bernays	Dept. of Environmental Health, Boston University School of Public Health	There is strong evidence that the critical effects are consistent for a suite of the longer carbon chain PFAS. The approach to sum the six PFAS based on toxicokinetic similarities (e.g. similar half-lives) and equipotency across the compounds, relies on good, defensible data about the half-lives of these compounds. EFSA combines PFOA, PFNA, PFHxS and PFOS, based on effects observed in humans and animal models, half-lives and co-occurrence. Strict mechanistic additivity was not examined. There	MassDEP notes this support.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
		is no known common mechanism of action for these PFAS and in the absence of an alternative interactive model, it is not prudent to wait for the mechanism, nor is it defensible from a public health perspective to ignore the toxicities of these compounds in drinking water. Can't assume that each of these compounds is acting identically, but there is sufficient evidence to support an MCL that is based on the sum of multiple PFAS.	
Wendy Heiger-Bernays	Dept. of Environmental Health, Boston University School of Public Health	Consider removing options to waive the third and fourth quarters of initial monitoring, as seasonal variation should be fully examined.	MassDEP believes this option is necessary and appropriate to balance the cost of monitoring against the likelihood of PFAS contamination in selected PWSs. No waiver is offered without an evaluation of existing monitoring data, known land uses in the area and existing source protection measures.
Wendy Heiger-Bernays	Dept. of Environmental Health, Boston University School of Public Health	Remove the option for monitoring waivers of routine monitoring.	MassDEP believes this option is necessary and appropriate to balance the cost of monitoring against the likelihood of PFAS contamination in selected PWSs. No waiver is offered without an evaluation of existing monitoring data, known land uses in the area and existing source protection measures.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Wendy Heiger-Bernays	Dept. of Environmental Health, Boston University School of Public Health	Supports the consumer notification provision.	MassDEP notes this support.
Wendy Heiger-Bernays	Dept. of Environmental Health, Boston University School of Public Health	Supports the Consumer Confidence Report requirement.	MassDEP notes this support.
Wendy Heiger-Bernays	Dept. of Environmental Health, Boston University School of Public Health	Suggest that MassDEP develop suitable guidance to address the Imminent Hazard level.	Outside the scope of the drinking water regulations.
Wendy Heiger-Bernays	Dept. of Environmental Health, Boston University School of Public Health	Involve local Boards of Health.	MassDEP routinely works with local Boards of Health, for example, to assist with risk communication issues in their communities.
Davis Billips, Francis Cain, Heather Stayton, Steven Fernandes	City of Westfield, DPW – Water Division	Exclude analytical results below the MRL when determining compliance.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
Davis Billips, Francis Cain, Heather Stayton, Steven Fernandes	City of Westfield, DPW – Water Division	Do not require reporting of analytical results below the MRL.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
			characterization but not for compliance.
Davis Billips, Francis Cain, Heather Stayton, Steven Fernandes	City of Westfield, DPW – Water Division	Do not use ½ MRL as a default value for detections below the MRL.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.
Davis Billips, Francis Cain, Heather Stayton, Steven Fernandes	City of Westfield, DPW – Water Division	Do not require a Tier 2 public notice prior to the identification of a violation as this is a costly process. Tier 3 notices should be sufficient.	MassDEP considers the proposed consumer notification more akin to public education required under the Lead and Copper Rule which is similarly required without an underlying violation in order to provide timely and actionable information to sensitive consumers. An annual notice would not serve this purpose given the developmental health risks associated with PFAS exposure.
Davis Billips, Francis Cain, Heather Stayton, Steven Fernandes	City of Westfield, DPW – Water Division	MassDEP has an obligation to determine what the real human risk exposure is, and then, when and if the science dictates, move towards standards that will achieve desired public health outcomes.	MassDEP took this approach, as described in the TSD.
Kristen Mello	Westfield Residents Advocating For Themselves	The proposed MCL is a good start.	MassDEP notes this support.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Kristen Mello	Westfield Residents Advocating For Themselves	The proposed MCL does not account for multigenerational exposures.	MassDEP has accounted for fetal and infant exposures attributable to maternal exposures to drinking water at the proposed limit in two ways. First, MassDEP revised the USEPA RfD downward to reflect data indicating effects at lower doses than those relied upon by USEPA. These lower dose effects included developmental effects. Second, MassDEP has applied a 20% RSC. This value is the same as that used by USEPA in deriving its drinking water health advisories for PFOA and PFOS, a decision made in light of uncertainties about other sources of exposure. This RSC is the most conservative value recommended under current guidance (USEPA, 2000. Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000). Office of Water, Office of Science and Technology. Washington, DC. EPA-822-B-00-004). It was applied to account for other possible sources of exposure, in particular to sensitive

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
			populations, including uncertain and variable exposures from: the diet (including infant exposure attributable to breast milk); consumer products and indoor dust related to these; and, existing body burdens, including to the fetus. This two-pronged approach acknowledges that current science and available data limit our ability to quantify all risks.
Kristen Mello	Westfield Residents Advocating For Themselves	Account for the many more PFAS that can be found in contaminated sites.	Based on its assessment as presented in the TSD, MassDEP has concluded that its approach to addressing the overall toxicity database for the longer-chain PFAS is appropriately health protective and reflective of the current data. Given the available scientific data MassDEP chose specific PFAS that could be included in this subclass. As explained in the TSD, there are technical limits on how many and which PFAS could be treated similarly.
Kristen Mello	Westfield Residents Advocating For Themselves	The proposed standard is not protective of the developing fetus, children, pregnant and nursing mothers.	MassDEP disagrees. The standard is based on developmental endpoints with appropriate

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
			adjustments to account for uncertainties.
Kristen Mello	Westfield Residents Advocating For Themselves	Regulate PFAS as a class or as subclasses based on structure, activity and functional groups.	Based on its assessment as presented in the TSD, MassDEP has concluded that its approach to addressing the overall toxicity database for the longer-chain PFAS is appropriately health protective and reflective of the current data. Given the available scientific data MassDEP chose specific PFAS that could be included in this subclass. As explained in the TSD, there are technical limits on how many and which PFAS could be treated similarly.
Christopher Clark	Westfield Residents Advocating For Themselves	Good first start but more to be done.	MassDEP notes this comment.
Christopher Clark	Westfield Residents Advocating For Themselves	Regulate soil.	Outside the scope of the drinking water regulations.
Christopher Clark	Westfield Residents Advocating For Themselves	Supports the use of the Total Oxidizable Precursor (TOP) assay.	MassDEP is aware of two assays for total PFAS: TOP and TOF. These methods have merit but are limited at this time by uncertainties in reproducibility of assay outputs. In addition, it is unclear what an appropriate screening level would be for

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
			either assay. At this time, MassDEP believes it is appropriate to focus on measurements of the subgroup of longer chain PFAS directly and notes that it has proposed to require all PFAS within the scope of the approved methods be reported, beyond PFAS6, whenever PFAS is being monitored. MassDEP will follow developments in this area and will consider these approaches in future revisions of the regulations.
Lena Entin, Claire Miller, Sylvia Broude, Ashley Hammell, Megan Stokes	Toxics Action Center	Supports proposed MCL.	MassDEP notes the support.
Lena Entin, Claire Miller, Sylvia Broude, Ashley Hammell, Megan Stokes	Toxics Action Center	Set an MCL of 1 ppt for all PFAS.	1 ppt is below the achievable reporting limit for PFAS as determined by MassDEP's laboratory and thus cannot be reliably quantified in drinking water at that level. As detailed in the TSD, MassDEP has concluded that the proposed drinking water standard is protective of public health based on current information.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Lena Entin, Claire Miller, Sylvia Broude, Ashley Hammell, Megan Stokes	Toxics Action Center	Include Method 533.	MassDEP will consider including EPA Method 533 in a subsequent amendment.
Lena Entin, Claire Miller, Sylvia Broude, Ashley Hammell, Megan Stokes	Toxics Action Center	Include re-evaluation in the regulation.	MassDEP has incorporated a periodic review provision in 22.07G(3).
Lena Entin, Claire Miller, Sylvia Broude, Ashley Hammell, Megan Stokes	Toxics Action Center	Require public notice for PFAS detections of any level.	While MassDEP does not believe that public notice for every detection of any PFAS would be consistent with public notice requirements for other contaminants, necessary or practical, all PFAS detections will appear in both the EEA Data Portal and in annual Consumer Confidence Reports.
Lena Entin, Claire Miller, Sylvia Broude, Ashley Hammell, Megan Stokes	Toxics Action Center	Hold hearings at night, in affected communities in familiar spaces so more people can attend outside of working hours.	MassDEP attempted to accommodate as many people and different circumstances as feasible in scheduling our public hearings. This included hearings in all four MassDEP regional offices, a live-streamed hearing in Boston and an evening event in Boston.
Lena Entin, Claire Miller, Sylvia	Toxics Action Center	Supports 2 ppt MRL.	MassDEP notes the support.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Broude, Ashley Hammell, Megan Stokes			
Brendan Shea		Supports proposed MCL.	MassDEP notes the support.
Brendan Shea		Add a provision that allows for MassDEP to review the list of PFAS chemicals again within two or three years.	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Brendan Shea		Apply test methods to detect total PFAS contamination in water.	MassDEP has proposed to require all PFAS within the scope of the approved methods be reported, beyond PFAS6, whenever PFAS is being monitored.
Brendan Shea		Regulate additional PFAS compounds in order to protect our drinking water.	Based on its assessment as presented in the TSD, MassDEP has concluded that its approach to addressing the overall toxicity database for the longer-chain PFAS is appropriately health protective and reflective of the current data. Given the available scientific data MassDEP chose specific PFAS that could be included in this subclass. As explained in the TSD, there are technical limits on how many and which PFAS could be treated similarly.

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Chris Matera, Diane Cotter, Gretel Munroe, Lawrence Spatz, Mark Cason-Snow, Ann Cason-Snow, Pat Weatherlow, Robert Ladino, Sarah McKee, Stephen Scalese, Abby Yanow, Alan Ticotsky, Al Blake, Alice Trexler, Alisa Knight, Alvin Blake, Amy Schneider, Amy Sophia Marashinsky, Andi Gibson, Ann Asnes, Daniel Asnes, Ann Spanel, Barbara Adner, Betsy Sowers, Blithe Hogan, Bonnie Gorman, Brenda Roberts, Brita Lundberg, Carol Baker, Carol Berkeley, Carol Walker, Carolyn Villanova, Cheryl Souza, Chris Aldrich, Christine Lazar, Constance Graham,		Set MCL to 1 ppt for all PFAS.	1 ppt is below the achievable reporting limit for PFAS as determined by MassDEP's laboratory and thus cannot be reliably quantified in drinking water at that level. As detailed in the TSD, MassDEP has concluded that the proposed drinking water standard is protective of public health based on current information.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Cynthia Martin, Danielle DeLuca, Debbie R Goodman, Dennis Rogers, Dennis Vieira, Diane Ritsher, Don Ogden, Dorothy Anderson, Edward Miller, Elana Katz Rose, Elizabeth Bish, Elizabeth Saulnier, Emily Lewis, Emily Welsh, Eva Cashdan, Francoise La Monica, Gail McArdle, Gayle DeBay, Gayle Mulrooney, George Borden, Gerda Brown, Ginny Ansbergs, Glenora Chaves, green589@comcast.net, harpo52@netzero.net, Hayden Hall, Heather Tausig, Heidi Leonard, H. Fleishon, H. Hardouf, hooppole@gmail.com, Jack Fanton, Jack Hillier, Julie Hillier,			

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Jamie Banks, Janet Kolodner, Jeffrey Nissenbaum, Jennifer Kay, Jim Conlon, jmogilnicki@hotmail.com, Joanne Lemelin Pappas, Jodie Dow, Jodi Rodar Rodar, John Cohen, John Gittins, Joyce Coleman, Judith Karlin, Karen Chin, Karen Marshall, Kate Cloud, Kathleen Belitsky, Kathleen Kilcoyne, Kathy Mullins, Katie Goldrick, Kendra Murray, Ken Kipen, Ethel Kipen, lauradubester@gmail.com, Laura Opie, Laurel Facey, Lee Courtemanche, Linda Hsu, Linda Richard, lizthomson38@gmail.com, Louise Berliner, Louise Quigley, Louise Yohalem, Lynn Bengston, Lynn			

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Crystoff, Marcia Cooper, Marc Laverdiere, Margaret Haight, Margie Phillips, Marie-Louise Jackson-Miller, Marjorie Greville, Mary Elloian, Mary Reynold, Masha Kogan, M B Justice, mbrooks3144@gmail.com, mdicarli@live.com, Megan Stokes, Melanie Pahigian, michele@bolagranola.com, Milo Cason-Snow, Mindy Maxwell, Miriam Kurland, Mike Kurland, Monica Lisafeld, Nancy McRae, Natalie Henrich, Nicole Gardner, Nima Rosepiper, paigeleh@yahoo.com, Patrick Leonard, Pauline Hokanson, Paul Schofield,			

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Peggy Kocoras, Regina Galat-Skey, Richard Hassinger, Richard Sirull, Robyn Bagley, Ronald Cabral, Ron Riggert, Karen Riggert, Roxy Gray, rpstevens@gmail.com, Sarah Beerman, Sara Sezun, scoutperry@gmail.com, sethro_tull@yahoo.com, Sharon Pickering, Sophie Higgs, Sosi Toomajanian, Stephanie Abundo, Stephen O'Hara, Steve Wineman, Susan Fasten, Susan Lozoraitis, Susan Mirsky, Susan OGrady, Susan Ringler, Susie_d@yahoo.com, Susi Westwood, Suzette Abbott, Tanja Ryden, Tedric Eiseman, Tien Lum, Timothy Havel, Tom			

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Kilday, Tom Rickenbacker, Tracy Manzella, Tracy Wallace, Vincent Carolan, Virginia Jastromb, Virginia Leeman, Virginia Robinson			
Leslie Lawrence		Thanks for proposing a strong standard.	MassDEP notes the support.
Robert Ladino		Prohibit the spreading of sewage sludge on agricultural land.	Outside the scope of the drinking water regulations.
Margaret Haight		Keep users of PFAS accountable for keeping them out of our drinking water.	Outside the scope of the drinking water regulations.
Tedric Eiseman		Set limits on pesticide use, particularly commercially and municipally and work toward the abolition of Roundup & neonicotinoids in general.	Outside the scope of the drinking water regulations
Lynn Langton, Dianne Plantamura, Karen Martin, Keith Connors, Kate McHugh		Set MCL at 1 ppt.	1 ppt is below the achievable reporting limit for PFAS as determined by MassDEP's laboratory and thus cannot be reliably quantified in drinking water at that level. As detailed in the TSD, MassDEP has concluded that the proposed drinking water standard is protective of public health based on current information.
Deborah Pacini, Rebecca Feldman, Renee Scott		Supports the proposed MCL but wants it to go further by regulating additional PFAS.	MassDEP notes the support. Based on its assessment as presented in the TSD, MassDEP

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
			has concluded that its approach to addressing the overall toxicity database for the longer-chain PFAS is appropriately health protective and reflective of the current data. Given the available scientific data MassDEP chose specific PFAS that could be included in this subclass. As explained in the TSD, there are technical limits on how many and which PFAS could be treated similarly.
Deborah Pacini, Rebecca Feldman, Renee Scott		Add a provision to review the list of PFAS in two or three years.	MassDEP is following the developing science and could propose changes to this regulation in the future. To that end, MassDEP has incorporated a periodic review provision in 22.07G(3).
Deborah Pacini, Rebecca Feldman, Renee Scott		Apply test methods for total PFAS.	MassDEP is aware of two assays for total PFAS: TOP and TOF. These methods have merit but are limited at this time by uncertainties in reproducibility of assay outputs. In addition, it is unclear what an appropriate screening level would be for either assay. At this time, MassDEP believes it is

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
			appropriate to focus on measurements of the subgroup of longer chain PFAS directly and notes that it has proposed to require all PFAS within the scope of the approved methods be reported, beyond PFAS6, whenever PFAS is being monitored. MassDEP will follow developments in this area and will consider these approaches in future revisions of the regulations.
Darin LaFalam, David Lucey, Dennis Morton, Andrew L. Reid, Bob Benlien, Carolyn Capodilupo, Edward Dowling, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra, William Chapman, Thomas Knowlton, Craig Crocker, Neal Merritt, Brian Antonioli, Marisa Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas Gaughan, Randy	Worcester Filtration Plant Manager, WesTech Engineering, Inc., Town of Plainville, Wareham Fire District, Dalton Fire District, Town of Billerica, City of Cambridge, Billerica Water Division (retired), City of Leominster, Town of Lenox, Town of Sharon, Edgartown Water Department, Salem and Beverly Water Supply Board,	Let EPA take the lead on regulating PFAS.	MassDEP believes it is appropriate to consider promulgating health-protective standards in the absence of federal action.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Swigor, David Condrey, Richard Mattson, Thomas Orcutt, Chris Allen, Daniel O'Neill, Edward Rondeau, Mark Warren, Maurice Goulet, Ryan Mouradian, Steve Rafferty, Todd Melanson	Centerville-Osterville-Marstons Mills Water District, Hanover DPW, Westborough DPW, Sarian Company, Inc., West Groton Water Supply District, Salem and Beverly Water Supply Board, Town of Southampton, Whitinsville Water Company, Milford Water Company, Town of Walpole, Town of Groton, Water Supply District of Acton, Lynn Water & Sewer Commission, Williamstown Water and Sewer, Westford Water Department, Medfield Department of Public Works Town of Holden Water & Sewer Division, Town of Falmouth,		

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
	Chelmsford Water District		
Darin LaFalam, David Lucey, Dennis Morton, Andrew L. Reid, Bob Benlien, Carolyn Capodilupo, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra, William Chapman, Thomas Knowlton, Craig Crocker, Neal Merritt, Brian Antonioli, Marisa Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas Gaughan, David Condrey, Richard Mattson, Thomas Orcutt, Chris Allen, Edward Rondeau, Mark Warren, Maurice Goulet, Nicholas Jones, Ryan Mouradian, Steve Rafferty, Todd Melanson	Worcester Filtration Plant Manager, WesTech Engineering, Inc., Town of Plainville, Wareham Fire District, Dalton Fire District, Town of Billerica, Billerica Water Division (retired), City of Leominster, Town of Lenox, Town of Sharon, Edgartown Water Department, Salem and Beverly Water Supply Board, Centerville-Osterville-Marstons Mills Water District, Hanover DPW, Westborough DPW, Sarian Company, Inc., West Groton Water Supply District, Salem and Beverly Water Supply Board, Town of Southampton,	Develop individual MCLs, don't use a cumulative approach.	MassDEP considered this approach but concluded, as explained in the TSD, that a subclass approach is preferable.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
	Milford Water Company, Town of Walpole, Town of Groton, Water Supply District of Acton, Williamstown Water and Sewer, Westford Water Department, Medfield Department of Public Works, Whately Water District Town of Holden Water & Sewer Division, Town of Falmouth, Chelmsford Water District		
Darin LaFalam, David Lucey, Dennis Morton, Andrew L. Reid, Bob Benlien, Carolyn Capodilupo, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra, William Chapman, Thomas Knowlton, Craig Crocker, Neal Merritt, Brian Antonioli, Marisa	Worcester Filtration Plant Manager, WesTech Engineering, Inc., Town of Plainville, Wareham Fire District, Dalton Fire District, Town of Billerica, Billerica Water Division (retired), City of Leominster, Town of Lenox, Town of	Don't require electronic reporting until eDEP is ready for it.	eDEP's infrastructure has already been demonstrated capable of supporting such mandated electronic reporting. eDEP went live in 2006 and since 2016 has accepted drinking water reports from 1200+ PWSs (~71%) each year. In 2019 eDEP saw 30 labs upload 435,793 reports across 15 different water quality reports.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas Gaughan, David Condrey, Richard Mattson, Thomas Orcutt, Chris Allen, Edward Rondeau, Mark Warren, Maurice Goulet, Nicholas Jones, Ryan Mouradian, Steve Rafferty, Todd Melanson	Sharon, Edgartown Water Department, Salem and Beverly Water Supply Board, Centerville-Osterville-Marstons Mills Water District, Hanover DPW, Westborough DPW, Sarian Company, Inc., West Groton Water Supply District, Salem and Beverly Water Supply Board, Town of Southampton, Milford Water Company, Town of Walpole, Town of Groton, Water Supply District of Acton, Williamstown Water and Sewer, Westford Water Department, Medfield Department of Public Works, Whately Water District Town of Holden Water & Sewer Division,		

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
	Town of Falmouth, Chelmsford Water District		
Darin LaFalam, David Lucey, Dennis Morton, Andrew L. Reid, Bob Benlien, Carolyn Capodilupo, Edward Dowling, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra, William Chapman, Thomas Knowlton, Craig Crocker, Neal Merritt, Brian Antonioli, Marisa Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas Gaughan, Randy Swigor, David Condrey, Richard Mattson, Thomas Orcutt, Chris Allen, Edward Rondeau, Mark Warren, Maurice Goulet, Nicholas Jones, Ryan Mouradian, Steve	Worcester Filtration Plant Manager, WesTech Engineering, Inc., Town of Plainville, Wareham Fire District, Dalton Fire District, Town of Billerica, City of Cambridge, Billerica Water Division (retired), City of Leominster, Town of Lenox, Town of Sharon, Edgartown Water Department, Salem and Beverly Water Supply Board, Centerville-Osterville-Marstons Mills Water District, Hanover DPW, Westborough DPW, Sarian Company, Inc., West Groton Water Supply District, Salem and Beverly Water	Require quarterly sampling when results are over the MCL rather than monthly sampling.	MassDEP proposed to determine compliance with the PFAS6 MCL quarterly to ensure that corrective actions are taken as soon as possible to limit short-term exposure risks for sensitive consumers. Basing violations on three monthly samples is more reliable than doing so on a single quarterly sample and its confirmation. However, the monthly monitoring requirement includes a provision for a system to reduce the cost of monthly monitoring after the first quarter by seeking MassDEP approval to use the first monthly sample of each quarter to identify subsequent violations. This provision lowers the cost to that of quarterly monitoring.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Rafferty, Todd Melanson	Supply Board, Town of Southampton, Whitinsville Water Company, Milford Water Company, Town of Walpole, Town of Groton, Water Supply District of Acton, Williamstown Water and Sewer, Westford Water Department, Medfield Department of Public Works, Whately Water District Town of Holden Water & Sewer Division, Town of Falmouth, Chelmsford Water District		
Darin LaFalam, David Lucey, Dennis Morton, Andrew L. Reid, Bob Benlien, Carolyn Capodilupo, Edward Dowling, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra, William Chapman,	Worcester Filtration Plant Manager, WesTech Engineering, Inc., Town of Plainville, Wareham Fire District, Dalton Fire District, Town of Billerica, City of Cambridge, Billerica	Don't include results below the MRL and don't use a default value for these detections. Such results raise questions of legal defensibility.	MassDEP has modified its approach regarding detections below the MRL. These detections will be used for site characterization but not for compliance.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Thomas Knowlton, Craig Crocker, Neal Merritt, Brian Antonioli, Marisa Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas Gaughan, Randy Swigor, David Condrey, Richard Mattson, Thomas Orcutt, Chris Allen, Daniel O'Neill, Edward Rondeau, Mark Warren, Maurice Goulet, Nicholas Jones, Ryan Mouradian, Steve Rafferty, Todd Melanson	Water Division (retired), City of Leominster, Town of Lenox, Town of Sharon, Edgartown Water Department, Salem and Beverly Water Supply Board, Centerville-Osterville-Marstons Mills Water District, Hanover DPW, Westborough DPW, Sarian Company, Inc., West Groton Water Supply District, Salem and Beverly Water Supply Board, Town of Southampton, Whitinsville Water Company, Milford Water Company, Town of Walpole, Town of Groton, Water Supply District of Acton, Lynn Water & Sewer Commission, Williamstown Water and Sewer, Westford		

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
	Water Department, Medfield Department of Public Works, Whately Water District Town of Holden Water & Sewer Division, Town of Falmouth, Chelmsford Water District		
Darin LaFalam, David Lucey, Dennis Morton, Andrew L. Reid, Bob Benlien, Carolyn Capodilupo, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra, William Chapman, Thomas Knowlton, Craig Crocker, Neal Merritt, Brian Antonioli, Marisa Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas Gaughan, Randy Swigor, David Condrey, Richard Mattson, Thomas Orcutt, Chris Allen,	Worcester Filtration Plant Manager, WesTech Engineering, Inc., Town of Plainville, Wareham Fire District, Dalton Fire District, Town of Billerica, Billerica Water Division (retired), City of Leominster, Town of Lenox, Town of Sharon, Edgartown Water Department, Salem and Beverly Water Supply Board, Centerville-Osterville-Marstons Mills Water District, Hanover DPW,	Allow for invalidation if the detections can be linked to products used in the sampling line or are due to human error or there are markedly different confirmation results.	The proposal includes provisions for identifying alternative sampling locations which would include situations where an existing sample line is suspected or can be demonstrated to be a source of PFAS. MassDEP does not agree that human error could alter the results of PFAS sampling in a way that would not also alter the field reagent blank that is a required part of every sampling event. A field reagent blank that fails QC would invalidate the associated field sample. Quality control measures are used to evaluate both initial and confirmation samples such that each can be individually determined to be acceptable for compliance use. MassDEP's

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Daniel O'Neill, Edward Rondeau, Mark Warren, Maurice Goulet, Nicholas Jones, Ryan Mouradian, Steve Rafferty, Todd Melanson	Westborough DPW, Sarian Company, Inc., West Groton Water Supply District, Salem and Beverly Water Supply Board, Town of Southampton, Whitinsville Water Company, Milford Water Company, Town of Walpole, Town of Groton, Water Supply District of Acton, Lynn Water & Sewer Commission, Williamstown Water and Sewer, Westford Water Department, Medfield Department of Public Works, Whately Water District Town of Holden Water & Sewer Division, Town of Falmouth, Chelmsford Water District		experience to date does not support the premise that confirmation samples are likely to be markedly different from initial samples but these situations would be evaluated on a case-by-case basis.
Darin LaFalam, David Lucey, Dennis	Worcester Filtration Plant Manager,	Supports use of historic data.	MassDEP notes the support.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Morton, Andrew L. Reid, Bob Benlien, Carolyn Capodilupo, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra, William Chapman, Thomas Knowlton, Craig Crocker, Neal Merritt, Brian Antonioli, Marisa Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas Gaughan, David Condrey, Richard Mattson, Thomas Orcutt, Chris Allen, Edward Rondeau, Mark Warren, Maurice Goulet, Nicholas Jones, Ryan Mouradian, Steve Rafferty, Todd Melanson	WesTech Engineering, Inc., Wareham Fire District, Dalton Fire District, Town of Billerica, Billerica Water Division (retired), City of Leominster, Town of Lenox, Town of Sharon, Edgartown Water Department, Salem and Beverly Water Supply Board, Centerville-Osterville-Marstons Mills Water District, Hanover DPW, Westborough DPW, Sarian Company, Inc., West Groton Water Supply District, Salem and Beverly Water Supply Board, Town of Southampton, Milford Water Company, Town of Walpole, Town of Groton, Water Supply District of		

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
	Acton, Williamstown Water and Sewer, Westford Water Department, Medfield Department of Public Works, Whately Water District Town of Holden Water & Sewer Division, Town of Falmouth, Chelmsford Water District		
Darin LaFalam, David Lucey, Dennis Morton, Andrew L. Reid, Bob Benlien, Carolyn Capodilupo, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra, William Chapman, Thomas Knowlton, Craig Crocker, Neal Merritt, Brian Antonioli, Marisa Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas Gaughan, David Condrey, Richard	Worcester Filtration Plant Manager, WesTech Engineering, Inc., Wareham Fire District, Dalton Fire District, Town of Billerica, Billerica Water Division (retired), City of Leominster, Town of Lenox, Town of Sharon, Edgartown Water Department, Salem and Beverly Water Supply Board, Centerville-Osterville-Marstons	Supports waivers.	MassDEP notes the support.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Mattson, Thomas Orcutt, Chris Allen, Edward Rondeau, Mark Warren, Maurice Goulet, Nicholas Jones, Ryan Mouradian, Steve Rafferty, Todd Melanson	Mills Water District, Hanover DPW, Westborough DPW, Sarian Company, Inc., West Groton Water Supply District, Salem and Beverly Water Supply Board, Town of Southampton, Milford Water Company, Town of Walpole, Town of Groton, Water Supply District of Acton, Williamstown Water and Sewer, Westford Water Department, Medfield Department of Public Works, Whately Water District Town of Holden Water & Sewer Division, Town of Falmouth, Chelmsford Water District		
Darin LaFalam, David Lucey, Dennis Morton, Andrew L.	Worcester Filtration Plant Manager, WesTech	Supports monitoring flexibility based on emergency considerations, laboratory capacity,	MassDEP notes the support.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Reid, Bob Benlien, Carolyn Capodilupo, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra, William Chapman, Thomas Knowlton, Craig Crocker, Neal Merritt, Brian Antonioli, Marisa Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas Gaughan, David Condrey, Richard Mattson, Thomas Orcutt, Chris Allen, Edward Rondeau, Mark Warren, Maurice Goulet, Nicholas Jones, Ryan Mouradian, Steve Rafferty, Todd Melanson	Engineering, Inc., Wareham Fire District, Dalton Fire District, Town of Billerica, Billerica Water Division (retired), City of Leominster, Town of Lenox, Town of Sharon, Edgartown Water Department, Salem and Beverly Water Supply Board, Centerville-Osterville-Marstons Mills Water District, Hanover DPW, Westborough DPW, Sarian Company, Inc., West Groton Water Supply District, Salem and Beverly Water Supply Board, Town of Southampton, Milford Water Company, Town of Walpole, Town of Groton, Water Supply District of Acton, Lynn Water &	and Public Water System operational considerations.	

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
	Sewer Commission, Williamstown Water and Sewer, Westford Water Department, Medfield Department of Public Works, Whately Water District Town of Holden Water & Sewer Division, Town of Falmouth, Chelmsford Water District		
Darin LaFalam, David Lucey, Dennis Morton, Andrew L. Reid, Bob Benlien, Carolyn Capodilupo, Edward Dowling, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra, William Chapman, Thomas Knowlton, Craig Crocker, Neal Merritt, Brian Antonioli, Marisa Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas Gaughan, Randy	Worcester Filtration Plant Manager, WesTech Engineering, Inc., Town of Plainville, Wareham Fire District, Dalton Fire District, Town of Billerica, City of Cambridge, Billerica Water Division (retired), City of Leominster, Town of Lenox, Town of Sharon, Edgartown Water Department, Salem and Beverly Water Supply Board,	Take the complexities, timing, and cost of designing, permitting and constructing treatment systems into account when establishing enforcement timelines.	MassDEP's enforcement practices currently allow for negotiated compliance timelines for specific challenges at each utility (e.g., the availability of funding, access to engineering services and the time to obtain and construct treatment units).

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Swigor, David Condrey, Richard Mattson, Thomas Orcutt, Chris Allen, Daniel O'Neill, Edward Rondeau, Mark Warren, Maurice Goulet, Nicholas Jones, Ryan Mouradian, Steve Rafferty, Todd Melanson	Centerville-Osterville-Marstons Mills Water District, Hanover DPW, Westborough DPW, Sarian Company, Inc., West Groton Water Supply District, Salem and Beverly Water Supply Board, Town of Southampton, Whitinsville Water Company, Milford Water Company, Town of Walpole, Town of Groton, Water Supply District of Acton, Lynn Water & Sewer Commission, Williamstown Water and Sewer, Westford Water Department, Medfield Department of Public Works, Whately Water District Town of Holden Water & Sewer Division, Town of Falmouth,		

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
	Chelmsford Water District		
Darin LaFalam, David Lucey, Dennis Morton, Andrew L. Reid, Bob Benlien, Carolyn Capodilupo, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra, William Chapman, Thomas Knowlton, Craig Crocker, Neal Merritt, Brian Antonioli, Marisa Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas Gaughan, Randy Swigor, David Condrey, Richard Mattson, Thomas Orcutt, Chris Allen, Daniel O'Neill, Edward Rondeau, Mark Warren, Maurice Goulet, Nicholas Jones, Ryan Mouradian, Steve Rafferty, Todd Melanson	Worcester Filtration Plant Manager, WesTech Engineering, Inc., Town of Plainville, Wareham Fire District, Dalton Fire District, Town of Billerica, Billerica Water Division (retired), City of Leominster, Town of Lenox, Town of Sharon, Edgartown Water Department, Salem and Beverly Water Supply Board, Centerville-Osterville-Marstons Mills Water District, Hanover DPW, Westborough DPW, Sarian Company, Inc., West Groton Water Supply District, Salem and Beverly Water Supply Board, Town of Southampton,	Work with the Operational Services Division to add necessary services and common treatment components to the state bid list.	Outside the scope of the drinking water regulations.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
	Whitinsville Water Company, Milford Water Company, Town of Walpole, Town of Groton, Water Supply District of Acton, Lynn Water & Sewer Commission, Williamstown Water and Sewer, Westford Water Department, Medfield Department of Public Works, Whately Water District Town of Holden Water & Sewer Division, Town of Falmouth, Chelmsford Water District		
Darin LaFalam, David Lucey, Dennis Morton, Andrew L. Reid, Bob Benlien, Carolyn Capodilupo, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra, William Chapman, Thomas Knowlton,	Worcester Filtration Plant Manager, WesTech Engineering, Inc., Town of Plainville, Wareham Fire District, Dalton Fire District, Town of Billerica, Billerica Water Division	Provide risk communication tools.	The proposal's public notice and consumer confidence requirements include health effects language. In addition, MassDEP has developed communication materials that are available on the web. These note other exposure pathways.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Craig Crocker, Neal Merritt, Brian Antonioli, Marisa Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas Gaughan, Randy Swigor, David Condrey, Richard Mattson, Thomas Orcutt, Chris Allen, Daniel O'Neill, Edward Rondeau, Mark Warren, Maurice Goulet, Nicholas Jones, Ryan Mouradian, Steve Rafferty, Todd Melanson	(retired), City of Leominster, Town of Lenox, Town of Sharon, Edgartown Water Department, Salem and Beverly Water Supply Board, Centerville-Osterville-Marstons Mills Water District, Hanover DPW, Westborough DPW, Sarian Company, Inc., West Groton Water Supply District, Salem and Beverly Water Supply Board, Town of Southampton, Whitinsville Water Company, Milford Water Company, Town of Walpole, Town of Groton, Water Supply District of Acton, Lynn Water & Sewer Commission, Williamstown Water and Sewer, Westford Water Department,		

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
	Medfield Department of Public Works, Whately Water District Town of Holden Water & Sewer Division, Town of Falmouth, Chelmsford Water District		
Darin LaFalam, David Lucey, Dennis Morton, Andrew L. Reid, Bob Benlien, Carolyn Capodilupo, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra, William Chapman, Thomas Knowlton, Craig Crocker, Neal Merritt, Brian Antonioli, Marisa Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas Gaughan, Randy Swigor, David Condrey, Richard Mattson, Thomas Orcutt, Chris Allen, Daniel O'Neill,	Worcester Filtration Plant Manager, WesTech Engineering, Inc., Town of Plainville, Wareham Fire District, Dalton Fire District, Town of Billerica, Billerica Water Division (retired), Town of Lenox, Town of Sharon, Edgartown Water Department, Salem and Beverly Water Supply Board, Centerville-Osterville-Marstons Mills Water District, Hanover DPW, Westborough DPW, Sarian Company,	Consumer notification should be specific to the sensitive subpopulation.	Depending on the length of exposure, health risks could be of concern for the general population not just sensitive subgroups and as such the consumer notice would be tailored to the specific situation.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Edward Rondeau, Mark Warren, Maurice Goulet, Nicholas Jones, Ryan Mouradian, Steve Rafferty, Todd Melanson	Inc., West Groton Water Supply District, Salem and Beverly Water Supply Board, Town of Southampton, Whitinsville Water Company, Milford Water Company, Town of Walpole, Town of Groton, Water Supply District of Acton, Lynn Water & Sewer Commission, Williamstown Water and Sewer, Westford Water Department, Medfield Department of Public Works, Whately Water District Town of Holden Water & Sewer Division, Town of Falmouth, Chelmsford Water District		
Darin LaFalam, David Lucey, Dennis Morton, Andrew L. Reid, Bob Benlien,	Worcester Filtration Plant Manager, WesTech Engineering, Inc.,	Provide context to relative PFAS exposures in drinking water.	The risk communication materials provided by MassDEP contain information on other exposures.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Carolyn Capodilupo, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra, William Chapman, Thomas Knowlton, Craig Crocker, Neal Merritt, Brian Antonioli, Marisa Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas Gaughan, Randy Swigor, David Condrey, Richard Mattson, Thomas Orcutt, Chris Allen, Daniel O'Neill, Edward Rondeau, Mark Warren, Maurice Goulet, Nicholas Jones, Ryan Mouradian, Steve Rafferty, Todd Melanson	Town of Plainville, Wareham Fire District, Dalton Fire District, Town of Billerica, Billerica Water Division (retired), City of Leominster, Town of Lenox, Town of Sharon, Edgartown Water Department, Salem and Beverly Water Supply Board, Centerville-Osterville-Marstons Mills Water District, Hanover DPW, Westborough DPW, Sarian Company, Inc., West Groton Water Supply District, Salem and Beverly Water Supply Board, Town of Southampton, Whitinsville Water Company, Milford Water Company, Town of Walpole, Town of Groton, Water Supply District		

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
	of Acton, Lynn Water & Sewer Commission, Williamstown Water and Sewer, Westford Water Department, Medfield Department of Public Works, Whately Water District Town of Holden Water & Sewer Division, Town of Falmouth, Chelmsford Water District		
Darin LaFalam, David Lucey, Dennis Morton, Andrew L. Reid, Bob Benlien, Carolyn Capodilupo, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra, William Chapman, Thomas Knowlton, Craig Crocker, Neal Merritt, Brian Antonioli, Marisa Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas	Worcester Filtration Plant Manager, WesTech Engineering, Inc., Town of Plainville, Wareham Fire District, Dalton Fire District, Town of Billerica, Billerica Water Division (retired), City of Leominster, Town of Lenox, Town of Sharon, Edgartown Water Department, Salem and Beverly	Provide information on PFAS-free alternative sources of water (bottled water and POU devices).	Although MassDEP does not regulate bottled water, MassDEP has solicited and made available on our web page testing results from bottled water companies. Publicly available treatment options for homeowners, to the extent available, have also been posted.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Gaughan, Randy Swigor, David Condrey, Richard Mattson, Thomas Orcutt, Chris Allen, Daniel O'Neill, Edward Rondeau, Mark Warren, Maurice Goulet, Nicholas Jones, Ryan Mouradian, Steve Rafferty, Todd Melanson	Water Supply Board, Centerville-Osterville-Marstons Mills Water District, Hanover DPW, Westborough DPW, Sarian Company, Inc., West Groton Water Supply District, Salem and Beverly Water Supply Board, Town of Southampton, Milford Water Company, Town of Walpole, Town of Groton, Water Supply District of Acton, Lynn Water & Sewer Commission, Williamstown Water and Sewer, Westford Water Department, Medfield Department of Public Works, Whately Water District Town of Holden Water & Sewer Division, Town of Falmouth,		

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
	Chelmsford Water District		
Darin LaFalam, David Lucey, Dennis Morton, Andrew L. Reid, Bob Benlien, Carolyn Capodilupo, Edward Dowling, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra, William Chapman, Thomas Knowlton, Craig Crocker, Neal Merritt, Brian Antonioli, Marisa Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas Gaughan, Randy Swigor, David Condrey, Richard Mattson, Thomas Orcutt, Chris Allen, Daniel O'Neill, Edward Rondeau, Mark Warren, Maurice Goulet, Nicholas Jones, Ryan Mouradian, Steve	Worcester Filtration Plant Manager, WesTech Engineering, Inc., Town of Plainville, Wareham Fire District, Dalton Fire District, Town of Billerica, City of Cambridge, Billerica Water Division (retired), City of Leominster, Town of Lenox, Town of Sharon, Edgartown Water Department, Salem and Beverly Water Supply Board, Centerville-Osterville-Marstons Mills Water District, Hanover DPW, Westborough DPW, Sarian Company, Inc., West Groton Water Supply District, Salem and Beverly Water Supply Board, Town	Establish timelines for BWSC investigations.	Outside the scope of the drinking water regulations.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Rafferty, Todd Melanson	of Southampton, Whitinsville Water Company, Milford Water Company, Town of Walpole, Town of Groton, Water Supply District of Acton, Lynn Water & Sewer Commission, Williamstown Water and Sewer, Westford Water Department, Medfield Department of Public Works, Whately Water District Town of Holden Water & Sewer Division, Town of Falmouth, Chelmsford Water District		
Darin LaFalam, David Lucey, Dennis Morton, Andrew L. Reid, Bob Benlien, Carolyn Capodilupo, Edward Dowling, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra,	Worcester Filtration Plant Manager, WesTech Engineering, Inc., Town of Plainville, Wareham Fire District, Dalton Fire District, Town of Billerica, City of	Identify grant funding for treatment.	Outside the scope of the drinking water regulations. Note: the State has made funding available for limited sampling as well as reimbursement for the design of PFAS treatment. The Drinking Water State Revolving Fund administered by the Clean Water Trust also has funding

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
William Chapman, Thomas Knowlton, Craig Crocker, Neal Merritt, Brian Antonioli, Marisa Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas Gaughan, Randy Swigor, David Condrey, Richard Mattson, Thomas Orcutt, Chris Allen, Daniel O'Neill, Edward Rondeau, Mark Warren, Maurice Goulet, Nicholas Jones, Ryan Mouradian, Steve Rafferty, Todd Melanson	Cambridge, Billerica Water Division (retired), City of Leominster, Town of Lenox, Town of Sharon, Edgartown Water Department, Salem and Beverly Water Supply Board, Centerville-Osterville-Marstons Mills Water District, Hanover DPW, Westborough DPW, Sarian Company, Inc., West Groton Water Supply District, Salem and Beverly Water Supply Board, Town of Southampton, Whitinsville Water Company, Milford Water Company, Town of Walpole, Town of Groton, Water Supply District of Acton, Lynn Water & Sewer Commission, Williamstown Water		specifically to address PFAS contamination via low interest loans.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
	and Sewer, Westford Water Department, Medfield Department of Public Works, Whately Water District Town of Holden Water & Sewer Division, Town of Falmouth, Chelmsford Water District		
Darin LaFalam, David Lucey, Dennis Morton, Andrew L. Reid, Bob Benlien, Carolyn Capodilupo, John Sullivan, Mark Piermarini, Robert Horn, Rob Terpstra, William Chapman, Thomas Knowlton, Craig Crocker, Neal Merritt, Brian Antonioli, Marisa Picone-Devine, Paul Curtin, Peter Smyrnios, Thomas Gaughan, Randy Swigor, David Condrey, Richard Mattson, Thomas	Worcester Filtration Plant Manager, WesTech Engineering, Inc., Town of Plainville, Wareham Fire District, Dalton Fire District, Town of Billerica, Billerica Water Division (retired), City of Leominster, Town of Lenox, Town of Sharon, Edgartown Water Department, Salem and Beverly Water Supply Board, Centerville-Osterville-Marstons Mills Water District,	Provide technical and compliance assistance.	Outside the scope of the drinking water regulations. Note: MassDEP has done so in the past and is currently doing so through an agreement with UMass Amherst.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Orcutt, Chris Allen, Daniel O'Neill, Edward Rondeau, Mark Warren, Maurice Goulet, Nicholas Jones, Ryan Mouradian, Steve Rafferty, Todd Melanson	Hanover DPW, Westborough DPW, Sarian Company, Inc., West Groton Water Supply District, Salem and Beverly Water Supply Board, Town of Southampton, Whitinsville Water Company, Milford Water Company, Town of Walpole, Town of Groton, Water Supply District of Acton, Lynn Water & Sewer Commission, Williamstown Water and Sewer, Westford Water Department, Medfield Department of Public Works, Whately Water District, Town of Holden Water & Sewer Division, Town of Falmouth, Chelmsford Water District		

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Marisa Picone-Devine	Sarian Company, Inc.	Take into account constraints unique to small private COM and NTNC systems, especially costs.	All systems are eligible for the state-funded testing through June 30, 2021.
Marisa Picone-Devine	Sarian Company, Inc.	Ban the use of PFAS in manufacturing and prohibit the sale of products containing PFAS.	Outside the scope of the drinking water regulations.
Randy Swigor	Whitinsville Water Company	The amount of time given to stakeholders to review and comment on these regulations is severely insufficient; perception of a lack of caring by MADEP about public input in their increasingly non-transparent and unilateral regulatory development process.	MassDEP is subject to and revises regulations in accordance with the requirements of the State Administrative Procedure Act. In fact, MassDEP provided an extended comment period of two and a half months for the public to review the proposal and submit comments. In addition, MassDEP has held PFAS discussions with stakeholders for over a year.
Randy Swigor	Whitinsville Water Company	MassDEP is ignoring other sections of the drinking water regulations where PFAS may affect systems (e.g. provide additional Zone II prohibitions within the groundwater supply protection regulations).	Once statewide PFAS monitoring is underway and additional information becomes available on confirmed sources of PFAS, MassDEP will consider whether additional land uses should be prohibited in Zone II (within 310 CMR 22.21).
Randy Swigor	Whitinsville Water Company	Systems need guidance on acceptable materials to use as part of their infrastructure (*e.g.*, should they stop using Teflon tape).	MassDEP is following the developments on whether and to what extent drinking water materials can be sources of PFAS and will share this information as guidance to systems, if

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
			appropriate, as it becomes available.
Randy Swigor	Whitinsville Water Company	What evidence can MADEP provide to show that creating a drinking water standard will have a measurable positive exposure effect on the general public while other sources go unaddressed?	Although other sources of exposure can be significant, when drinking water is contaminated with PFAS greater than the proposed MCL, this exposure pathway can be the most significant source of exposure for those consuming the contaminated water.
Randy Swigor	Whitinsville Water Company	More should be done on source reduction rather than waiting for PFAS to show up in drinking water.	Outside the scope of the drinking water regulations.
Randy Swigor	Whitinsville Water Company	MassDEP should conduct sampling and testing itself or via a state-funded third-party to ensure consistency.	MassDEP believes that state-certified, trained drinking water operators should be capable of collecting all types of water quality samples.
Randy Swigor	Whitinsville Water Company	Sample bottles should be air-tight to avoid cross contamination via air exposure.	EPA Methods 537 and 537.1 specify the appropriate sample bottles to be used and do not included a requirement that they be air-tight. Moreover, MassDEP is not aware of airborne cross contamination being a significant concern but if it were then the field blank collected at the same time would show this contamination and related field samples would be invalidated.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Randy Swigor	Whitinsville Water Company	The list of major sources in drinking water at 22.16A(27)(a) is inadequate and implies that few sources exist.	MassDEP disagrees. The description of sources is broad and the language covers both the manufacture, use and disposal of PFAS themselves as well as products that contain PFAS.
Randy Swigor	Whitinsville Water Company	MassDEP should disclose the MCL is based on health concerns from a sensitive subpopulation. It is disingenuous to then extrapolate it to the general public.	Most, if not all, drinking water MCLs are based on adverse health outcomes for subpopulations. The TSD covers the basis of the proposed PFAS MCL.
Randy Swigor	Whitinsville Water Company	Don't use the term, "some people" in the health effects language.	This term is consistent with the federal language that is used for the majority of all regulated contaminants when they are described in both the public notice rule and the consumer confidence rule.
Randy Swigor	Whitinsville Water Company	Add a definition for Minimum Detection Limit (MDL) to explain its use throughout 310 CMR 22.00.	The term "*minimum* detection limit" does not appear in 310 CMR 22.00. However, the term "*Method* Detection Limit" does and its definition, from 310 CMR 42.00, has been added to 310 CMR 22.00.
Daniel O'Neill	Lynn Water & Sewer Commission	MCL is too stringent and relies on insufficient information pertaining to the health risks at these concentrations.	As detailed in the TSD, MassDEP has concluded that the proposed drinking water standard is protective of public health based on current information.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Daniel O'Neill	Lynn Water & Sewer Commission	Implement a PFAS source identification and elimination program, including investigating rainfall as a potential source, prior to promulgating an MCL	Outside the scope of the drinking water regulations.
Daniel O'Neill	Lynn Water & Sewer Commission	Address increased operational costs associated with PFAS treatment.	Outside the scope of this proposal. Note: the State has made funding available for limited sampling as well as reimbursement for the design of PFAS treatment. The Drinking Water State Revolving Fund administered by the Clean Water Trust also has funding specifically to address PFAS contamination via low interest loans.
Nicholas Jones	Whately Water District	Massachusetts should work to eliminate other PFAS exposures. Ban products that cause these exposures.	Outside the scope of the drinking water regulations.
Nicholas Jones	Whately Water District	Appreciate the effort to fill the void left by EPA inaction.	MassDEP notes the support.
Nicholas Jones	Whately Water District	Hold the industries that manufactured PFAS products responsible for the remediation of contamination.	Outside the scope of the drinking water regulations.
Steve Rafferty	Town of Falmouth	MassDEP will need more staff to fast track review and approval of PFAS treatment systems.	Outside the scope of the drinking water regulations.
Harvey LeSueur		Supports the proposal.	MassDEP notes the support.
Lisa Campe	Woodward & Curran	MassDEP should continue to maintain a science and fact-based approach to the regulation of PFAS.	MassDEP notes the support.

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
Lisa Campe	Woodward & Curran	Supports MassDEP's reasonable and scientifically sound approach.	MassDEP notes the support.
Lisa Campe	Woodward & Curran	Don't be swayed by anomalous situations where biosolids or wastewater has been affected by large industrial discharges.	Outside the scope of the drinking water regulation.
Ted Conna		Supports as small a standard as possible.	MassDEP notes the comment.
Ted Conna		Bottled water is not an environmentally sustainable alternative to public drinking water.	MassDEP notes the comment.
Michael Moore	MA State Senator	Supports a more stringent standard.	MassDEP notes the comment.
Michael Moore	MA State Senator	Hold hearings at night in affected communities.	MassDEP attempted to accommodate as many people and different circumstances as feasible in scheduling our public hearings. This included hearings in all four MassDEP regional offices, a live-streamed hearing in Boston and an evening event in Boston.
Maureo Fernández y Mora	Clean Water Action	Pleased with MassDEP's efforts.	MassDEP notes the support.
Maureo Fernández y Mora	Clean Water Action	Concerned with the small number of PFAS being regulated.	Based on its assessment as presented in the TSD, MassDEP has concluded that its approach to addressing the overall toxicity database for the longer-chain PFAS is appropriately health protective and reflective of the current data. Given the available scientific data MassDEP chose specific PFAS that could be included in this subclass. As

Commenter	Affiliation (if any was provided)	Summary of Comment	MassDEP Response
			explained in the TSD, there are technical limits on how many and which PFAS could be treated similarly.
Maureo Fernández y Mora	Clean Water Action	Encourage use of Method 533.	MassDEP will consider including EPA Method 533 in a subsequent amendment.
Maureo Fernández y Mora	Clean Water Action	Encourage more testing of other PFAS, especially short-chain replacements.	The proposed regulation requires that all PFAS testing cover the full scope of the approved method.
Maureo Fernández y Mora	Clean Water Action	Hold hearings in more accessible locations and during evenings.	MassDEP attempted to accommodate as many people and different circumstances as feasible in scheduling our public hearings. This included hearings in all four MassDEP regional offices, a live-streamed hearing in Boston and an evening event in Boston.