Message

From: Wintrob, Paul [Wintrob.Paul@epa.gov]
Sent: 11/20/2018 9:34:23 PM
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CC: Correa, Sylvia [Correa.Sylvia@epa.gov]; Teel, Pam [Teel.Pam@epa.gov]; Katchinoff, Julien M [katchinoffjm@state.gov]; DunlapEM@state.gov; SoR@state.gov; Dunn, Alexandra [dunn.alexandra@epa.gov]; Szaro, Deb [Szaro.Deb@epa.gov]; Gutro, Doug [Gutro.Doug@epa.gov]; Conway, Timothy [Conway.Tim@epa.gov]; McGuire, Karen [Mcguire.Karen@epa.gov]; Chow, James [chow.james@epa.gov]; Moraff, Kenneth [Moraff.Ken@epa.gov]; Hamjian, Lynne [Hamjian.Lynne@epa.gov]; Melanson, Kate [Melanson.Kate@epa.gov]; Ellis, Rebecca [Rebecca.Ellis@vermont.gov]; Neil Kamman [Neil.Kamman@vermont.gov]
Subject: Nov 20 VT DEC Responses to Lake Memphremagog Follow-up Questions from Global Affairs Canada and Environment Canada
Attachments: 2018-11-20 EPA Canada Questions.pdf

Good Afternoon Nicole, Morgan, Danielle, Guy, Arash, Steve, Felicia, Sean:

Our colleagues at VT DEC have provided responses to the second set of questions you sent along on Nov 7 (see the attached PDF file: 2018-11-20 EPA Canada Questions). As I mentioned in a previous email, VT DEC has offered to have a follow-up conference call so that any additional questions that you have can be discussed. Kate Melanson and I will connect with VT DEC and get some dates/times that will work for their subject matter experts and then we'll circle back to the larger group (Global Affairs Canada, Environment Canada, State Department, EPA OITA & R1, VT DEC) and cross our fingers that we can find a date that works for everyone. (VT DEC is checking with staff about their availability during the weeks of Dec 3 and 10.)

Special thanks to Neil Kamman and Rebecca Ellis at VT DEC for pulling together the responses.

Best Regards,

Paul

617.918.1514
EPA Region 1

Responses to USEPA Region 1 Questions regarding the NEWS-VT Facility Updated 11/20/2018
Vermont Department of Environmental Conservation

Question 1: when does Vermont expect to issue the Solid Waste Management Facility Permit? If we understand correctly, once the Solid Waste Management Facility Permit has been granted, the Act 250 process will resume.

Response 1: Vermont DEC issued the final Solid Waste Facility Certification on October 12, 2018. Documents pertaining to this certification may be found at: https://anrweb.vt.gov/DEC/ERT/SolidWaste.aspx?SWFacID=OL510.

Question 2: Can we please get clarification of the permitting and Act 250 process and a timeline?

Response 2: On June 13th, the Act 250 District Commission , recessed the proceeding regarding the expansion of NEWS-VT pending information to be filed by the facility operator, on or before November 30, 2018. In their recess order, the Act 250 Commission provided that parties would have 15 days from the date of receipt of the required information to provide information in response.

On October 19th, the Act 250 District Commission filed a Memorandum of Decision stating that:

> The District #7 Environmental Commission (Commission) received and is reviewing the Solid Waste Management Faciltiy (sic) Certification dated October 12, 2019, and may reconvene the hearing. Pursuant to Rule 19(C), the Commission hereby notifies parties of their right to request a reconvenend (sic) hearing, to rebut the presumption. Any such request shall be filed on or before October 29, 2018. IF the hearing is reconvened, the persons and entities which requested untimely party status (...) will be allowed limited rights to participate as Friends of the Commission, after all admitted parties have had an opportunity to present evidence and cross-examine, to the extent that time is reasonably available, so as to not cause unfair delay. Reference is also made to Rule 19(F) concerning the effect of presumptions.

The effect of the October 19th Decision is as follows: 1) The new October 29th deadline allows parties the opportunity to request a hearing for the express purpose of rebutting the presumption of compliance afforded to the Solid Waste Facility Certification; 2) The previous November 30th deadline has been superseded; and, 3) the District Commission is considering whether to reconvene the hearing of its own motion. This means that even if no parties come forward by October 29th to request a hearing, the Commission may still decide that a hearing is needed. The District's October 19th Decision is silent on the Memphremagog Regional Commission's requests for the Commission to address concerns regarding the treatment and discharge of leachate.

On October 29th, the Memphremagog Regional Commission (MRC) filed a request for a hearing before the Act 250 District Commission. The MRC filed further information on November 16th. The Act 250 District Commission is expected to issue a memo on party status and notice of reconvened hearing on November 20th or shortly thereafter.

All information regarding this proceeding can be viewed on the Vermont Act 250 Database, at https://anrweb.vt.gov/ANR/vtANR/Act250SearchResults.aspx?Num=7R0841-13.

Question 3: We understand that two additional permits will be required for landfill leachate. The first is a Pre-treatment permit issued to New England Waste Services Vermont (NEWSVT) by the Vermont Department of Environmental Conservation, which will require testing of leachate before treatment at

WWTFs. Is there an expected timeframe for this updated permit to be complete? Can we find out more about testing that will be required under this permit?

Response 3: Vermont is taking a closer look at leachate across the State, particularly with respect to PFAS. PFAS concentrations within landfill leachate can fluctuate depending on factors such as the waste composition, waste age and weather. Similarly, WWTF effluent PFAS concentrations can vary due to fluctuations in the sources of PFAS within the influent. To better establish the potential range in PFAS concentrations within the landfill leachate, the DEC is requiring the landfill operators to conduct PFAS sampling and testing on a semi-annual basis. In addition, further evaluation is needed to better understand the fate and transport of PFAS from landfill leachate as it is processed through WWTFs. The DEC will also begin more rigorous sampling of WWTF influent, effluent and surface water sampling which will be conducted during times when WWTFs are processing landfill leachate. This preliminary testing will occur in 2019 and this data will be used to help inform the renewal of the pre-treatment permit including any additional requirements. Attachment A of the Responsiveness Survey for the Solid Waste Facility Certification details these and other actions to be taken regarding leachate management from landfills, and provides a compilation of information collected to date.

Question 4: The second is a WWTF Discharge permit, issued to the City of Newport by Vermont Department of Environmental Conservation. The current permit is over ten years old and issuance of the new permit was pending while awaiting results of studies. Expect to have this permit out next year (2019). Can you please confirm whether this is the earlier permit, issued in 2004: https://anrweb.vt.gov/PubDocs/DEC/WSMD/Wastewater/permits/3-1241/3-1241_factsheet.pdf?

Response 4: This is the current permit for Newport City.

Question 5: Can you please provide more information on the studies, referred to above, required before issuance of the new permit?

Response 5: The DEC has required the City of Newport test their effluent for arsenic and to complete four Whole Effluent Toxicity (WET) tests to inform the Reasonable Potential Analysis required for renewal of the permit. A Reasonable Potential Analysis is required at renewal of wastewater discharged permits issued under the National Point Source Discharge Elimination System to ensure that any pollutants discharged by the facility will not cause or contribute to an exceedance of the Vermont Water Quality Standards.

Question 6: Can you please confirm that we understand the following correctly, that testing on effluent, including toxicity, from the landfill is currently taking place.

Response 6: The landfill operators have been the testing organic and inorganic contaminants including metals under their prior Certification. The new October 12, 2018 Certification also requires semi-annual testing for PFAS. Newport City WWTF is currently completing the testing required under their current permit and completed arsenic and WET testing.

Question 7: And, that the results of this testing will determine the testing and monitoring requirements for the new permit to be issued in 2019.

Response 7: Results of the testing at the landfill and the Newport City WWTF will help inform the requirements of the renewed permits for both facilities.

Question 8: Is this testing what was being referred to, above?

Response 8: Yes. In addition the DEC has conducted preliminary testing of PFAS in WWTF Influent and Effluent. The full report of this work is available here.

Question 9: How do these two permits, pre-treatment and discharge, fit into the overall process for the landfill expansion? Can the expansion proceed before new permits are issued?

Response 9: These two permits are separate from the landfill expansion and are not required for the expansion permit issuance.

Question 10: During the call it was noted that VT has been quite aggressive in setting standards for PFAS. In 2016, Vermont updated its health advisory for drinking water to 20 parts per trillion. How does the 20 PPT compare across the U.S. and to EPA national standards?

Response 10: EPA's Health Advisory is set at 70 parts per trillion (PPT) for the combination of PFOA and PFOS, which is not a regulatory standard. Some States have adopted this Standard. The State of Connecticut has adopted a Drinking Water Action Level of 70 PPT for five PFAS compounds. Vermont has adopted a groundwater enforcement standard of 20 PPT for the sum of five PFAS compounds (PFOA, PFOS, PFHxS, PFHpA, PFNA) in the Groundwater Protection Rule and Strategy (Chapter 12 of Vermont's Environmental Protection Rules).

Question 11: Does this standard apply to all classes of Vermont waters, like the Class B Lake Memphremagog?

Response 11: No. The Groundwater Protection Rule and Strategy does not apply to surface waters. There is no standard or criteria for PFAS in in the Vermont Water Quality Standards, which pertain to surface waters.

Question 12: Does it apply within the water body itself or "at the tap" once water has been treated?

Response 12: The Vermont Water Quality Standards presently require that Class B(2) surface waters "be managed to achieve and maintain a level of quality that is suitable for use as a public water source with filtration and disinfection or other required treatment."

Utilizing PFAS concentrations measured at the Newport WWTF, and a steady-state receiving water model (see EPA's "Technical Support Document for Water Quality-Based Toxics Control"), the DEC has calculated likely receiving water concentrations of PFAS downstream of the Newport WWTF within the Clyde River. These calculations show that the PFAS concentration within the Clyde River would be far lower than the Groundwater Enforcement Standard.

Question 13: We understand VT is considering requirements for PFAS testing in new permits for landfill. Which permits may require PFAS testing? We understand, from news reports, that issuance of permits has been delayed until PFAS testing done. Could you share more information about PFAS testing that was done (e.g., was PFAS testing done on groundwater, lakewater, or both? Is it the Solid Waste Management Facility Permit that was delayed for this testing, or other permits as well?).

Response 13: Please see responses and resources linked above for testing of leachate, influent, and effluent. Lakewater has not been tested for PFAS to date. For groundwater, in considering the final decision of the pending application for the Solid Waste Management Facility Certification, the DEC did request that PFAS testing be completed in six groundwater monitoring wells located around the landfill property. This initial testing occurred in August 2018. The results for the five PFAS compounds that have groundwater enforcement standards and Health Advisories in Vermont are as follows:

Table 1. Testing results for five PFAS sampling results (in parts per trillion) that are part of the Vermont Groundwater Enforcement Standard, for six groundwater monitoring wells in the vicinity of the NEWS-VT Facility.

Well location	PFOA	PFOS	PFHpA	PFHxS	PFNA	Total
MW-705	nd <1.8	nd <1.8	nd <1.8	nd <1.8	nd <1.8	ND
BRW-3D	nd <1.8	nd <1.8	nd <1.8	nd <1.8	nd <1.8	ND
MW-P2RR	57	nd <8.9	41	18	nd <8.9	116
MW-P6	nd <1.7	nd <1.7	nd <1.7	nd <1.7	nd <1.7	ND
MW-E1	nd <1.8	nd <1.8	6.7	nd <1.8	nd <1.8	6.7
MW-E2	nd <1.8	nd <1.8	nd <1.8	nd <1.8	nd <1.8	ND

Three PFAS compounds above the Groundwater Enforcement Standard of 20 PPT were noted in MW-P2RR. This monitoring well is positioned immediately adjacent to the closed unlined landfill, on the landfill property, and over 800 feet from the property boundary which serves as the compliance point for the unlined landfill.

Due to this detection of PFAS above standard in the vicinity of the unlined landfill, and the low-level detection in MW-E1, downgradient of the lined portion of the landfill, the Solid Waste Management Facility Certification issued October 12th has been amended to include a condition requiring PFAS sampling to be incorporated into the regular semi-annual groundwater monitoring program. The certification also requires semi-annual monitoring for PFAS within the landfill leachate and within the landfill underdrain discharge locations.

Question 14: could we please have more information about the lake water monitoring being done by VT on Memphremagog (e.g., frequency, parameters, etc.)? Are there any plans to update/change these requirements based on the results of current studies being done re: the landfill?

Response 14: The Vermont DEC coordinates a comprehensive monitoring program for Lake Memphremagog aimed at phosphorus and other nutrient management. A summary of those efforts is provided in Appendix A of this document. DEC does not have immediate plans to update its lake monitoring program based on results of landfill monitoring; however, DEC practices adaptive management and updates its plans regularly, as needed.

Question 15: We understand that Vermont is compiling all requests and comments that were received by the October 29 deadline to file requests for re-hearings. Do you have a sense of when the District Environmental Commission might rule on whether to reconvene the hearing? If the hearing is not reconvened, we understand from the Hearing Recess Order that the Commission will set a date for adjournment and issue a final decision based on the existing record; are you able to let us know how long that process might take?

Response 15: The decision to reconvene the hearing rests with the District 7 Commission and will depend on how the Commission decides to address several pending hearing requests and requests for party status. On October 29th, MRC de Memphremagog and the City of Sherbrooke filed a request for a hearing under Criteria 1 (undue water pollution), 1B (waste disposal), 3 (burden on existing water supply), 7 (municipal & government services) and 9K (public investment). On November 2nd, the Applicant filed a Memo in Opposition. The Applicant objects to broadening the scope of the hearing and argues that the scope of any future hearing should be solely limited to Criterion 1B and rebuttal of the Solid Waste Certification under 1B. The Applicant also objects to party status requests filed by the citizens' group, Don't Undermine Memphremagog's Purity (DUMP) and other individuals. Given the flurry of recent filings, it would appear likely that a hearing will be scheduled at some point, howeverthe scope of the hearing remains in question. The Act 250 District Coordinator for the District 7 Commission, housed in St. Johnsbury, would be in the best position to forecast when the Commission may elect to schedule a hearing. Full contact information for District 7 staff and Commissioners may be found at https://nrb.vermont.gov/act250-program/district-staff-and-commissions.

Question 16: Is the Act 250 process the final step in the approval process before expansion can proceed? Are there any other requirements that must be met?

Response 16: In addition to the requirements set forth by the Solid Waste Facility Certification, and adherence to requirements for other Agency permits, should an amended Act 250 Land Use Permit authorize the expansion, that Permit will very likely contain additional requirements and conditions. It is unknown at this time what conditions the Commission may elect to impose. However, at this point our Department understands that the Act 250 amended Land Use permit is the final permit necessary to authorize the expansion.

Question 17: We note that on October 26th, the City of Newport filed a letter with VT DEC indicating that it had voted to immediately stop taking leachate from the landfill and to formally oppose its expansion. Are you able to confirm that the landfill is no longer sending leachate for treatment at Newport WWTF? If this is the case, we assume all leachate is now being directed to the other four facilities outlined in the pre-treatment permit. Can you please confirm?

Response 17: At the present time, DEC understands that the City of Newport is not accepting leachate from the landfill. However, DEC also understands that the landfill operator is permitted to truck leachate to Plattsburgh WWTF and to the Concord, N.H. WWTF, if needed. The landfill is required by the State of VT to report the quantities of leachate delivered to all VT facilities subject to the NPDES pre-treatment permit. Thus, it cannot be unequivocally assumed that leachate is being treated only by the Vermont facilities.

Question 18: The Responsiveness Survey from the DEC indicates that "there are water quality conditions besides the treatment of leachate at a wastewater treatment facility that currently prevent Lake Memphremagog from being classified as a Class A (2) water". Can you provide more information about the water quality conditions that prevent the lake from being classified as Class A (2)? We are curious about the process used to determine the classification of lakes, as well as what the process would be for reclassification of a lake.

Response 18: It is the statutory requirements for surface waters designated as Class A(2) for public water source, coupled with existing land use conditions, that render reclassification infeasible. Vermont State Statute at Title 10 V.S.A. §1253 documents the reclassification process for surface waters in

Vermont. Chapter 29a of the Environmental Protection Rules, or the Water Quality Standards, is the rule containing waterbody classifications.

Title 10 V.S.A. 1259 (C) indicates that no direct discharges of waste that at any time contained pathogens of human origin may be allowed in waters designated Class A. Class A incorporates Class A(1), or designated ecological waters, and Class A(2), or designated public surface water sources. There are four wastewater treatment facilities that provide pollution control services in the United States portion of the watershed, and at least one in the Canada portion of the watershed. Reclassification of Lake Memphremagog to Class A(2) for the designated use of Public Water Source would render these duly authorized pollution control facility discharges in violation of Vermont State law.

In addition, Chapter One of the Vermont Environmental Protection Rules, or the Vermont Wastewater System and Potable Water Supply Rules, preclude the establishment of any in-ground wastewater treatment system in excess of 1,000 gallons per day in the watershed of a surface water designated as Class A(2) for public water source. There are likely hundreds or even thousands of such permitted septic systems in the U.S. portion of the Lake Memphremagog watershed. Reclassification of the Lake to Class A(2) for the designated use of Public Water Source would render these systems in violation of Chapter Two and also preclude the construction of any additional septic systems in excess of 1,000 gallons per day, per parcel.

Title 10 V.S.A. §1253 documents the reclassification process for surface waters in Vermont. Chapter 29a of the Environmental Protection Rules, or the Water Quality Standards, is the rule containing waterbody classifications.

Appendix A.
Lake Memphremagog Water Quality Monitoring Summary
Watershed Management Division
Department of Environmental Conservation
Vermont Agency of Natural Resources

Oct 24, 2018

The Vermont Department of Environmental Conservation's Watershed Management Division coordinates a comprehensive monitoring effort for conventional water quality parameters in the lake waters and tributaries of Lake Memphremagog. In-lake efforts to track nutrients and cyanobacteria are described first. This is followed by a description of tributary testing, and finally, water quality summaries using the Vermont Lakes Scorecard are described.

- Routine In-Lake Monitoring

Principal Location:
Station #1 (same as Lay Monitoring Program) in center of lake off Whipple Point, Newport Town, VT (44.9628, -72.2228). See https://anrweb.vt.gov/DEC/IWIS/ReportViewer.aspx?Report=MonitoringSiteSummary&ViewParms=False&LocationID=504805

Supplemental Locations:
- Lake Memphremagog Station #2 (historical only)
- Lake Memphremagog Station #3 (44.9665,-72.2256)
- Lake Memphremagog Station #4 (44.9818,-72.2168)
- South Bay Station #1 (44.9203,-72.2097)

Frequency:
Monthly from May to October (6 sampling events) and once in late winter when iced over.

Water Sampling Method and Parameters:
- Secchi Depth
  - Water Transparency/Turbidity
- Surface Bottle Grab (depth = 0.5 m)
  - Total Phosphorus
  - Dissolved Phosphorus
  - Total Nitrogen
  - Chloride
  - Dissolved Organic Carbon
  - Earth Metals – Aluminum, Calcium, Iron, Magnesium, Manganese, Potassium, Sodium
  - Phytoplankton (if visible)
- Bottom Water Sample (depth = 1 m above bottom ≈ 8 m)
  - Total Phosphorus
  - Dissolved Phosphorus
  - Total Nitrogen
  - Chloride
  - Dissolved Organic Carbon

- Earth Metals – Aluminum, Calcium, Iron, Magnesium, Manganese, Potassium, Sodium

- Multi-Probe Vertical Profile (depth = 0.5 m and every 1 m to 1 m above bottom ≈ 8 m)
  - Chlorophyll-a
  - Conductivity
  - Dissolved Oxygen
  - pH
  - Temperature

- Lake Memphremagog Cyanobacteria Monitoring Program

Citizen volunteers recruited by the Memphremagog Watershed Association participate annually in the Vermont cyanobacteria monitoring program coordinated by VT DEC and the VT Department of Health (VDH). They have been active in this program since 2013. Volunteers are recruited and trained each year to utilize Vermont' visual assessment protocol to evaluate cyanobacteria conditions on surface waters. Reports documenting observed conditions are provided weekly from mid-June through late September via an online portal hosted by the VDH. Additional mid-week reports from volunteers and other observers are also collected each summer during bloom events. All reports are reviewed and approved before posting to the CyanoTracker online map hosted on the VDH website. Though the number of sites fluctuates annually with volunteer participation, sites for which data are available include:

- Lake Memphremagog Spring Phosphorus Monitoring Program

The Watershed Management Division's (WSMD) Spring Phosphorus Program Coordinator conducts water quality monitoring annually soon after ice out at Lake Memphremagog Stations 1, 3 , 4 as well as South Bay Station #1 for a variety of water quality parameters including total phosphorus, total nitrogen, alkalinity, calcium, chloride, magnesium, hardness, Secchi disk transparency, color, temperature, dissolved oxygen, pH, conductivity, chlorophyll-a and turbidity. As a component of a focused water quality monitoring effort, WSMD's Lake Assessment and Lay Monitoring Program Coordinator started collecting similar multi-probe parameters (temperature, dissolved oxygen, pH, conductivity, chlorophyll-a) and discrete (surface grab and 1 meter above bottom Kemmerer) water samples (TP/DP, TN, Earth metals, chloride, DOC) during the summer of 2018 visits on a monthly basis from May to September. This focused monitoring is slated to continue indefinitely going forward.

Lake Memphremagog Cyanobacteria Monitoring Locations

- Prouty Beach (#204)
- Derby Bay (#211)
- Holbrook Bay (#212)
- Newport City docks (#342)

Annual summaries can be found in the statewide reports located on the VT DEC's cyanobacteria webpage (near the bottom of the page). The project's quality assurance plan can also be found on this page.

- Lake Memphremagog Tributary Monitoring Summary

A targeted tributary monitoring program that has been supported through the LaRosa volunteer monitoring program since 2005 has included sampling at over 153 sites in the lake Memphremagog watershed with an additional 13 sites in the Stearns Brook watershed. This water sampling program has been supported through collaboration of NorthWoods Stewardship Center, the Memphremagog

Watershed Association, Seymour Lake Association, and the Orleans County Natural Resources Conservation District with Fritz Gerhardt of Beck Pond LLC leading the program.
This sampling program has included sampling eight times a year for nitrogen, phosphorus and turbidity with at least two dates targeting runoff events and has focused on identifying source areas through sampling small tributaries and ditches or bracketing source areas. Through these efforts, several pollution source areas have been identified as shown in Figure 2 and many of these have been addressed in collaboration with agricultural partners and landowners while others are the focus for ongoing implementation efforts. This water quality monitoring program has demonstrated several cases where implementation of best management practices resulted in reductions in phosphorous concentrations including the "Strawberry Acres" tributary where water quality sampling suggests a greater than 50% reduction in phosphorus loading after a barnyard overhaul and pasture improvement practices completed in this watershed. The Seymour Lake Association also completed sampling of six tributaries to the lake in 2008 and 2009 and will be resampling these tributaries in 2017 to evaluate if these levels have remained consistent.
The WSMD maintains an ongoing tributary monitoring program targeting monthly sampling for the four major tributaries (Barton, Black, Clyde, and Johns River) with an additional 8-12 high flow event samples per year. Effluent sampling and flow measurements will monitor wastewater treatment plan phosphorus loads to verify compliance with phosphorus wasteload allocations for each facility in order to meet the target load allocations for the Lake Memphremagog Phosphorus TMDL.
A collaborative water sampling program supported by VTDEC through the LaRosa volunteer monitoring program and Clean Water Initiative funding is also integral to the Lake Memphremagog TMDL as it will continue to pinpoint phosphorus source areas and evaluate load reductions achieved through the implementation of BMPs (See Figure 1, below). This targeted water sampling program is also being incorporated into the RCPP program to target agricultural BMP's where they can have the greatest impact. Sampling will be done in collaboration with farmers and resource staff to aid in the development of nutrient management plans and land treatment plans that truly address the primary phosphorus sources on the farm. The sampling will then continue as BMP's are installed to evaluate load reductions or if loading calculations are not possible at least changes in phosphorus concentrations before and after BMP implementation. A local BMP scenario tool will continue to be used to compare predicted vs measured load reductions achieved at a smaller scale and the scenario tool will be refined if monitoring results show significant differences in load reductions in a number of locations. Such efforts also be used to "fine tune" basin-wide BMP scenario tool presented in in the TMDL for future Tactical Basin plans.

- The Vermont Lakes Scorecard

The Vermont Inland Lake Score Card is a user-friendly interface developed by the Vermont Lakes and Ponds Management and Protection Program (VLPP) to share available data on overall lake health with lake users. The Lake Score Card for Memphremagog and South Bay are good references for past and current monitoring data with program descriptions in the link to How Lakes Are Scored. The Lay Monitoring Program coordinates with Newport City staff at the City Dock to sample at Lake Memphremagog Station #1 (see Figure 2 for monitoring locations below) for total phosphorus (nutrient) concentration, chlorophyll-a (algae and cyanobacteria) concentration, and/or Secchi depth (water transparency) every week to ten days from Memorial Day to Labor Day (see Vermont Lay Monitoring Program (LMP) Sampling Protocol). See https://dec.vermont.gov/watershed/lakes-ponds/data-maps/scorecard

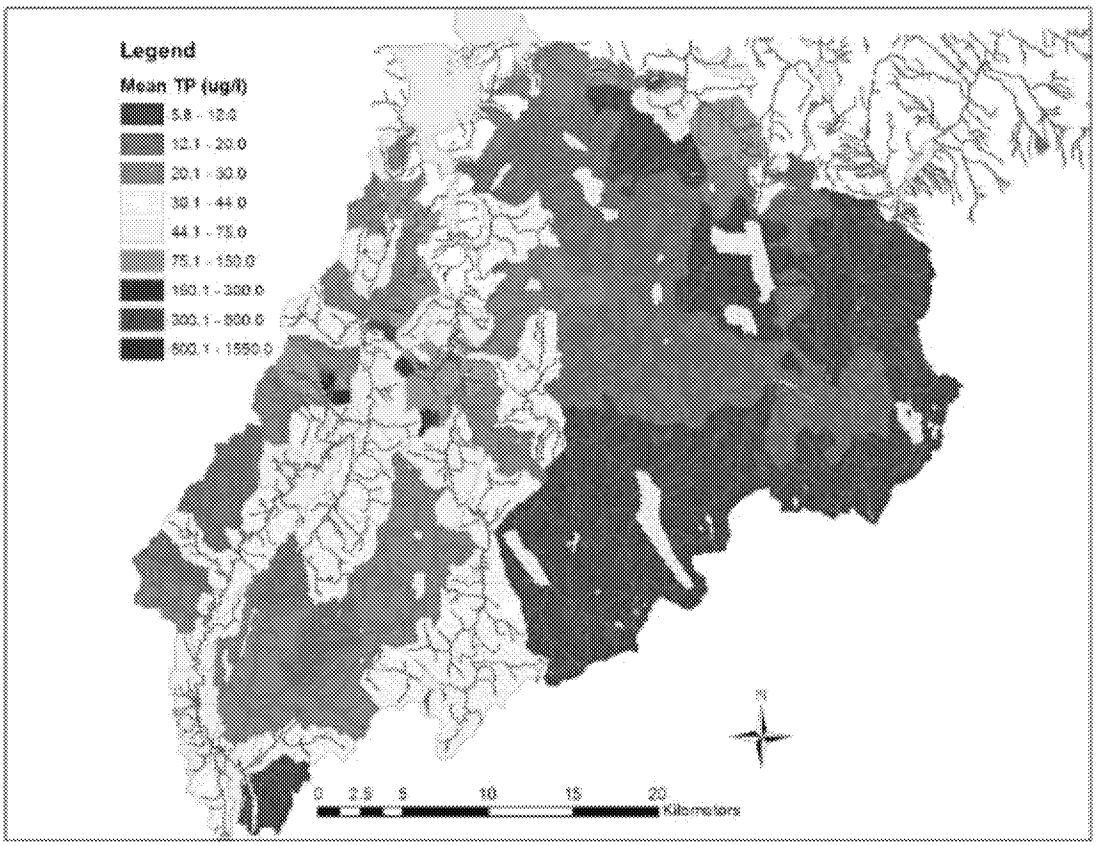

Figure 1. Mean total phosphorus concentrations measured from 146 sub-watersheds of the Lake Memphremagog Basin during 2005-2016. Watersheds with mean phosphorus concentrations of greater than 44 ug/l are targeted for phosphorus reduction efforts in the lake Memphremagog watershed.

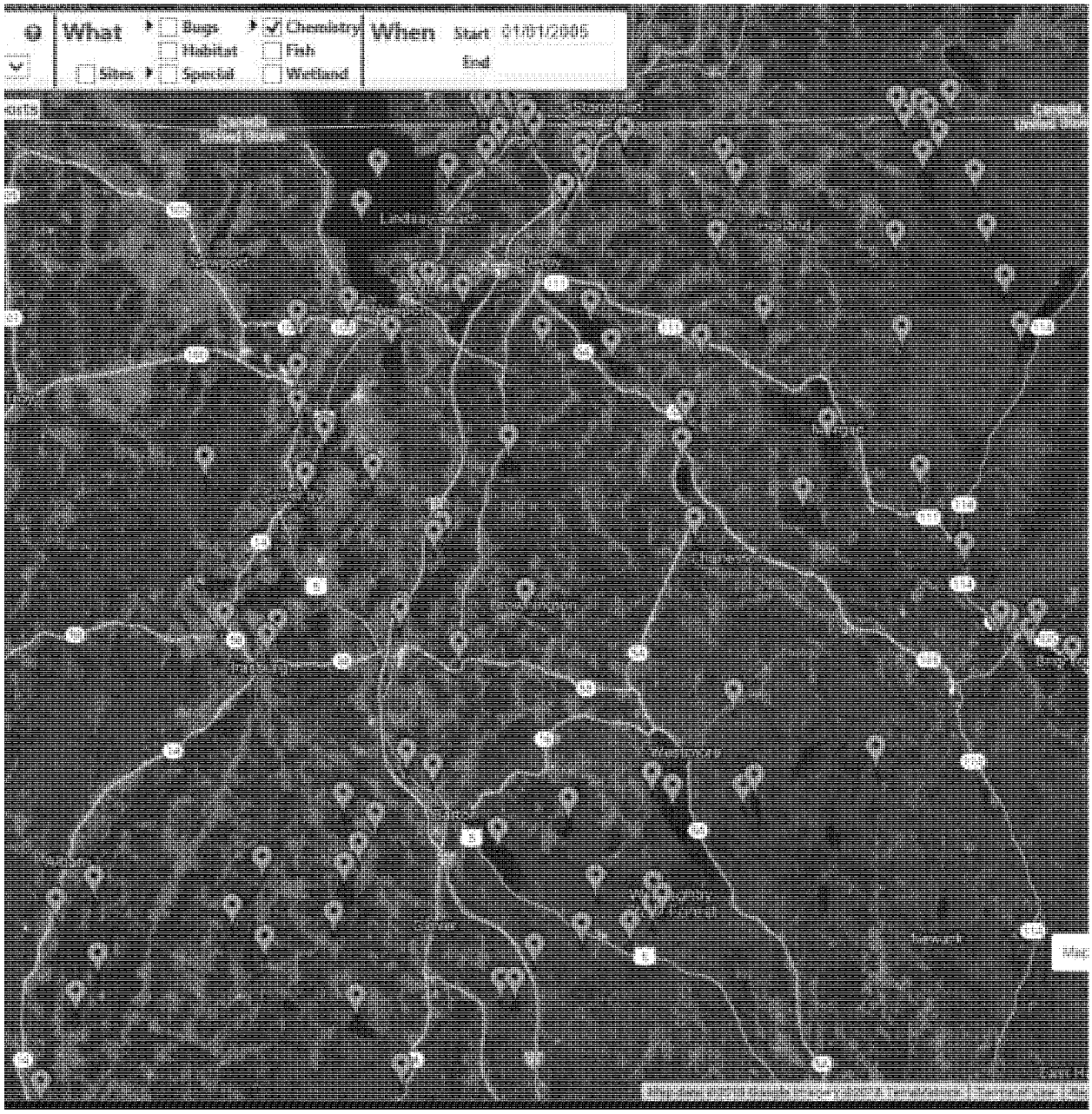

Figure 2. Overview of the chemical monitoring locations within the Lake Memphremagog Basin in Vermont.

Appointment

From: Melanson, Kate [Melanson.Kate@epa.gov]
Sent: 8/29/2018 3:01:19 PM
To: Melanson, Kate [Melanson.Kate@epa.gov]; Dixon, Sean [dixon.sean@epa.gov]; Dunn, Alexandra [dunn.alexandra@epa.gov]; Szaro, Deb [Szaro.Deb@epa.gov]; Coit, Janet (DEM) [janet.coit@dem.ri.gov]; terry.gray@dem.ri.gov; Maguire, Rayna (DEM) [rayna.maguire@dem.ri.gov]
CC: Richards, Claire (GOV) [Claire.Richards@governor.ri.gov]

Subject: Call with RIDEM on Early Engagement - Call in number attached
Attachments: States Early Engagement Agenda.docx; EPA FY18-22 Transformation Strategy.pdf; fy-2018-2022-epa-strategic-plan.pdf

Start: 10/3/2018 7:15:00 PM
End: 10/3/2018 7:45:00 PM
Show Time As: Busy

Call in number
Ex. 6
Enter Ex. 6
Passcode - Ex. 6

Good Afternoon Director Coit –

Earlier this year RA Dunn sent an email to New England States and Tribes on EPA's plan to initiating early engagement discussions with States and Tribes to gain early input into the FY20-21 National Program Guidance. We've spoken with a few states so far, and had a call with the Tribes earlier in the month. We have a call scheduled with you on Wednesday.

We are hoping to come away from the call on Wednesday with an understanding of: Rhode Island' priorities; strategies to carry out the priorities, and financial, administrative and/or programmatic flexibilities needed to carry out the strategies identified in the Strategic Plan. RIDEM office directors are invited to participate if you would like them to.

I've attached an agenda for the call, as well EPA's strategic plan.

Please let me know if you have any questions.

Thank you!
-Kate

Kate Melanson
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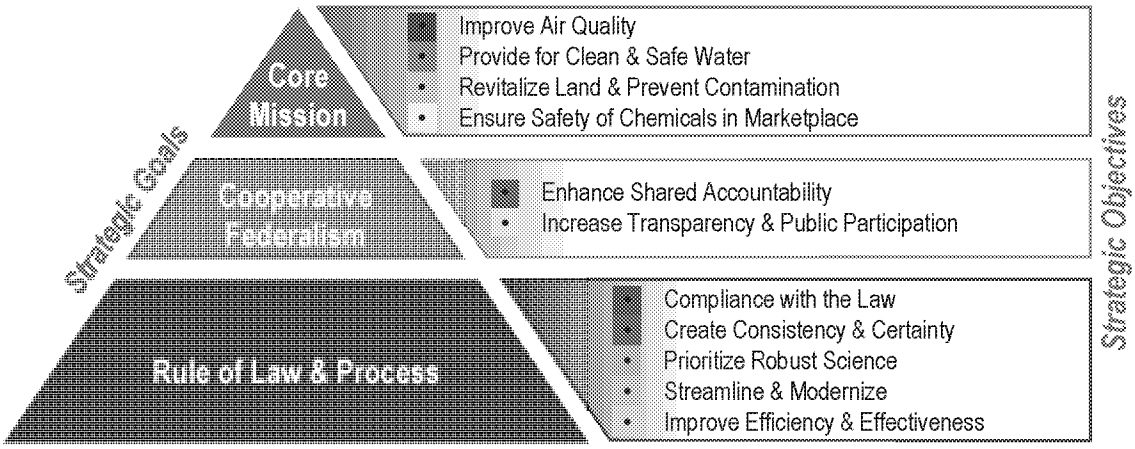
EPA FY18-22 Transformation Strategy



Strategic Measures (FY18-22)

Agency Priority Goal (APG)

- Reduce number of non-attainment areas from 166 to 101 (2019 APG = 138)
- Reduce number of community water systems out of compliance with health-based standards from 3,600 to 2,700
- Increase by $40 billion the non-federal dollars leveraged by EPA water infrastructure finance programs (2019 APG = increase by $16 billion)
- Reduce number of square miles of watershed with surface water not meeting standards by 37,000 square miles
- Make 255 additional Superfund sites Ready for Anticipated Use (RAU) (2019 APG = 102 additional)
- Make 3,420 additional Brownfields sites RAU (2019 APG = 1,368 additional)
- Make 536 additional Resource Conservation and Recovery Act (RCRA) corrective action facilities RAU
- Complete 56,000 additional Leaking Underground Storage Tank (LUST) cleanups that meet risk-based standards
- Complete all EPA-initiated Toxic Substances Control Act (TSCA) risk evaluations for existing chemicals in accordance with statutory timelines (2019 APG = 100%)
- Complete all TSCA risk management actions for existing chemicals in accordance with statutory timelines (2019 APG = 100%)
- Complete all TSCA pre-manufacture notice final determinations in accordance with statutory timelines (2019 APG = 80%)
- Complete all cases of Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)-mandated decisions for the pesticides registration review program
- Reduce Pesticide Registration Improvement Act (PRIA) registration decision timeframe by an average of 60 days

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- Increase number of grant commitments achieved by states, tribes, and local communities
- Increase use of alternative shared governance approaches to address state, tribal, and local community reviews
- Eliminate backlog and meet statutory deadlines for responding to Freedom of Information Act (FOIA) requests

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- Reduce average time from violation identification to correction
- Increase environmental law compliance rate (2019 APG = reduce Clean Water Act National Pollutant Discharge Elimination System (NPDES) permittees in significant noncompliance with their permit limits from 24% to 21%)
- Meet 100% of legal deadlines imposed on EPA
- Eliminate unnecessary or duplicative reporting burdens to the regulated community by 10,000,000 hours
- Increase number of research products meeting customer needs
- Reach all permitting-related decisions within 6 months (2019 APG = Reduce by 50% those exceeding 6 months)
- Reduce unused office and warehouse space by 850,641 square feet
- Reduce procurement processing times by achieving 100% of procurement action lead times
- Improve 250 operational processes
- Increase enterprise adoption of shared services by four

Reform Plan Priority Areas (FY19-22)

- Eliminating the State Implementation Plan (SIP) backlog
- Tailoring state oversight
- Examining EPA field presence
- Increasing flexibility in state and tribal assistance
- Maximizing infrastructure investments
- Speeding up FOIA responses
- Reducing unnecessary industry reporting burden
- Improving management of EPA laboratories
- Speeding up environmental permitting
- Speeding up the EPA acquisition process
- Enhancing Human Resource shared services centers
- Deploying a Lean Management System

Draft as of February 23, 2018

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FY 2018-2022 EPA Strategic Plan

February 12, 2018

U.S. Environmental Protection Agency
Washington, DC 20460

EPA's Mission

To Protect Human Health and the Environment

Goal 1 - Core Mission: Deliver real results to provide Americans with clean air, land, and water, and ensure chemical safety.

- **Objective 1.1 – Improve Air Quality**
- **Objective 1.2 – Provide for Clean and Safe Water**
- **Objective 1.3 – Revitalize Land and Prevent Contamination**
- **Objective 1.4 – Ensure Safety of Chemicals in the Marketplace**

Goal 2 - Cooperative Federalism: Rebalance the power between Washington and the states to create tangible environmental results for the American people.

- **Objective 2.1 – Enhance Shared Accountability**
- **Objective 2.2 – Increase Transparency and Public Participation**

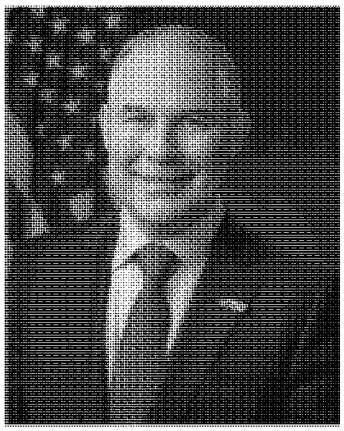
Goal 3 - Rule of Law and Process: Administer the law, as Congress intended, to refocus the Agency on its statutory obligations under the law.

- **Objective 3.1 – Compliance with the Law**
- **Objective 3.2 – Create Consistency and Certainty**
- **Objective 3.3 – Prioritize Robust Science**
- **Objective 3.4 – Streamline and Modernize**
- **Objective 3.5 – Improve Efficiency and Effectiveness**

Table of Contents

Administrator's Message **1**
Introduction **4**
Goal 1: Core Mission **7**
Objective 1.1: Improve Air Quality 8
Objective 1.2: Provide for Clean and Safe Water 11
Objective 1.3: Revitalize Land and Prevent Contamination 14
Objective 1.4: Ensure Safety of Chemicals in the Marketplace 17
Goal 2: Cooperative Federalism **21**
Objective 2.1: Enhance Shared Accountability 22
Objective 2.2: Increase Transparency and Public Participation 24
Goal 3: Rule of Law and Process **28**
Objective 3.1: Compliance with the Law 29
Objective 3.2: Create Consistency and Certainty 33
Objective 3.3: Prioritize Robust Science 35
Objective 3.4: Streamline and Modernize 39
Objective 3.5: Improve Efficiency and Effectiveness 41

Administrator's Message



I am proud to present the U.S. Environmental Protection Agency's FY 2018 – FY 2022 Strategic Plan, which emphasizes the EPA's "Back-to-Basics" agenda. The agenda set out in this plan has three over-arching goals which reflect my core philosophies: (1) refocus the agency back to its core mission; (2) restore power to the states through cooperative federalism; and (3) lead the agency through improved processes and adhere to the rule of law.

The agency's mission of protecting human health and the environment resonates with all Americans; we all can agree that we want our future generations to inherit a cleaner, healthier environment that supports a thriving economy.

Our nation has made great progress in making rivers and lakes safer for swimming and boating, reducing the smog that clouded city skies, cleaning up lands that were once used as hidden chemical dumps and providing Americans greater access to information on chemical safety. However, we still have important work to do.

We must create a sense of shared accountability between states, tribes and the federal government to achieve positive environmental results. Along with faithfully following the rule of law, improves the processes by which the EPA has operated and is crucial to advance the agency's mission.

Air

- Over the next five years, the EPA will prioritize key activities to support attainment of the national ambient air quality standards (NAAQS) and implementation of stationary source regulations.
- We will work with our state and tribal partners to rapidly approve their implementation plans for attaining air quality standards to reduce contaminants that cause or exacerbate health issues.

Water

- We will modernize and update aging drinking water, wastewater and stormwater infrastructure which the American public depends on.
- The agency will continue to leverage the State Revolving Funds (SRFs) and *Water Infrastructure Finance and Innovation Act* (WIFIA) to assist states, tribes, municipalities and private entities to finance high-priority infrastructure investments that protect human health and the environment.

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Land

- I am placing particular emphasis on my top priority list of Superfund sites and will implement Superfund Task Force recommendations to accelerate the pace of cleanups and promote site reuse, while addressing risks to human health and the environment.
- The agency will accelerate cleanup by re-prioritizing some resources to focus on remedial actions, construction completions, ready-for-reuse determinations and National Priorities List site deletions.

Chemicals

- We will prioritize the safety of chemicals in the marketplace in the implementation of the new *Frank R. Lautenberg Chemical Safety for the 21st Century Act*, which modernizes the *Toxic Substances and Control Act* (TSCA).
- To achieve this, the EPA will focus on meeting its statutory requirements and mandatory deadlines of TSCA and ensure our reviews are efficient, effective and transparent to stakeholders.

More than 45 years after the creation of the EPA most states, and to a lesser extent territories and tribes, are authorized to implement delegated federal environmental programs within their jurisdictions. Recognizing the congressionally intended responsibilities of our state, local and tribal partners, we must adapt and modernize our practices to reduce duplication of effort and tailor oversight of delegated programs.

For example, the EPA will expand its compliance assistance work by continuing to partner with third-party organizations and federal agencies to support existing web-based, sector-specific compliance assistance centers and seek to develop new centers. I will lead an assessment of our shared governance to clarify the agency's statutory roles and responsibilities and tailor state oversight to maximize our return on investment and reduce burden on states.

Over the next five years, the EPA will improve its processes and reinvigorate the rule of law as it administers environmental regulations as Congress intended and will refocus the agency on its core statutory obligations.

I am a firm believer that federal agencies exist to administer laws passed by Congress, in accordance with the will of this body. The EPA will ensure compliance with the law by providing consistency and certainty for the regulated community and clarify the impact of proposed actions on human health, the environment and the economy to provide a clear path and timeline for entities to achieve compliance.

Further, we will reform our approach to regulatory development and prioritize meeting our statutory deadlines to ensure that expectations for the regulated community and the public are clear and comprehensive. The EPA will also employ business process improvement strategies, such as Lean, to improve efficiencies in all permitting processes, working alongside states to streamline the review of state-issued permits and to improve our internal business processes.

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I believe we can accomplish the environmental and human health outcomes outlined in this Strategic Plan by increasing collaboration with other external partners and striving to achieve improved consistency and certainty for the regulated community.

E. Scott Pruitt

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Introduction

EPA's Mission: To Protect Human Health and the Environment

Goal 1 – Core Mission: Deliver real results to provide Americans with clean air, land, and water, and ensure chemical safety.

Goal 2 – Cooperative Federalism: Rebalance the power between Washington and the states to create tangible environmental results for the American people.

Goal 3 – Rule of Law and Process: Administer the law, as Congress intended, to refocus the Agency on its statutory obligations under the law.

The U.S. Environmental Protection Agency (EPA) developed this *FY 2018-2022 EPA Strategic Plan (*the *Plan)* to: (1) refocus the Agency back to its core mission; (2) restore power to the states through cooperative federalism; and (3) lead the Agency through improved processes and adhere to the rule of law. The *FY 2018-2022 EPA Strategic Plan* sharply refocuses EPA on its role of supporting the primary implementers of environmental programs – states and federally-recognized Indian tribes[1] – by streamlining programs and processes, reducing duplication of effort, providing greater transparency and listening opportunities, and enabling the Agency to focus on its core mission work. Process, the rule of law, and cooperative federalism are necessary for an efficient and effective Agency to provide tangible and real environmental results to the American people.

EPA's senior managers will use this *Plan* routinely as a management tool to guide the Agency's path forward, tracking progress and assessing and addressing risks and challenges that could potentially interfere with EPA's ability to accomplish its goals. The three strategic goals established in the *Plan* are supported by strategic objectives and strategic measures[2] focused on advancing human health and environmental results over the next five years. These longer-term strategic measures are supported by annual measures included in the annual performance plans and budgets that EPA submits to Congress. The strategies and strategic measures in this *Plan* highlight key areas in which the Agency will make the most dramatic changes over the next five years and are not intended to address all ongoing programs. The annual performance plans and budgets, and supporting annual and operational measures, address a broader range of the Agency's work. In addition, the Agency will hold quarterly and monthly meetings to assess progress toward annual and long-term strategic measures.

The EPA Administrator established two-year agency priority goals (APGs) for accelerating progress on EPA priorities. APGs reflect agency leadership's top near-term priorities for implementing performance improvement. EPA's APGs were selected from among the suite of strategic measures. EPA will support these priority goals by developing two-year implementation plans and reporting quarterly progress.

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[1] Tribes include all federally-recognized tribes, including Alaska Native Villages (as issued by the Secretary of the Interior).

[2] Strategic measures are the measurable results the Agency is working to achieve over the life of the *Plan* and are supported by data quality records (DQRs), which provide details such as the methods of measurement and other important contextual information such as baselines. DQRs can be found at https://www.epa.gov/planandbudget/results.

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FY 2018-2019 Agency Priority Goals

APG-1: Improve air quality by implementing pollution control measures to reduce the number of nonattainment areas. By September 30, 2019, EPA, in close collaboration with states, will reduce the number of nonattainment areas to 138 from a baseline of 166.

APG-2: Empower communities to leverage EPA water infrastructure investments. By September 30, 2019, EPA will increase by $16 billion the non-federal dollars leveraged by EPA water infrastructure finance programs (Clean Water and Drinking Water State Revolving Funds and the Water Infrastructure Finance and Innovation Act).

APG-3: Accelerate the pace of cleanups and return sites to beneficial use in their communities. By September 30, 2019, EPA will make an additional 102 Superfund sites and 1,368 brownfields sites ready for anticipated use (RAU).

APG-4: Meet new statutory requirements to improve the safety of chemicals in commerce. By September 30, 2019, EPA will complete in accordance with statutory timelines (excluding statutorily-allowable extensions): 100% of required EPA-initiated Toxic Substances Control Act (TSCA) risk evaluations for existing chemicals; 100% of required TSCA risk management actions for existing chemicals; and 80% of TSCA pre-manufacture notice final determinations.

APG-5: Increase environmental law compliance rate. Through September 30, 2019, EPA will increase compliance by reducing the percentage of Clean Water Act (CWA) National Pollutant Discharge Elimination System (NPDES) permittees in significant noncompliance with their permit limits to 21% from a baseline of 24%.

APG-6: Accelerate permitting-related decisions. By September 30, 2019, EPA will reduce by 50% the number of permitting-related decisions that exceed six months.

The *FY 2018-2022 EPA Strategic Plan* is supported by other, more detailed Agency plans in specific areas. For example, EPA's Human Capital Operating Plan details the actions the Agency will execute to achieve its overarching human capital goals, and EPA's Information Technology/Information Management Strategic Plan will guide efforts to support and modernize the Agency's technology and data infrastructure. The EPA's workforce and reform efforts will support streamlining efforts to work more efficiently and effectively in the future. The many activities described in these plans align with and help position the Agency to achieve the strategic goals and objectives presented in this *Plan.*

EPA is also in the process of deploying a Lean management system specifically designed to deliver measurable results that align with this *Plan*. Lean is a set of principles and tools designed to identify and eliminate waste from processes while maximizing customer value and return on taxpayer investment. EPA will standardize and streamline processes to strengthen efficiency and quality to better meet mission goals and objectives. Under the Administrator's leadership, EPA will become a Lean organization.

Strategies to achieve EPA's goals and objectives are also informed by gathering evidence related to environmental problems and evaluating the effectiveness of the strategies that the programs use to address them. Examples of recent evidence and evaluation efforts used to develop this *FY 2018-2022 EPA Strategic Plan* and a preliminary list of future planned efforts can be found at https://www.epa.gov/planandbudget/strategicplan.

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The GPRA (Government Performance and Results Act) Modernization Act of 2010 directs agencies to consult with the Congress and requires that they solicit and consider the views and suggestions of those entities likely to be interested in or potentially affected by a strategic plan. Consultation with EPA's federal, state, tribal, and local government partners and its many stakeholders is integral to the Agency's strategic planning process. In developing the *FY 2018-2022 EPA Strategic Plan*, EPA issued a *Federal Register* notice and used www.regulations.gov to encourage and share feedback on the draft *Plan*. The Agency also sent notifications on the availability of the draft *Plan* to leaders of the Agency's Congressional authorizing, appropriations, and oversight committees, and notified all federally-recognized Indian tribes of the opportunity for consultation and coordination. These outreach efforts resulted in unique submissions from approximately 5,000 organizations and individuals.

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Goal 1 - Core Mission:
Deliver real results to provide Americans with clean air, land, and water, and ensure chemical safety.

Pollution comes in many forms with myriad impacts on human health and the environment. With the goal of clean and safe air, water, and land for all Americans, Congress enacted a range of environmental statutes that spell out EPA's core responsibilities. Our nation has come a long way since EPA was established in 1970. We have made great progress in making rivers and lakes safe for swimming and boating, reducing the smog that clouded city skies, cleaning up lands that were once used as hidden chemical dumps, and providing Americans greater access to information on the safety of the chemicals all around us. Today we can see enormous progress—yet we still have important work to do.

EPA has established priorities for advancing progress over the next five years in each of its core mission areas—land, air, water—as well as chemicals. The Agency will focus on speeding the cleanup of Superfund and brownfields sites, and will use a list of top priority sites to advance progress on Superfund sites of particular concern. We will work with states and tribes to more rapidly approve their implementation plans for attaining air quality standards, reducing contaminants that can cause or exacerbate health issues. We will work with our state and tribal partners to provide for clean and safe water by updating aging infrastructure, both for drinking water and wastewater systems. EPA's top priority for ensuring the safety of chemicals in the marketplace is the implementation of the new Frank R. Lautenberg Chemical Safety for the 21st Century Act, which modernizes the Toxic Substances and Control Act (TSCA) by creating new standards and processes for assessing chemical safety within specific deadlines. These efforts will be supported by strong compliance assurance and enforcement in collaboration with our state and tribal partners, up-to-date training for partners, and use of the best available science and research to address current and future environmental hazards, develop new approaches, and improve the foundation for decision making.

The Agency will collaborate more efficiently and effectively with other federal agencies, states, tribes, local governments, communities, and other partners and stakeholders to address existing pollution and prevent future problems. EPA will directly implement federal environmental laws in Indian country where eligible tribes have not taken on program responsibility.

With our partners, we will pay particular attention to vulnerable populations. Children and the elderly, for example, may be at significantly greater risk from elevated exposure or increased susceptibility to the harmful effects of environmental contaminants. Some low-income and minority communities may face greater risks because of proximity to contaminated sites or because fewer resources are available to avoid exposure to pollutants. Tribal ways of life such as traditional subsistence hunting, fishing, and gathering also may increase exposure to contaminants and increase risks. Much work remains and, together with our partners, we will continue making progress in protecting human health and the environment.

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Objective 1.1 - Improve Air Quality:

Work with states and tribes to accurately measure air quality and ensure that more Americans are living and working in areas that meet high air quality standards.

Introduction

As part of its mission to protect human health and the environment, EPA is dedicated to improving the quality of the nation's air. From 1970 to 2016, aggregate national emissions of the six criteria air pollutants[3] were reduced over 70 percent, while gross domestic product grew by over 253 percent. Despite this progress, in 2016, more than 120 million people lived in counties with monitored air quality that did not meet standards for at least one criteria pollutant. EPA's work to control emissions of air pollutants is critical to continued progress in reducing public health risks and improving the quality of the environment. Over the next five years, EPA will conduct a wide range of activities that contribute to improving air quality and protecting human health and the environment.

Strategic Measure

- SM-1 By September 30, 2022, reduce the number of nonattainment areas to 101[4].

Strategies for Achieving the Objective

EPA works in cooperation with states, tribes, and local governments to design and implement air quality standards and programs. EPA relies on other federal agencies, academia, researchers, industry, other organizations, and the public. These partnerships are critical to achieving improvements in air quality and reducing public health risks.

EPA will prioritize key activities to support attainment of the national ambient air quality standards (NAAQS) and implementation of stationary source regulations. The Agency will address its Clean Air Act (CAA) responsibilities by collaborating with and providing technical assistance to states and tribes to develop plans and implement decisions that administer the NAAQS and visibility programs; taking federal oversight actions such as approving state implementation plan/tribal implementation plan (SIP/TIP) submittals consistent with statutory obligations; developing regulations and guidance to implement standards; and addressing transported air pollution. EPA will focus on ways to improve the efficiency and effectiveness of the SIP/TIP process, including the Agency's own review process, with a goal of maximizing timely processing of state/tribal-requested implementation plan actions to help move more quickly to attainment.

EPA will operate effective nationwide and multi-state programs, such as the acid rain program and the cross-state air pollution rule, which address global, national, and regional air pollutants from the power sector and other large stationary sources. The Agency also will develop and provide data, analysis, and technical tools and assistance to industries, states, tribes, and communities to meet CAA obligations and other statutory requirements.

EPA also develops, implements, and ensures compliance with national emission standards to reduce mobile source-related air pollution from light-duty cars and trucks, heavy-duty trucks and buses, nonroad engines and vehicles, and their fuels—a priority for the Agency to ensure that industry has the certainty it

[3] The Clean Air Act (CAA) requires EPA to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants including carbon monoxide, lead, ground-level ozone, nitrogen dioxide, particulate matter, and sulfur dioxide.
[4] The baseline is 166 nonattainment areas as of 10/1/2017.

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needs while protecting human health and the environment and to support improvements in air quality and moving areas into attainment. The Agency evaluates new emission control technologies and provides information to state, tribal, and local air quality managers on a variety of transportation programs. EPA will review and approve vehicle and engine emissions certification applications and perform its compliance oversight functions on priority matters where there is evidence to suggest noncompliance. The Agency will also conduct pre-certification confirmatory testing for emissions and fuel economy for passenger cars.

EPA develops and implements national emission standards for stationary and mobile sources and works with state, tribal, and local air agencies to address air toxics problems in communities. For stationary sources, pursuant to the CAA, EPA develops initial air toxics emissions standards for categories of industrial sources and reviews these standards' risk reduction and technological currency according to timeframes set by the Act. EPA will conduct these reviews to meet CAA requirements and to ensure that the air toxics rules appropriately protect public health.

To support our partners in meeting their CAA obligations, EPA will provide grants and technical assistance to state, tribal, and local air pollution control agencies to manage and implement their individual air quality programs, including funding for air quality monitoring. State and tribal air quality monitoring, which provides critical information for developing clean air plans, for research, and for public awareness, will be a focus of the Administration.

EPA will prioritize efforts to reduce the production, import, and use of ozone depleting substances (ODS), including reviewing and listing alternatives that are safer for the stratospheric ozone layer through implementation of Title VI of the CAA and the Montreal Protocol.

EPA also is responsible for measuring and monitoring ambient radiation and radioactive materials and assessing radioactive contamination in the environment. The Agency supports federal radiological emergency response and recovery operations under the National Response Framework and the National Oil and Hazardous Substances Pollution Contingency Plan and will assist states, tribes, and other partners, as appropriate. EPA will design essential training and conduct exercises to improve our nation's radiation response preparedness.

External Factors and Emerging Issues

Emerging measurement and information technologies are shifting the paradigm for air quality data. Traditionally, state, tribal, and local air programs, along with EPA, have been the primary resource for collecting, storing, sharing, and communicating air data. Increasingly, air quality information is also available from nontraditional sources, such as satellites or sensors. Additionally, big data companies are becoming involved in storing, analyzing, and presenting publicly available air quality data alongside other data sets. These developments are expected to have profound influence on understanding air quality, as well as determining the most cost-effective ways to improve air quality. EPA partners with states and tribes through efforts such as E-Enterprise, and with other entities in a variety of ways to ensure that the Agency advances appropriate technologies and stays abreast of emerging technologies.

EPA engages in both domestic and international forums to address the depletion of the stratospheric ozone layer, a global problem that cannot be solved by domestic action alone. Success relies on joint action.

Lastly, there are several emerging issues and external factors that will affect how EPA protects the public from unnecessary exposure to radiation, including evolving policies on radioactive waste management, uranium extraction and processing technologies, a decrease in available radiation expertise, and new

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science on radiation health effects. The Agency will focus on education, including formal and informal training in the areas of health physics, radiation science, radiation risk communications, and emergency response to fill existing and emerging gaps.

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Objective 1.2 - Provide for Clean and Safe Water:

Ensure waters are clean through improved water infrastructure and, in partnership with states and tribes, sustainably manage programs to support drinking water, aquatic ecosystems, and recreational, economic, and subsistence activities.

Introduction

The nation's water resources are the lifeblood of our communities, supporting our economy and way of life. Across the country we depend upon reliable sources of clean and safe water. Just a few decades ago, many of the nation's rivers, lakes, and estuaries were grossly polluted, wastewater sources received little or no treatment, and drinking water systems provided very limited treatment to water coming through the tap. Now over 90 percent of the population receives safe drinking water from community water systems regulated by EPA or delegated states and tribes, and many formerly impaired waters have been restored and support recreational and public health uses that contribute to healthy economies.

We have made significant progress since enactment of the Clean Water Act (CWA); Safe Drinking Water Act; and Marine Protection, Research, and Sanctuaries Act. However, serious water resource and water infrastructure challenges remain. Many communities need to improve and maintain both drinking water and wastewater infrastructure and develop the capacity to comply with new and existing standards. Tens of thousands of homes, primarily in tribal and disadvantaged communities and the territories, lack access to basic sanitation and drinking water.

Over the next five years, EPA will work with states, tribes, territories, and local communities to better safeguard human health; maintain, restore, and improve water quality; and make America's water systems sustainable and secure, supporting new technology and innovation wherever possible.

Strategic Measures

- SM-2 By September 30, 2022, reduce the number of community water systems out of compliance with health-based standards to 2,700[5].
- SM-3 By September 30, 2022, increase by $40 billion the non-federal dollars leveraged by EPA water infrastructure finance programs (CWSRF, DWSRF, and WIFIA)[6].
- SM-4 By September 30, 2022, reduce the number of square miles of watershed with surface water not meeting standards by 37,000 square miles[7].

Strategies for Achieving the Objective

Invest in infrastructure to spur environmental benefits and economic growth

Supporting state, tribal, and local efforts to modernize the outdated drinking water, wastewater, and stormwater infrastructure on which the American public depends is a top priority for EPA. The Agency

[5] Baseline is 3,600 community water systems out of compliance with health-based standards as of FY 2017.

[6] The baseline is $32 billion in non-federal dollars leveraged from the CWSRF and DWSRF between FY 2013 and FY 2017 (i.e., loans made from recycled loan repayments, bond proceeds, state match, and interest earnings). The baseline does not include WIFIA leveraged dollars because the program's first loans are anticipated to close in FY 2018.

[7] Draft baseline is 464,020 square miles of impaired waters as of 9/2017, to be updated in 10/2018.

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will promote construction of infrastructure in tribal and, small, rural, and disadvantaged communities. EPA's state revolving fund (SRF) and Water Infrastructure Finance and Innovation Act (WIFIA) programs will allow the Agency, states, tribes, municipalities, and private entities to finance high-priority infrastructure investments that protect human health and the environment. The revolving nature of the SRFs and the leveraging capacity of WIFIA greatly multiply the federal investment. For the clean water SRF, EPA estimates that every federal dollar contributed thus far has resulted in close to three dollars of investment in water infrastructure. For the drinking water SRF, for every one dollar the federal government has invested, the states, in total, delivered $1.80 in assistance to drinking water systems. For WIFIA, for every $1 million in credit subsidy appropriations, EPA could potentially provide approximately $100 million in direct credit assistance, resulting in an estimated $200 million in total infrastructure investment.

Protect Human Health

Sustaining the quality of our water resources is essential to safeguarding human health. More than 300 million people living in the United States rely on the safety of tap water provided by public water systems that are subject to national drinking water standards. EPA will help protect human health and make America's water systems secure by:

- Providing financial assistance to states, tribes, and territories to assist public water systems in protecting and maintaining drinking water quality;
- Strengthening compliance with drinking water standards to ensure protection of public health by enhancing the technical, managerial, and financial capability of those systems;
- Continuing to protect and restore water resources, including sources of drinking water, from contamination;
- Taking actions to address known and emerging contaminants that endanger human health;
- Supporting states, tribes, territories, and local communities in implementing water programs by providing guidance, training, and information;
- Ensuring the security and preparedness of the nation's drinking water supplies by implementing EPA's national security responsibilities for the water sector; and
- Protecting underground sources of drinking water by providing for the safe injection of fluids underground for storage, disposal, enhanced recovery of oil and gas, or minerals recovery.

Recent challenges in Flint, Michigan and elsewhere highlighted the need to strengthen EPA's implementation of the Safe Drinking Water Act to ensure we protect and build upon the enormous public health benefits achieved through the provision of safe drinking water throughout the country. The Agency's highest priorities include reducing exposure to lead in the nation's drinking water systems, ensuring continuous compliance with contaminant limits, responding quickly to emerging concerns, and improving the nation's aging and insufficient drinking water infrastructure to address significant needs. EPA is also collaborating with states and tribes to share more complete data from monitoring at public water systems through the Safe Drinking Water Information System (SDWIS). This will allow for better targeting of funding and technical assistance resources, and improve data quality while increasing public access to drinking water data.

Human health and recreational criteria are the foundation for state, tribal, and territorial tools to safeguard human health. Over the next five years we will improve our understanding of emerging potential waterborne threats to human health; provide technical assistance and resources to help the states, tribes, and territories monitor and prevent harmful exposures; and develop new or revised criteria as needed.

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Protect and Restore Water Quality

Protecting the nation's waters relies on cooperation among EPA, states, tribes, territories, and local communities and involves a suite of programs to protect and improve water quality in the country's rivers, lakes, wetlands, and streams, as well as in estuarine, coastal, and ocean waters. EPA will foster strong partnerships with other federal agencies, states, tribes, local governments, and other organizations that facilitate achieving water quality goals while supporting robust economic growth. In partnership with states, tribes, territories, and local governments, EPA core water programs will:

- Develop recommended water quality criteria for protecting designated uses of water;
- Assist states, authorized tribes, and territories in adopting water quality standards that support designated uses;
- Establish pollution reduction targets for impaired waters;
- Improve water quality by financing traditional and nature-based wastewater treatment infrastructure;
- Develop national effluent guidelines that set a technology-based floor;
- Work with partners to protect and restore wetlands and coastal and ocean water resources;
- In cooperation with the Army Corps of Engineers, work with states and tribes interested in assuming the Clean Water Act Section 404 program;
- Prevent or reduce the discharge of pollutants;
- Update analytical methods that enable precise analysis; and
- Conduct monitoring and assessment so we know the status of the nation's waters.

EPA will partner with states and tribes to implement the National Aquatic Resource Surveys (NARS)[8] to provide nationally-consistent and scientifically-defensible assessments of America's waters. These surveys will support EPA and its partners in identifying actions to protect and restore water quality and in assessing whether these efforts are improving water quality over time.

External Factors and Emerging Issues

Water quality programs face challenges such as increases in nutrient loadings, nonpoint source[9] and stormwater runoff, and aging infrastructure. EPA is carefully examining the potential impacts of and solutions to these issues. Many important water quality problems have complex causes that can only be addressed through strategic use of federal, state, tribal, and local authorities. EPA will work closely with its partners to ensure that these issues are addressed in a coordinated and effective manner, particularly where water quality issues cross jurisdictional lines. The Agency will implement the National Aquatic Resource Surveys to support collection of nationally-consistent data to support these efforts.

EPA is working with external partners and stakeholders to address the barriers to and incentives for ways that technology and innovation can accelerate improvements in water infrastructure and protection and restoration of waters. Some key market opportunities for innovative practices and technology to help address current and emerging water resource issues are identified in EPA's Blueprint for Integrating Technology Innovation into the National Water Program.[10]

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[8] Read more on NARS: https://www.epa.gov/national-aquatic-resource-surveys
[9] Read more about nonpoint source pollution: https://www.epa.gov/nps
[10] Read more about the technology blueprint: https://www.epa.gov/innovation/water-technology-innovation-blueprints

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Objective 1.3 - Revitalize Land and Prevent Contamination:

Provide better leadership and management to properly clean up contaminated sites to revitalize and return the land back to communities.

Introduction

EPA works to improve the health and livelihood of all Americans by cleaning up and returning land to productive use, preventing contamination, and responding to emergencies. Challenging and complex environmental problems persist at many contaminated properties, including contaminated soil, sediment, surface water, and groundwater that can cause human health concerns.

One of EPA's top priorities is accelerating progress on Superfund sites. EPA recently convened a Superfund Task Force that identified 42 recommendations to streamline and improve the Superfund process. Over the next five years, these recommendations and other innovative ideas will be considered and applied to Superfund sites with priority given to addressing National Priority List (NPL) sites.[11]

EPA collaborates with other federal agencies, industry, states, tribes, and local communities to enhance the livability and economic vitality of neighborhoods. The Agency works with international, state, tribal, and local governments, and other federal agencies to achieve goals and help communities understand and address risks posed by releases of hazardous substances into the environment. EPA's efforts are guided by scientific data, tools, and research that inform decisions on addressing contaminated properties and preparing for and addressing emerging contaminants.

Strategic Measures

- SM-5 By September 30, 2022, make 255 additional Superfund sites ready for anticipated use (RAU) site-wide[12].
- SM-6 By September 30, 2022, make 3,420 additional brownfields sites RAU[13].
- SM-7 By September 30, 2022, make 536 additional Resource Conservation and Recovery Act (RCRA) corrective action facilities RAU[14].
- SM-8 By September 30, 2022, complete 56,000 additional leaking underground storage tank (LUST) cleanups that meet risk-based standards for human exposure and groundwater migration[15].

Strategies for Achieving the Objective

Cleaning Up Contaminated Sites

Over the next five years, EPA will focus special attention on the Administrator's top priority Superfund sites and will implement Superfund Task Force recommendations to accelerate the pace of cleanups and promote reuse, while addressing risks to human health and the environment. Cleanup actions can take

[11] Please see the Superfund Task Force Recommendations at https://www.epa.gov/sites/production/files/2017-07/documents/superfund_task_force_report.pdf

[12] By the end of FY 2017, 836 Superfund sites had been made RAU site-wide.

[13] By the end of FY 2017, 5,993 brownfield properties/sites had been made RAU.

[14] By the end of FY 2017, 1,232 RCRA corrective action facilities had been made RAU site-wide.

[15] By the end of FY 2017, 469,898 LUST cleanups had been completed.

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from a few months for relatively straight-forward soil excavation or capping remedies to several decades for complex, large, area-wide groundwater, sediment, or mining remedies. NPL sites in the investigation stages will be expedited by developing strategies that apply new technologies and innovative approaches. NPL sites at which remedies already have been selected will be prioritized for faster completion and deletion from the NPL, as will sites that have been on the NPL for five years or longer without significant progress. Finally, the Agency will aim to accelerate cleanup by re-prioritizing some resources to focus on remedial actions, construction completions, ready-for-reuse determinations, and NPL site deletions.

In addition, EPA will work with communities to revitalize their brownfield sites and return them to productive use, advancing environmental and human health protection while stimulating economic development and job creation. EPA will award competitive grants to communities, states, and tribes to assess, clean up, and plan reuse of brownfield properties that are contaminated or perceived to be contaminated. To reduce risks from exposure to waste, consistent with RCRA, EPA or authorized states will oversee and manage cleanups by the owners or operators. There are currently 3,779 facilities subject to RCRA corrective action. EPA will support, along with its state and tribal partners, the cleanup of LUST sites and work to revitalize abandoned facilities. These cleanups protect people from exposure to contaminants, and can improve property values[16] and provide redevelopment opportunities.

Preparedness and Response

EPA prepares for the possibility of nationally-significant incidents and provides guidance and technical assistance to state, tribal, and local planning and response organizations to strengthen their preparedness. During an incident, EPA works to prevent, mitigate, or contain the release of chemical, oil, radiological, biological, or hazardous materials. The Agency will work with industry, states, tribes, and local communities to ensure national safety and security for responses. EPA homeland security research fills critical scientific and technological gaps, enhancing the Agency's ability to carry out its mandated national preparedness and emergency response and recovery obligations, and informing disaster response and guidance. EPA develops the tools, methods, and data needed to implement our environmental statutes effectively and support EPA and local emergency responders in characterizing chemical, biological, or radiological (CBR) contamination; assessing exposure and risks to human health; cleaning up impacted areas; and improving community resilience.

Preventing Contamination

With its state and tribal partners, EPA works to prevent releases of contamination, allowing the productive use of facilities and land and contributing to communities' economic vitality[17]. In partnership with tribes, the Agency directly provides training, compliance assistance, and inspection support to implement the updated underground storage tank (UST) regulations in Indian country. EPA also helps to prevent chemical releases by reviewing approximately 12,500 risk management plans (RMPs) and delivering RMP inspector training for federal and state inspectors. EPA seeks to prevent and prepare for accidental releases from chemical facilities that store hazardous chemicals by requiring chemical facilities that store a certain amount of hazardous chemicals to analyze the potential for accidental releases and possible consequences, develop an accident prevention program, and coordinate with communities to ensure that all are prepared to respond to a release.

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[16] A 2016 study found that high profile UST releases decrease nearby property values by 4% - 6%. Once cleanup is completed, nearby property values rebound by a similar margin. (Guignet, Dennis, Robin Jenkins, Matthew Ranson, and Patrick Walsh (2016), "Do Housing Values Respond to Underground Storage Tank Releases? Evidence from High-Profile Cases across the United States," US EPA National Center for Environmental Economics Working Paper, 2016-01, Washington, DC, March.) Available at: https://www.epa.gov/sites/production/files/2016-05/documents/2016-01.pdf

[17] This work will be done consistent with the government-wide National Response Framework and the National Disaster Recovery Framework.

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EPA will update and improve the efficiency of the RCRA hazardous waste regulations to meet the needs of today's business and industry to ensure protective standards for managing hazardous waste. To prevent future environmental contamination and to protect the health of the estimated 20 million people living within a mile of a hazardous waste management facility,[18] EPA will support states to issue, update, or maintain RCRA permits for the approximately 20,000 hazardous waste units (such as incinerators and landfills) at these facilities. EPA also will issue polychlorinated biphenyl (PCB) cleanup, storage, and disposal approvals, since this work cannot be delegated to states or tribes.

EPA will improve and modernize hazardous waste transportation and tracking by implementing the Hazardous Waste Electronic Manifest Establishment Act, enacted on October 5, 2012. The fee-based e-Manifest system will provide better knowledge of waste generation and final disposition, enhanced access to manifest information, and greater transparency for the public about hazardous waste shipments. It will also reduce the burden associated with paper manifests by between 300,000 and 700,000 hours.[19]

As authorized in the Water Infrastructure Improvements for the Nation Act of 2016, EPA will help states develop plans, work to approve state permit programs for coal ash disposal, coordinate closely with the states on guidance for evaluating state permit programs, and implement a coal ash permit program in Indian country.

Over the next five years, EPA will provide technical assistance, assets, and outreach to industry, states, tribes, and local communities as part of its effort to ensure national safety and security for inland oil incidents. There are approximately 580,000 spill prevention, control, and countermeasure facilities, including a high-risk subset of 4,600 facility response plan facilities required to ensure that resources will be available to respond in the event of a discharge.

External Factors and Emerging Issues

A number of factors may delay cleanup timelines. For example, new scientific information (such as new toxicity information or a new analytical method) can call previous determinations into question. In general, cleanup standards have become more stringent over the years, and discovery of new pathways and emerging contaminants (such as vapor intrusion and per- and polyfluoroalkyl substances [PFAS]) have made remediation of remaining Superfund sites more challenging. Many of the Superfund sites remaining on the National Priorities List—including sediment, mining, and large groundwater sites—are large, contain multiple areas of contamination, and require more complex remediation efforts. Discovery of new sites, newly detected contamination, or emerging contaminants can also impact cleanup schedules.

Several external factors and emerging issues may affect the overall success of EPA's waste management and chemical facility risk programs. Rapidly changing technology, emerging new waste streams, and aging infrastructure present challenges, as does the complexity of issues and consideration of specific solutions for varying waste streams and situations.

The Agency recognizes that our state, tribal, local, and regional government partners face challenges in fully characterizing environmental outcomes associated with land. Over the next five years, EPA will emphasize the importance of engaging stakeholders at all levels and from all perspectives in making cleanup and land revitalization decisions.

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[18] U.S. EPA, Office of Land and Emergency Management Estimate. 2014. Data collected includes: (1) site information as of the end of FY 2011 from RCRAInfo, and (2) census data from the 2007-2011 American Community Survey.

[19] From a 2009 programmatic estimate, cited in *Hazardous Waste Management System; Modification of the Hazardous Waste Manifest System; Electronic Manifests; Final Rule.* 40 CFR § 260, 262, 263, 264, 265, and 271.

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Objective 1.4 - Ensure Safety of Chemicals in the Marketplace:

Effectively implement the Toxic Substances Control Act, and the Federal Insecticide, Fungicide, and Rodenticide Act, to ensure new and existing chemicals and pesticides are reviewed for their potential risks to human health and the environment and actions are taken when necessary.

Introduction

Chemicals and pesticides released into the environment as a result of their manufacture, processing, use, or disposal can threaten human health and the environment. EPA gathers and assesses information about the risks associated with chemicals and pesticides and implements risk management strategies when needed. EPA's research efforts will help advance the Agency's ability to assess chemicals more rapidly and accurately.

In 2016, TSCA was amended by the Frank R. Lautenberg Chemical Safety for the 21st Century Act. The amendments give EPA significant new, as well as continuing, responsibilities for reviewing chemicals in or entering commerce to prevent unreasonable risks to human health and the environment, including unreasonable risks to potentially exposed or susceptible subpopulations. Proper implementation, as Congress intended, of the TSCA amendments is one of EPA's top priorities.

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) is the primary federal law governing oversight of pesticide manufacture, distribution, and use in the United States. FIFRA requires EPA to register pesticides based on a finding that they will not cause unreasonable adverse effects on people and the environment, taking into account the economic, social, and environmental costs and benefits of the use of the pesticide. Each time the law was amended, Congress strengthened FIFRA's safety standards while continuing to require consideration of pesticide benefits.

In addition to FIFRA, the Federal Food, Drug, and Cosmetic Act (FFDCA) governs the maximum allowable level of pesticides in and on food grown and sold in the United States. The legal level of a pesticide residue on a food or food item is referred to as a tolerance. FFDCA requires that the establishment, modification, or revocation of tolerances be based on a finding of a "reasonable certainty of no harm." When evaluating the establishment, modification, or revocation of a tolerance, EPA tries to harmonize the tolerance with the maximum residue levels (MRLs) set by other countries to enhance the trade of agricultural commodities.

Strategic Measures

- SM-9 By September 30, 2022, complete all EPA-initiated TSCA risk evaluations for existing chemicals in accordance with statutory timelines[20].

- SM-10 By September 30, 2022, complete all TSCA risk management actions for existing chemicals in accordance with statutory timelines[21].

- SM-11 By September 30, 2022, complete all TSCA pre-manufacture notice final determinations in accordance with statutory timelines[22].

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[20] There is no baseline for this measure, as the program is operating under new statutory authority.
[21] There is no baseline for this measure, as the program is operating under new statutory authority.
[22] Baseline is 11.7% of determinations made within 90 days in FY 2017.

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- SM-12 By September 30, 2022, complete all cases of Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)-mandated decisions for the pesticides registration review program[23].

- SM-13 By September 30, 2022, reduce the Pesticide Registration Improvement Act (PRIA) registration decision timeframe by an average of 60 days[24].

Strategies for Achieving the Objective

Chemicals

Over the next five years, EPA will focus on meeting the statutory requirements and mandatory deadlines of the amended TSCA and ensuring that the reviews are efficient, effective, and transparent to EPA's stakeholders. EPA will ensure that decisions are based on science, are transparent, use methods and tools that are based on the weight of scientific evidence, are consistent with the best available scientific information, and are reasonable and consistent with the intended use of the information.

Under the chemical data reporting (CDR) rule, EPA collects basic exposure-related information from manufacturers (including importers) on the types, quantities, and uses of chemical substances produced domestically or imported into the United States. Since the enactment of TSCA in 1976, many new chemicals have entered commerce following review by EPA under the TSCA new chemicals program. Once in commerce, these chemicals are considered existing chemicals in commerce. The amended TSCA provides a framework for making progress in understanding and managing the risks associated with existing chemicals to prevent unreasonable risk posed by their manufacturing, processing, distribution, use or disposal. The Act requires EPA to identify high- and low-priority existing chemicals and evaluate high-priority chemicals against a new risk-based safety standard. By December 2019, EPA must complete risk evaluations for the first ten high-priority chemicals, ramp up the risk evaluation process so that 20 high-priority chemicals are under evaluation at all times, and identify 20 low-priority chemicals which will not undergo further evaluation at this time. Chemical risk evaluations of existing chemicals must be completed within three years. Transparency and stakeholder engagement are vital parts of the process, as they help inform EPA's prioritization and risk evaluation of existing chemicals.

The Agency has two years to address unreasonable risks identified as warranted for action by the findings of the chemical risk evaluations[25]. Risk management actions may include prohibiting, restricting, or modifying the manufacture, processing, distribution in commerce or commercial use, modifying the labeling, recordkeeping, and other restrictions.

For new chemicals, EPA reviews and takes action on approximately 1,000 new chemical notices -- including exemption notices—submitted by industry annually, including pre-manufacture notices (PMNs), to ensure that the chemicals are not likely to pose unreasonable risk before being allowed to commercialize. To prevent such risk, EPA may establish risk reduction/management requirements through the new chemical review process to protect workers, consumers or the environment. The 2016 TSCA amendments created additional new requirements for positive determinations of chemical safety, which have resulted in changes to EPA's assessment process for new chemicals. In particular, for each new chemical notice, EPA now has 90 days to make an affirmative determination of safety based on

[23] Baseline is 251 decisions completed by the close of FY 2017 out of the known universe of 725.

[24] Baseline is an average timeframe of 655 days (range: 93-2,086 days) for PRIA decisions for 68 new active ingredients completed in FY 2015-2017.

[25] TSCA section 6(c)(1) requires final regulatory action within 2 years of publication of the final risk evaluation but allows for an extension to this deadline "for not more than 2 years."

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whether the chemical substance will present, may present, or is not likely to present an unreasonable risk to human health or the environment, or that the available information is insufficient to enable the Agency to make any of the above determinations. All four of these outcomes constitute final determinations on pre-manufacture notices and thus count toward EPA's strategic target of completing 100% of such determinations within statutory timelines. Under the TSCA amendments, if EPA makes an "insufficient information" determination, the Agency will work with the submitter to conduct testing needed to make a determination or will impose restrictions on the substance that prevent exposure from occurring.

EPA will protect legitimate claims of confidentiality of the identity of chemicals. With limited exceptions provided by statute, the Agency will review within 90 days all chemical identity confidential business information (CBI) claims requiring substantiation under TSCA Section 14(c)(3) and a representative subset, comprising at least 25 percent, of all other CBI claims. Timely review of CBI claims will help to increase transparency of chemical data. Additionally, EPA is developing guidance required by TSCA, as amended, to address how states, tribes, and medical professionals in an emergency situation may gain access to CBI information.

The Agency uses a variety of tools and approaches to assess, prevent, and reduce chemical releases and exposures, and empowers stakeholders by ensuring access to chemical data and other information and expertise. EPA annually publishes the Toxics Release Inventory (TRI), a public database that contains release and other waste management information (e.g., recycling) and pollution prevention data on over 650 toxic chemicals from approximately 20,000 industrial and federal facilities.

Pesticides

EPA is responsible for licensing (registering) and periodically reevaluating (registration review) pesticides to protect consumers, pesticide users, workers who may be exposed to pesticides, children, and other sensitive populations, while considering the benefits associated with the use of the pesticide. EPA seeks public input on all pesticide reevaluations; all new active ingredients; first food uses; and the establishment, modification, or revocation of tolerances. For example, the rules governing the registration review program[26] typically provide for three distinct comment periods at various stages of the review process. In making pesticide decisions, the Agency often seeks input from stakeholders to address specific information, such as real-world use patterns and benefits to the user community.

EPA works with other federal, state, and tribal agencies, trade organizations, industry, and non-governmental organizations to ensure the effective and safe use of pesticides. EPA also has long provided financial support and expertise to states and tribes so that they can provide training, education, and outreach to pesticide applicators about the safe, proper, and legal use of pesticides. States and tribes work with farmers, businesses, and public agencies to protect human health and the environment and serve as a critical part of job training and business growth in rural areas.

External Factors and Emerging Issues

The amended TSCA provides EPA the authority to collect user fees designed to defray 25 percent of the Agency's costs to administer TSCA Sections 4, 5, 6, and 14. While EPA is directed by the statute to design the fees to collect 25 percent of the costs of administering these sections, it has no control over exactly how much revenue the fees will generate. That will be determined in large part by how the fee-paying community responds to the new fees in terms of their number of fee-related submissions or requests.

[26] 40 CFR 155 – Registration Standards and Registration Review

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New pests and disease vectors carried by pests create challenges for managing pesticides. EPA works closely with public health officials, researchers, and agricultural experts to identify emerging pests; and, with industry, to expeditiously register pesticides that address issues while ensuring pesticide safety. Assessing and appropriately addressing risks is complex. The Agency must determine safe, effective methods of pesticide use, weighing differing risks for humans and ecosystems. For example, one pesticide may have lower risks for humans than do other pesticides, but have increased risks for pollinators or endangered species. Similarly, a pesticide may have risks for humans, but may be appropriate to fight mosquitos that carry diseases that also pose risks to humans.

EPA continues to conduct education and outreach with tribes. One challenge is ensuring that the flow of information on the safe use of pesticides reaches all federally-recognized tribes across the country, and comes in forms that result in protective actions on the ground.

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Goal 2 – Cooperative Federalism: Rebalance the power between Washington and the states to create tangible environmental results for the American people.

The idea that environmental protection is a shared responsibility between the states, tribes, and the federal government is embedded in our environmental laws, which in many cases provide states and tribes the opportunity and responsibility for implementing environmental protection programs. More than 45 years after the creation of EPA and the enactment of a broad set of federal environmental protection laws, most states, and to a lesser extent territories and tribes, are authorized to implement environmental programs within their jurisdictions in lieu of EPA-administered federal programs. Specifically, states have assumed more than 96 percent of the delegable authorities under federal law.[27] EPA retains responsibility for directly implementing federal environmental programs in much of Indian country where eligible tribes have not received delegable authorities. There are also programs that by statute may not be delegated to the states or tribes. Recognizing these evolving responsibilities, EPA headquarters and regions will facilitate constructive dialogue with states and tribes to ensure maximum utilization of resources. EPA will adapt its practices to reduce duplication of effort with authorized states and tribes, and tailor its oversight of delegated programs.

Cooperative federalism – the relationship between states, tribes and EPA – is not just about who makes decisions, but about how decisions are made and a sense of shared accountability to provide positive environmental results. EPA understands that improvements to protecting human health and the environment cannot be achieved by any actor operating alone, but only when the states, tribes, and EPA, in conjunction with affected communities, work together in a spirit of trust, collaboration, and partnership. Effective environmental protection is best achieved when EPA and its state and tribal partners work from a foundation of transparency, early collaboration – including public participation – and a spirit of shared accountability for the outcomes of this joint work. This foundation involves active platforms for public participation, including building the capacity of the most vulnerable community stakeholders to provide input. With these public participation opportunities, the beneficiaries of environmental protection – the American people – will be able to more meaningfully engage through their communities, their local governments, and their state and tribal governments. Including the public's voice, particularly the voices of the most vulnerable to environmental and public health challenges among us, in EPA's policy, regulatory, and assistance work is essential to meeting their needs as the Agency implements its statutory responsibilities.

EPA also recognizes that meeting the needs of states, tribes, local governments, and communities, and achieving environmental improvements cannot be done in isolation from economic growth. Opportunities for prosperous economic growth and clean air, water, and land are lost without effective infrastructure investments that align with community needs. This is especially true for infrastructure investments that repair existing systems, support revitalization of existing communities and buildings, take advantage of existing roads, and lead to the cleanup and redevelopment of previously-used sites and buildings. Currently, there is a need for significant infrastructure investments. EPA will play a role in meeting this need by aligning its relevant programs to catalyze other resources, supporting beneficial infrastructure investments, and meeting community needs for thriving economies and improved environmental and human health outcomes.

[27] Environmental Council of the States (ECOS) Paper, "Cooperative Federalism 2.0," June 2017

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Objective 2.1 - Enhance Shared Accountability:

Improve environmental protection through shared governance and enhanced collaboration with state, tribal, local, and federal partners using the full range of compliance assurance tools.

Introduction

In the spirit of cooperative federalism, EPA and its partners have made enormous progress in protecting air, water, and land resources. EPA recognizes that states and tribes vary in the environmental challenges that they face due to variations in geography, population density, and other factors. EPA will maximize the flexibilities provided by law to take each state's unique situation into account when making regulatory and policy decisions. EPA directly implements the majority of federal environmental programs in Indian country. The Agency actively works with tribes to develop their capacity to administer environmental programs and to enable tribes that choose to implement federal environmental laws and programs for their lands. The unique relationship among EPA and its co-regulators is the foundation of the nation's environmental protection system; each organization fulfills a critical role based on its expertise, abilities, and responsibilities in protecting and improving human health and the environment.

EPA recognizes the advances states and tribes have made in implementing environmental laws and programs. This Administration will undertake a series of initiatives to rethink and assess where we are and where we want to be with respect to shared governance. These initiatives will clarify the Agency's statutory roles and responsibilities and tailor state and tribal oversight to maximize our return on investment and reduce burden on states and tribes, while ensuring continued progress in meeting environmental laws.

In addition, EPA, with its state, tribal, and local partners, ensures consistent and fair enforcement of federal environmental laws and regulations. The Agency works jointly with its co-regulators to protect human health and the environment, using a full set of compliance assurance tools, such as compliance assistance and monitoring; electronic reporting; traditional enforcement; grants to states and tribes; and tribal capacity building. EPA is building on progress made using E-Enterprise for the Environment, a platform for transformative change that operationalizes cooperative federalism principles. EPA's E-Enterprise partnership with states and tribes modernizes the way we do the business of environmental protection.

Strategic Measures

- SM-14 By September 30, 2022, increase the number of grant commitments achieved by states, tribes, and local communities[28].
- SM-15 By September 30, 2022, increase the use of alternative shared governance approaches to address state, tribal, and local community reviews[29].

[28] Baseline will be determined in FY 2018.
[29] Baseline will be determined in FY 2018.

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Strategies for Achieving the Objective

Shared Governance

To develop a future model of shared governance that takes into account the progress states and tribes have made in protecting human health and the environment, the Agency will undertake an analysis of EPA's statutory roles and responsibilities to determine what we have to do and assess what we want to do in light of priorities. The Agency will work with states and tribes to find alternative approaches to shared governance, seeking to provide flexibility and streamline oversight of state and tribal programs. As part of this process, the Agency will seek to understand which approaches currently are working well for state, tribal and local co-regulators. EPA will pilot new approaches to oversight (e.g., permit reviews) where we have the legal flexibility to do so and streamline those processes by which EPA reviews and approves state and tribal actions. EPA will continue to work with states and tribes through E-Enterprise, focused on how we work and plan together, agree on priorities, and allocate roles and responsibilities to update processes and programs. Through shared governance – engaging early and meaningfully with states and tribes – the Agency will use E-Enterprise to deliver streamlined processes as well as accessible, reliable information and data that benefit co-regulators and the regulated community.

The National Environmental Performance Partnership System (NEPPS) has long served as a model for advancing cooperative federalism by providing the flexibility needed to address the unique needs of individual states and tribes to achieve the best environmental results. NEPPS is a performance-based approach for organizing working relationships with states and many tribes, providing specific benefits, such as greater flexibility to assess environmental conditions, shared priorities, and strategically leveraged resources, thus improving cooperative federalism, shared governance, and shared accountability. EPA will work with states and tribes to strengthen cooperative federalism principles through NEPPS, and intends to make NEPPS training available for state and tribal stakeholders.

EPA will work closely with states and tribes on NEPPS, Performance Partnership Grants (PPGs), and related policies. PPGs are a financial tool that allows states and tribes to combine separate "streams" of categorical grant funding, from across 20 eligible categorical grants, into one multi-program grant with a single budget. The goal of the review is to understand PPG utilization and outline a course of action addressing the challenges, leveraging lessons learned and progress achieved over the last 22 years. The intent is to provide states and tribes the flexibility to maximize human health and environmental protection achieved by the funds; further enhance the federal, state, and/or tribal partnership; and promote the goals of NEPPS.

EPA will respect the important role governors play in cooperative federalism and will seek their views and perspectives on compliance assistance and other opportunities to improve EPA-state partnerships. In addition, the Agency will work to strengthen intergovernmental consultation methods to engage stakeholders and hear diverse views on the impacts of prospective regulations.

Local governments also have a unique relationship with EPA as partners and often as innovative problem solvers. EPA works with local governments to build stronger and more robust partnerships and bring local concerns forward into Agency decision making. As part of these efforts, EPA seeks advice from the Local Government Advisory Committee (LGAC), a chartered policy committee comprising elected and appointed local officials, on the impacts of the Agency's regulations and policies on local governments.

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Consistent with the 1984 Indian Policy and EPA Policies on consultation and treaty rights[30], EPA will work on a government-to-government basis to build tribal capacity to implement federal programs through delegations, authorizations, and primacy designations to enable tribes to meaningfully participate in the Agency's policy making, standard setting, and direct implementation activities under federal environmental statutes[31]. EPA will work with individual tribes to develop and implement an EPA-Tribal Environmental Plan (ETEP), a joint planning document for achieving stronger environmental and human health protection in Indian country. ETEPs identify tribal, EPA, and shared priorities, and the roles and responsibilities for addressing those priorities.

EPA will focus its direct implementation efforts on areas of high need for human health or environmental protection, including programs identified in the ETEP for which tribes are not eligible, as well as those for which tribes do not currently anticipate seeking delegation, authorization, or primacy. In carrying out its direct implementation activities, EPA will work closely with tribes to develop tribal capacity for programs for which they do not anticipate seeking delegation, authorization, or primacy. EPA will also encourage tribes to participate in policy making and to assume appropriate partial roles in the implementation of programs, including through the use of Direct Implementation Tribal Cooperative Agreements (DITCAs) or other agreements, as available.

Compliance Assurance

Over the next five years, the Agency will look for cost-effective ways to enhance the compliance assurance tool box in collaboration with its state, tribal, local, federal, and industry partners. For example, the E-Enterprise Web Portal offers a platform or gateway for making shared services available to states, tribes, and EPA to transact business (e.g., e-permitting and reporting). It also provides information for the regulated community (e.g., compliance assistance information). Tools and services are designed to enhance efficiency, reduce burden on the regulated community, and improve environmental outcomes. EPA will expand its compliance assistance work by continuing to partner with third-party organizations and federal agencies to support the 17 existing web-based, sector-specific compliance assistance centers[32] and developing new centers. In general, an expanded and modernized compliance assurance tool box will enhance EPA's ability to tailor compliance assurance approaches to the differing needs and challenges among states and regulated entities. EPA is also working closely with states and tribes to develop new compliance tools and approaches to make programs more effective and efficient in promoting compliance and remedying violations. Some of the Agency's ongoing collaborative efforts with the Environmental Council of the States (ECOS) include[33] producing webinars to help identify new compliance approaches that EPA could pilot and evaluate, increasing availability of training, and preparing for advances in pollution monitoring technology[34].

A key component of EPA's overall compliance assurance program is compliance monitoring. Compliance monitoring allows the regulatory agencies to detect noncompliance and promote compliance with the nation's environmental laws. Effective targeting of compliance monitoring plays a central role in

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[30] "EPA Policy for the Administration of Environmental Programs on Indian Reservations," "EPA Policy on Consultation and Coordination with Indian Tribes," and "EPA Policy on Consultation and Coordination with Indian Tribes: Guidance for Discussing Tribal Treaty Rights."

[31] The Tribal Consultation Opportunities Tracking System (TCOTS) publicizes upcoming and current EPA consultation opportunities for tribal governments and can be located here: https://TCOTS.epa.gov.

[32] For more information on compliance assistance centers, see https://www.epa.gov/compliance/compliance-assistance-centers.

[33] For more information on OECA's collaboration with ECOS via E-Enterprise, see Article: Advanced Monitoring Technology: Opportunities and Challenges. A Path Forward for EPA, States, and Tribes.

[34] For more information on a broader range of collaborations between OECA and ECOS, see Compendia of Next Generation Compliance Examples in Water, Air, Waste, and Cleanup Programs.

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achieving the goals EPA has set for protecting human health and the environment. EPA, state, and tribal inspectors often provide regulated entities with compliance assistance during the inspection process. On a national level, EPA works closely with individual states, tribes, and state and tribal associations to develop, modernize, and implement national compliance monitoring strategies to ensure a level playing field for regulated entities across the country. EPA principally focuses compliance monitoring activities, such as field inspections, electronic reporting, and data analysis tools, for those programs that are not delegated to states and tribes. The Agency provides monitoring, program evaluations, and capacity building to support and complement authorized state, tribal, and local government programs. The Agency will work with its state and tribal partners to enhance compliance monitoring tools and increase the use of Lean practices. Through E-Enterprise for the Environment, EPA, states, tribes, and territories will collaborate to develop smart mobile tools to enhance the effectiveness and efficiency of state, tribal, and EPA inspectors, and support advanced monitoring technology.

International Partnerships

To achieve the Agency's domestic environmental and human health objectives, the EPA will work with international partners to address international sources of pollution, as well as the impacts of pollution from the United States on other countries and the global environment. Pollution impacts air, water, food crops, and food chains, and can accumulate in foods such as fish. EPA efforts will include working with international partners to strengthen environmental laws and governance to more closely align with U.S. standards and practices and to help level the playing field for U.S. industry.

External Factors and Emerging Issues

Advances in the field of information technology and social science research may offer innovative ways to promote compliance. EPA is partnering with states to help prepare for and use these technologies and research to carry out our statutory obligations. The Agency also is working with the academic community on additional research to develop innovation in promoting compliance. EPA also will work closely with ECOS; the National Tribal Caucus; state and tribal program associations; and individual states, tribes, and territories to implement the Administrator's vision for cooperative federalism. In partnership with ECOS, EPA plans to develop principles and best practices for enhancing collaboration among EPA and states on compliance assurance work. In addition, EPA will continue to work with ECOS, the Association of State and Territorial Solid Waste Management Officials (ASTSWMO), and individual states to develop an integrated hardware/software solution that supports documenting and conducting inspections.

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Objective 2.2 - Increase Transparency and Public Participation:

Listen to and collaborate with impacted stakeholders and provide effective platforms for public participation and meaningful engagement.

Introduction

EPA will strengthen its community-driven approach, which emphasizes public participation to better partner with states, tribes, and communities and to maximize the support and resources of the entire Agency to create tangible environmental results. The Agency will deploy its collective resources and expertise to collaborate with states, tribes, and communities and support locally-led, community-driven solutions to improved environmental protection and economic growth. EPA will increase transparency with industry, environmental groups, and other stakeholders, and will facilitate public participation, emphasizing cooperation and collaboration, especially at the early stages of Agency actions. This will provide a more comprehensive understanding of community needs.

The Agency also will coordinate better across its programs and with federal partners to ensure mutual efforts are aligned. EPA will include consideration of vulnerable groups and communities in decisions, and will reflect community needs in its actions and investments, recognizing that the needs of rural communities may not be the same as urban areas. Increasing transparency and public participation in EPA's work with other agencies will enhance the Agency's ability to partner with states, tribes, and local governments and increase responsiveness to the needs of their most vulnerable communities. EPA will serve as a convener and leverage resources with new and existing partners to deliver services more efficiently and effectively. The Agency also will engage with regulated entities to identify reforms to more efficiently and effectively meet the nation's environmental goals.

Strategic Measure

- SM-16 By September 30, 2022, eliminate the backlog and meet statutory deadlines for responding to Freedom of Information Act (FOIA) requests[35].

Strategies for Achieving the Objective

Over the next five years, EPA will meet community needs through public participation and will build community capacity through grants, technical assistance, partnering, and meaningful engagement. The Agency will leverage recommendations provided by federal advisory committees, such as the National Environmental Justice Advisory Council (NEJAC), LGAC, and Children's Health Protection Advisory Committee (CHPAC), and focus on partnerships representing vulnerable populations, such as youth, the elderly, and low-income communities. Specifically, the Agency will engage with the focus communities identified by EPA regions to understand each community's goals and identify its environmental priorities and needs, recognizing that rural communities and more urban areas may have different priorities.

EPA will continue to provide loans and grants to states and tribes to improve infrastructure. Given that investment in infrastructure is necessary for economic growth and environmental protection and that EPA investments are catalytic to both, the Agency's efforts will be used to support private and public investment in economic revitalization and improved environmental outcomes across the country. This requires that EPA strengthen its infrastructure and community assistance programs (e.g., the clean water SRF, drinking water SRF, Water Infrastructure Finance and Innovation Act, environmental justice,

[35] Baseline will be determined in FY 2018.

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community revitalization, and brownfields area-wide planning grant programs) to better align EPA investments with each other and with other federal investments in pursuit of economic revitalization and improved environmental outcomes. At the same time, EPA will ensure that it is serving disadvantaged communities, leveraging private investment to improve the economy, and protecting human health and the environment.

EPA will work in a focused manner to make infrastructure and public health protection investments in communities with and through partners such as states and tribes. To further integrate and implement community environmental considerations within EPA programs, the Agency will create tools to facilitate incorporation of community understanding, needs, and concerns across program activities, and advance more systematic incorporation of existing tools and needs, such as use of the Environmental Justice Screening and Mapping Tool (EJSCREEN) and EnviroAtlas. EPA will develop a cross-Agency communities team to lead regional involvement in and resourcing of community-based environmental work through a fully-integrated resource platform.

The Agency will coordinate across the federal government – EPA regions partnering with federal agencies in focus communities – to deliver services more efficiently and effectively. EPA will utilize such partnerships to leverage resources and expertise from across EPA and a range of outside partners to advance economic revitalization through the environmental and health goals of communities. EPA will look for opportunities for early engagement with state, local, and tribal co-regulators through existing advisory committees and other forums. The Agency will also continue leadership of and involvement in the Office of Management and Budget (OMB) Community Solutions Taskforce to better access and leverage resources from across federal agencies, and will strengthen coordination with the Interagency Working Group on Environmental Justice to better integrate EPA priorities and support and engage communities. In addition, EPA will support and align its work with the activities and priorities of the President's Task Force on Environmental Health Risks and Safety Risks to Children.

EPA will work on the E-Enterprise Web Portal's Assistance Gateway, which provides tools and resources for communities to facilitate two-way communication between the public and environmental agencies. The Agency will determine how EPA, states, and tribes can most effectively harness and benefit from the recent, rapid development of environmental monitoring technologies that are smaller, more portable, and less expensive than traditional methods. EPA will pursue innovative technologies without compromising the accuracy of the information collected. In consultation with state, tribal, and local partners, EPA will make monitoring data publicly available, providing context and relevancy. EPA will support the E-Enterprise Assistance Gateway that will enhance collaboration and communication with communities. The Agency will seek to increase the number and type of public participation platforms it has to ensure that the public can meaningfully participate in all of EPA's work—including policy making, regulatory development, outreach, education, and community engagement.

EPA will also focus on reducing the FOIA backlog the Agency has built up over the years, and enhancing the FOIA process. The complexity and volume of electronic documents required to be searched, collected, and reviewed has increased over time. The Agency will ensure that it can support the timely searching and collection of electronically-stored information for purposes of responding to FOIA requests and other information needs in a cost-effective, sustainable manner. This should not only help the Agency provide the public information requested, but also reduce the fees and lawsuits the Agency incurs from missing FOIA response deadlines.

External Factors and Emerging Issues

Resources are critical to the expansion of technical assistance directed at communities and state, tribal, and local government partners that support community-focused engagement and collaboration. Staff must

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be available for a wide variety of implementation activities such as direct community engagement and support, intra- and inter-agency coordination, and partnering effectively with states and tribes.

In addition, the challenges of coordinating across offices within EPA and with other federal agencies can inhibit the identification and delivery of creative solutions and services that can lead to tangible results for communities and a more effective leveraging of government resources. EPA recognizes the need to communicate successes and achievements related to this work, both to market its effectiveness and to teach new partners and practitioners how to replicate successful models and approaches.

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Goal 3: Rule of Law and Process: Administer the law, as Congress intended, to refocus the Agency on its statutory obligations under the law.

EPA will seek to reinvigorate the rule of law and process as it administers the environmental laws as Congress intended, and to refocus the Agency on its basic statutory obligations. To accomplish this, EPA will work cooperatively with states and tribes to ensure compliance with the law, as well as to create consistency and certainty for the regulated community. Of course, EPA will take civil or criminal enforcement action against violators of environmental laws.

A robust enforcement program is critically important for addressing violations and promoting deterrence, and supports the Agency's mission of protecting human health and the environment. Ensuring compliance with the law also ensures consistency and certainty for the regulated community so it has a complete understanding of the impact of proposed actions on human health, the environment, and the economy, and a clear path and timeline to achieve that compliance. EPA's policies and rules will reflect common sense, consistent with the Agency's statutory authorities, and provide greater regulatory and economic certainty for the public. EPA will enforce the rule of law in a timely manner and take action against those that violate environmental laws to the detriment of human health or the environment.

One of EPA's highest priorities must be to create consistency and certainty for the regulated community. Consistency in how the laws and regulations are applied across the country is part of that process. EPA will undertake a variety of efforts to ensure that consistency in application of laws and regulations is evaluated and addressed, while respecting the unique circumstances of each state and tribe. EPA recognizes the importance of applying rules and policies consistently as well as creating certainty by meeting the statutory deadlines that are required for EPA's actions. The rule of law must also be built on the application of robust science that is conducted to help the Agency meet its mission and support the states and tribes in achieving their environmental goals. Research, in conjunction with user-friendly applications needed to apply the science to real-world problems, will help move EPA and the states forward in making timely decisions based on science.

Carrying out this goal requires that EPA improve the efficiency of its internal business and administrative operations. First, EPA's business operations, specifically the vast permitting processes established by the different environmental statutes, are key to ensuring economic growth and human health and environmental protection. Over the next five years, EPA will modernize its permitting practices to increase the timeliness of reviews and decisions, while working more collaboratively, transparently, and cost effectively to achieve the Agency's mission. The second part of improving internal operations includes reducing EPA's overhead and creating more efficient and effective administrative processes (e.g., acquisition) that allow EPA to accomplish its core mission work.

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Objective 3.1 - Compliance with the Law:

Timely enforce environmental laws to increase compliance rates and promote cleanup of contaminated sites through the use of all of EPA's compliance assurance tools, especially enforcement actions to address environmental violations.

Introduction

For decades, the protections mandated by federal environmental laws have been essential to the growth of American prosperity. Noncompliance with those laws diminishes shared prosperity and unfairly tilts the field of economic competition in favor of those that skirt the law. To carry out its mission to protect human health and the environment, EPA, in collaboration with state and tribal partners, relies on a strong national compliance assurance and cleanup enforcement program. An effective enforcement program is key to ensuring that the ambitious goals of the nation's environmental statutes are realized.

EPA's enforcement priorities remain focused on cleaning up hazardous waste sites and addressing the most significant violations consistent with EPA's statutory authorities. EPA takes the overwhelming majority of its enforcement actions in programs that are: (1) not delegable to a state or tribe; (2) in states or tribes that have not sought authorization to implement a delegable program; or (3) in states or tribes that do not have the resources or expertise, or that seek assistance from the Agency—and these actions are taken in coordination with the states and tribes. For states and tribes with authorized programs, EPA, states, and tribes share enforcement responsibility, with primary enforcement responsibility residing with the state[36] or tribe. Further, EPA is responsible for addressing violations that occur in Indian country in the absence of an approved program.

Even in states or tribes authorized to implement a program, EPA serves a critical role in addressing serious national noncompliance problems, such as those affecting multiple states or tribes, and in serving as a backstop for instances when a state or tribe does not timely or appropriately address serious noncompliance. EPA also may assist a state or tribe in remedying noncompliance problems when the state or tribe is unable to address the problem because it lacks the capability or resources, such as in actions against other federal or state agencies. For some serious violations, the Agency and states or tribes may decide that the best approach is a joint enforcement action. Further, EPA will take immediate action when there is an environmental emergency, such as an oil spill or chemical accident. Through the State Review Framework (SRF), EPA periodically reviews authorized state compliance monitoring and enforcement programs, using criteria agreed upon by states, to evaluate performance against national compliance monitoring or enforcement program standards. When states do not achieve standards, the Agency works with them to make progress. However, EPA may also take a lead implementation role when authorized states have a documented history of failure to make progress toward meeting national standards.

In all of its work, EPA's enforcement program strives to address noncompliance in an efficient and timely manner, applying a broad range of enforcement and compliance tools to achieve the goal of reducing noncompliance.

[36] See e.g., ECOS Resolution 98-9, U.S. EPA Enforcement in Delegated States (revised September 28, 2016), describing the EPA and state roles in enforcement in authorized states: "WHEREAS, U.S. EPA and the States have bilaterally developed policy agreements which reflect those roles and which recognize the primary responsibility for enforcement action resides with the States, with U.S. EPA taking enforcement action principally where the State requests assistance, is unwilling or unable to take timely and appropriate enforcement actions, or in actions of national interest, or in actions involving multiple state jurisdictions."

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Strategic Measures

- SM-17 By September 30, 2022, reduce the average time from violation identification to correction[37].
- SM-18 By September 30, 2022, increase the environmental law compliance rate[38].

Strategies for Achieving the Objective

Civil Enforcement

The overall goal of EPA's civil enforcement program is to maximize compliance with the nation's environmental laws and regulations to protect human health and the environment. The Agency works closely with the U.S. Department of Justice, states, tribes, territories, and local agencies to ensure consistent and fair enforcement of all major environmental statutes. EPA will seek to strengthen environmental partnerships with its state and tribal partners, encourage regulated entities to correct violations rapidly, ensure that violators do not realize an economic benefit from noncompliance, and pursue enforcement to deter future violations.

EPA recognizes that significant environmental progress has been made over the years, much of it due to enforcement efforts by EPA, states, tribes, and local communities. To maximize compliance over the next five years, the Agency will refocus efforts toward areas with significant noncompliance issues and where enforcement can address the most substantial impacts to human health and the environment. EPA also recognizes the role of states and tribes as the primary implementers, where authorized by EPA to implement the federal statutes, and will focus compliance assurance and enforcement resources on direct implementation responsibilities, addressing the most significant violations, and assisting authorized states and tribes in meeting national standards. For example, the Agency will provide expertise and implement compliance monitoring strategies that will ensure a level playing field. EPA is responsible for direct implementation for programs that are not delegable or where a state or tribe has not sought or obtained the authority to implement a particular program (or program component). Examples of non-delegable programs include the CAA mobile source program, pesticide labeling and registration under FIFRA, virtually all compliance assurance and enforcement in Indian country, enforcement of the federal Superfund cleanup program, and enforcement of non-delegated portions of various other laws, including RCRA, the CWA, and stratospheric ozone under the CAA. EPA also will pursue enforcement actions at federal facilities where significant violations are discovered, will ensure that federal facilities are held to the same standards as the private sector, and will provide technical and scientific support to states and tribes with authorized programs.

Criminal Enforcement

EPA's Criminal Enforcement program enforces the nation's environmental laws through targeted investigation of criminal conduct committed by individual and corporate defendants that threaten public health and the environment. Over the next five years, EPA will collaborate and coordinate with the U.S. Department of Justice and state, tribal, and local law enforcement counterparts to ensure that the Agency

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[37] Baseline will be determined in FY 2018.

[38] This concept will be piloted by focusing initially on increasing the percentage of Clean Water Act (CWA) National Pollutant Discharge Elimination System (NPDES) permittees not in significant noncompliance with their permit limits to 88% from a baseline of 76% from Q4 FY 2016 to Q3 FY 2017. Other program areas may be included in this strategic measure during the FY 2018-2022 timeframe.

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responds to violations as quickly and effectively as possible. EPA enforces the nation's environmental laws through targeted investigation of criminal conduct committed by individual and corporate defendants that threatens human health and the environment. The Agency plays a critical role across the country since states and tribes have limited capacity to prosecute environmental crimes. The Agency will focus resources on the most egregious environmental cases (i.e., those presenting significant human health and environmental impacts).

Cleanup Enforcement

Through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund), EPA will facilitate prompt site cleanup and use an "enforcement first" approach that maximizes the participation of liable and viable parties in performing and paying for cleanups. The Agency will protect communities by ensuring that potentially responsible parties (PRPs) conduct cleanups at Superfund sites, preserving federal taxpayer dollars for sites where there are no viable contributing parties, and by recovering costs if the EPA expends Superfund-appropriated dollars to clean up sites. EPA also will address liability concerns that can be a barrier to potential reuse. Addressing the risks posed by Superfund sites and returning them to productive use strengthens the economy and spurs economic growth.

Over the next five years, EPA will focus its resources on the highest priority sites, particularly those that may present an immediate risk to human health or the environment. In accordance with the Superfund Task Force Report, the Agency will improve and revitalize the Superfund program to ensure that contaminated sites across the country are remediated to protect human health and the environment, and returned to beneficial reuse as expeditiously as possible. At federally-owned sites, EPA will also focus on resolving formal disputes under the federal facility agreements.

External Factors and Emerging Issues

Advanced monitoring technology and information technology are rapidly evolving, and advances in these fields offer great opportunities for improving the ability of EPA, states, and tribes to ensure compliance. EPA, states, and tribes do, however, face challenges in keeping up with the rapid pace of change in these technologies. In addition, social science research and knowledge may offer innovative ways to promote compliance. EPA is partnering with states and tribes to help prepare for and use these advanced monitoring technologies, consistent with statutory and regulatory obligations. The Agency will collaborate with ECOS and state associations to maximize the use of these technologies and modernize programs. EPA, in collaboration with states, is working with the academic community to identify new ways to improve compliance. For example, EPA will work with states and academics to pilot and evaluate innovative compliance methods.[39] EPA will work with states to integrate advanced pollution monitoring and information technology into Agency work.

[39] ECOS Resolution 17-2: On the Value of Diverse and Innovative Approaches to Advance Compliance (2017)

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Objective 3.2 - Create Consistency and Certainty:

Outline exactly what is expected of the regulated community to ensure good stewardship and positive environmental outcomes.

Introduction

The regulatory framework is inherently dynamic. As part of its statutory obligations, EPA is required to publish many regulations within a set timeframe each year that implement environmental programs and assist the Agency in meeting its core mission. These regulations address newly mandated responsibilities as well as updates and revisions to existing regulations. As EPA meets its obligations to protect human health and the environment through regulatory action, it must also meet another key responsibility – minimizing "regulatory uncertainty" that unnecessarily causes businesses and communities to face delays, planning inefficiencies, and compliance complexities that impede environmental protection, economic growth, and development. EPA will employ a set of strategies to reduce regulatory uncertainty while continuing to improve human health and environmental outcomes consistent with the Agency's authorities as established by Congress and while considering unique state, tribal, and local circumstances. These strategies, which reflect EPA's commitment to cooperative federalism and commitment to the rule of law, will also help advance Agency goals for streamlining and modernizing permitting and enhancing shared accountability.

Strategic Measures

- SM-19 By September 30, 2022, meet 100% of legal deadlines imposed on EPA.
- SM-20 By September 30, 2022, eliminate unnecessary or duplicative reporting burdens to the regulated community by 10,000,000 hours[40].

Strategies for Achieving the Objective

As EPA issues new or revised regulations, businesses and individuals can find it challenging to know which rules apply to them and to adjust their compliance strategies. Over the next five years, EPA will reinvigorate its approach to regulatory development and prioritize meeting its statutory deadlines to ensure that expectations for the regulated community and the public are clear and comprehensive and that Agency actions are defensible and consistent with its authorities. The Agency will use new approaches and flexible tools to minimize regulatory uncertainty and will communicate more comprehensively to realize more consistent and better environmental outcomes, while centering work on statutory and regulatory obligations. EPA will strengthen working relationships with industry sectors to better understand their needs and challenges in implementing Agency requirements and with communities to understand their concerns. This knowledge will enable the Agency to develop better policies and regulations to protect human health and the environment in line with the authorities given to EPA by Congress.

On average, the EPA faces approximately 20 legal challenges under the various environmental statutes each year that assert that the Agency missed a statutory or regulatory deadline for taking an action or unreasonably delayed taking an action. In addition, the Agency faces nearly the same number of legal challenges under FOIA for failure to comply with the deadlines in that law. Responding to these challenges often diverts significant EPA resources away from priority activities, and could impact the

[40] Baseline is estimated at 173,849,665 information collection and reporting hours.

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Agency's ability to fulfill its commitments. In order to facilitate achievement of this goal, EPA will undertake a systematic mapping of the processes associated with these obligations and implement improvements where needed.

In addition, EPA will develop and engage stakeholders in reviewing a draft base catalog of responsibilities that statutes require EPA to perform in programs delegated to states and tribes. The base catalog, to be complete by 2019 and subsequently updated as necessary, will provide EPA a foundation to make decisions that reduce contradictory policy determinations at headquarters and across regions. It will also support EPA cooperative federalism commitments aimed at minimizing duplication and overlap among regions, headquarters, states, and tribes. This effort also leverages the commitment that EPA is making under cooperative federalism to identify, for all environmental media, an inventory and timeline for state-led permits that EPA reviews.

The Agency will ensure consistent implementation of policies across all regions. EPA will also work towards more cooperative decision making between EPA's regions and headquarters, when necessary. EPA will review regulatory guidance documents to identify key opportunities and will clarify and realign Agency approaches to improve consistency and clarity. EPA will strengthen working relationships with states, tribes, and local communities to transfer knowledge, leveraging its commitments under cooperative federalism, such as collaboration under E-Enterprise for the Environment. EPA will make available to states and tribes tools or services designed by other federal agencies, states, tribes, or local communities that enhance efficiency and reduce burden on the regulated community while ensuring protection of human health and the environment.

EPA will work with states and tribes to achieve this objective without overburdening those entities with costly unnecessary reporting systems and technology. Building on efforts to date, such as under E-Enterprise, EPA will collaborate with its partners on systems and services, including but not limited to:

- E-reporting: A systematic digital approach that enables states, tribes, and the regulated community to move from paper-based to electronic reporting.
- The Environmental Information Exchange Network: Managed under the collaborative leadership of EPA, states, territories, and tribes, a communication, data, and services platform for submitting and sharing environmental information among partners to foster informed decision making.
- SPeCS for SIPs (State Plan Electronic Collection System for State Implementation Plans): A web-based system for authorized state, tribal, and local governments to submit and manage SIPs under the Clean Air Act.

External Factors and Emerging Issues

A number of factors and emerging issues may impede the Agency's ability to meet this strategic objective. Sustainable resource levels and a strong workforce are critical to success. Proposing and finalizing regulations is often a multi-year process, which can be challenged by lawsuits causing further delays. For example, technical complexity also creates challenges in meeting aggressive deadlines.

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Objective 3.3 - Prioritize Robust Science:

Refocus the EPA's robust research and scientific analysis to inform policy making.

Introduction

EPA will identify, assess, conduct, and apply the best available science to address current and future environmental hazards, develop new approaches, and improve the scientific foundation for environmental protection decisions. EPA conducts problem-driven, interdisciplinary research to address specific environmental risks, and is committed to using science and innovation to reduce risks to human health and the environment, based on needs identified by EPA's program and regional offices and as well as state and tribal partners. Specifically, over the next five years, the Agency will strengthen alignment of its research to support EPA programs, regions, states, and tribes in accomplishing their top human health and environmental protection priorities for improved air quality, clean and safe water, revitalized land, and chemical safety[41]. Working closely with ECOS and its subsidiary, the Environmental Research Institute of the States (ERIS), the Agency will strive to connect state research needs with Agency priorities, and work to improve communication of research results. Through the public-private coalition Interstate Technology and Regulatory Council[42], EPA will encourage the adoption of innovative technologies and solutions. The Agency will also emphasize the translation of its work products for end user application and feedback.

EPA research will be reviewed by various scientific advisory boards (e.g., Board of Scientific Counselors) that are made up of recognized experts in various scientific, engineering, and social science fields and may be from industry; business; public and private research institutes or organizations; academia; federal, state, tribal, and local governments; nongovernmental organizations; and other relevant interest areas.

Strategic Measure

- SM-21 By September 30, 2022, increase the number of research products meeting customer needs[43].

Strategies for Achieving the Objective

Air Quality

EPA's research will advance the science and provide the information critical to improve air quality and to inform stationary source regulations; vehicle and fuel standards and certification; emission inventories; air quality assessments; and domestic ozone actions. The results of Agency research to support air quality program priorities will inform EPA programs; state, tribal, and local air programs; communities; and individuals about measures and strategies to reduce air pollution. Researchers will publish peer-reviewed scientific journal articles to disseminate research findings as appropriate and consistent with resource and program needs.

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[41] EPA research under Homeland Security supports efforts outlined in Core Mission (Goal 1) objectives.

[42] For more information on the Interstate Technology and Regulatory Council, go to http://www.itrcweb.org/.

[43] Baseline will be determined in FY 2018.

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Over the next five years, the Agency will:

- Deliver state-of-the-art tools for states and tribes to use in identifying effective emission reduction strategies to meet national ambient air quality standards and enhance air quality measurement methods used to ascertain compliance with NAAQS.
- Assess human and ecosystem exposures and effects associated with air pollutants on individual, community, regional, and global scales.
- Develop and evaluate approaches to prevent and reduce pollution, particularly sustainable, cost-effective, and innovative multi-pollutant and sector-based approaches.
- Provide human exposure and environmental modeling, monitoring, metrics, and information needed to inform air quality decision making at the state, tribal, and local level.

Safe and Sustainable Water Resources

EPA will develop innovative, cost-effective solutions to current, emerging, and long-term water resource challenges for complex chemical and biological contaminants. Using a systems approach to develop scientific and technological solutions for protecting human health and aquatic ecosystems, EPA researchers partner with program experts; federal and state agencies; tribes; local communities; academia; nongovernmental organizations; and private stakeholders.

Over the next five years, the Agency will:

- Support safe drinking water by focusing research on assessing the distribution, composition, remediation, and health impacts of known and emerging chemical and biological contaminants.
- Improve methods for fast and efficient waterborne pathogen monitoring in recreational waters.
- Investigate health impacts from exposure to harmful algal/cyanobacteria toxins, and develop innovative methods to monitor, characterize, and predict blooms for early action.
- Support states and tribes in meeting their priorities and setting water quality and aquatic life thresholds.
- Assist states, tribes, communities, and utilities in addressing stormwater and wastewater infrastructure needs through applied modeling, technical assistance, and capture-and-reuse risk assessments.
- Provide water reuse research support on potable and non-potable use guidance for states and tribes.

Sustainable and Healthy Communities

EPA will conduct research to support regulatory activities and protocol development for the National Oil and Hazardous Substances Pollution Contingency Plan and provide on-demand technical support at cleanup sites managed by federal, state or tribal governments, as well as assistance during emergencies. The Agency conducts health, environmental engineering, and ecological research and prepares planning and analysis tools for localities nationwide to use in facilitating regulatory compliance and improving environmental and health outcomes.

Over the next five years, EPA will:

- Provide technical support to the states and tribes through technical support centers for remediating CERCLA-designated contaminated sites and returning them to productive use.
- Assist regional, state, tribal, and local leaders in reducing costs and setting science-based cleanup levels in areas designated under CERCLA.

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- Characterize sites and contaminants released from leaking underground storage tanks identified under the LUST Trust Fund.
- Work with the ECOS/ERIS to evaluate the causal relationships between ecosystem goods and services and human health, and to document these relationships using EnviroAtlas.
- Assess the impact of pollution (e.g., health impact assessments) on such vulnerable groups as children, tribes, environmental justice communities, and other susceptible populations.

Chemical Safety

EPA will evaluate and predict impacts from chemical use and disposal, and provide states and tribes with information, tools, and methods to make better informed, more timely decisions about the thousands of chemicals in the United States. The Agency will produce innovative tools that accelerate the pace of data-driven evaluations, enable knowledge-based decisions that protect human health, and advance the science required to anticipate and solve problems.

Over the next five years, EPA will:

- Provide tools to more efficiently and cost-effectively evaluate the biological activity and health risks of chemicals and reduce the use of toxicity tests to animals.
- Use ToxCast/Tox21 data to develop high-throughput risk assessments, particularly for chemicals for which adequate risk assessment information has been historically unavailable.
- Develop online software tools to provide information on thousands of chemicals and integrate health, environmental, and exposure data to support regulatory and prioritization decisions.
- Explore how high-throughput exposure and hazard information can be combined to predict the potential for exposure and risk to susceptible subpopulations.
- Conduct nanoparticle research by using life-cycle analyses, evaluating impacts on ecosystem health, and supporting the development of safer nanomaterials in private industry.

Human Health Risk Assessment

EPA also will focus on the science of assessments that inform Agency, state, and tribal decisions and policies. These risk assessments provide the research and technical support needed to ensure safety of chemicals in the marketplace, revitalize and return land to communities, provide clean and safe water, and work with states and tribes to improve air quality.

Over the next five years, EPA will:

- Develop a portfolio of chemical evaluation products that use the best available science for use by EPA, states, tribes, and other federal agencies.
- Provide research and scientific support for proper TSCA implementation, as Congress intended.
- Develop assessment products, peer-reviewed toxicity values, and advanced exposure assessment tools to help inform Superfund and hazardous waste cleanups as required by RCRA and CERCLA.
- Provide scientific support to the risk and technology reviews conducted under the CAA.
- Provide integrated science assessments (ISAs) to support decisions to retain or revise the national ambient air quality standards. ISAs also inform benefit-cost and other analyses conducted by state, tribal, and local officials to support implementation of air quality management programs.
- Provide research and technical support to deliver safe drinking water by evaluating exposures to and health impacts of known and emerging chemical and biological contaminants.
- Work with states and tribes on research and development of new assessment technologies.

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External Factors and Emerging Issues

EPA faces a number of challenges in its commitment to conducting robust science. For example, aging information technology infrastructure presents a risk to information security and limits the capacity for information management. Recruiting and maintaining a strong workforce with appropriate scientific and technical skillsets are also critical to EPA's research efforts.

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Objective 3.4 - Streamline and Modernize:

Issue permits more quickly and modernize our permitting and reporting systems.

Introduction

EPA implements a host of environmental statutes that affect the regulated community. Permitting requirements under these statutes can impose a variety of costs, including direct costs and opportunity costs related to uncertainty, delay, and cancellation. Delays in the approval of permits and modifications by federal, state, or tribal permitting authorities can postpone or prevent manufacturers from building, expanding, or beginning operations, even if the affected operations ultimately may be deemed suitable as proposed. Delays can also impact construction of major infrastructure projects. EPA is committed to speeding up the processing of permits and modifications to create certainty for the business community, leading to more jobs, increased economic prosperity, and streamlined permit renewals, which incorporate up-to-date information and requirements more quickly, thereby improving environmental protection. Further, EPA will continue to convert permit applications and reports that rely on paper submissions to electronic processing in order to reduce burden, shorten the wait for approval decisions, and increase the opportunity for public transparency.

Strategic Measure

- SM-22 By September 30, 2022, reach all permitting-related decisions within six months.

Strategies for Achieving the Objective

Over the next five years, EPA will systematically collect and report permitting data for each of its permitting programs. The Agency will employ business process improvement strategies, such as Lean, to increase efficiencies in all permitting processes and meet our commitments. The Agency will also work with states and use Lean techniques to streamline the review of state-issued permits. Solutions may include conducting earlier triage and communications, conducting Agency reviews in parallel with public reviews, and/or focusing reviews where they add the most value.

EPA will consider where policy changes can improve permitting efficiency without sacrificing environmental results. Examples include expanding the scope of minor permit modifications to reduce the number of permit reviews required, reinvigorating the use of plant-wide applicability limits (PALs) to reduce unnecessary permitting transactions, and increasing states' ability to incorporate federal regulations by reference, enabling them to adjust quickly and efficiently to new regulatory provisions.

EPA will modernize permitting and reporting processes through efforts such as E-Enterprise for the Environment, a shared governance model with EPA, states, and tribes. EPA will work with states and tribes to achieve this objective without overburdening those entities with costly unnecessary reporting systems and technology. Building on efforts to date, EPA will collaborate with its partners on the following systematic process improvements:

- E-Enterprise Web Portal: A web portal that allows the states, tribes, regulated community, and EPA to transact business, such as permitting and reporting, and provides easy access to needed information.
- E-permitting: An online system to ensure the ability to apply for, track the status of, and receive a permit electronically.

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External Factors and Emerging Issues

Sustainable resource levels for states, tribes, and EPA are critical to efforts to streamline and modernize permitting processes. Support from states and tribes, including state and tribal capacity for maintaining and increasing delegation, is also critical to streamlining and modernizing permitting processes. The global shift to digital services for communication and transaction raises expectations of EPA stakeholders and provides more robust approaches and technologies for developing electronic services.

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Objective 3.5 - Improve Efficiency and Effectiveness:

Provide proper leadership and internal operations management to ensure that the Agency is fulfilling its mission.

Introduction

To support its mission to protect human health and the environment, EPA will improve the efficiency and effectiveness of its business processes. Focus areas will include financial, facility, human resource, contract, grant, and information technology/information management. EPA will improve its future workforce, modernize and streamline its business practices, and take advantage of new collaborative and cost-effective tools and technologies. The Agency will build a modern and secure work environment that will protect critical information and support its efforts to address the environmental problems of the 21st century. EPA will work to alleviate challenges associated with outdated or non-existent policies, tension between centralized and decentralized approaches, myriad federal acquisition and grants requirements, complex processes, and fluctuating levels of expertise across Agency programs.

Strategic Measures

- SM-23 By September 30, 2022, reduce unused office and warehouse space by 850,641 square feet[44].
- SM-24 By September 30, 2022, reduce procurement processing times by achieving 100% of procurement action lead times (PALT)[45].
- SM-25 By September 30, 2022, improve 250 operational processes.
- SM-26 By September 30, 2022, increase enterprise adoption of shared services by four[46].

Strategies for Achieving the Objective

EPA will modernize and improve business processes and operations to promote transparency, efficiency, and effectiveness; enhance collaborative, results-driven partnerships with internal and external business partners; recruit, develop, and maintain a highly-skilled, diverse, and engaged workforce; and improve the capabilities and cost-effectiveness of its information technology (IT) and information management (IM) systems.

EPA will apply Lean principles and will leverage input from customer-focused councils, advisory groups, surveys, workgroups, acquisition partnership initiatives, technical user groups, portfolio reviews, and federal advisory committees to identify business process streamlining opportunities. To improve the efficiency and cost effectiveness of its operations, EPA will standardize and streamline internal business processes in its acquisition and grants processes and systems, and use additional federal and/or internal shared services when supported by business case analysis.

EPA will ensure its workforce is positioned to accomplish the Agency's mission effectively by providing access to quality training and development opportunities that will improve staff's and managers' skills, knowledge, and performance, and prepare them to capitalize on opportunities that advance progress. EPA

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[44] Baseline is 5,264,846 square feet as of FY 2017.

[45] Baseline for FY 2017 is under development.

[46] Baseline is 5 administrative systems/operations shared services in FY 2017.

ED_002545_00008584-00044

will improve its workforce planning and management, strengthen its Senior Executive Service, and focus on developing and maintaining a highly-skilled technical workforce.

EPA also will transform and modernize its information systems, tools, and processes to improve how the Agency collaborates both internally and with external stakeholders. EPA will enhance the power of information by delivering on-demand data to the right people at the right time. To enable the Agency, its partners, and the public effectively to acquire, generate, manage, use, and share information – a critical resource in protecting human health and the environment – EPA will improve its IT/IM capabilities and customer experiences. EPA will employ enterprise risk management and financial data analytics to support data management decision making, using the enterprise risk management framework mandated by OMB Circular A-123.

To ensure that critical environmental and human health information is adequately protected, EPA will strengthen its cybersecurity posture. The Agency will focus on implementing two key cybersecurity priorities—the mandated federal-government-wide Continuous Diagnostics and Mitigation (CDM) effort, and the complementary EPA-specific Cyber Risk Mitigation Projects (CRMPs). These two priorities introduce or improve upon dozens of cybersecurity capabilities, enhance the Agency's ability to respond to threats, and improve EPA's privacy posture via the Privacy Act of 1974. EPA will work closely with the Department of Homeland Security and other partners in implementing CDM capabilities.

To better understand complex interactions between pollutants and the environment and address the environmental problems of the 21st century effectively and efficiently, EPA and its partners analyze large volumes of data. EPA will develop a comprehensive data management strategy that addresses the collection, management, and use of data generated both internally and from external partners including states, tribes, grantees, the regulated community, and citizen science. The Agency will deploy new data analysis, data visualization, and geospatial tools in a Cloud-based framework to enable analysis and provide the basis for informed decision making.

Environmental decision making across media programs requires access to high-quality data and analytics. EPA will build shared IT services, maximizing the benefits of our investments and ensuring consistency and scalability in tools and services. Over the next five years, EPA programs that receive submissions from outside the Agency, whether from the reporting community, states, tribes, or local governments, will rely increasingly on centrally-developed and maintained information services, decreasing the volume of computer code each program must develop and maintain. Shared services will reduce reporting burden for submitting entities and improve data quality for EPA. EPA programs, states, and tribes must establish a common catalog of shared services and agree to a minimum set of common standards and practices.

The Agency will enhance its extensive information resources by designing an enterprise-wide information architecture that will facilitate the electronic management of data and information, as well as multimodal access, effective searching, and ease of use. The Agency's future information management architecture will support official recordkeeping requirements, as well as daily document management, business processes, information access, and legal needs of EPA employees and organizations, while also being flexible, scalable, and cost effective.

External Factors and Emerging Issues

EPA faces a number of factors that may impede its ability to promote effective and efficient internal operations. The Agency's ability to attract and retain staff skilled in human resources, IT/IM, cybersecurity, and acquisition management and staff with scientific and technical expertise is a continuing challenge in improving Agency operations. A lack of category-focused skills and business acumen can negatively affect strategic sourcing decisions. Myriad federal acquisition and grant requirements, complex

ED_002545_00008584-00045

processes, and varying levels of expertise across Agency programs often prevent the timely awarding of contract and grant vehicles to meet Agency demands. EPA must increase its competencies in these areas through a robust training program for staff and managers.

Without standard business processes, EPA cannot achieve its objectives. For example, tension between local needs and Agency-wide strategies may result in missed opportunities to make effective strategic sourcing decisions. This not only impedes Agency efforts to modernize business processes and streamline IT infrastructure, but also affects the ability of government shared service providers to serve additional customers and use standard software to achieve efficiencies and cost savings. Furthermore, continually changing IT/IM and security requirements and variation among states and tribes require development of a holistic "Enterprise-Level Vision and Data Strategy" that optimizes both business processes and solutions; aligns all data programs, resources, and budgets; and strengthens the Agency's enterprise risk strategies. Demands for IT/IM services will continue to grow, due to the increasing volume of environmental data and increased expectations of other agencies, regulated entities, the public, and EPA staff. As cybersecurity risks evolve, protecting EPA's information assets will continue to be a priority.

ED_002545_00008584-00046

Office of the Chief Financial Officer
Office of Planning, Analysis, and Accountability (2721A)
United States Environmental Protection Agency
12 Pennsylvania Avenue, NW
Washington, DC 20460
https://www.epa.gov/planandbudget/strategicplan
EPA-190-R-18-003
February 2018

ED_002545_00008584-00047

FY20-21 National Program Guidance
Early Engagement Discussion

Intended Outcomes:
Understanding of:
• States Priorities
• Strategies to carry out the priorities
• Financial, administrative and/or programmatic flexibilities needed to carry out the strategies

Welcome and Introductions (Regional Administrator Alexandra Dunn)

ENGAGEMENT DISCUSSION

GOAL 1: CORE MISSION
Strategic Objectives:
• Improve Air Quality
• Provide Clean and Safe Water
• Revitalize Land and Prevent Contamination
• Ensure Safety of Chemicals in the Marketplace

GOAL 2: COOPERATIVE FEDERALISM
Strategic Objectives:
• Ensure Shared Accountability
• Increase Transparency and Public Participation

Goal 3: RULE OF LAW AND PROCESS
Strategic Objectives:
Compliance with the Law
• Create Consistency and Certainty
• Prioritize Robust Science
• Streamline and Modernize
• Improve Efficiency and Effectiveness

CONCLUSION AND NEXT STEPS
• Follow-up Actions/Discussions

Appointment

From: Lindsay, Jane [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D8E1BBD664B54CF2909B87A75DE47F31-LINDSAY, JA]
Sent: 7/12/2018 6:27:35 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]; Dixon, Sean [dixon.sean@epa.gov]; Szaro, Deb [Szaro.Deb@epa.gov]; Melanson, Kate [Melanson.Kate@epa.gov]; Gutro, Doug [Gutro.Doug@epa.gov]; 'Boedecker, Emily' [Emily.Boedecker@vermont.gov]; 'renita.marshall@vermont.gov' [renita.marshall@vermont.gov]; 'ellis.rebecca@vermont.gov' [ellis.rebecca@vermont.gov]

Subject: National Program Guidance with Vermont DEC (confirmed)
Attachments: States Early Engagement Agenda.docx; fy-2018-2022-epa-strategic-plan.pdf
Location: Teleconference - VT DEC will call Ex. 6

Start: 9/18/2018 6:00:00 PM
End: 9/18/2018 6:45:00 PM
Show Time As: Busy

Please note updated number – Ex. 6 thank you.

Starting in FY2016 EPA began to implement a two year cycle process around developing National Program Guidance from our five major National Program offices – Air and Radiation; Water; Land and Emergency Management; Chemical Safety and Pollution Prevention; Enforcement and Compliance Assurance – along with the Office of Congressional and Intergovernmental Relations; the Office of International and Tribal Affairs and the Office of Environmental Information.

We are beginning the process of development of the FY2020-2021 National Program Guidance, which will be the first issued under the agency's recently finalized Strategic Plan.

The purpose of this call is to begin getting feedback on your states' priorities, strategies and any flexibilities in grant work plans needed to advance those priorities. **Please note that that program directors from DEC are invited to join as well.**

This is a new way to develop this guidance, and I'm looking forward to having this conversation at the regional level.

If you have any questions please let myself or Sean Dixon know.

Thank you!

Alexandra Dapolito Dunn, J.D.
Regional Administrator
Region 1 New England
(617) 918-1012

States Early Engagement Age... fy-2018-2022-ep...

Appointment

From: Melanson, Kate [Melanson.Kate@epa.gov]
Sent: 6/13/2018 6:35:24 PM
To: Melanson, Kate [Melanson.Kate@epa.gov]; Dunn, Alexandra [dunn.alexandra@epa.gov]; Boedecker, Emily [emily.boedecker@vermont.gov]; Walke, Peter [Peter.Walke@vermont.gov]; martin.suuberg@state.ma.us; Cassidy, Meghan [Cassidy.Meghan@epa.gov]; Block, Molly [block.molly@epa.gov]; Szaro, Deb [Szaro.Deb@epa.gov]
CC: Grantham, Nancy [Grantham.Nancy@epa.gov]; Konkus, John [konkus.john@epa.gov]; Doig, Rebecca (DEP) [rebecca.doig@state.ma.us]; Boccadoro, Helena (DEP) [helena.boccadoro@state.ma.us]; douglas.fine@state.ma.us

Subject: Call with VT and MA - PFAS event in NH update

Start: 6/13/2018 9:00:00 PM
End: 6/13/2018 9:30:00 PM
Show Time As: Busy

Dial-In Number: Ex. 6

Conference Code: Ex. 6

Appointment

From: Lindsay, Jane [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D8E1BBD664B54CF2909B87A75DE47F31-LINDSAY, JA]
Sent: 5/17/2018 7:47:14 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]; Cassidy, Meghan [Cassidy.Meghan@epa.gov]; Szaro, Deb [Szaro.Deb@epa.gov]; Gutro, Doug [Gutro.Doug@epa.gov]; Murphy, Jim [Murphy.Jim@epa.gov]; Olson, Bryan [Olson.Bryan@epa.gov]; Dixon, Sean [dixon.sean@epa.gov]; Moraff, Kenneth [Moraff.Ken@epa.gov]; Downing, Jane [Downing.Jane@epa.gov]; Bender, Emily [Bender.Emily@epa.gov]; Deegan, Dave [Deegan.Dave@epa.gov]; Dumville, Kelsey [Dumville.Kelsey@epa.gov]; Melanson, Kate [Melanson.Kate@epa.gov]; Block, Molly [block.molly@epa.gov]
CC: Hamjian, Lynne [Hamjian.Lynne@epa.gov]; Klee, Robert [Robert.Klee@ct.gov]; Coit, Janet (DEM) [janet.coit@dem.ri.gov]; Boedecker, Emily [emily.boedecker@vermont.gov]; martin.suuberg@state.ma.us; Mercer, Paul [paul.mercer@maine.gov]; terry.gray@dem.ri.gov; Doig, Rebecca (DEP) [rebecca.doig@state.ma.us]; Beauchesne, Suzanne [Suzanne.Beauchesne@des.nh.gov]; lynn.a.boutilier@maine.gov; Maguire, Rayna (DEM) [rayna.maguire@dem.ri.gov]; Marshall, Renita [renita.marshall@vermont.gov]; Colon, Carmen [Carmen.Colon@ct.gov]; robert.kaliszewski@ct.gov; Clark Freise [clark.freise@des.nh.gov]; Walke, Peter [Peter.Walke@vermont.gov]

Subject: Check-in for PFAS Community Summit
Location: Alex's office

Start: 6/13/2018 5:30:00 PM
End: 6/13/2018 6:00:00 PM
Show Time As: Busy

Please note new call-in number:

Dial-In Number: Ex. 6

If you receive busy signal, please use Ex. 6 (Boston) or

Find a local number

Conference Code: Ex. 6

Appointment

From: Szaro, Deb [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=2A189E7C928E4EB3930E29543CAD5E5D-SZARO, DEB]
Sent: 4/26/2018 12:12:10 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]; Cassidy, Meghan [Cassidy.Meghan@epa.gov]; Szaro, Deb [Szaro.Deb@epa.gov]; Murphy, Jim [Murphy.Jim@epa.gov]; Freise, Clark [Clark.Freise@des.nh.gov]; Beauchesne, Suzanne [Suzanne.Beauchesne@des.nh.gov]; St. Fleur, Marilyn [StFleur.Marilyn@epa.gov]
CC: Downing, Jane [Downing.Jane@epa.gov]

Subject: PFAS Community Advocates (confirmed)
Location: Alex's office

Start: 5/8/2018 5:00:00 PM
End: 5/8/2018 5:45:00 PM
Show Time As: Busy

Conference Call-in information:

Ex. 6

Message

From: Dunn, Alexandra [dunn.alexandra@epa.gov]
Sent: 6/11/2018 6:04:36 PM
To: 'Julie.moore@vermont.gov' [Julie.moore@vermont.gov]
CC: Szaro, Deb [Szaro.Deb@epa.gov]; Cassidy, Meghan [Cassidy.Meghan@epa.gov]
Subject: Regional PFAS Engagement Session

Good afternoon, Secretary Moore.

As part of our Regional PFAS Engagement Session, our Tuesday June 26th agenda includes a Moderated State Panel. The goal of this panel is to provide a brief overview of how each of our state partners is addressing PFAS, and to hear state thoughts for consideration in the development of EPA's PFAS Management Plan.

Each state will be provided with 10 minutes to provide information related to the following areas of interest:

1. Overview of state approach/strategy related to PFAS.
2. Presentation of state-specific PFAS benchmarks.
3. Challenges state faces in identifying, addressing and communicating about PFAS.

Given the limited timeframe for each state to speak, we request that the environmental commissioners/directors for CT, RI and ME coordinate with your drinking water public health counterparts to include any information pertinent to their programs.

I hope that you or a member of your staff will participate on this panel. My Point of Contact for this panel is Meghan Cassidy. Please confirm your participation and identify the state speaker via email to cassidy.meghan@epa.gov by COB Friday, June 15th.

Alexandra Dapolito Dunn, J.D.
Regional Administrator

Region 1 New England
5 Post Office Sq. Suite 100
Mail Code: ORA01-4
Boston, MA 02109-3912

Desk: (617) 918-1012
Mobile: Ex. 6
Fax: (617) 918-0012
dunn.alexandra@epa.gov

Message

From: Dunn, Alexandra [dunn.alexandra@epa.gov]
Sent: 6/11/2018 5:58:27 PM
To: 'robert.scott@des.nh.gov' [robert.scott@des.nh.gov]
CC: Szaro, Deb [Szaro.Deb@epa.gov]; Cassidy, Meghan [Cassidy.Meghan@epa.gov]
Subject: Regional PFAS Engagement Session

Good afternoon, Commissioner Scott.

As part of our Regional PFAS Engagement Session, our Tuesday June 26th agenda includes a Moderated State Panel. The goal of this panel is to provide a brief overview of how each of our state partners is addressing PFAS, and to hear state thoughts for consideration in the development of EPA's PFAS Management Plan.

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I hope that you or a member of your staff will participate on this panel. My Point of Contact for this panel is Meghan Cassidy. Please confirm your participation and identify the state speaker via email to cassidy.meghan@epa.gov by COB Friday, June 15th.

Alexandra Dapolito Dunn, J.D.
Regional Administrator

Region 1 New England
5 Post Office Sq. Suite 100
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Boston, MA 02109-3912

Desk: (617) 918-1012
Mobile: Ex. 6
Fax: (617) 918-0012
dunn.alexandra@epa.gov

Message

From: Boedecker, Emily [Emily.Boedecker@vermont.gov]
Sent: 6/8/2018 12:58:42 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
CC: Moore, Julie [Julie.Moore@vermont.gov]; Walke, Peter [Peter.Walke@vermont.gov]; Gutro, Doug [Gutro.Doug@epa.gov]; Melanson, Kate [Melanson.Kate@epa.gov]; Szaro, Deb [Szaro.Deb@epa.gov]
Subject: RE: PFAS regional summit on June 25 and June 26

Thanks Alex. Appreciate your presence at the OTC meeting, and for your comments immediately following Bill Wehrum's comments.
Emily

Emily Boedecker, Commissioner
Vermont Department of Environmental Conservation
1 National Life Dr., Main 2
Montpelier, VT 05602
emily.boedecker@vermont.gov
(802) 828-1556 (office)
Ex. 6 (cell)

From: Dunn, Alexandra <dunn.alexandra@epa.gov>
Sent: Friday, June 8, 2018 7:40 AM
To: Boedecker, Emily <Emily.Boedecker@vermont.gov>
Cc: Moore, Julie <Julie.Moore@vermont.gov>; Walke, Peter <Peter.Walke@vermont.gov>; Gutro, Doug <Gutro.Doug@epa.gov>; Melanson, Kate <Melanson.Kate@epa.gov>; Szaro, Deb <Szaro.Deb@epa.gov>
Subject: Re: PFAS regional summit on June 25 and June 26

Emily,

There is no limit on attendees from VTANR. A skeletal agenda will be out Monday June 11 and then we will be filling it in. There is a state panel on day 2 where each state can discuss their issues. Once you see the agenda you will probably have an idea of who to include.

We will have a call of the states to discuss too.

Great to see you at the OTC!

Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***

On Jun 6, 2018, at 3:58 PM, Boedecker, Emily <Emily.Boedecker@vermont.gov> wrote:

> Thank you Alex. Given the substantial increase in seats with this venue, are there any guidelines for states on the number of participants from each state?
> Warm regards
> Emily
>
> _____
> From: Dunn, Alexandra <dunn.alexandra@epa.gov>
> Sent: Wednesday, June 6, 2018 3:42 PM

Subject: PFAS regional summit on June 25 and June 26
To: Moore, Julie <julie.moore@vermont.gov>, Walke, Peter <peter.walke@vermont.gov>, Boedecker, Emily <emily.boedecker@vermont.gov>
Cc: Gutro, Doug <gutro.doug@epa.gov>, Melanson, Kate <melanson.kate@epa.gov>, Szaro, Deb <szaro.deb@epa.gov>

Dear Secretary Moore, Deputy Secretary Walke, and Director Boedecker,

I wanted to let you know that we will be having the pfas New England summit on June 25 and June 26. We have are in the process of securing Exeter HS in New Hampshire which has a capacity of 1000. The event will be fully open to the media and all who desire to attend. We are waiting for further details from headquarters on an announcement that will come on June 11, but please consider this your official invitation to the event so that you can make any necessary travel.

Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***

Message

From: Scott, Robert [Robert.Scott@des.nh.gov]
Sent: 6/8/2018 12:18:02 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
CC: Wimsatt, Mike [Michael.Wimsatt@des.nh.gov]
Subject: FW: PFAS workshop

Anything you can provide to help us answer these type of inquiries?

Robert R Scott
Commissioner
New Hampshire Department of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095
W: 603.271.2958
C: Ex. 6
Robert.Scott@des.nh.gov

From: Alex Koutroubas [mailto:alex@dennehybouley.com]
Sent: Thursday, June 7, 2018 10:21 PM
To: Fitzgerald, Mike
Subject: PFAS workshop

Hi Mike,

Do you know how folks can register for this meeting below?

I can't seem to find anything.

Thanks,

Alex

EPA New England will host the first regional PFAS workshop at the NHDES Seacoast office at Pease Intl Tradeport on June 25 from 5-9 and June 26 from 8-3.

Message

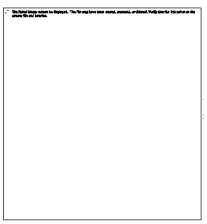
From: Pino, Raul [Raul.Pino@ct.gov]
Sent: 6/7/2018 8:00:38 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
Subject: RE: PFAS regional summit on June 25 and June 26
Attachments: ATT00001.txt

Alexandra

Thanks for reaching out to us. A few coincidences, 1) Ex. 6
3) I have stayed at that same hotel. I would be there.

Raul

Raul Pino MD/MPH
Commissioner
Connecticut Department of Public Health
410 Capitol Avenue
Hartford, CT 06134
Phone Ex. 6
raul.pino@ct.gov



From: Dunn, Alexandra [mailto:dunn.alexandra@epa.gov]
Sent: Thursday, June 07, 2018 3:27 PM
To: Pino, Raul <Raul.Pino@ct.gov>
Subject: PFAS regional summit on June 25 and June 26

Dear Commissioner Pino,

I wanted to let you know that we will be having the PFAS New England summit on June 25 and June 26. We are in the process of securing Exeter HS in New Hampshire which has a capacity of 1000. The event will be fully open to the media and all who desire to attend. We are waiting for further details from headquarters on an announcement that will come on June 11, but please consider this your official invitation to the event so that you can make any necessary travel.

Thank you,

Alexandra Dapolito Dunn, J.D.
Regional Administrator

Region 1 New England
5 Post Office Sq. Suite 100
Mail Code: ORA01-4
Boston, MA 02109-3912

Desk: (617) 918-1012
Mobile: Ex. 6
Fax: (617) 918-0012
dunn.alexandra@epa.gov

Message

From: Dunn, Alexandra [dunn.alexandra@epa.gov]
Sent: 6/7/2018 7:31:37 PM
To: 'nicole.alexanderscott@health.ri.gov' [nicole.alexanderscott@health.ri.gov]
Subject: PFAS regional summit on June 25 and June 26

Dear Director Alexander-Scott,

I wanted to let you know that we will be having the PFAS New England summit on June 25 and June 26. We are in the process of securing Exeter HS in New Hampshire which has a capacity of 1000. The event will be fully open to the media and all who desire to attend. We are waiting for further details from headquarters on an announcement that will come on June 11, but please consider this your official invitation to the event so that you can make any necessary travel.

Thank you,

Alexandra Dapolito Dunn, J.D.
Regional Administrator

Region 1 New England
5 Post Office Sq. Suite 100
Mail Code: ORA01-4
Boston, MA 02109-3912

Desk: (617) 918-1012
Mobile: Ex. 6
Fax: (617) 918-0012
dunn.alexandra@epa.gov

Message

From: Dunn, Alexandra [dunn.alexandra@epa.gov]
Sent: 6/7/2018 7:29:52 PM
To: 'ricker.hamilton@maine.gov' [ricker.hamilton@maine.gov]
Subject: PFAS regional summit on June 25 and June 26

Dear Commissioner Hamilton,

I wanted to let you know that we will be having the PFAS New England summit on June 25 and June 26. We are in the process of securing Exeter HS in New Hampshire which has a capacity of 1000. The event will be fully open to the media and all who desire to attend. We are waiting for further details from headquarters on an announcement that will come on June 11, but please consider this your official invitation to the event so that you can make any necessary travel.

Thank you,

Alexandra Dapolito Dunn, J.D.
Regional Administrator

Region 1 New England
5 Post Office Sq. Suite 100
Mail Code: ORA01-4
Boston, MA 02109-3912

Desk: (617) 918-1012
Mobile: Ex. 6
Fax: (617) 918-0012
dunn.alexandra@epa.gov

Message

From: Scott, Robert [Robert.Scott@des.nh.gov]
Sent: 6/1/2018 7:33:31 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
Subject: RE: Region 1 / NHDES PFAS EVENT JUNE 25-26

Excellent, thanks.

Sent with BlackBerry Work
(www.blackberry.com)

From: Dunn, Alexandra <dunn.alexandra@epa.gov<mailto:dunn.alexandra@epa.gov>>
Date: Friday, Jun 01, 2018, 1:48 PM
To: Scott, Robert <Robert.Scott@des.nh.gov<mailto:Robert.Scott@des.nh.gov>>, Gutro, Doug <Gutro.Doug@epa.gov<mailto:Gutro.Doug@epa.gov>>
Cc: Wimsatt, Mike <Michael.Wimsatt@des.nh.gov<mailto:Michael.Wimsatt@des.nh.gov>>, Cassidy, Meghan <Cassidy.Meghan@epa.gov<mailto:Cassidy.Meghan@epa.gov>>, Kernen, Brandon <Brandon.Kernen@des.nh.gov<mailto:Brandon.Kernen@des.nh.gov>>
Subject: Re: Region 1 / NHDES PFAS EVENT JUNE 25-26

Bob - EPA is getting Exeter high school. We went there yesterday and it is perfect. Capacity is 900.

Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act

On May 29, 2018, at 10:11 AM, Scott, Robert <Robert.Scott@des.nh.gov<mailto:Robert.Scott@des.nh.gov>> wrote:

For discussion purposes, here is a proposed agenda. We are exploring a larger venue in the area now. Any idea how many total we should expect?

Robert R Scott
Commissioner
New Hampshire Department of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095
W: 6
C: Ex. 6
Robert.Scott@des.nh.gov<mailto:Robert.Scott@des.nh.gov>

From: Dunn, Alexandra [mailto:dunn.alexandra@epa.gov]
Sent: Tuesday, May 29, 2018 8:37 AM
To: Scott, Robert
Cc: Wimsatt, Mike; Cassidy, Meghan
Subject: Re: Region 1 / NHDES PFAS EVENT JUNE 25-26

Excellent!
Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act

On May 29, 2018, at 8:03 AM, Scott, Robert <Robert.Scott@des.nh.gov<mailto:Robert.Scott@des.nh.gov>> wrote:
Mike Wimsatt will be on the call tomorrow.

Robert R Scott
Commissioner
New Hampshire Department of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095
W: 6
C: Ex. 6
Robert.Scott@des.nh.gov<mailto:Robert.Scott@des.nh.gov>

From: Dunn, Alexandra [mailto:dunn.alexandra@epa.gov]
Sent: Tuesday, May 22, 2018 4:07 PM
To: Scott, Robert

Subject: Re: Region 1 / NHDES PFAS EVENT JUNE 25-26

See below. We have 2 calls set so far. Who should run point for DES?
Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act

On May 22, 2018, at 4:04 PM, Lindsay, Jane <lindsay.jane@epa.gov<mailto:lindsay.jane@epa.gov>> wrote:
Alex,

Confirming two meetings already on the books as follows:

Wednesday, May 30th at 11:00
Wednesday, June 13th at 1:30

Will ensure above group gets calendar invites for both meetings –

Tks,
J

From: Dunn, Alexandra
Sent: Tuesday, May 22, 2018 3:40 PM
To: Szaro, Deb <Szaro.Deb@epa.gov<mailto:Szaro.Deb@epa.gov>>; Olson, Bryan <Olson.Bryan@epa.gov<mailto:Olson.Bryan@epa.gov>>; Cassidy, Meghan <Cassidy.Meghan@epa.gov<mailto:Cassidy.Meghan@epa.gov>>; Dixon, Sean <dixon.sean@epa.gov<mailto:dixon.sean@epa.gov>>; Gutro, Doug <Gutro.Doug@epa.gov<mailto:Gutro.Doug@epa.gov>>; Moraff, Kenneth <Moraff.Ken@epa.gov<mailto:Moraff.Ken@epa.gov>>; Downing, Jane <Downing.Jane@epa.gov<mailto:Downing.Jane@epa.gov>>; Murphy, Jim <Murphy.Jim@epa.gov<mailto:Murphy.Jim@epa.gov>>; Lindsay, Jane <lindsay.jane@epa.gov<mailto:lindsay.jane@epa.gov>>
Subject: Region 1 / NHDES PFAS EVENT JUNE 25-26

We need to have a meeting ASAP to discuss how to move ahead on this workshop. I'll get some info from Peter and team on support resources.

I'd like to discuss prelim issues like location structure capacity content logistics registration etc.

I'm hoping Jim & Megan can take the lead in close coordination w others.

Jane pls schedule.

Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act
<Tentative Program Agenda.docx>

Message

From: Brian F. Goetz [bfgoetz@cityofportsmouth.com]
Sent: 5/31/2018 4:24:10 PM
To: Cassidy, Meghan [Cassidy.Meghan@epa.gov]; Dunn, Alexandra [dunn.alexandra@epa.gov]; Scott, Robert [Robert.Scott@des.nh.gov]
CC: Kernen, Brandon [Brandon.Kernen@des.nh.gov]; Pillsbury, Sarah [Sarah.Pillsbury@des.nh.gov]; Clark Freise [clark.freise@des.nh.gov]
Subject: RE: PFAS National Leadership Summit and Engagement

All – I understand that the meeting dates are set for the Region 1 Meeting here somewhere in or near Portsmouth. I have blocked off time and am looking forward to presenting the Portsmouth/Pease Tradeport case study either of the days. Also, I let Meghan know that if we can be of any assistance here locally just let us know.

Thanks – Brian

Brian F. Goetz
Deputy Director of Public Works
City of Portsmouth
680 Peverly Hill Road
Portsmouth, NH 03801
Ph: 603-766-1420
Cell: Ex. 6
bfgoetz@cityofportsmouth.com

From: Brian F. Goetz
Sent: Thursday, May 24, 2018 9:36 AM
To: 'Cassidy, Meghan' <Cassidy.Meghan@epa.gov>; Dunn, Alexandra <dunn.alexandra@epa.gov>; Scott, Robert <Robert.Scott@des.nh.gov>
Cc: Kernen, Brandon <Brandon.Kernen@des.nh.gov>; Pillsbury, Sarah <Sarah.Pillsbury@des.nh.gov>; Clark Freise <clark.freise@des.nh.gov>
Subject: RE: PFAS National Leadership Summit and Engagement

Meghan –

Thank you. I will look forward to participating.

– Brian

Brian F. Goetz
Deputy Director of Public Works
City of Portsmouth
680 Peverly Hill Road
Portsmouth, NH 03801
Ph:
Cell: Ex. 6
bfgoetz@cityofportsmouth.com

From: Cassidy, Meghan [mailto:Cassidy.Meghan@epa.gov]
Sent: Thursday, May 24, 2018 7:51 AM
To: Brian F. Goetz <bfgoetz@cityofportsmouth.com>; Dunn, Alexandra <dunn.alexandra@epa.gov>; Scott, Robert <Robert.Scott@des.nh.gov>
Cc: Kernen, Brandon <Brandon.Kernen@des.nh.gov>; Pillsbury, Sarah <Sarah.Pillsbury@des.nh.gov>; Clark Freise <clark.freise@des.nh.gov>
Subject: RE: PFAS National Leadership Summit and Engagement

Brian,

I just wanted to let you know that we will be reaching out to you in the next week or so to further discuss your interest and potential involvement.

Thanks.

Meghan F. Cassidy, Chief
Superfund Technical & Enforcement Support Section
617-918-1387
cassidy.meghan@epa.gov

From: Brian F. Goetz [mailto:bfgoetz@cityofportsmouth.com]
Sent: Wednesday, May 23, 2018 10:23 AM
To: Dunn, Alexandra <dunn.alexandra@epa.gov>; Scott, Robert <Robert.Scott@des.nh.gov>; Cassidy, Meghan <Cassidy.Meghan@epa.gov>
Cc: Kernen, Brandon <Brandon.Kernen@des.nh.gov>; Pillsbury, Sarah <Sarah.Pillsbury@des.nh.gov>; Clark Freise <clark.freise@des.nh.gov>
Subject: RE: PFAS National Leadership Summit and Engagement

Dear Ms. Dunn and Mr. Scott –

Thank you both for responding to this. As you know, one of the wells serving the Pease Tradeport Water System here in Portsmouth was impacted by PFAS above the Health Advisory over four years ago. Since that time we have been actively working with the Air Force, the Pease Development Authority, the regulatory agencies and our community in response to all aspects of this contamination. We have worked with a large technical team to monitor and assess the extent of the contamination, explored treatment options, installed an activated carbon treatment system on two of the three wells at Pease impacted by PFAS, run pilots on alternative treatment medias, and researched other PFAS impacted public water systems to find out what their response to the contamination has been. We would certainly like to participate in the upcoming PFAS summit here in New Hampshire and are also willing to present our case study in how we have responded to the issue and lessons learned.

Please feel free to contact me directly if you would like to discuss further.

Thank you for your consideration.

Brian F. Goetz
Deputy Director of Public Works
City of Portsmouth
680 Peverly Hill Road
Portsmouth, NH 03801
Ph: 6
Cell: Ex. 6

bfgoetz@cityofportsmouth.com

From: Dunn, Alexandra [mailto:dunn.alexandra@epa.gov]
Sent: Wednesday, May 23, 2018 8:19 AM
To: Scott, Robert <Robert.Scott@des.nh.gov>; Cassidy, Meghan <Cassidy.Meghan@epa.gov>
Cc: Kernen, Brandon <Brandon.Kernen@des.nh.gov>; Brian F. Goetz <bfgoetz@cityofportsmouth.com>; Pillsbury, Sarah <Sarah.Pillsbury@des.nh.gov>; Clark Freise <clark.freise@des.nh.gov>
Subject: Re: PFAS National Leadership Summit and Engagement

And I'm copying our lead at R1.

Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***

On May 23, 2018, at 7:12 AM, Scott, Robert <Robert.Scott@des.nh.gov> wrote:

> Brian,
>
> We are still working out details with EPA but the intent is to be as inclusive as space allows. We'll add you to the list of those wishing to attend and will let you know when we have more details.
>
> Bob Scott
>
> Sent with BlackBerry Work
> (www.blackberry.com)
>
> From: Kernen, Brandon <Brandon.Kernen@des.nh.gov<mailto:Brandon.Kernen@des.nh.gov>>
> Date: Wednesday, May 23, 2018, 5:47 AM
> To: Brian F. Goetz <bfgoetz@cityofportsmouth.com<mailto:bfgoetz@cityofportsmouth.com>>
> Cc: Pillsbury, Sarah <Sarah.Pillsbury@des.nh.gov<mailto:Sarah.Pillsbury@des.nh.gov>>, Scott, Robert <Robert.Scott@des.nh.gov<mailto:Robert.Scott@des.nh.gov>>, Freise, Clark <Clark.Freise@des.nh.gov<mailto:Clark.Freise@des.nh.gov>>
> Subject: Re: PFAS National Leadership Summit and Engagement
>
> Thank you Brian.
>
> I am not sure who is organizing the agenda at this point.
>
> I am copying Clark Freise and Bob Scott to let them know about your interest in being involved in the regional summit. It does make sense as Pease was one of the first DoD sites where PFAS was addressed and it impacted three major water supply sources. Portsmouth's experience and assessment of the needs and challenges associated with PFAS should be part of the agenda.

Regards

Brandon

From: Brian F. Goetz <bfgoetz@cityofportsmouth.com>
Sent: Tuesday, May 22, 2018 6:24 PM
To: Kernen, Brandon
Subject: Re: PFAS National Leadership Summit and Engagement

Brandon - I tried to watch the live stream of the summit today. They only had the first hour of talks up on YouTube so I didn't get to see anything from the afternoon. I did see you and Andrea Amico in the photo of the audience that they had online. I guess they'll be having a local summit in NH June 25th and 26th. I'd like to be involved as I tried to get into the Washington one and was told it wasn't an open invitation.

Thanks - Brian
cell: Ex. 6

.pptx>

Message

From: Walke, Peter [Peter.Walke@vermont.gov]
Sent: 5/30/2018 6:14:13 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
Subject: Re: Following up - Region 1 PFAS Conference

Hahaha. Ok.

From: Dunn, Alexandra <dunn.alexandra@epa.gov>
Sent: Wednesday, May 30, 2018 2:02:57 PM
To: Walke, Peter
Subject: Re: Following up - Region 1 PFAS Conference

Yes if that's ok. We have to pay for dinner! $25 each so tell her to work that into her budget!

Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***

On May 30, 2018, at 11:49 AM, Walke, Peter <Peter.Walke@vermont.gov> wrote:

> Absolutely. Sean is always welcome here. Will he be coming to dinner at Julie's? She and I were realizing that's this weekend.
>
> ---
>
> **From:** Dunn, Alexandra <dunn.alexandra@epa.gov>
> **Sent:** Wednesday, May 30, 2018 11:48 AM
> **To:** Walke, Peter <Peter.Walke@vermont.gov>
> **Subject:** Re: Following up - Region 1 PFAS Conference
>
> Yes we will be doing that. Let me check on timing! And yes I'm flying into Burlington from DC to meet you all. On my dime to be clear! My policy adviser Sean Dixon (JD MEM LLM) will join me - is that ok?
>
> Sent from my iPhone
> Alexandra Dapolito Dunn, J.D. , Regional Administrator
> Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***
>
> On May 30, 2018, at 11:08 AM, Walke, Peter <Peter.Walke@vermont.gov> wrote:
>
>> Alex,
>>
>> Just following up to see if we can get all the states together to talk through the agenda and invite concept around the PFAS discussion. See you on Sunday!
>>
>> Thanks,
>> Peter

Peter Walke, *Deputy Secretary*

[phone] Ex. 6
[email] peter.walke@vermont.gov

Agency of Natural Resources
Secretary's Office
1 National Life Drive, Davis 2
Montpelier, VT 05620-3901

Message

From: Scott, Robert [Robert.Scott@des.nh.gov]
Sent: 5/29/2018 2:10:55 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
CC: Wimsatt, Mike [Michael.Wimsatt@des.nh.gov]; Cassidy, Meghan [Cassidy.Meghan@epa.gov]; Kernen, Brandon [Brandon.Kernen@des.nh.gov]
Subject: RE: Region 1 / NHDES PFAS EVENT JUNE 25-26
Attachments: Tentative Program Agenda.docx

For discussion purposes, here is a proposed agenda. We are exploring a larger venue in the area now. Any idea how many total we should expect?

Robert R Scott
Commissioner
New Hampshire Department of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095
W:
C: Ex. 6
Robert.Scott@des.nh.gov

From: Dunn, Alexandra [mailto:dunn.alexandra@epa.gov]
Sent: Tuesday, May 29, 2018 8:37 AM
To: Scott, Robert
Cc: Wimsatt, Mike; Cassidy, Meghan
Subject: Re: Region 1 / NHDES PFAS EVENT JUNE 25-26

Excellent!

Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***

On May 29, 2018, at 8:03 AM, Scott, Robert <Robert.Scott@des.nh.gov> wrote:

> Mike Wimsatt will be on the call tomorrow.
>
> *Robert R Scott*
> Commissioner
> New Hampshire Department of Environmental Services
> 29 Hazen Drive, PO Box 95
> Concord, NH 03302-0095
> W:
> C: Ex. 6
> Robert.Scott@des.nh.gov
>
> ---
>
> **From:** Dunn, Alexandra [mailto:dunn.alexandra@epa.gov]
> **Sent:** Tuesday, May 22, 2018 4:07 PM
> **To:** Scott, Robert
> **Subject:** Re: Region 1 / NHDES PFAS EVENT JUNE 25-26
>
> See below. We have 2 calls set so far. Who should run point for DES?

Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***

On May 22, 2018, at 4:04 PM, Lindsay, Jane <lindsay.jane@epa.gov> wrote:

> Alex,
>
> Confirming two meetings already on the books as follows:
>
> Wednesday, May 30th at 11:00
> Wednesday, June 13th at 1:30
>
> Will ensure above group gets calendar invites for both meetings –
>
> Tks,
> J
>
> ---
>
> **From:** Dunn, Alexandra
> **Sent:** Tuesday, May 22, 2018 3:40 PM
> **To:** Szaro, Deb <Szaro.Deb@epa.gov>; Olson, Bryan <Olson.Bryan@epa.gov>; Cassidy, Meghan <Cassidy.Meghan@epa.gov>; Dixon, Sean <dixon.sean@epa.gov>; Gutro, Doug <Gutro.Doug@epa.gov>; Moraff, Kenneth <Moraff.Ken@epa.gov>; Downing, Jane <Downing.Jane@epa.gov>; Murphy, Jim <Murphy.Jim@epa.gov>; Lindsay, Jane <lindsay.jane@epa.gov>
> **Subject:** Region 1 / NHDES PFAS EVENT JUNE 25-26
>
> We need to have a meeting ASAP to discuss how to move ahead on this workshop. I'll get some info from Peter and team on support resources.
>
> I'd like to discuss prelim issues like location structure capacity content logistics registration etc.
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> Jane pls schedule.
>
> Sent from my iPhone
> Alexandra Dapolito Dunn, J.D. , Regional Administrator
> Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***

Tentative Program Agenda

Question: Should we offer a pre-summit Monday afternoon field trip showing the PFAS work at Pease??
Question: The agenda provides a lot of opportunity for public input. Should a couple of community groups have a dedicated space on the agenda?

Monday, June 25, 2018	
5:30 p.m. - 6:00 p.m.	**Registration and Networking**
6:00 p.m. - 6:10 p.m.	**Introduction and Opening Remarks** (USEPA)
6:10 p.m. - 6:30 p.m.	**Approach to Addressing PFAS and Objectives of the Regional Summit** (USEPA)
6:30 p.m. - 6:45 p.m.	**PFAS Human Health Information – State of the Science & Government Initiatives** (ATSDR)
6:45 p.m. - 7:00 p.m.	**Federal Delegation Update & Remarks**
7:00 p.m. - 7:15 p.m.	**Break**
7:15 p.m. - 9:30 p.m.	**Public Discussion with USEPA, State Officials from CT, MA, ME, RI, NH & VT** Provide recommendations and comments focused on USEPA's PFAS Strategy including but not limited to: • Identifying and addressing PFAS in the environment of your community • Communicating PFAS results and Risk • Collaboration opportunities • How to prioritize the federal government's response to PFAS • Source control • Occurrence studies • Regulation • Remediation • Standards and guidance
9:30 p.m.	**Adjourn meeting for the evening**

Tuesday, June 26, 2018	
8:00 a.m. – 9:00 a.m.	**Registration and Networking**
Morning Session – State/Regional Responses and the State of the Science	
9:00 a.m. - 9:15 a.m.	**Introduction and Opening Remarks** (USEPA)
9:15 a.m. - 9:45 a.m.	**USEPA's PFAS Initiatives and the Development of Plan to Address PFAS** (USEPA)
9:45 a.m. - 10:45 a.m.	**Summary of USEPA & State Response to PFAS** (each state to prepare a handout summarizing work) • Occurrence Studies • Drinking Water • Groundwater • Waste sites • Surface water • Biosolids • Wastewater/Industrial Pretreatment • Air • Source Control/Pollution Prevention
10:45 a.m. - 11:00 a.m.	**Break**
11:00 a.m. - 11:30 a.m.	**Status of PFAS Health Studies** (need to invite) Linda S. Birnbaum, Ph.D., D.A.B.T., A.T.S. Director, NIEHS & NTP - https://www.niehs.nih.gov/about/od/director/index.cfm
11:30 a.m. - 11:50 a.m.	**University of Rhode Island PFAS Superfund Grant**
11:50 a.m.- 12:10 p.m.	**Industry Perspective** Invite Global Fluoro-Chemistry, American Chemistry Council, businesses that are large users PFAS in NE – increase time if needed
12:10 p.m. – 12:30 p.m.	**Other Public Health Protection Initiatives and Constrained Budgets** Identify speaker to present other important drinking water protection initiatives & relative risk.
12:30 p.m. – 1:15 p.m.	**Lunch**

Tuesday, June 26, 2018	
Afternoon Session – Providing Guidance and Recommendations to USEPA (provide questionnaires)	
1:15 p.m. - 2:00 p.m.	**Approaches for Addressing PFAS in Drinking Water** (10 minute presentation followed by 35 minutes of discussion with meeting attendees)
2:00 p.m. - 2:45 p.m.	**PFAS Risk and Response Communication** (10 minute presentation followed by 35 minutes of discussion with meeting attendees)
2:45 p.m. – 3:00 p.m.	**Break**
3:00 p.m. - 3:45 p.m.	**Solutions for Preventing Future Contamination** (10 minute presentation followed by 35 minutes of discussion with meeting attendees)
3:45 p.m. - 4:30 p.m.	**Prioritizing PFAS Initiatives** (10 minute presentation followed by 35 minutes of discussion with meeting attendees)
4:30 p.m.	**Meeting Adjourned**

Message

From: Scott, Robert [Robert.Scott@des.nh.gov]
Sent: 5/29/2018 12:03:18 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
CC: Wimsatt, Mike [Michael.Wimsatt@des.nh.gov]; Cassidy, Meghan [Cassidy.Meghan@epa.gov]
Subject: RE: Region 1 / NHDES PFAS EVENT JUNE 25-26

Mike Wimsatt will be on the call tomorrow.

Robert R Scott
Commissioner
New Hampshire Department of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095
W:
C: Ex. 6
Robert.Scott@des.nh.gov

From: Dunn, Alexandra [mailto:dunn.alexandra@epa.gov]
Sent: Tuesday, May 22, 2018 4:07 PM
To: Scott, Robert
Subject: Re: Region 1 / NHDES PFAS EVENT JUNE 25-26

See below. We have 2 calls set so far. Who should run point for DES?

Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***

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> J
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> **From:** Dunn, Alexandra
> **Sent:** Tuesday, May 22, 2018 3:40 PM
> **To:** Szaro, Deb <Szaro.Deb@epa.gov>; Olson, Bryan <Olson.Bryan@epa.gov>; Cassidy, Meghan <Cassidy.Meghan@epa.gov>; Dixon, Sean <dixon.sean@epa.gov>; Gutro, Doug <Gutro.Doug@epa.gov>; Moraff, Kenneth <Moraff.Ken@epa.gov>; Downing, Jane <Downing.Jane@epa.gov>; Murphy, Jim <Murphy.Jim@epa.gov>; Lindsay, Jane <lindsay.jane@epa.gov>
> **Subject:** Region 1 / NHDES PFAS EVENT JUNE 25-26

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Jane pls schedule.

Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***

Message

From: Maybury, Steve [Steve.Maybury@dep.nj.gov]
Sent: 5/24/2018 9:18:18 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]; dave.e.burns@maine.gov; dougfarquhar@ncsl.org; mdjohnson@cdc.gov
Subject: PFAS Chart
Attachments: Perflourinated Compounds_EA_2017.pdf

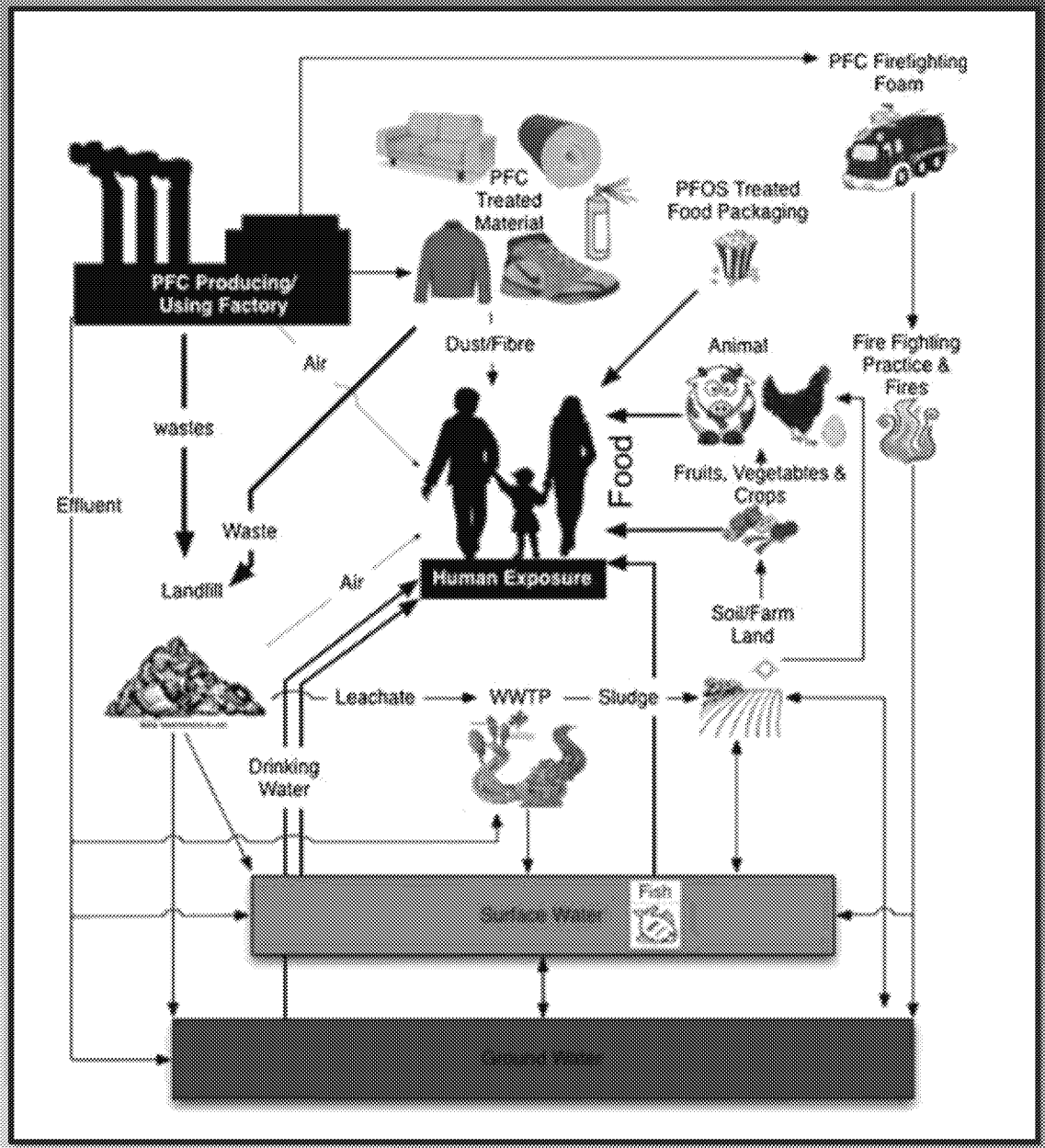
Alexandra, Dave, Doug and Mark,

It was a pleasure talking to you and hearing different perspectives at the Summit. Attached is the full presentation that includes the PFAS chart that helps explains how complex this chemistry is.
If I can help in any other way feel free to reach out.

Best, Steve

Stephen E. Maybury
New Jersey Department of Environmental Protection
Chief, Bureau of Case Management
Mail Code 401-05F
PO Box 420
401 East State Street
Trenton, NJ 08625-0420

Phone# Ex. 6



Per- and Polyfluoroalkyl Substances (PFAS)— Emerging Contaminant

Prepared for:

DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

Prepared by:

EA Engineering, Science, and Technology, Inc., PBC

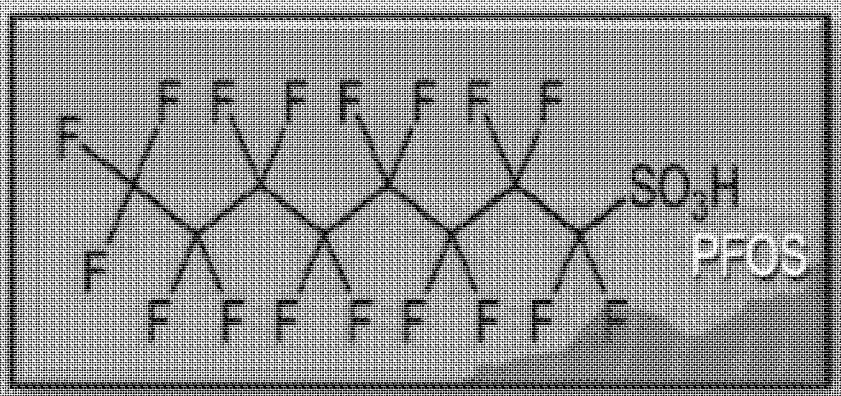
February 2017

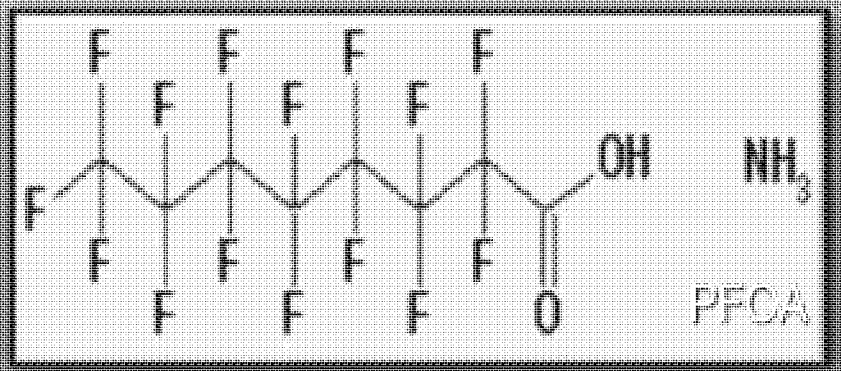
Agenda

- PFAS Background
- PFAS Production/Supply Chain
- PFAS Sources and Distribution in the Environment
- Health Effects
- Current Regulatory Status
- Sampling Approaches/Site Response
- Remedial Technologies
- Summary
- Case Studies

Poly- and Perfluoroalkyl Substances (PFAS) Background

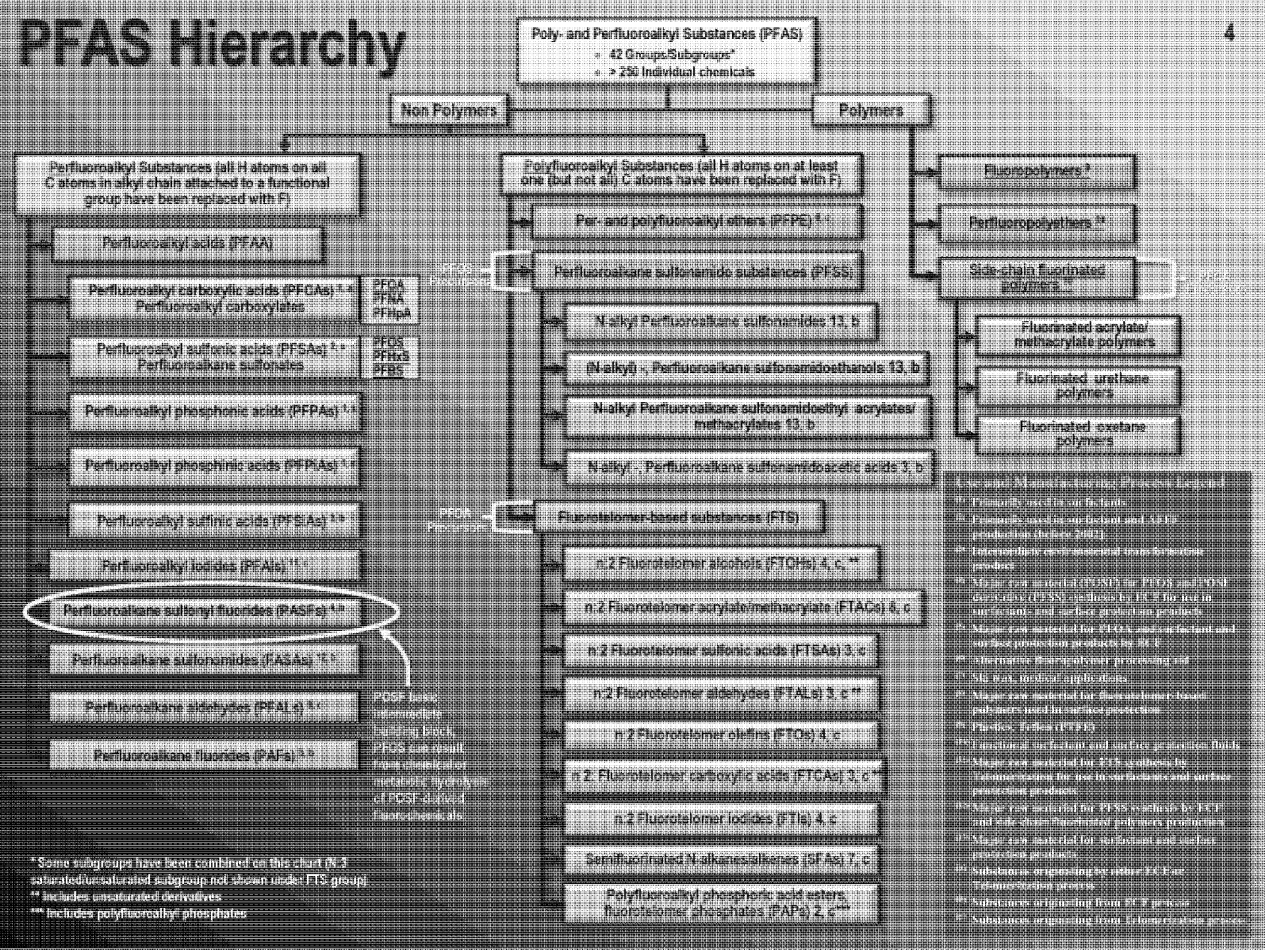
- PFAS are synthetic chemicals used in manufacturing fluoro-polymers
- Typically only a fraction of final product/not an end product
- Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) are the two "highest profile" PFAS used in Aqueous Film Forming Foam (AFFF) formulations for fire suppression
  - PFOA manufactured from 1947-present; 8 manufactures phased out production in 2010
  - PFOS manufactured from 1949 to 2002



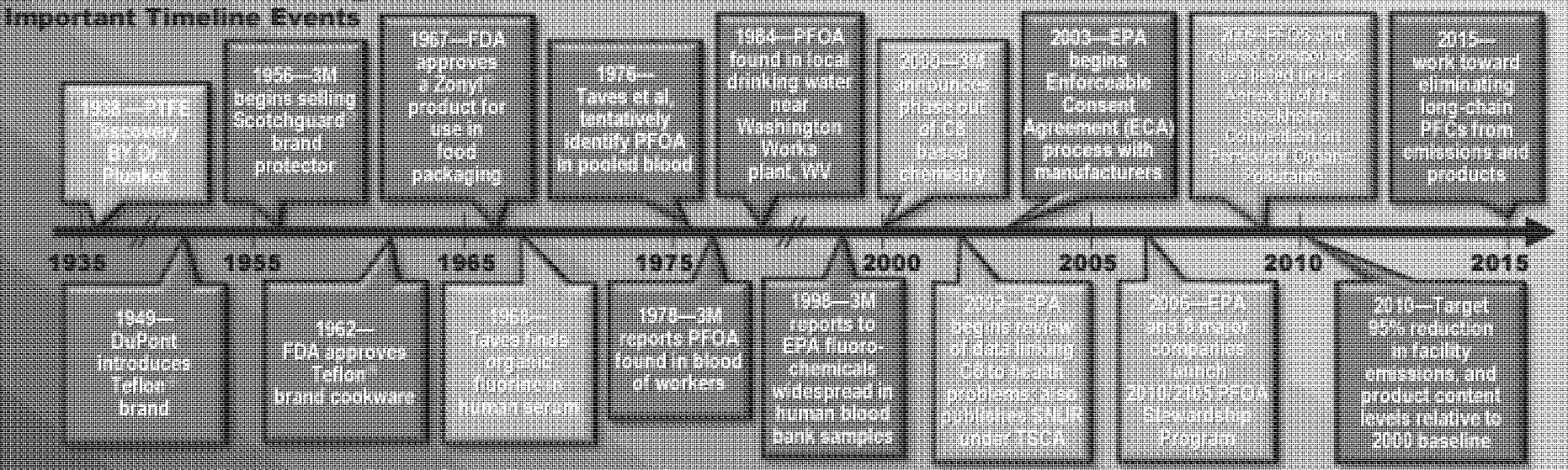


- PFAS also used in a wide variety of other surface treatments and performance chemicals

PFAS Hierarchy



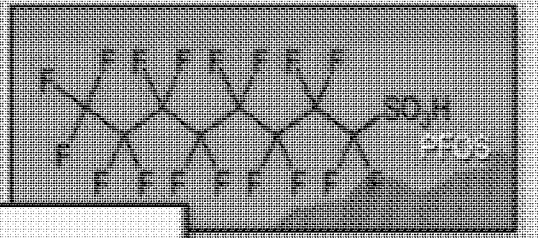
Why are We Concerned with PFAS?



Source: https://www.researchgate.net/

- Large number of perfluorochemical substances and their derivatives
- Used in a variety of processes and manufactured processes for more than 50 years
- Concerns with historical AFFF use
- Discovered in human blood serum as early as 1960s and around the world
- High profile suite of pollutants – in the news
- Environmental stable end products, mobile and bioaccumulate
- Found worldwide in humans, wildlife, aquatic systems and in all environmental media
- Uncertainties with toxicological data and risk assessment methods hinder development of risk-based standards
- Limited effective remediation technologies and some remediation methods can exacerbate the problem
- No Federally promulgated standards

Estimated Global PFC Production

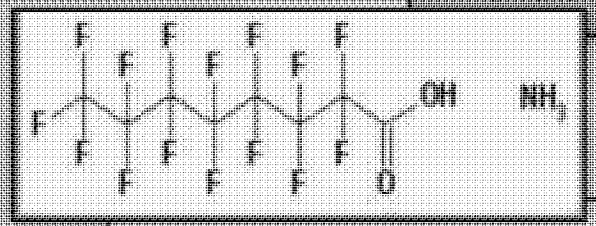


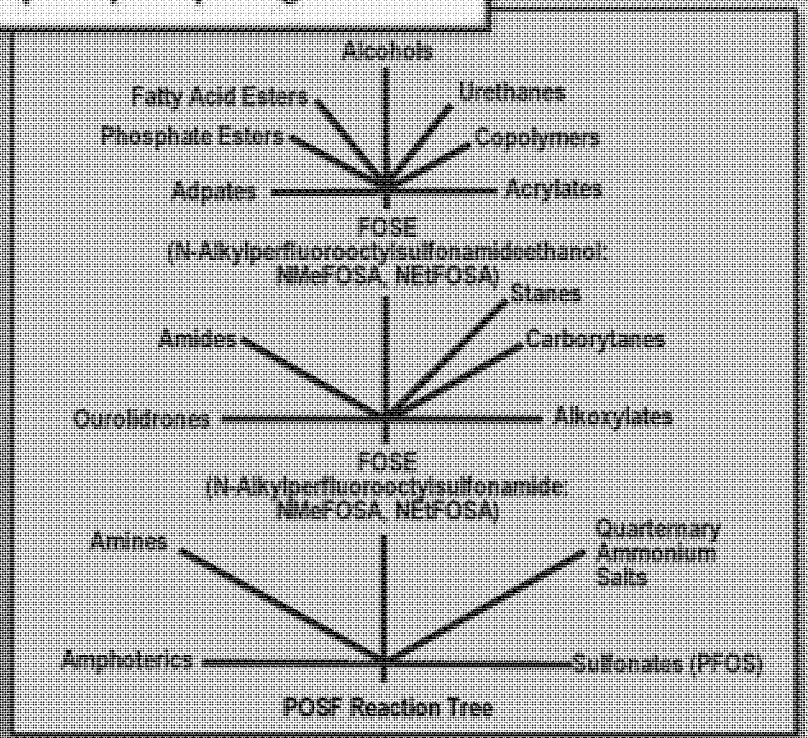
Estimated 100,000 tons global PFAS production through 2004

- Electrochemical fluorination (ECF) used perfluorooctanesulfonyl fluoride (POSF) as primary building block to synthesize large array of perfluoroalkyl sulfonates and their derivatives up unit early 2000's resulting in > 70,000 tons of PFSA-related substances
- Global production of PFCA, (e.g., PFOA) through 2004 estimated 4500-8000 tons
- Typically only a fraction of final product/not an end product

Since early to late 2000's Telomerization-derived fluorinated substances produced at rate of < 1000 tons per year (U.S production about 50%)

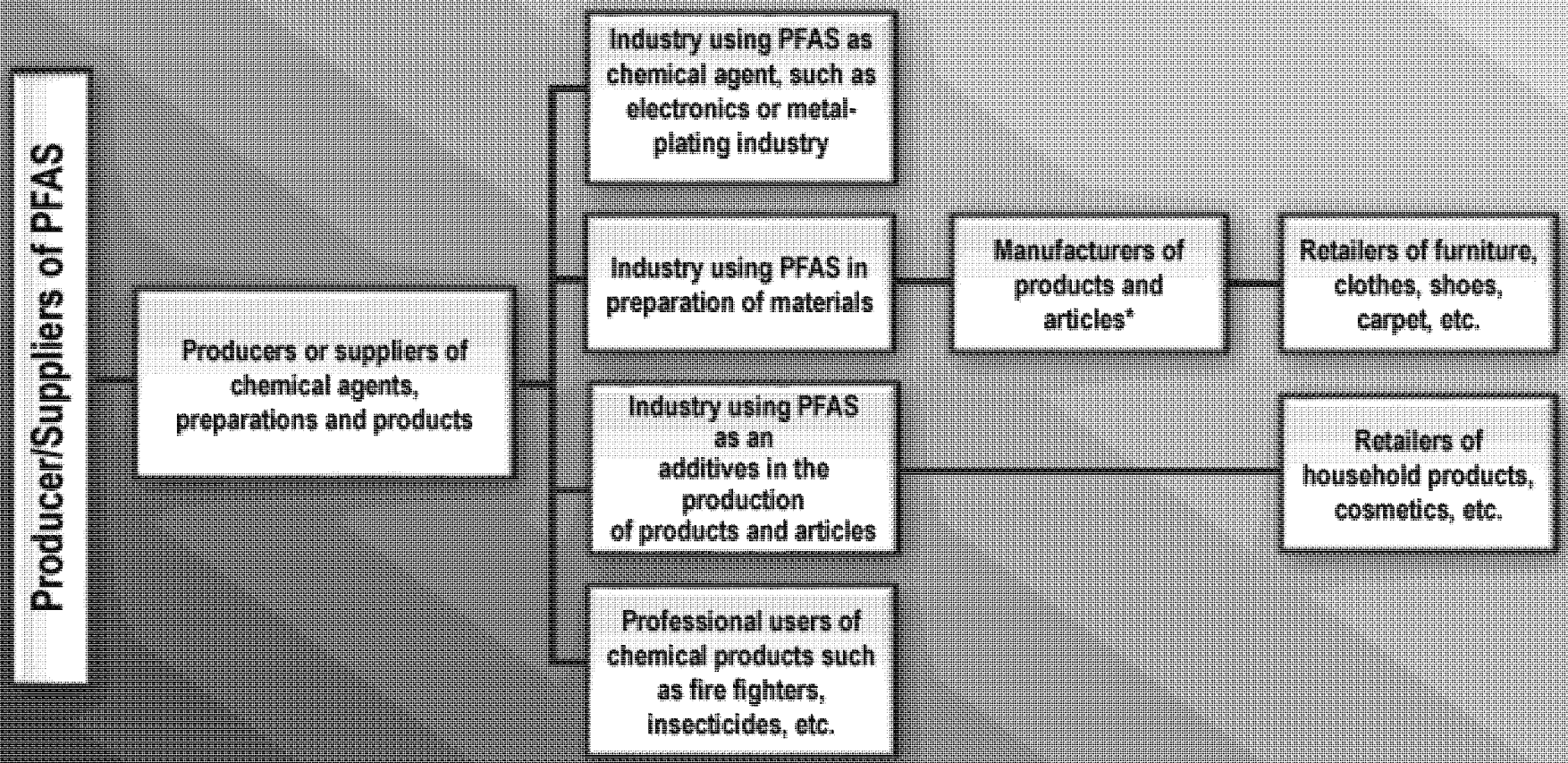
- FTOH and FTO precursors account for ~100 tons/year PFOA from transformation





(Source Paul AG, Jones, KC, Sweetman A.J. (2009). First Global Production, Emission, and Environmental Inventory for Perfluorooctane Sulfonate. Environmental Science and Technology 43, 386-392

PFAS Supply Chain



Source: Guidance for the inventory of perfluorooctane sulfonic acid (PFOS) and related chemicals listed under the Stockholm Convention on Persistent Organic Pollutants, July 2012

PFAS Used in Manufacturing of Products

Electronics/Semiconductor industries

- Anti-reflective coatings
- etching
- Photolithography

Photographic industry

- Electrostatic charge control agents
- Adhesion and dirt repellent agents

Metals Plating industry

- Mist suppressants
- Surfactants/wetting agents

Oil and gas Production

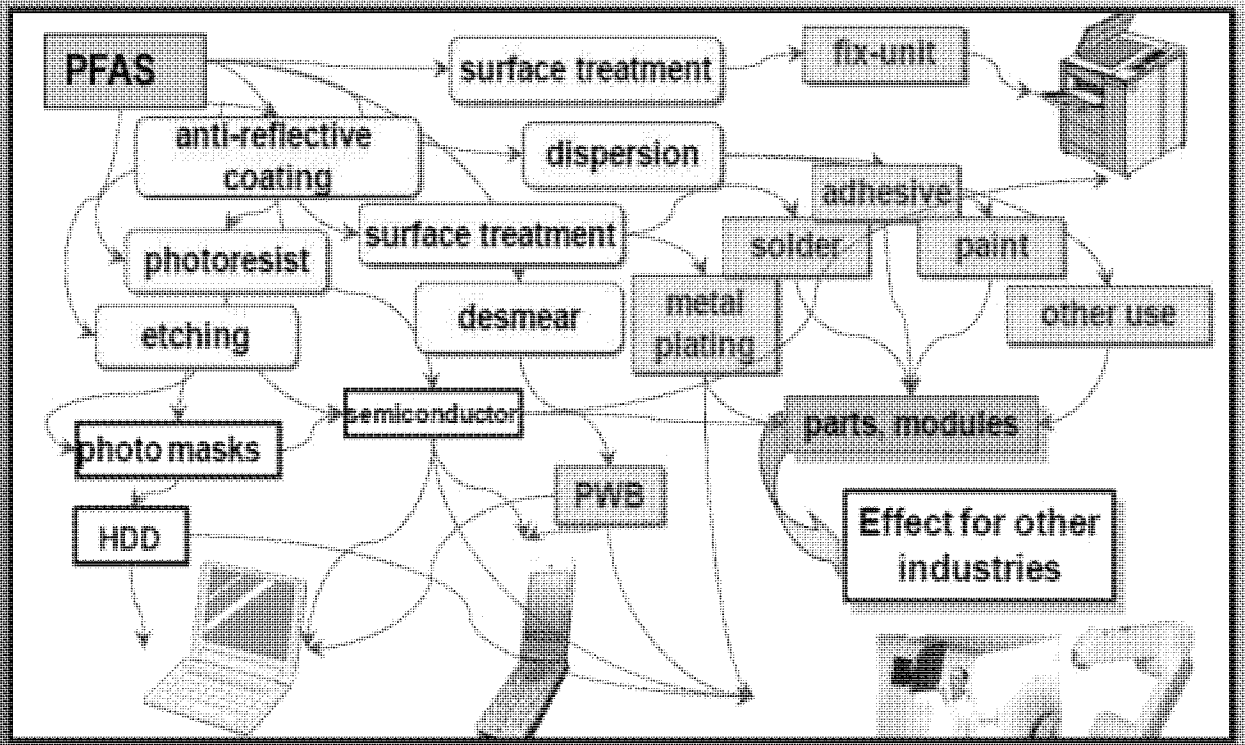
- Enhanced recovery surfactants

Mining Industry

- Surfactants for enhanced copper and gold recovery

Plastics and rubber manufacturing

- Surfactants/wetting agents



PFAS Used in Manufacturing of Products

Oil and Water Repellency Treated Products

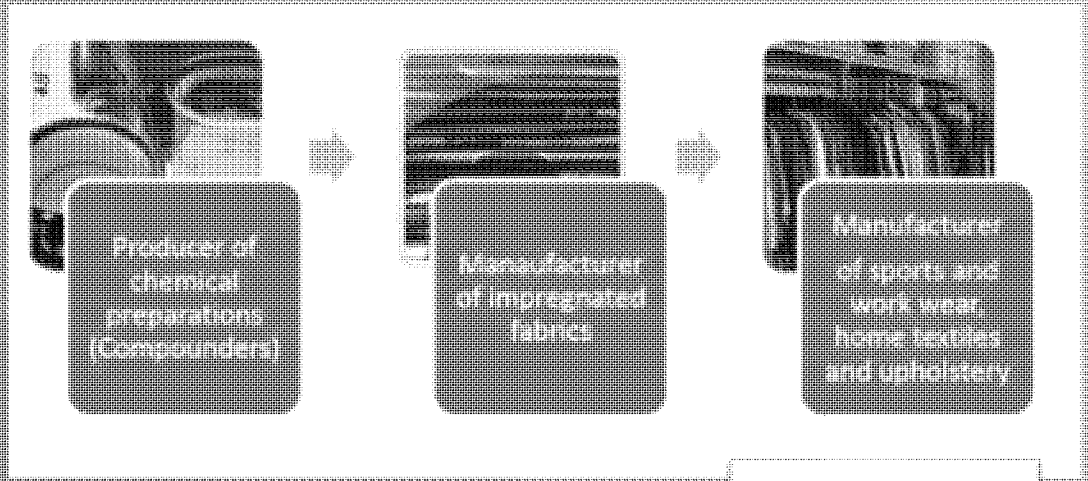
- Textiles and fabrics
- Leather

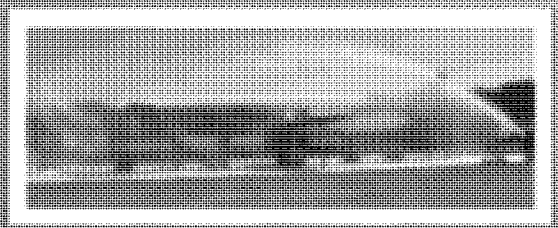
Compounders/Commercial Mixtures

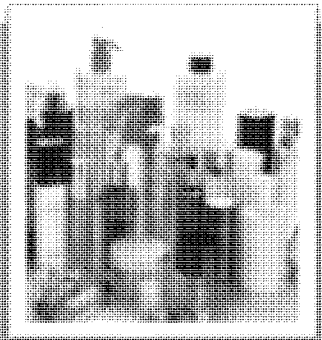
- Aviation hydraulic fluids
- Impregnation formulas
- AFFF
- Insecticides
- Surfactants

Products/Articles

- Non stick cookware
- Synthetic carpets
- Paper/cardboard packaging (food containers)
- Textiles/leather (treated)
- Furniture
- Industrial and household products (alkaline cleaners, cosmetics, car wash/waxes, floor polishes, etc.)
- Paints and varnishes
- Toner and printing inks
- Sealants and adhesives
- Medical devices (video endoscopes, angiography catheters)

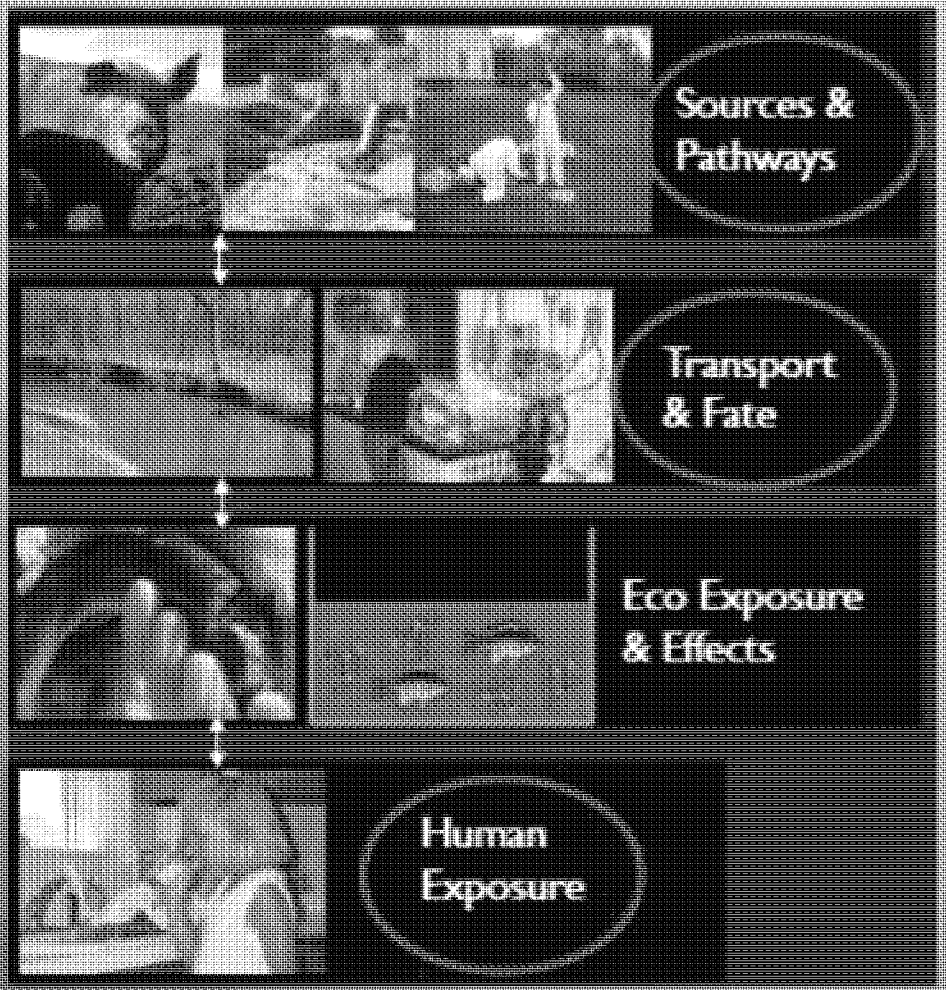




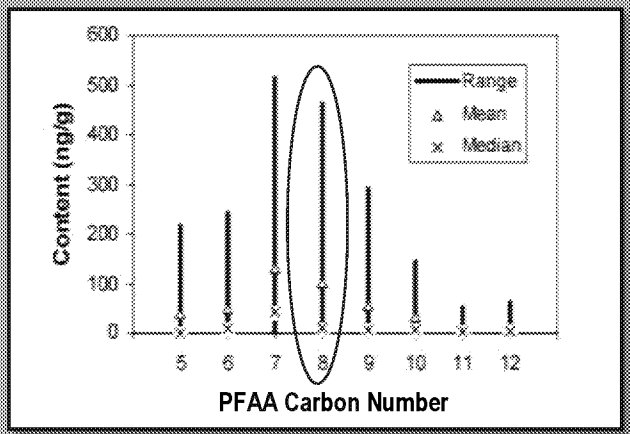


Potential Sources of PFAS

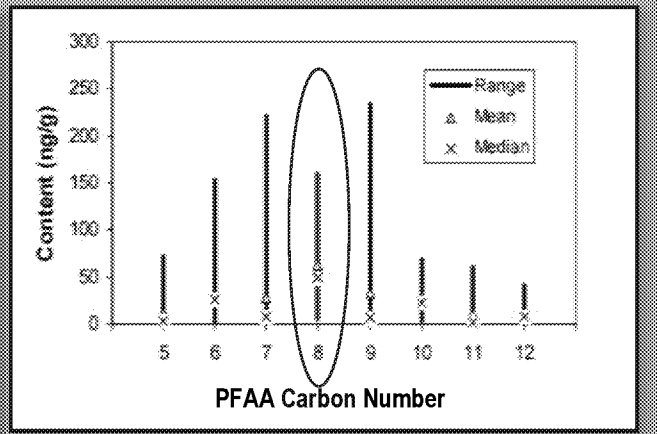
- Manufacturing facilities
- Fire training areas
- Near runways
- Around aircraft hangars
- Landfills
- Naval facilities
- WWTP sludge
- Oil extraction/production
- Mining



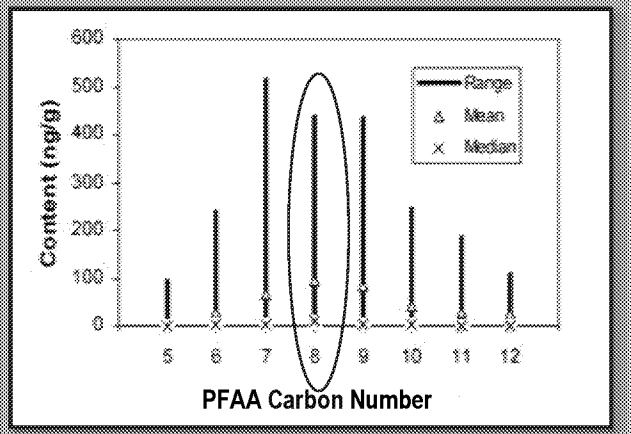
PFAA Distribution in Common Products



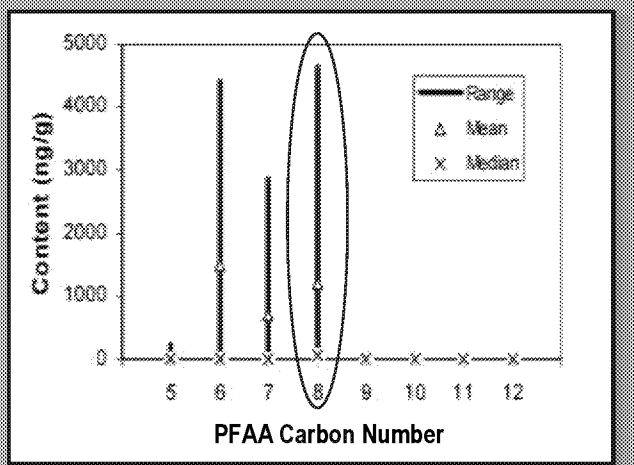
Pre-Treated Carpet



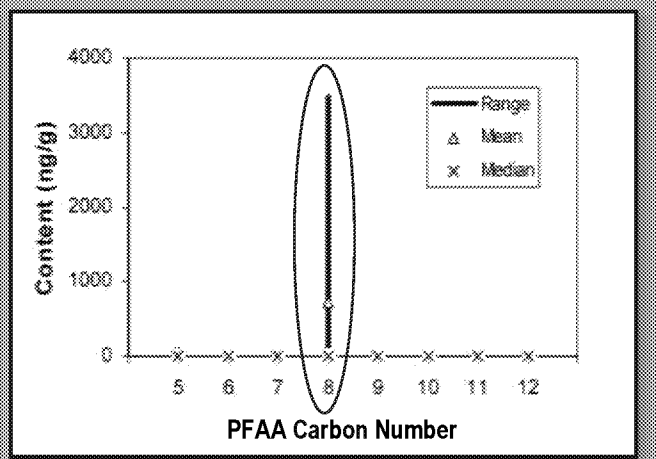
Treated Apparel



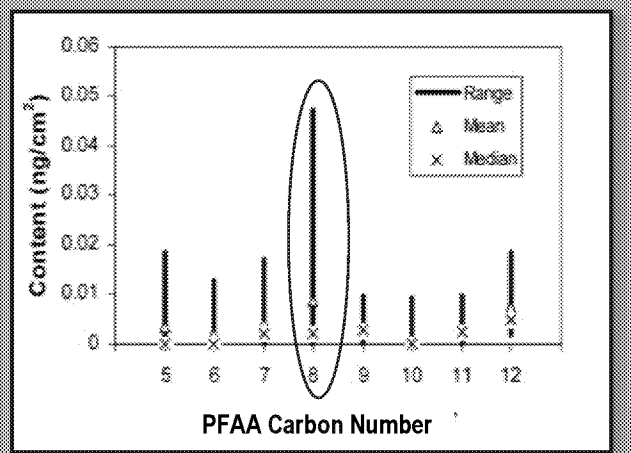
Treated Upholstery



Food Contact Paper



Pipe Thread Tape/Paste

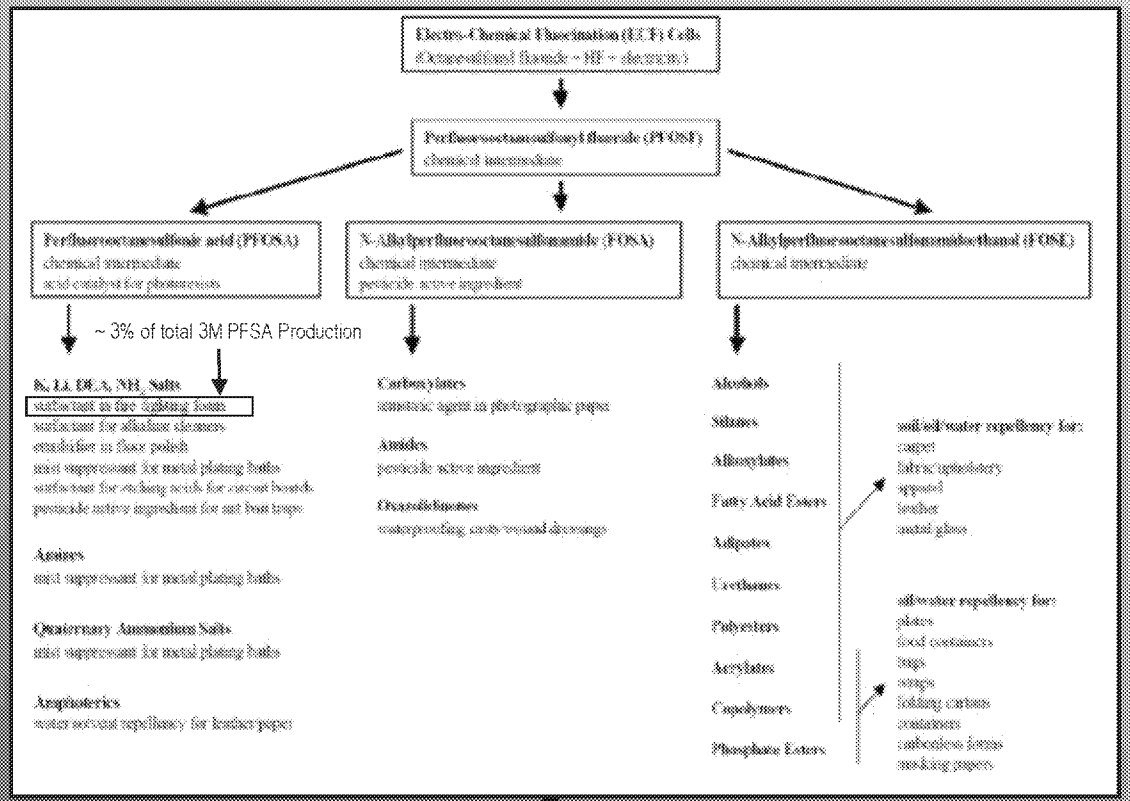


Non-stick Cookware

Source: Guo, et. Al, EPA, 2009

Aqueous Film Forming Foam (AFFF)

- Approximately 3% of 3M C8-based PFSA (e.g., PFOS) production used in AFFF
  - Other uses include
    - Industrial surfactants, additives, coatings (~13%)
    - Paper and packaging (~47%)
    - Textile, leather and carpet treatment (~ 37%)
- DOD uses approximately 75% of AFFF
  - Other = municipal airports, industry, etc.
    - PFAS only a few % of AFFF formulation
  - The majority (~90%) of 3M AFFF is PFSA- based (e.g., PFOS)
  - Less than 2% of 3M AFFFs are PFCA-based (e.g., PFOA)
- AFFF contained 100's of PFAS, including precursors
- In other words, a lot of PFOS in groundwater from 3M AFFF, not as much PFOA



PFOS is the final breakdown product of the Class of PFCs shown above

AFFF Storage and Use in US

- Although production of PFOS-based AFFF ceased in 2002; product is still in stockpile and in use through 2016
- DoD initiative to eliminate PFOS-based AFFF in 2017
- DOD policies require identification of AFFF impacts at thousands of areas of concern (AOC), nationwide and within US territories and sampling of drinking water sources for PFAS

Sector	PFOS-based AFFF (2004), gallons	PFOS-based AFFF (2011), gallons
Military & Other Federal	2,100,000	1,094,700
Civil Aviation (Aircraft Rescue and Fire)	130,000	20,000
Oil Refineries	950,000	152,000
Other Petro-Chem	1,000,000	500,000
Civil Aviation (Hangars)	190,000	70,300
Fire Departments	120,000	60,000
Miscellaneous	150,000	75,000
TOTALS	4,600,000	1,972,000

(Darwin, 2011)

TSCA Regulations to Limit PFAS Use

- March – December, 2002, under TSCA EPA published Significant New Use Rule SNURs requiring notification before any manufacture or import of 88 PFAS included in voluntary phase out of PFOS
- October 2007 EPA finalized SNUR on 183 PFAS believed to no longer be used in manufacture or imported in US
- September 2013, EPA issued rules requiring companies to report all new uses of certain PFOA-related chemical s as part of carpets
- January 2015, EPA proposed SNUR to require manufacturers (including importers) of PFOA-related to notify EPA before starting or resuming use in any products
- TSCA LCPFACs Action Plan
- EPA New Chemical Program reviews alternatives for PFOA and related chemicals

PFOA Stewardship Program

In 2006 EPA invited 8 major companies that used PFAS to join global stewardship program

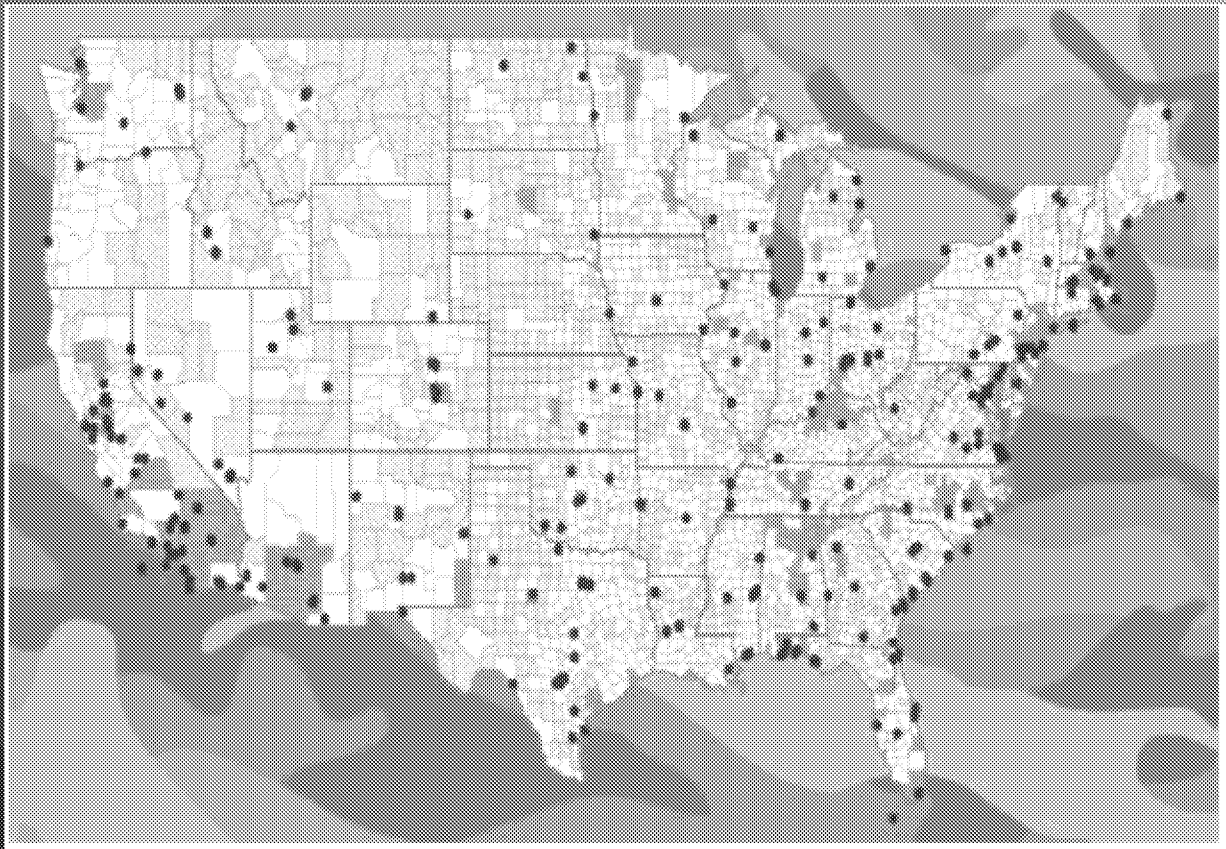
Achieve 95% reduction facility emissions to all media for PFOA and precursor compounds using 2000 as baseline

Eliminate chemical from emissions by 2015

All companies met goals, final report in 2016

- Companies achieved goals by phasing out PFAS or getting of PFAS-related industry altogether
- Companies agreed to work with EPA to establish scientifically credible analytical standards

PFAS Contamination in the US (Drinking Water)



Data visualization: Moiz Syed. Sources: EPA and Department of Defense.
https://theintercept.com/2015/12/16/toxic-firefighting-foam-has-contaminated-u-s-drinking-water-with-pfcs/

- Municipal water supply systems
- Private wells
- Major aquifers
- Co-mingled plumes
- Groundwater-surface water interactions

PFAS Occurrence in US Drinking Water Hydrologic Basins

PFOA and PFOS Levels in Water Samples

Sample type	Location	PFOA (ng/L)	PFOS (ng/L)	Reference
Surface runoff	Cape Fear Basin, North Carolina,	12.6 - 287	30 – 132	Sasaki et al., 2003
Rain	North East Canada	<0.1 – 89 L	Not analyzed	Scott et al., 2006
Snow	Albany, NY	<0.75 – 19.6	< 0.25 – 1.93	Kim and Kannan, 2007
Tap Water	Ruhr, Germany	< 2 – 519 L	< 2 – 22	Skutlarek et al., 2006
Ground water	AF Base, Michigan	nd – 105000	8000 – 110000	Moody et al., 2003
River Water	Tennessee River, Decatur, Alabama	< 25 – 598	16.8 – 144	Hansen et al., 2002
Sea Water	Hong Kong, South China	0.24 - 320	0.04 - 730	So et al., 2004
Waste Water	WWTP Kentucky, USA	8.3 - 334	7.0 - 993	Loganathan et al., 2007
Lake Water	Canadian Arctic	0.5 - 16	0.9 - 90	Stock et al., 2007

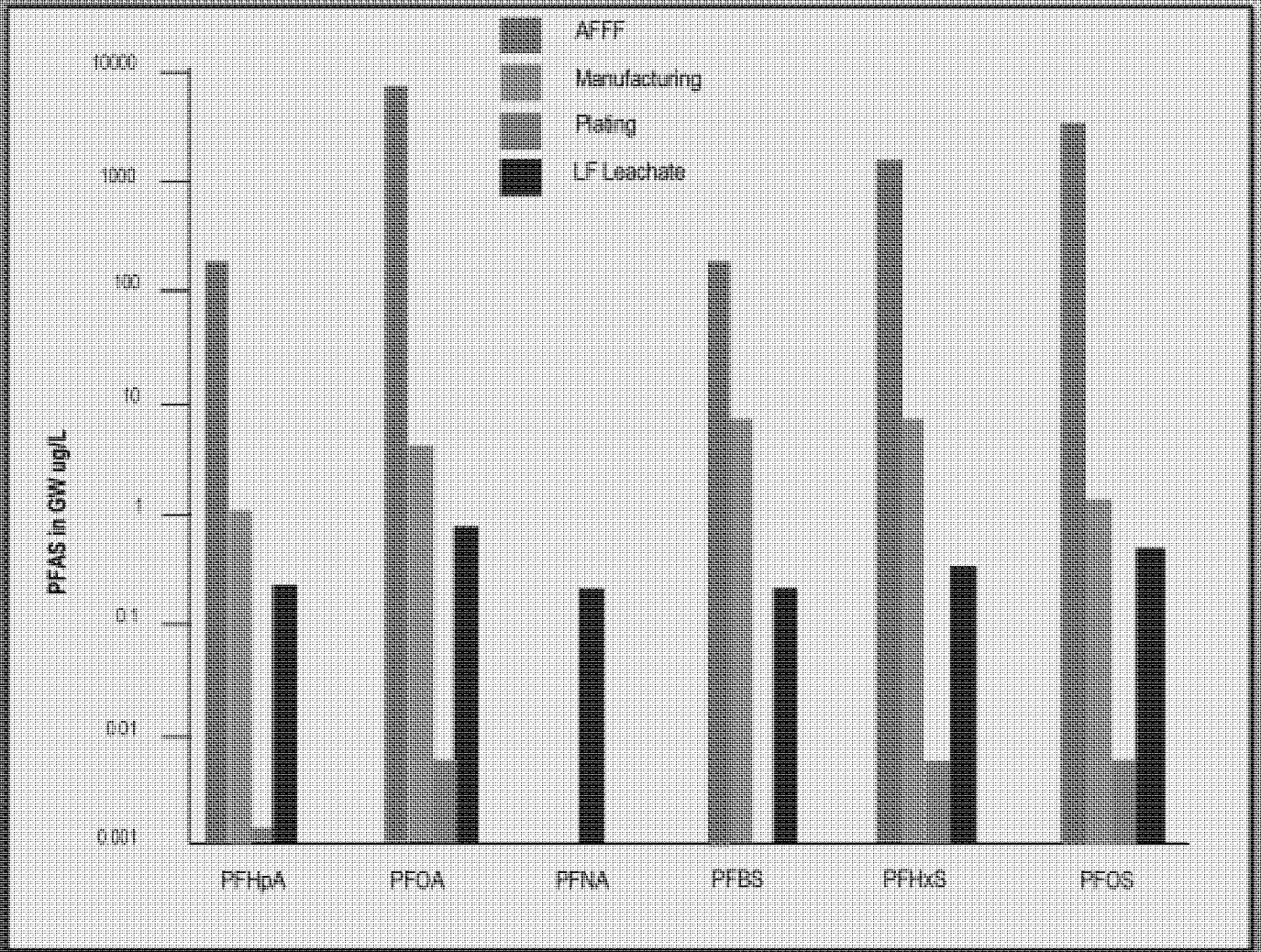
PFOA and PFOS Levels in Solid Matrices and Food

Sample type	Location	PFOA (ug/kg)	PFOS (ug/kg)	Reference
Marine Sediment	Barcelona Har-bour, Spain	8 - 12	Not analyzed	Alzaga et al., 2005
River Sediment	San Francisco Bay Area	nd – 0.625	Not analyzed	Higgins et al., 2006
Vacuum cleaner dust	Japan	69 – 3700	11 – 2500	Moriwaki et al., 2003
Sludge WWTP	Kentucky	33 – 219	8.2 – 993	Loganathan et al., 2007
Seafood	China	<0.25 – 1.67	0.33 – 13.9	Gulkowska et al., 2006
Beef (steak, ground)	Canada	< 0.4 – 2.6	<0.6 – 2.7	Tittlemier et al., 2007
Pizza	Canada	0.74	<1	Tittlemier et al., 2007
Microwave popcorn	Canada	3.6	0.98	Tittlemier et al., 2007
Chicken	Spain	<0.067	0.021	Ericson et al., 2008
Whole Milk	Spain	0.056	< 0.014	Ericson et al., 2008

PFOA and PFOS Levels in Biota Samples

Sample type	Location	PFOA (ug/kg)	PFOS (ug/kg)	Reference
Oyster (whole body)	Gulf of Mexico, Chesapeake Bay, USA	Not analyzed	<42 – 1225	Kannan et al., 2002 a
Smallmouth bass (liver)	New York State	< 1.5 – 7.7	10 – 142	Sinclair et al. 2006
Brown trout (eggs)	Lake Superior, Michigan, USA	<0.75 – 19.6	49 – 75	Kannan et al., 2005
Bottlenose dolphins (plasma)	Charleston, Sarasota Bay, USA	3.4 - 43	340 - 914	Houde et al., 2006 a
Mink (liver)	Lalamazoo River watershed, USA	< 2 – 3.3	1280 - 59500	Kannan et al., 2005
Polar bear (liver)	Greenland, Denmark	< 12	1245 - 1325	Bossi et al., 2005 a

Groundwater Impacts From Different Sources



Source: Gentile, Subsurface Fate and Transport of Poly-and Perfluoroalkyl Substances, ©2016

Example of Multiple PFAS Exposure Bennington, VT

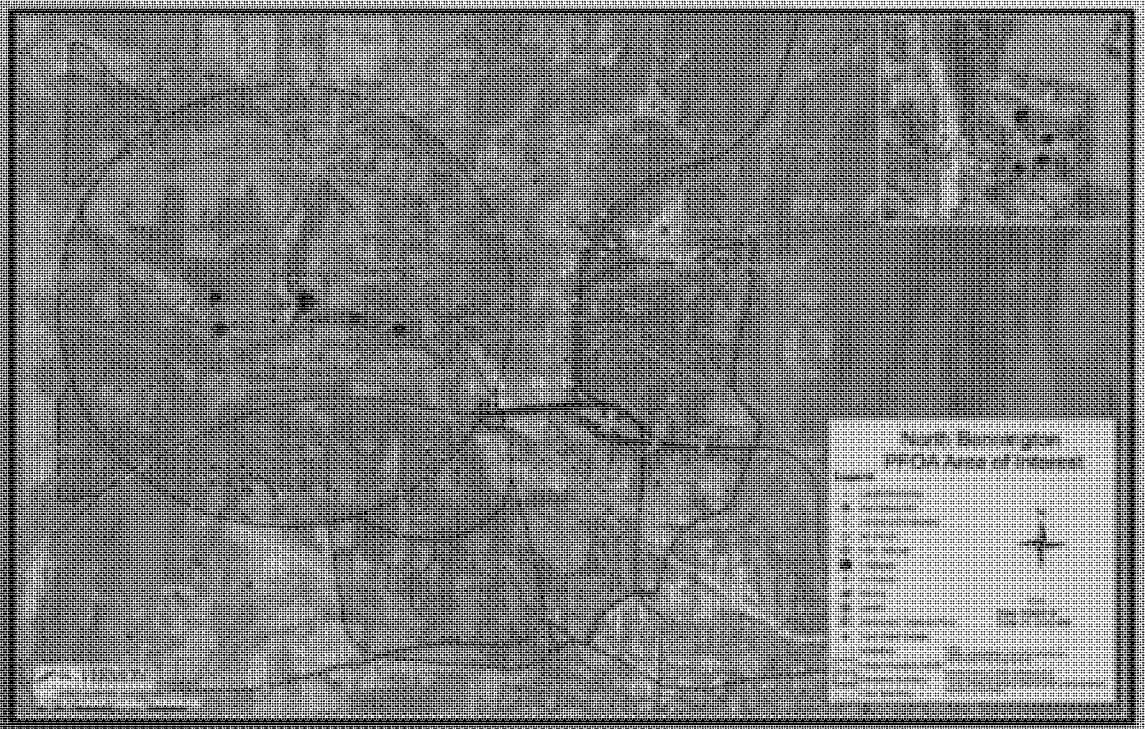
Water quality results indicated widespread PFOA and PHpA impacts throughout 1.5 mile AOC

Sampling of residential wells near ChemFab plant resulted in another AOC due to PFOA detections (1970s-early 2000s)

- Approximately 500 wells sampled; 40% > VT levels (20 ppt)

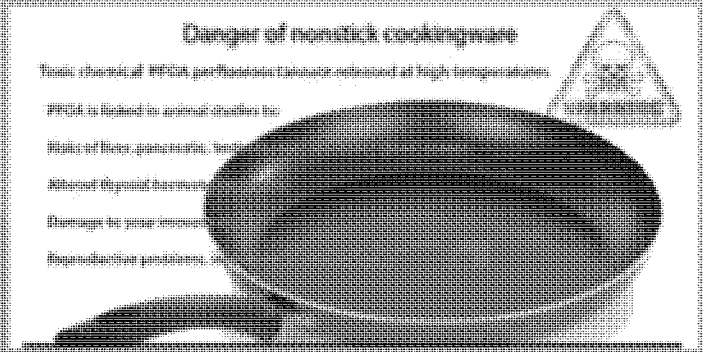
Multiple sources and release mechanisms identified

- Airborne exhaust
- Fills, dumping
- WWTP sludge spreading
- Landfilling



PFAS in the News

- 6 million Americans have unsafe levels of toxic chemicals in their drinking water - Department of Environmental Health at Harvard, January 2017
- Non-stick pans can affect your baby's weight – Edith Cowan University – Dec 2016
- Pizza boxes contain chemicals that may be worse for you than pizza – U.S. Food and Drug Administration has imposed a ban on the use of certain chemicals used in pizza boxes effective January 2016
- Non-stick pan chemicals PFPIAs found in dolphins, fish and birds –ACS journal Environnemental Science & Technology, September 2016
- Study reports unsafe levels of firefighting chemicals in 16.5 million Americans' drinking water – Journal Env, Sci and Tech Letters, Aug 2016
- Chemical in you Popcorn- NY times, June 2015

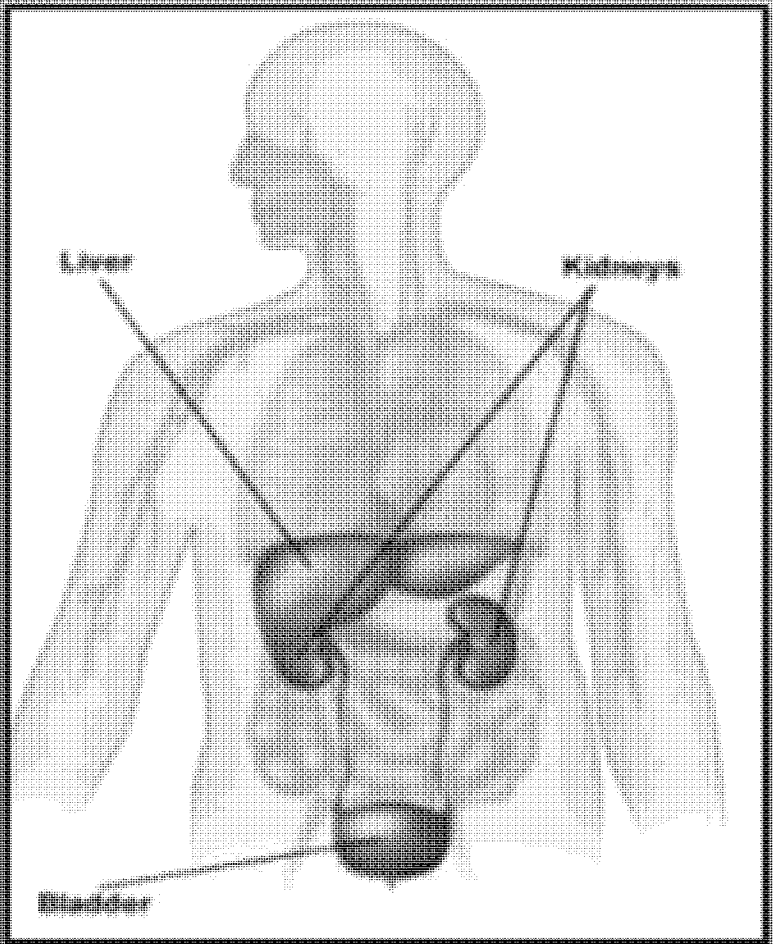


The Role of Uncertainty in Standard Development

- Orders of magnitude uncertainty and differences in scientific interpretation
- Current risk assessment methods and tools may hamper development of consistent guidance values
- Uncertainty in toxicological endpoints (i.e., liver, blood, developmental effects)

Potential Adverse Health Effect Summary

- Increased serum cholesterol, LDL, uric acid, thyroid imbalance
- Hypertension
- Chronic kidney and liver disease
- Neonatal growth and development affects
- Immunotoxicity
- Induction of tumors (liver, pancreatic, testicular)
- Endocrine disruption



PFOA/PFOS Health Effects Weight of Evidence

Target Organ or system	Animal Toxicity Studies	Human Epidemio-logical studies	C8 Panel Conclusions (Human Studies)	Modes of Action
Serum cholesterol	✖	✖	Probable link	• Persistence in tissues • Electrostatic binding to proteins • Actual or potential displacement of endogenous/exogenous substance normally bound to serum albumin such as fatty acid, minerals, • Renal resorption • Initiating activation or suppression of gene transcription • Interference with intercellular communication
Diabetes	✖	✖		
Thyroid disease	✖	✖	Probable link	
Liver disease	✖	✖		
Immune function	✖	✖		
Developmental effects	✖	✖		
Kidney disease	✖	✖		
Cancer	• **Kidney** • **Testicular** • **Pancreatic**	• **Kidney** • **Testicular**	Probable Link	

✖ Multiple studies and/or multiple lines of evidence

✖ Limited studies or uncertain lines of evidence

✖ Lines of evidence do not show positive correlation

PFAS in Humans

- Exposure mainly by ingestion
- PFAS bind to proteins (not to lipids / fats) and are mainly detected in blood, liver and kidneys
- Study with 656 children demonstrated elevated exposure to PFOS & PFOA are associated with reduced humoral immune response [*JAMA 2012, 307, 391-397*]
- Large epidemiological study of 69,000 persons found probable link between elevated PFOA blood levels and the following diseases: high cholesterol, ulcerative colitis, thyroid disease, testicular cancer, kidney cancer and preeclampsia –C8 science panel [http://www.c8sciencepanel.org/]

Regulatory Standard Development

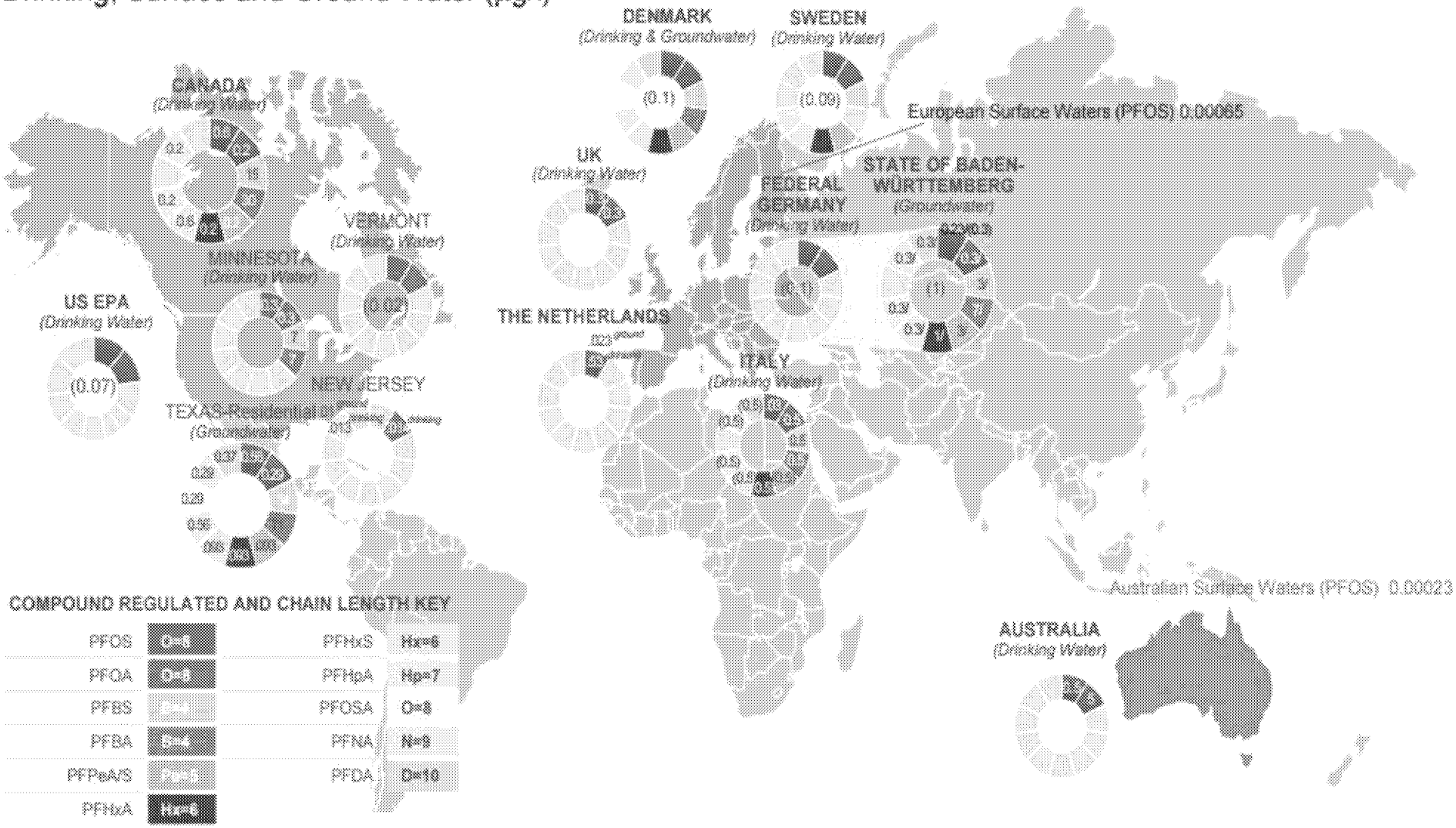
- In January 2009, the U.S. EPA Office of Water issued provisional health advisories (PHA) for PFOA and PFOS
- EPA issued Lifetime Health Advisories (LHA) for drinking water in May 2016 (0.07 ug/L for combined PFOS/PFOA)
- In 2010, PFOS and PFOA were removed from the Integrated Risk Information System (IRIS) agenda
- Some States (2010-2016) have developed standards
- EPA Region IV established residential soil screening level of 6 mg/kg for PFOS and 16 mg/kg for PFOA
- In 2015, U.S. EPA listed PFOS and PFOA on its Draft 4th Contaminant Candidate List (CCL)
- EPA Tapwater RSL (0.04 ug/L) (pending)

Agency or State	Water Criteria							Basis
	PFOS (µg/L)	PFOA (µg/L)	PFBS (µg/L)	PFBA (µg/L)	PFNA (µg/L)	PFOSA (µg/L)	PFHpA (µg/L)	
EPA	0.07 (combined)		7 (RfD)	—	—	—	—	
DE	0.07 (combined)		—	—	—	—	—	July 2016–Guidance for Notification under Division of Waste and Hazardous Substances
IL	0.2	0.4	—	—	—	—	—	Class I Provisional Groundwater Remediation Objective
ME	0.12	0.12	140	—	—	—	—	August 2016–Groundwater Screening Levels for Resident, Maine Center for Disease Control
MN	0.3	0.3	7	7				Health-Based Value by end of year and Health Risk Limits by End of 2017– Winter of 2018
NC	—	2	—	—	—	—	—	Interim Maximum Allowable Concentration (IMAC) in groundwater developed in 2006 of 2 ug/L. A value of 1 ug/L was proposed but not ever accepted.
NY	—	0.1	—	—	—	—	—	EPA Region 2 came out with 0.1 ug/L at the beginning of 2016- this is not a state value but adopted by New York.
AK	0.4	0.4	—	—	—	—	—	Groundwater Clean-up Levels in effect under Amendments for 18 AAC 75–effective January 2017
MI	0.011	0.42	—	—	—	—	—	Rule 57 Water Quality Rule–Human Non-cancer Values for Drinking Water
NJ	—	0.04	—	—	0.01	—	—	Interim Groundwater Quality Criteria
TX*	0.56	0.29	34	71	0.29	0.29	0.56	Protective Concentration Levels (PCLs) for Texas Risk Reduction Program Clean-up Program.
OR	300	24	—	—	1	0.2	300	Oregon Department of Health Initiation Levels
VT		0.02	—	—	—	—	—	Vermont Health Advisory published in 2016 for 20 ppt is applicable to the sum of PFOA and PFOS
NV	—	—	667	—	—	—	—	PFBS–DEP Basic Comparison Level for Clean-up–residential water
NH	0.07 (combined)		—	—	—	—	—	Ambient Groundwater Quality Standards and Public Water System DW–Emergency Rule, May 2016

Note: Perfluorobutane sulfonate (PFBS), Perfluorobutanoic acid (PFBA), Perfluorononanoic acid (PFNA), Perfluorooctanesulfonic acid (PFOSA), Perfluoroheptanoic acid (PFHpA) *TCEQ has developed PCLs for 16 PFAS (not all are listed on table)

Evolving Regulatory PFAS Values – Overview

Drinking, Surface and Ground Water (µg/l)



PFOA/PFOS Federal Regulation Decision Process

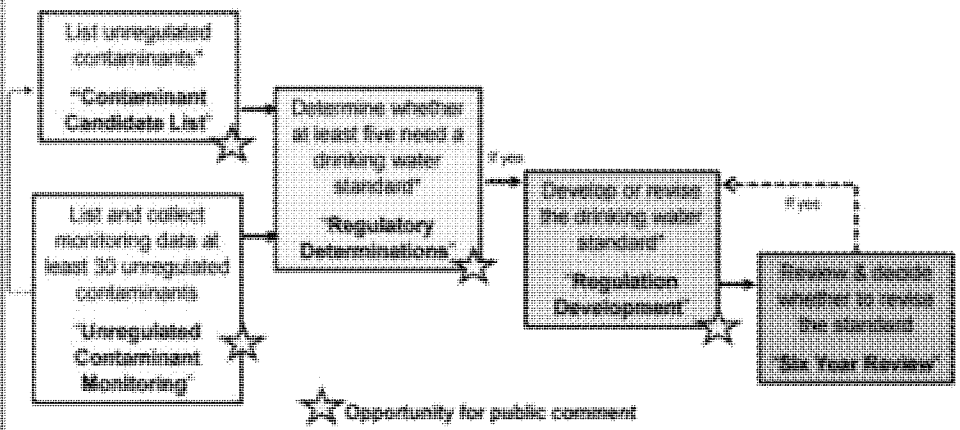
SDWA, as amended in 1996, requires EPA to determine whether or not to regulate no fewer than five Contaminant Candidate List (CCL) contaminants every 5 yrs

- The contaminant may have an adverse effect on the health of persons;
- the contaminant is known to occur or there is a substantial likelihood that the contaminant will occur in PWSs with a frequency and at levels of public health concern; and
- in the sole judgment of the Administrator, regulation of such contaminant presents a meaningful opportunity for health risk reduction for persons served by PWSs.

If EPA determines that these three statutory criteria are met

- 24 months to publish a proposed maximum contaminant level goal[1] (MCLG) and NPDWR.[1]
- 18 months to publish and promulgate a final MCLG and NPDWR

General Flow of SDWA Regulatory Processes



- PFOA and PFOS Included on CCL3 list in 2009
- Included on UCMR3 List in 2012
- Data Reported for UCMR3 list of six in 2015
- Include on CCL4 list (November 2016)

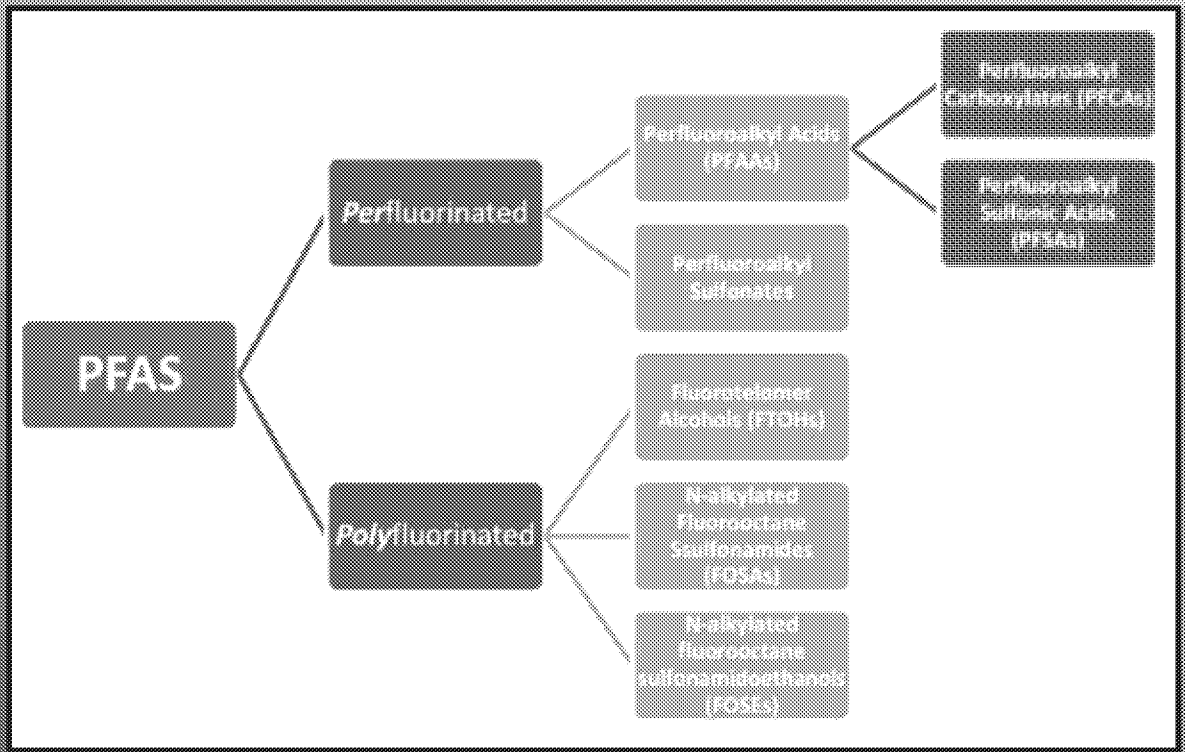
Managing Pubic Health Perceptions Amidst Multiple Uncertainties

- Evolving understanding of PFAS sources
- Evolving Analytical Capacity
- Evolving understanding of PFAS fate and transport
- Evolving risk assessment/toxicology

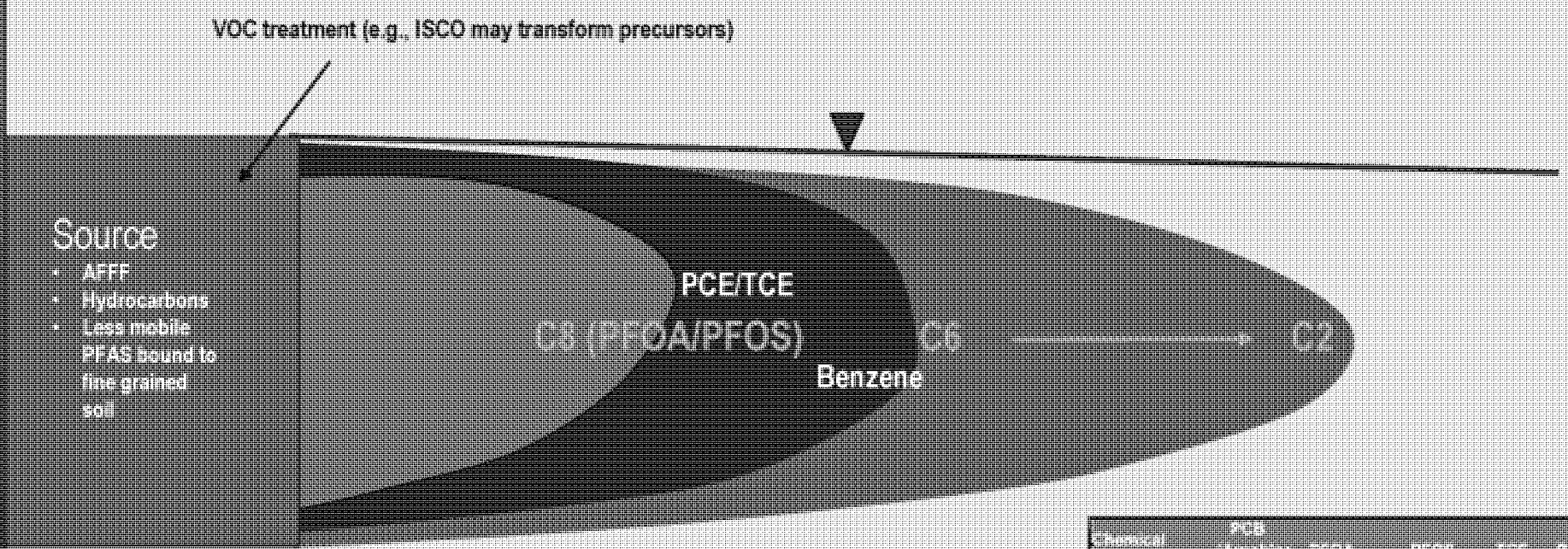
Additional Complicating Factors

What do we really know about "poly"-alkyl substances/precursors?

- PFAS precursors
- Likely present at all sites where AFFF was used
- To what extent have prior remedial efforts aimed at co-contaminants (e.g., ISCO) altered the composition and distribution of PFASs



Conceptual VOC/PFAS Plume Characteristic



— Increasing mobility of shorter chain PFAS

— Precursor biotransformation more likely in aerobic conditions

Chemical Properties	PCB (Aroclor 1260)	PFOA	PFOS	TCE	Benzene
Molecular Weight	357.7	414.07	538	131.5	78.11
Solubility (@20-25°C), mg/L	0.0027	3400 – 9500	519	1100	1780
Vapor Pressure (@25°C), mmHg	4.05×10^{-5}	0.5-10	2.48×10^{-6}	77.5	97
Henry's Constant, atm-m³/mol	4.6×10^{-3}	1.01×10^{-4}	3.05×10^{-9}	0.01	0.0056
Log Koc	5 – 7	2.06	2.57	2.473	2.13

Current PFAS Focus Areas

Since 2010, average of 400 papers/year published on PFC-related subjects

Increased ESTCP/SERDP activity since 2014

- ER-2422 - Bioaugmentation with Vaults: Novel In Situ Remediation Strategy for Transformation of Perfluoroalkyl Compounds
- ER-2423 - In Situ Treatment Train for Remediation of Perfluoroalkyl Contaminated Groundwater: In Situ Chemical Oxidation of Sorbed Contaminants (ISCO-SC); Dr. Michele Crimi; Clarkson University
- ER-2424 - Investigating Electrocatalytic and Catalytic Approaches for In Situ Treatment of Perfluoroalkyl Contaminants in Groundwater; Dr Charles Schaefer; CDM Smith
- ER-2425 - Development of a Novel Approach for In Situ Remediation of PFC Contaminated Groundwater Systems; Dr. Mack Simcik ; University of Minnesota
- ER-2426 - Quantification of In Situ Chemical Reductive Defluorination (ISCRD) of Perfluoroalkyl Acids in Groundwater Impacted by AFFFs; Dr. Linda Lee ; Purdue University
- ER 2625 - Development of Toxicity Data to Support Toxicity Reference Values for Perfluorinated Compounds; Dr. Michael Quinn; U.S. Army Public Health Command
- ER 2626 - Development of Amphibian Poly- and Perfluoroalkyl Substances Toxicity Reference Values for use in Ecological Risk Assessment at Aqueous Film-Forming Foam Sites; Dr. Maria Sepulveda; Purdue University
- ER 2627 - Advancing the Understanding of the Ecological Risk of Per- and Polyfluoroalkyl Substances; Dr. Christopher Salice; Towson University
- ER-2714 - Development of Coupled Physicochemical and Biological Systems for In Situ Remediation of Perfluorinated Chemical and Chlorinated Solvent Groundwater Plumes; Dr. Kurt Pennell, Tufts University
- ER-2715 - In Situ Remediation of Aqueous Film Forming Foams and Common Co-Contaminants with the Dual Approach of Chemical Oxidation and Bioremediation; Dr. Lisa Alvarez-Cohen; University of California, Berkley
- ER-2716 - Synergistic Treatment of Mixed 1,4-Dioxane and Polyfluorinated Chemical Contaminations by Combining Electrolytic Degradation with Electrobiostimulation; Dr. Jens Blotevogel, Colorado Srate University
- ER- 2720 - Key Fate and Transport Processes Impacting the Mass Discharge, Attenuation, and Treatment of Poly- and Perfluoroalkyl Substances and Comingled Chlorinated Solvents or Aromatic Hydrocarbons; Dr. Christopher Higgins, Colorado School of Mines

PFC "State of Science" Development

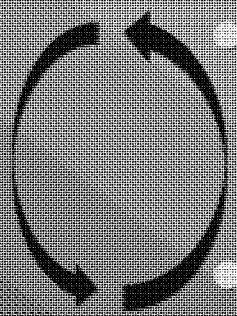
- Treatment of Perfluoroalkyl Acids by Non-thermal Plasma Processes – Christopher Bellona, CO School of Mines
- –Application of Ion-Selective Electrodes Based on Fluorous Matrixes for Sensing of Perfluorinated Surfactants – Li Chen, United Science LLC
- –Demonstration of Thermal Treatment of Polyfluoroalkyl and Perfluoroalkyl Substances using a Mass Balance Approach – Jeff Gamlin, CH2M
- –Insight into Fluorosurfactant Fate in Aquifers Based on Oxidation of AFFF in Soil-Water Microcosms – Jim Hatton, CH2M
- –Application of ScisoRÀ® for In-situ Treatment of PFOS in Soil and Groundwater – Allan Horneman, Arcadis
- –Fungal Transformation of 6:2 Fluorotelomer alcohol (6:2 FTOH): Peroxidases vs. P450 Oxygenases – Shaily Mahendra, UCLA
- –Abiotic reductive transformation of perfluoroalkyl substances (PFOA and PFOS) by vitamin B12 with zero valent iron – Saerom Park, Purdue U
- A Rapid Screening Test for Per- and Poly-Fluoroalkyl Substances – Evelyn Ritter, UMP Analytical LLC
- –In Situ Treatment Train for Remediation of Perfluoroalkyl Contaminated Groundwater: Sorption of PFASs on to Granular Activated Carbon – Dinusha Siriwardena, Clarkson U
- –Activated Carbon "Inks" for Treatment of PFOA/PFOS and 1,4-Dioxane Plumes – Kristen Thoreson, REGENESIS Remediation Solutions
- –PFC Plumes are not diffuse: High-Resolution Characterization of PFCs – Nick Welty, Arcadis
- –Sustainable Removal of Polyfluorinated and Perfluorinated Alkyl Substances from Groundwater Using Synthetic Media – Steven Woodard, Emerging Compounds Treatment Technologies (ECT)
- –Reduction of perfluorooctanesulfonate and perfluoroctanoic acid by synthesized activated carbon-supported bimetals – Jenny Zenobio, Purdue U

Lessons Learned/Key Considerations

- Significant potential for upgradient and non-point sources
- Large dilute plumes likely to form
  - PFAS likely to be at leading edge of plume
  - Co-mingled plumes (e.g. petroleum HCs, CVOCs, & ethylene glycol) especially at Fire Training Areas
  - High concentration "source area" may not exist
    - May need to sample soil if source is suspected
    - PFOS sporadic soil SL exceedances, PFOA less likely

Potential Site Identification/ Sampling Approach

PFAS Response Strategy



- Site Investigation
  - Prioritize candidate sites based on proximity to drinking water sources
  - Address mixtures (PFAS, VOC, etc.), co-mingled plumes
- Water Supply Sampling
  - Public, private, agricultural
- Action Required?
  - In home POU treatment
  - Alternative water supply
- Public Transparency is Key
  - Acknowledge limits of current PFAS science
  - Allow residents to proactively research home treatment options and provide information on how to limit exposure
  - Public meetings, webpages, other social media

Response Action/Program

Step 1: Prioritize potential candidate sites

- Action: conduct Phase 1 inventory (potential sources near drinking water supply)

Step 2: Verify release or suspected release

- Action: Confirmation sampling & initial characterization-does exposure exists?

Step 3: Confirmed pathway and receptor

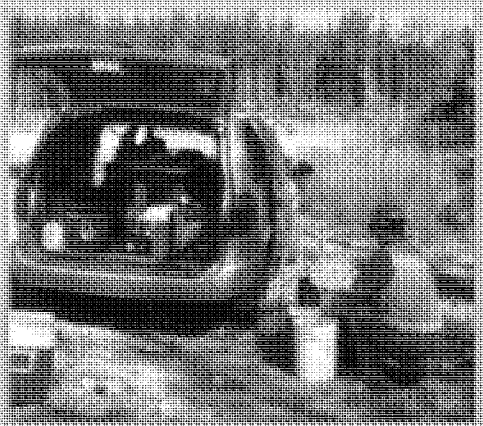
- Action : eliminate "unacceptable " exposure

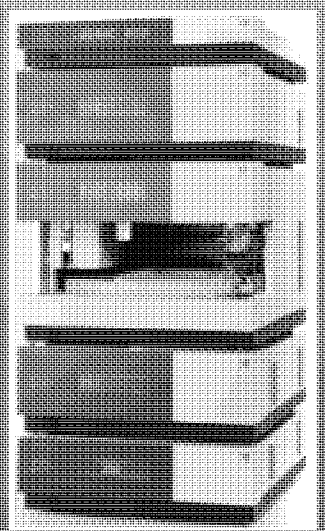
Step 4: Are "action level" exceeded?

- Action: Remedial action implemented

Recommended PFAS Sampling/Screening Procedures

- Sampling procedures must address potential cross contamination and/or false positives from typical field sampling tools:
  - Rite-in-Rain and other all-weather field equipment
  - Teflon® lined bottles, gloves, tape, tubing, and bailers
  - Decon 90 and other decon solutions
  - Tyvek® suits
- Preference for a 250 mL high-density polyethylene (HDPE) bottle, no preservatives
- Standardized SOPs EPA Method 537 (drinking water) and ISO 25101-PFOS and PFOA in water;
- Method detection limits for ECs are generally lower (ng/L vs ug/L)
- Field screening kits/equipment for PFCs are in development:
  - Ziltek Remscan uses infra-red spectroscopy; proven for screening HCs
  - Methylene Blue Active Substance (MBAS) Assay—Colorimetric test used to detect presence of foaming agents and other anionic substances in water





PFAS Sampling Considerations

Prohibited	Acceptable
Field	
Teflon® containing materials	High-density polyethylene (HDPE) materials
Low density polyethylene (LDPE) materials	Acetate liners
	Silicon tubing
Waterproof field books	Loose paper (non-waterproof)
Plastic clipboards, binders, or spiral bound cover notebooks	Aluminum field clipboards or with Masonite
	Sharpie®, pens
Post-It Notes	
Chemical (blue) ice packs	Regular ice
Field Clothing and	
New cotton clothing or synthetic water resistant, waterproof, or stain-treated clothing, clothing containing Gore-Tex™	Well-laundered clothing made of natural fibers (preferable cotton)
Clothing laundered using fabric softener	No fabric
Boots containing Gore-Tex™	Boots made with polyurethane and PVC
Tyvek®	Cotton Clothing
No cosmetics, moisturizers, hand cream, or other related products as part of personal cleaning/showering routine on the morning of sampling	**Sunscreens** - Alba Organics Natural Sunscreen, Yes To Cucumbers, Aubrey Organics, Jason Natural Sun Block, Kiss my face, Baby sunscreens that are "free" or "natural" **Insect Repellents** - Jason Natural Quit Bugging Me, Repel Lemon Eucalyptus Insect repellent, Herbal Armor, California Baby Natural Bug Spray, BabyGanics **Sunscreen and insect repellent** - Avon Skin So Soft Bug Guard Plus - SPF 30 Lotion
Sample	
LDPE or glass containers	HDPE or polypropylene
Teflon®-lined caps	Unlined polypropylene caps
Rain	
Waterproof or resistant rain gear	Gazebo tent that is only touched or moved prior to and following sampling activities
Equipment	
Decon 90	Alconox® and or Liquinox®
Water from an on-site well	Potable water from remote drinking water supply
Food	
All food and drink, with exceptions noted on the right	Bottled water and hydration drinks (i.e. Gatorade® and Powerade®) to be bought and consumed only in the staging area

Remediation Technologies

- Water
  - Granulated Activated Carbon—best available
  - Ion Exchange resins—somewhat effective but difficult to regenerate media
  - Reverse Osmosis—additional O&M, waste management of concentrate
  - Filtration
  - Destruction (e.g., ISCO, UV-oxidation, ZVI, other chemically mediated processes)—mostly proof of concept/lab/bench scale R&D
- Solids
  - Landfill—not recommend unless dedicated cell with landfill leachate treatment
  - Incineration—high concentration/low volume (>1100 °C)
  - Incineration—low concentration/higher volume

Remediation Technologies

Compound	M.W. (g/mol)	Aeration	Coagulation Dissolved Air Floatation	Coagulation Flocculation Sedimentation Filtration	Conventional Oxidation (MnO_4, O_3, ClO_2, CLM, UV-AOP)	Anion Exchange (select resins tested)	**Granular Activated Carbon**	**Nano Filtration**	**Reverse Osmosis**
PFBA	214	assumed	assumed						
PFPeA	264								
PFHxA	314								
PFHpA	364								
PFOA	**414**								
PFNA	464					assumed	assumed		
PFDA	514					assumed	assumed		
PFBS	300								
PFHxS	400								
PFOS	**500**								
FOSA	499						assumed		assumed
N-MeFOSAA	571	assumed				assumed	assumed	assumed	
N-EtFOSAA	585					assumed	assumed	assumed	

Conventional Treatment

Specialized Treatment

> 90% removal

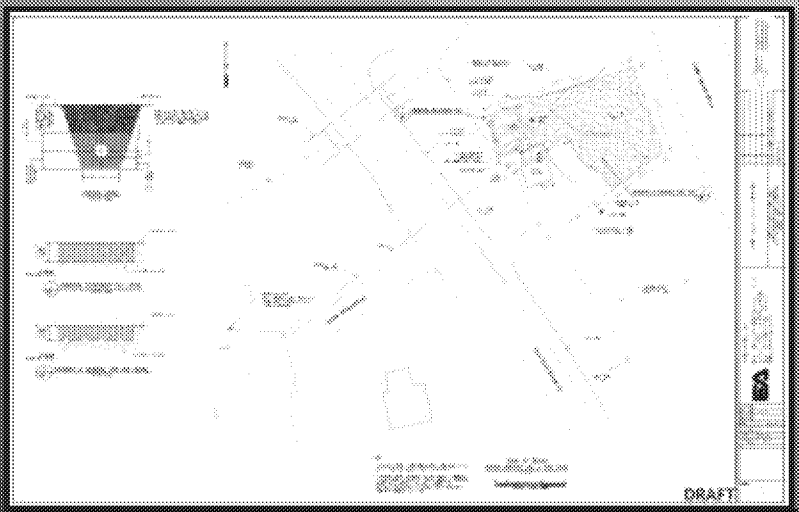
> 10%, < 90% removal

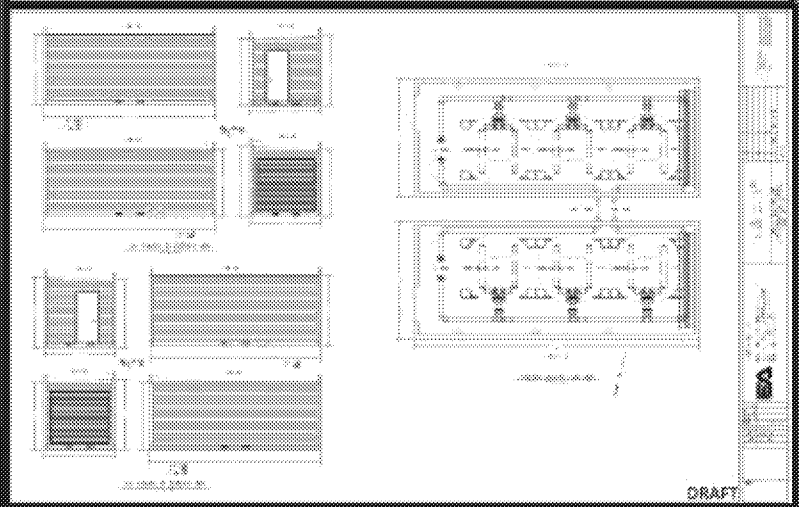
< 10% removal

unknown

Dickenson and Higgins, 2016. Treatment mitigation strategies for poly- and perfluoralkyl substances, Water Research Foundation

Petersburgh Landfill Site Water Treatment Improvements, Berlin, New York





- Existing 500,000 gpd Public Water System
- Located 5 miles from Hoosick Falls
- Adjacent to landfill that received industrial waste from Honeywell and other industries
- NYSDEC required treatment because PFOA detected at 0.01 μg/L
- System includes 2 parallel 10,000 lb. GAC vessels
  - Empty bed contact time design for 350 gpm
  - At current flow and PFOA levels GAC will last more than 1000 years!
  - GAC change out will occur more frequently for aesthetic reasons
  - GAC disposal will include thermal reactivation

Summary

PFAS are a significant environmental challenge world-wide.

Managing pubic perceptions amidst uncertainties

- Evolving understanding of PFAS sources
- Evolving Analytical capabilities
- Evolving understanding of PFAS fate and transport
- Evolving risk assessment/toxicology

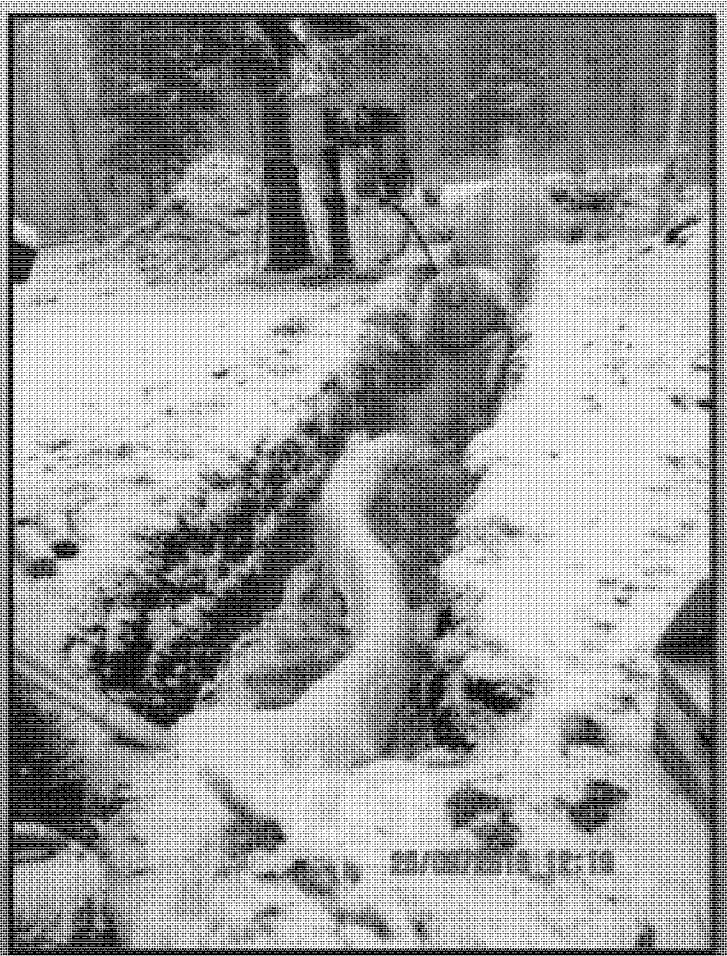
More cleanup standards/regulations will likely be established and are trending downward

- P&T with GAC may be best current GW treatment option
- Expanded PFAS focus beyond PFOS/PFOA
- PFAS are in the news

Case Study: Moose Creek, AK

PFAS Impacts Community/ Private Water Supply

Moose Creek, AK
PFAS Sampling and Water Treatment Systems

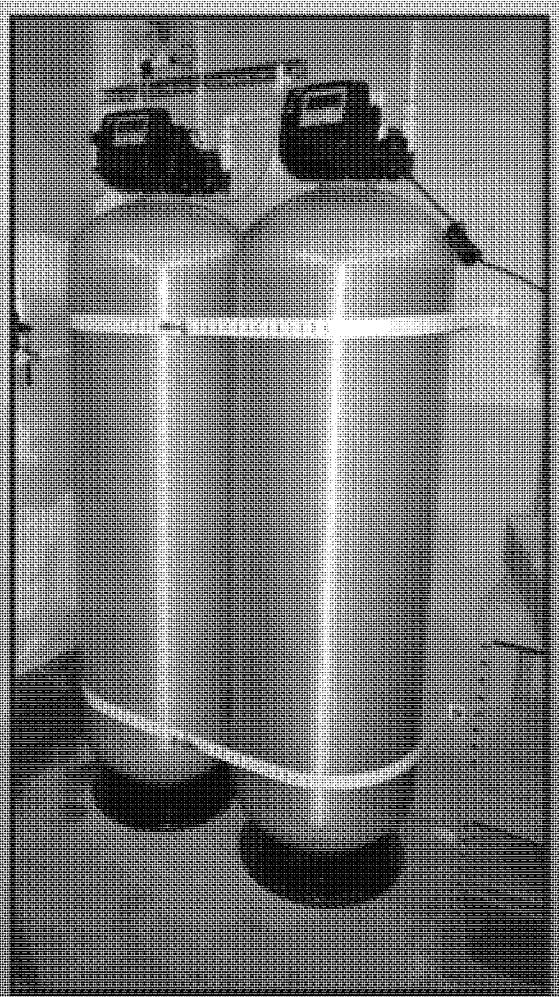


- Off-site migration of PFCs from Eielson AFB have more than 100 properties in Moose Creek, AK
- Impacted properties include;
  - Approximately 120 single family residences
  - Multiple duplex housing units
  - 11 fourplex units
  - Three apartment buildings (11,17,70 units)
  - Two commercial facilities
  - Two churches
  - Fire Station

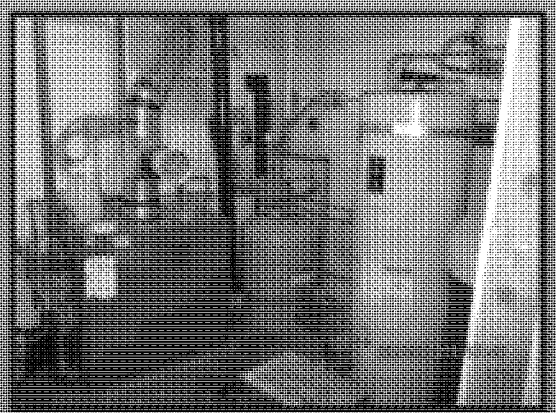
The list keeps growing…

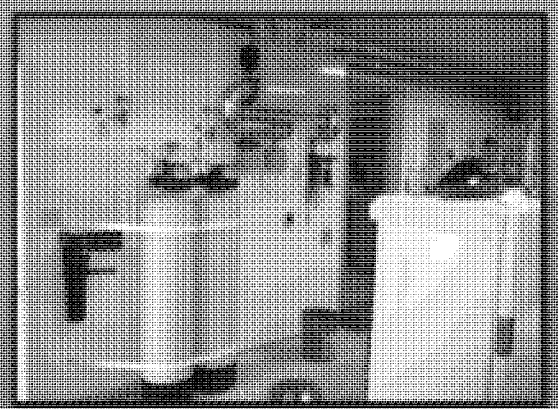
Moose Creek, AK

PFAS Sampling and Water Treatment Systems (cont.)



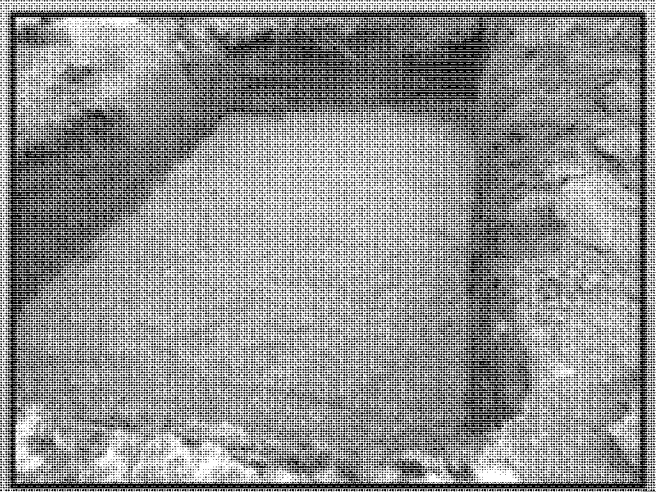
- The two general solutions include granular-activated carbon (GAC) treatment and water tank installation
- Treatment involves installation of 6 or 10 cubic foot GAC vessels depending on well flow rates
- GAC installation at most properties includes replacing water pumps/pressure tanks, installation or rerouting of drains/vents for backflush, and electrical effort to bring wiring to code



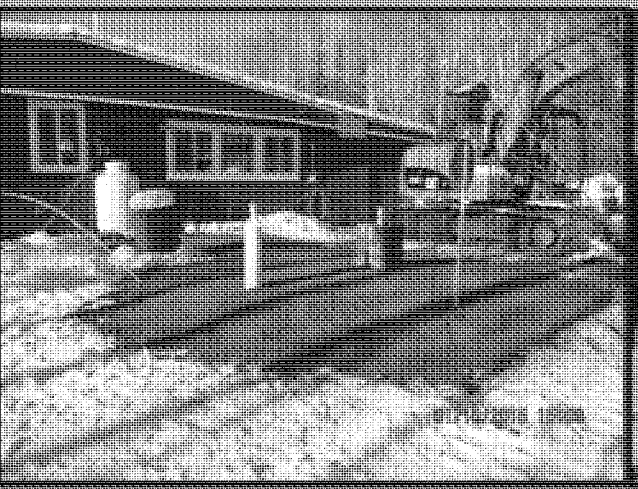


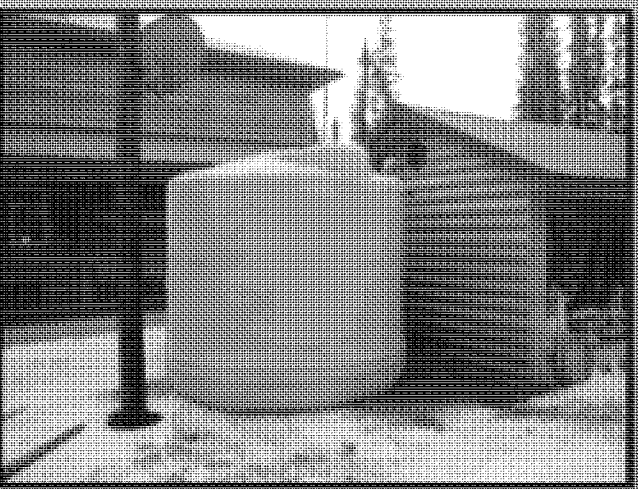
Moose Creek, AK

PFAS Sampling and Water Treatment Systems (cont.)



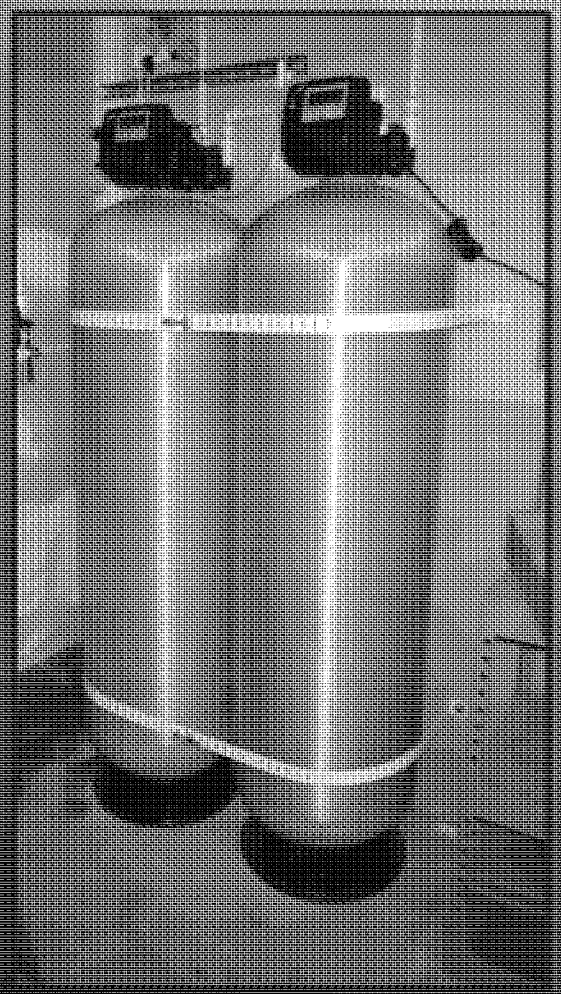
- The second option provided is installation of above ground or below ground water storage tanks
- Tanks sizes range from 1,500 – 2,500 gal.
- Water tank installation generally includes installation of a new water pump/pressure tank, a new electrical panel, and coordination with water delivery subcontractor



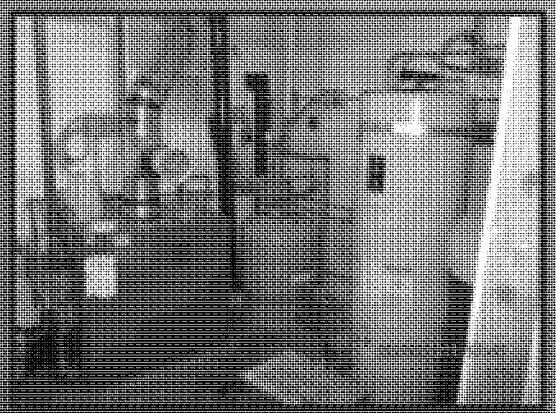


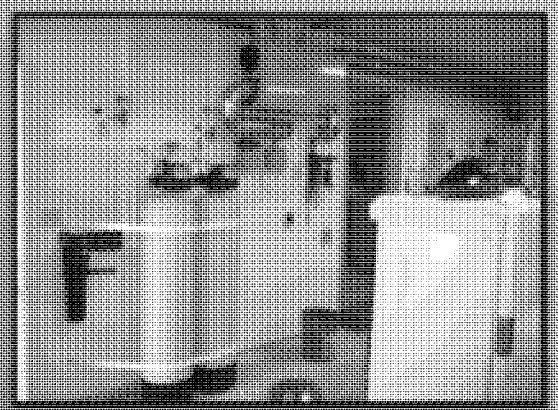
Moose Creek, AK (Eielson AFB)

PFAS Sampling and Water Treatment Systems



- 66 granular-activated carbon (GAC) treatment systems in operation of variable sizes
  - Approximately 22,500 lbs. of GAC in systems
  - Average PFOS/PFOA concentration 0.92 ug/L
  - More than 8 million gallons water treated to date
  - Generated 560 lbs. of spent GAC to date
  - Usage rate 2.5%/year of operation
  - Spent GAC disposal/reuse options

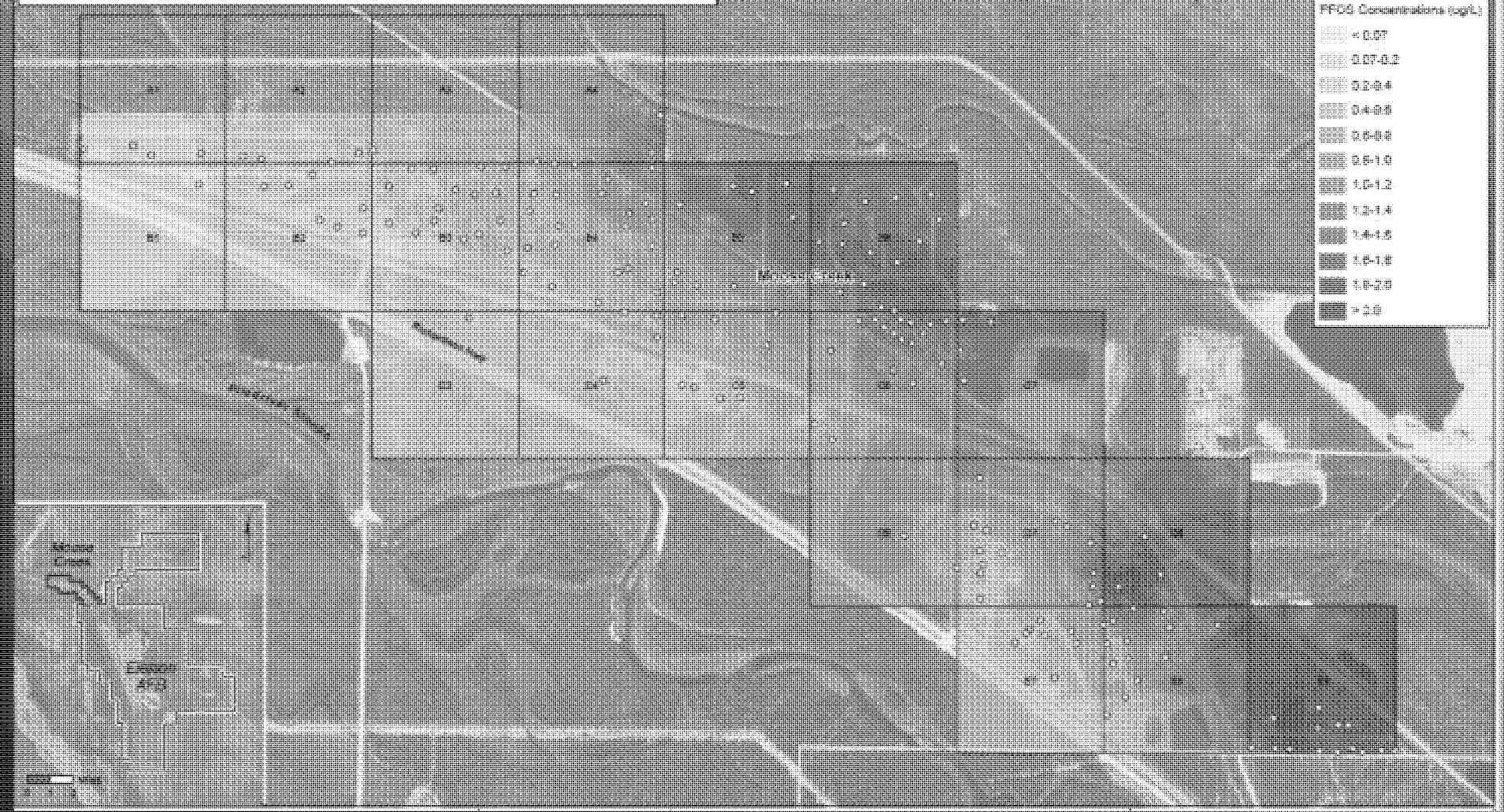




Moose Creek PFOS Results through September 2016

Note:
Concentrations less than or equal to 0.0140 µg/L are below 1/2 of the EPA Health Advisory Level (HA) (EPA 2016), concentrations of 0.0140-0.069 µg/L are equal to and above the 1/2 of the HA Level, and concentrations equal to or above 0.07 µg/L are exceeding the HA level.

Data Sources:
Jacobs 2016; EA 2016; Imagery: Alaska Mapped, Geographic Information Network of Alaska 2007



Case Study: NDEQ State-Wide Inventory

Inventory Approach

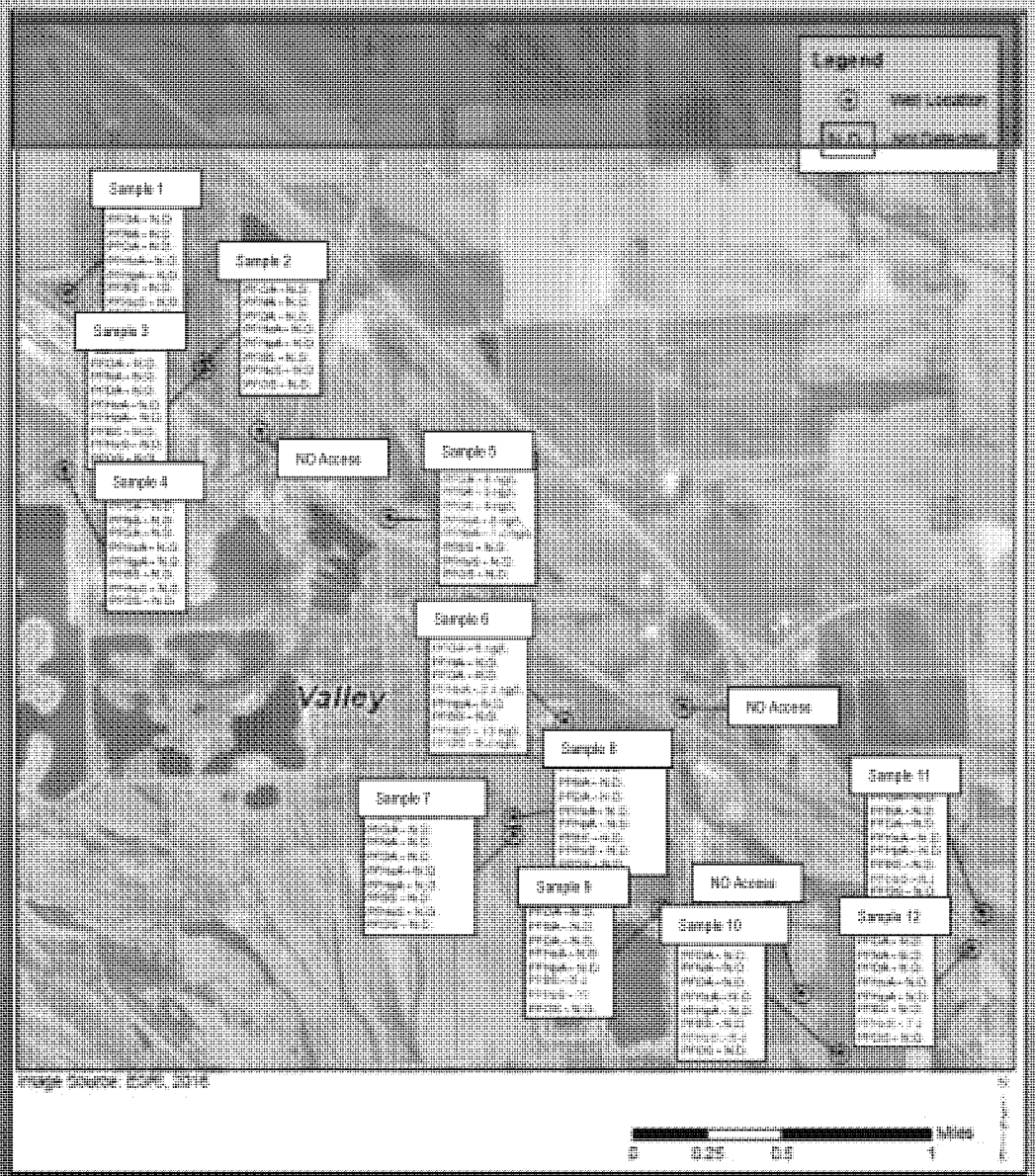
- Conducted NAICS/SIC code database search
- Searched other data base review (RCRA, State, Manufacturer Directory)
- GIS Mapping of potential sources
- Prioritization of potential sources for follow-up sampling (i.e., sensitive receptors)
  - Clustering of potential sources around drinking water intakes (private/public)
  - Clustering of potential sources around SWLF
  - Clustering of potential sources around WWTP
  - Heavy industrial (i.e., metals plating)
- Phase 2 will include site sampling/investigation

Site Physical Information

Activity	Chemical	PTFE Spray Coating Reduction?	PTFE Spray Coating Reduction	Potential Sensitive Pathways?	Estimated Size of Gas	Estimated Size of Gas
Electrostatic Coating/Anodyzing	Chrome/Nickel Plating & Anodyzing	90		Both		1999
Fire Fighting	AFFF					
Plastic Extrusion Monofilaments	Plastic Extrusion	90		Both		
Wire Coating/Cable Extrusion	PTFE Extrusion	90		Both		2006
Printing - Rotogravure						
Snowboard Manufacturing	Misc Other					
Paints, Stains & Coatings	Paint Manufacture			Water		
Wire Coating/Cable Extrusion	Plastic Extrusion			Both		
PTFE impregnated fabrics	PTFE impregnated fabrics/PTFE Spray Coating	100		Air	1970	2002
Electronics manufacturing						
Electrostatic Coating/Anodyzing	Chrome/Nickel Plating & Anodyzing	90		Both		
Performance Coatings	PTFE Spray Coating	90		Air		
Performance Coatings	PTFE Spray Coating	90		Air		
Capacitor Manufacturing	Misc Other	0				
PTFE Coated Ductwork	PTFE Spray Coating	90		Air	2002	
Paperboard	Impregnated/Coated paper Products			Both		
Paperboard w/ Coating	Impregnated/Coated paper Products			Both		2003
Electrostatic Coating/Anodyzing	Chrome/Nickel Plating & Anodyzing	90		Both		
Defense Armaments						
Defense Armaments						2001
Aircraft Turbine Manufacturing	Spray Coating			Air		
Aircraft Turbine Manufacturing	Chemical milling/etching			Both		
Semiconductor Manufacturing	Semiconductors	100		Both	1950	2010
Fire Fighting	AFFF					
Oven Manufacture	Spray Coating			Air		1999
Electrostatic Coating/Anodyzing	Chrome/Nickel Plating & Anodyzing	90		Both		
Plastics - Inj Molding	Inj Molding/Spray Coating			Both		
HDPE Pipe						
Wire Coating/Cable Extrusion	PTFE Extrusion	90		Both		
Electrostatic Coating/Anodyzing	Chrome/Nickel Plating & Anodyzing	90		Both		2014
Plastics - Inj Molding/Machinery	Inj Molding/Spray Coating			Both		
Mica Paper/Insulation Coatings	Impregnated/Coated paper Products			Both		
Electrostatic Coating/Anodyzing	Spray Coating	90		Both		
Electrostatic Coating/Anodyzing	Spray Coating	90		Both		2013
PVC Vinyl Siding						
Electrostatic Coating/Anodyzing	Chrome/Nickel Plating & Anodyzing	90		Both		
Electrostatic Coating/Anodyzing	Chrome/Nickel Plating & Anodyzing	90		Both		
Plastics - Inj Molding and Finishing	Inj Molding/Spray Coating			Both		
Plastics - Inj Molding and Finishing	Inj Molding/Spray Coating			Both		
Plastics - Inj Molding and Finishing	Inj Molding/Spray Coating			Both		
Hockey Jersey Manufacturing	Spray Coating?					
Semiconductor Manufacturing	Semiconductors					1981
Microfiche (film) Manufacturing	Impregnated/Coated paper Products			Both		
Antireflective Coatings	Misc Industrial					
Mineral Quarry						
Paper - Tissue						
Wire Coating/Dip Tank Emulsion	PTFE Emulsion	90		Both	1996	
Wire Coating/Dip Tank Emulsion	PTFE Emulsion	90		Both	1970	1990

Follow-up Sampling Verifies GW Impacts/Potential Source

- Initial Survey prioritizes areas of concern
- Sampling and Analysis identifies GW Impacts
- Potential source (manufacturing site identified)



Thank You!

Questions?

Paul Caprio, VP
Technical Director, Site Characterization and Remediation
EA Engineering, Science and Technology, Inc., PBC
410 584 7000 x 5156
pcaprio@east.com

Message

From: Grevatt, Peter [Grevatt.Peter@epa.gov]
Sent: 5/16/2018 5:30:14 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]; Robert Scott [robert.scott@des.nh.gov]; Cassidy, Meghan [Cassidy.Meghan@epa.gov]; Szaro, Deb [Szaro.Deb@epa.gov]; Murphy, Jim [Murphy.Jim@epa.gov]; Wagner, Kenneth [wagner.kenneth@epa.gov]; Forsgren, Lee [Forsgren.Lee@epa.gov]; Ross, David P [ross.davidp@epa.gov]
CC: Mclain, Jennifer [Mclain.Jennifer@epa.gov]; Wadlington, Christina [Wadlington.Christina@epa.gov]; Drinkard, Andrea [Drinkard.Andrea@epa.gov]
Subject: RE: Region 1 PFAS Workshop Confirmed for June 25-26

Thanks Alex and Commissioner Scott. This will be a terrific way to kick off the community engagement portion of our work towards a National PFAS Management Strategy. I think it will be great to include this in comments at the opening of the Summit next week. Looping in Ken, Lee and Dave for awareness.

From: Dunn, Alexandra
Sent: Wednesday, May 16, 2018 12:02 PM
To: Grevatt, Peter <Grevatt.Peter@epa.gov>; Robert Scott <robert.scott@des.nh.gov>; Cassidy, Meghan <Cassidy.Meghan@epa.gov>; Szaro, Deb <Szaro.Deb@epa.gov>; Murphy, Jim <Murphy.Jim@epa.gov>
Subject: Region 1 PFAS Workshop Confirmed for June 25-26

Peter -

Great news. The dates you offered work! Thanks to our colleague Commissioner Bob Scott in New Hampshire, EPA New England will host a regional PFAS workshop at NHDES' Seacoast office at Pease Intl Tradeport on June 25 from 5-9 (community engagement forum) and June 26 from 8-3 (working session). We are really looking forward to working with you to organize this event.

Maybe you, Bob, Deb and I can connect next week when in DC at the national event.

Best - Alex

Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***

Message

From: Ellenbogen, Victoria [Ellenbogen.Victoria@epa.gov]
Sent: 5/16/2018 4:44:23 PM
To: Craig.Butler@epa.ohio.gov; Jessica_bowman@fluorocouncil.org; Morris, Jeff [Morris.Jeff@epa.gov]; maureen.sullivan18.civ@mail.mil; tracie.white@state.co.us; Dunn, Alexandra [dunn.alexandra@epa.gov]; carel.vandermeyden@cfpua.org; brandon.kernen@des.nh.gov; Gillespie, Andrew [Gillespie.Andrew@epa.gov]; pjb7@cdc.gov; eolson@nrdc.org; GretherH@michigan.gov
CC: Wadlington, Christina [Wadlington.Christina@epa.gov]; Goodwin, Kara [goodwin.kara@epa.gov]
Subject: National PFAS Summit
Attachments: Security and Logistics_PFAS summit(02).pdf

Hello Panelists and Speakers,

This is a friendly reminder to provide any slides that you will be using to ellenbogen.victoria@epa.gov so that we can get them posted to the website by the end of this week. In addition, could you please also share your bio as well.

We also wanted to note that an updated agenda is located on the PFAS Website and we are resending the logistics handout in case it missed anyone. Please see attached.

Lastly, provided below is contact information for you to use when arriving at EPA. Please call or text this number when you arrive so that we can meet you at security.

Christina Wadlington
Ex. 6
Wadlington.christina@epa.gov

Thank you. Let us know if there are any questions.
-Victoria

Victoria Ellenbogen

Office of Ground Water and Drinking Water
U.S. Environmental Protection Agency
Washington, DC, Room 2368C, EPA East
Phone: (202) 564-2053
Email: Ellenbogen.Victoria@epa.gov

United States Environmental Protection Agency

National Leadership Summit: Per- and Polyfluoroalkyl Substances (PFAS)

May 22nd and May 23rd 2018

Security and Additional Logistics

Prior to Arriving at the EPA

Step 1. Confirm identity and register for Wi-Fi

- EPA requests that attendees confirm the full legal name of each participant for security purposes **by May 14**.
- Please ensure that the provided name matches your identification (see section on Security/Building Access).
- If you would like to register for Wi-Fi access at EPA, please also provide your organization name, email address and phone number. EPA will provide your log in credentials at check-in on May 22.
- Please use the following web address to confirm your identity and register for Wi-Fi: https://www.epa.gov/pfas/forms/pfas-national-leadership-summit-logistics

Step 2. Confirm lunch

- EPA will arrange for lunch to be delivered to meeting participants. Lunch will include a sandwich, chips and a drink for a cost of $10.
- To view lunch options and to place an order visit: https://www.epa.gov/pfas/forms/pfas-national-leadership-summit-logistics
- Lunch orders must be received **by May 14.**
- **Cash** will be collected at check-in on May 22.

We strongly encourage participants to take advantage of this option. Participants that choose to leave the building for lunch will need to be re-cleared through security.

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Arriving at the EPA

Please use the 1201 Constitution Ave NW Entrance (EPA Building East)

- EPA is most easily accessed by taking DC's subway, commonly called "Metro." The campus is located at the Federal Triangle Metro stop on the Blue/Orange/Silver lines.
- Use the **1201 Constitution Avenue NW** entrance to access the William Jefferson Clinton **East** EPA Building.
- Check in is **from 7:30am to 8:30am**
- Please arrive early enough to go through security and get checked in.

Technical Information

Accessing Wi-Fi

- The information being provided at https://www.epa.gov/pfas/forms/pfas-national-leadership-summit-logistics will also be used to facilitate Wi-Fi access.
- Wi-Fi login information will be provided at check-in for those that did not receive an email.

Participating in the Interactive Software

- A portion of the Summit will allow participants to interact with panelists and other attendees using their phones and computers.
- We are encouraging participants bring a smart phone, tablet, or laptop to participate in the Summit and access meeting materials.
- Throughout the meeting there will be EPA staff available to assist with technical issues and will be able to manually input responses in cases where participants choose not to or do not have an electronic device with them.

Security/Building Access

Going through Security

Guests visiting EPA headquarters:

- need to have an acceptable form of photo identification, such as a driver's license
- may be asked to go through a metal detector; and
- must be signed in and escorted by an EPA employee. An EPA employee will be there to escort attendees to the room.

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Acceptable Forms of Photo Identification

The Department of Homeland Security has begun implementing REAL ID Act requirements for visitors who present state-issued driver's licenses as IDs at restricted federal facilities. **In EPA headquarters buildings, driver's licenses must comply with REAL ID Act requirements.** Driver's licenses from states and territories that do not comply with the REAL ID Act will not be accepted as identification.

Individuals from states with noncompliant licenses may present alternative forms of identification:

One of These Items	OR	Two of These Items (one must include a photograph)
▪ Federal ID (PIV card, similar to an EPASS badge), ▪ U.S. passport, ▪ Permanent resident card (green card), ▪ Foreign passport, ▪ U.S. military ID		▪ ID card issued by federal, state, or local gov. ▪ School ID, ▪ Voter registration card, ▪ Native American tribal document, ▪ Social Security card, ▪ Birth certificate ▪ U.S. citizen ID card, ▪ Student green card, ▪ Employment authorization document issued by the Department of Homeland Security

General Summit Logistics

Location: Federal Triangle

US Environmental Protection Agency
William Jefferson Clinton Building East, Room 1153
1201 Constitution Ave, Washington, DC 20460

Date and Times: May 22nd and May 23rd 2018

May 22, 2018

- Attendees: All Invited Guests
- Start time: 8:30am
- Recommended arrival time (for security and check in): 7:30am
- End time: 5:30pm

May 23, 2018

- Attendees: States and Federal Partners
- Start time: 8:00am
- Recommend arrival time (for security and check in): 7:30am
- End time: 12:30pm

Transportation Options

ED_002545_00008627-00003

Closest Airports

- Ronald Reagan National Airport (DCA): 4 miles from EPA
  http://www.flyreagan.com/dca/reagan-national-airport
- Dulles International Airport (IAD): 27 miles from EPA
  http://www.flydulles.com/iad/dulles-international-airport

Getting Around

- Metro train: Orange, Red, Blue or Silver Lines https://www.wmata.com/
- Car: Parking is available in the Ronald Reagan Building and International Trade Center and nearby garages
- Other: Car sharing or bike sharing services

Lodging Options

Washington, DC

- Hotels along the Blue/Orange/Silver (e.g. Foggy Bottom, McPherson Square) and Red (e.g. Dupont Circle, Chinatown) metro train lines

Virginia

- Hotels along the Blue/Orange/Silver metro train lines (e.g. Rosslyn, Crystal City)
- Nearby towns: Arlington, Alexandria

Maryland

- Hotels along the Red metro train line (e.g. Silver Spring, Bethesda)
- Nearby towns: Takoma Park, Silver Spring, Bethesda

ED_002545_00008627-00004

Message

From: Scott, Robert [Robert.Scott@des.nh.gov]
Sent: 5/15/2018 5:20:41 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
CC: Cassidy, Meghan [Cassidy.Meghan@epa.gov]; Clark Freise [clark.freise@des.nh.gov]
Subject: RE: Commissioner - Per my voice mail

Thanks Alex. Yes we will support for June 25th and 26th.

Robert R Scott
Commissioner
New Hampshire Department of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095
W:
C: Ex. 6
Robert.Scott@des.nh.gov

From: Dunn, Alexandra [mailto:dunn.alexandra@epa.gov]
Sent: Tuesday, May 15, 2018 9:31 AM
To: Scott, Robert
Cc: Cassidy, Meghan
Subject: Commissioner - Per my voice mail

I have been successful in getting epa R1 to be the host of the first regional PFAS summit. Can u host at seaport des office 5-9 June 25 and 8-3 June 26?

Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***

Message

From: Scott, Robert [Robert.Scott@des.nh.gov]
Sent: 4/2/2018 1:16:43 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
Subject: RE: Opportunity to Attend EO Signing at White House April 6

Thanks for the thought but probably not as I need to take care of a few things here on Friday.

I understand that the Secretary of the Air Force will be at Pease on Thursday and meeting in the afternoon regarding contamination issues with Senator Shaheen. I assume that you are aware.

Will you be attending the PFAS summit in May? The plan at the moment is for Governor Sununu and myself to attend.

Robert R Scott
Commissioner
New Hampshire Department of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095
W:
C: Ex. 6
Robert.Scott@des.nh.gov

From: Dunn, Alexandra [mailto:dunn.alexandra@epa.gov]
Sent: Monday, April 2, 2018 7:57 AM
To: Scott, Robert
Subject: Opportunity to Attend EO Signing at White House April 6

Commissioner -

The President is signing an EO on April 6 with stakeholders to apply deadlines to SIPS, reconstruction permits, relying on monitoring, revisiting FIPs from regional haze and others etc.

EPA is inviting stakeholders. Would you be interested in coming? It's April 6 at the White House. Likely 1:45pm.

Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***

Message

From: Dunn, Alexandra [dunn.alexandra@epa.gov]
Sent: 2/14/2018 10:41:56 PM
To: 'robert.klee@ct.gov' [robert.klee@ct.gov]; 'Paul.mercer@maine.gov' [Paul.mercer@maine.gov]; martin.suuberg@state.ma.us; 'robert.scott@des.nh.gov' [robert.scott@des.nh.gov]; 'janet.coit@dem.ri.gov' [janet.coit@dem.ri.gov]; 'Julie.moore@vermont.gov' [Julie.moore@vermont.gov]; 'Emily.boedecker@vermont.gov' [Emily.boedecker@vermont.gov]
Subject: Call for State Applications for 2018 ORD ROCS-Net Program
Attachments: 2018 OVERVIEW EPA ORD-Region-States ROCS-Net ProgramR1final.docx; 2018 rocs-net_application_stateR`1.docx

Dear Colleagues,

I am pleased to announce the call for state applications for EPA Office of Research and Development's (ORD) **Regional/ORD Community of Science Networking (ROCS-Net) Program.** The ROCS-Net Program provides an opportunity for an EPA regional scientist/engineer to visit an ORD research facility and collaborate on a particular topic of interest. Region 1 has chosen to work on PFOA/PFAS Human Health Risk Assessment.

This year, ORD is extending an invitation to one state scientist per region to participate with the EPA regional scientist. The program will be held at EPA's research center in Cincinnati, Ohio from May 1-3. Participants will be assigned an ORD mentor, meet with ORD scientists, learn about ORD research capabilities, and tour the labs. EPA ORD will pay the travel expenses for one state participant from each EPA region.

State scientists who are interested in working on PFOA/PFOS Human Health Risk Assessment should consider applying for the program. Region 1 will select one state participant who will work closely with our Region 1 scientist in the program and will develop and present a paper on the science.

A ROCS-Net Program Overview and state application form are attached. Please submit applications to Region 1's Regional Science Liaison, Robert Hillger (Hillger.Robert@EPA.GOV) by **March 16**. Please reach out to Robert at Ex. 6 Ex. 6) with any questions or for more details.

Thank you,

Alex

PROGRAM OVERVIEW FOR STATE APPLICANTS

ROCS-Net is an EPA orientation and networking program for scientists and engineers. It provides an opportunity for EPA regional staff who have limited familiarity with EPA's Office of Research and Development (ORD) to visit an ORD research facility for discussions with ORD scientists about collaborative research opportunities, regional priorities and cross-cutting issues.

This year, ORD is launching a pilot project designed to strengthen ORD-Regional-State engagement on science-related activities. One component of the pilot is to include state scientists (one per region) in this year's ROCS-Net event.

2018 Program Goals

- Strengthen science across the agency by establishing new connections between ORD, regional and state scientists and engineers
- Promote a greater awareness within ORD of regional and state science issues
- Provide a path to future research collaborations

2018 Program Details

1. *What is the date of the event?*

The ROCS-Net event will be held on May 1-3, 2018, with travel days on April 30 and May 4.

2. *Which research facility will the participants visit in 2018?*

The event will be held at EPA's Andrew W. Breidenbach Environmental Research Center in Cincinnati, OH. Researchers from the following ORD National Laboratories and Centers work at this facility:

- National Homeland Security Research Center (NHSRC)
- National Exposure Research Laboratory (NERL)
- National Risk Management Research Laboratory (NRMRL)
- National Center for Environmental Assessment (NCEA)

3. *Who should apply?*

State scientists who would benefit from a greater understanding of ORD research capabilities and expertise should consider applying for the program. Selected state participants will work closely with their regional counterpart to develop and present a paper on the science issue selected by the region. Candidates must have supervisor approval to apply.

This year, Region I has selected PFOA/PFAS Human Health Risk Assessment as Region I's science issue.

4. *How do I apply?*

States can solicit internally in the appropriate environmental programs, forwarding one selected state candidate to Region I's Regional Science Liaison, Robert Hillger (Hillger.robert@epa.gov , 617-918-8660) by **March 16**.

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5. *Who will review and select the applications?*

The Regional Administrator and Deputy Regional Administrator will determine the best fit for the ROCS-Net event. The selected state participant will be notified by Robert Hillger who will coordinate all aspects of the Region I participation.

6. *How will travel and per diem expenses be covered?*
ORD's Office of Science Policy will cover the travel expenses for each state participant.

7. *What is the focus of this year's visit?*
The 2018 program will emphasize research conducted at the Cincinnati facility under the following ORD research programs:

- ORD's **Safe and Sustainable Water Resources (SSWR) research program** uses an integrated, systems approach to address current and future water resource challenges by developing scientific and technological solutions to protect human health, and to protect and restore watersheds and aquatic ecosystems. SSWR is organized into four topical areas: (1) watershed sustainability; (2) nutrients and harmful algal blooms; (3) stormwater management, including green infrastructure; and (4) water systems, including drinking water and wastewater treatment and infrastructure and water reuse.

- ORD's **Homeland Security research program (HSRP)** develops data, tools, and technologies to minimize the impact of accidents, natural disasters, terrorist attacks and other incidents. HSRP supports EPA emergency responders in characterizing chemical, biological, or radiological (CBR) contamination, cleaning up impacted areas, managing wastes, and improving community resilience.

- ORD's **Human Health Risk Assessment (HHRA) research program** provides a comprehensive set of risk assessment products and analytical approaches that support a wide range of environmental management decisions.

- ORD's **Sustainable and Healthy Communities (SHC) research program** provides innovative and effective technologies, guidance, and tools for decision makers to help communities advance sustainability and achieve regulatory compliance. ORD research areas include: oil spills remediation, materials and waste management, tools for structured decision making and community planning, technical support for contaminated sites, and innovative technologies for site and soil remediation. ORD's Engineering Technical Support Center is located in Cincinnati, OH and provides technical support for soil, sediment, and mining related contamination.

- ORD's **Chemical Safety for Sustainability (CSS) research program** provides publically available information and cutting edge methods to help us make better-informed, more-timely decisions about chemicals we may be exposed to on a daily basis. ORD research areas include: life cycle analysis, nanomaterials, and sustainable chemistry.

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8. *What is on the agenda for the visit?*
   - Meetings with ORD management and staff
   - Regional and state staff-led discussions about region and state specific science issues
   - Lab tours
   - Poster sessions and much more

9. What will participants be required to do prior to the visit?
   - Participate in a pre-visit orientation webinar in April to learn about ORD's organization, national research programs and research capabilities.
   - Work with your regional counterpart and Robert Hillger, Regional Science Liaison, to develop an issue paper. During the event in Cincinnati, regional and state participants will present the issue paper to event attendees during a panel session to generate discussions about possible opportunities for future collaboration.
   - Participants will be assigned an ORD host who will help build relationships and make connections at the ROCS-Net event. Prior to the event, participants will set up a short call with their assigned host to introduce themselves and briefly discuss the issue paper. This call will also provide an opportunity for participants to learn about ORD publications or other materials related to the identified issue.
   - ORD staff will assist participants with preparing travel arrangements.

10. What happens after the visit?
   - Participants will be invited to offer suggestions about how to improve the program and to further strengthen the community of science.
   - Six months after the event, OSP will organize a follow-up webinar to check in on progress and further encourage scientist-to-scientist networking.
   - Participants are encouraged to continue interacting with the contacts you made at the event to discuss future collaborative research opportunities.

12. Who do I contact for more information about the program?
For further questions about the program, please contact Heather Drumm (drumm.heather@epa.gov, 202-564-8239) or the Regional Science Liaison Robert Hillger (Hillger.robert@epa.gov, 617-918-8660).

ED_002545_00008643-00003

ROCS-Net

Regional ORD Community of Science Networking Program

EPA

State Application Cover Sheet

Date: _____

Applicant Name: _____

State/Office: _____

Position Title: _____

Years in Current Position: _____

Mailing Address: _____

_____

Email Address: _____

Supervisor's Name: _____

Supervisor's Email: _____

SIGNATURES:

_____ _____

Applicant Date

_____ _____

Supervisor Date

ROCS-Net

Regional ORD Community of Science Networking Program

EPA

Application Questions

Each answer should be no more than 250 words.

1. Describe your current job. How does science play a role in your day-to-day activities?

2. How will your participation in this program benefit:
    a. your professional development?
    b. your work, particularly with respect to the designated focus areas (water, homeland security, risk assessment, or contaminated sites)?

3. Explain your interest and/or background related to the science issue chosen by your EPA Region I: PFOA/PFAS Human Health Risk Assessment. *Note: the selected state participant will work with the EPA regional participant to develop an issue paper on the chosen issue and present the paper at the ROCS-Net event.*

Message

From: Dunn, Alexandra [dunn.alexandra@epa.gov]
Sent: 3/26/2018 9:33:58 PM
To: martin.suuberg@state.ma.us; 'robert.klee@ct.gov' [robert.klee@ct.gov]; 'Paul.mercer@maine.gov' [Paul.mercer@maine.gov]; 'robert.scott@des.nh.gov' [robert.scott@des.nh.gov]; 'janet.coit@dem.ri.gov' [janet.coit@dem.ri.gov]; 'Julie.moore@vermont.gov' [Julie.moore@vermont.gov]; 'Emily.boedecker@vermont.gov' [Emily.boedecker@vermont.gov]
CC: Szaro, Deb [Szaro.Deb@epa.gov]; Johnson, Arthur [Johnson.Arthur@epa.gov]
Subject: Extended Deadline - 3/29 - Call for State Applications for 2018 ORD ROCS-Net Program

Dear Colleagues,

The deadline for the state applications for the EPA Office of Research and Development's (ORD) **Regional/ORD Community of Science Networking (ROCS-Net) Program** has been extended to this **Thursday (3/29)**. We are still looking for candidates and hope you will take advantage of the ROCS-Net Program as it provides an opportunity for a scientist/engineer to visit an ORD research facility and collaborate on a particular topic of interest. Region 1 has chosen to work on PFOA/PFAS Human Health Risk Assessment.

Please submit applications to the Region 1 Office of Environmental Measurement and Evaluation Office Director, Art Johnson at Johnson.Arthur@epa.gov by **March 29**. If you have any questions, Art can be reached at Ex. 6 for more details.

Sincerely,

Alex

From: Dunn, Alexandra
Sent: Wednesday, February 14, 2018 5:42 PM
To: 'robert.klee@ct.gov' <robert.klee@ct.gov>; 'Paul.mercer@maine.gov' <Paul.mercer@maine.gov>; martin.suuberg@state.ma.us; 'robert.scott@des.nh.gov' <robert.scott@des.nh.gov>; 'janet.coit@dem.ri.gov' <janet.coit@dem.ri.gov>; 'Julie.moore@vermont.gov' <Julie.moore@vermont.gov>; 'Emily.boedecker@vermont.gov' <Emily.boedecker@vermont.gov>
Subject: Call for State Applications for 2018 ORD ROCS-Net Program

Dear Colleagues,

I am pleased to announce the call for state applications for EPA Office of Research and Development's (ORD) **Regional/ORD Community of Science Networking (ROCS-Net) Program.** The ROCS-Net Program provides an opportunity for an EPA regional scientist/engineer to visit an ORD research facility and collaborate on a particular topic of interest. Region 1 has chosen to work on PFOA/PFAS Human Health Risk Assessment.

This year, ORD is extending an invitation to one state scientist per region to participate with the EPA regional scientist. The program will be held at EPA's research center in Cincinnati, Ohio from May 1-3. Participants will be assigned an ORD mentor, meet with ORD scientists, learn about ORD research capabilities, and tour the labs. EPA ORD will pay the travel expenses for one state participant from each EPA region.

State scientists who are interested in working on PFOA/PFOS Human Health Risk Assessment should consider applying for the program. Region 1 will select one state participant who will work closely with our Region 1 scientist in the program and will develop and present a paper on the science.

A ROCS-Net Program Overview and state application form are attached. Please submit applications to Region 1's Regional Science Liaison, Robert Hillger (Hillger.Robert@EPA.GOV) by **March 16**. Please reach out to Robert at Ex. 6 Ex. 6 with any questions or for more details.

Thank you,

Alex

Message

From: Scott, Robert [Robert.Scott@des.nh.gov]
Sent: 1/4/2019 9:37:15 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
CC: Szaro, Deb [Szaro.Deb@epa.gov]
Subject: RE: Release: NHDES Proposes New PFAS Drinking Water Standards

I forgot my manners. Congratulations on your latest confirmation!

Robert R Scott
Commissioner
New Hampshire Department of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095
W:
C: Ex. 6
Robert.Scott@des.nh.gov

From: Dunn, Alexandra [mailto:dunn.alexandra@epa.gov]
Sent: Thursday, January 3, 2019 12:18 PM
To: Scott, Robert
Cc: Szaro, Deb
Subject: Re: Release: NHDES Proposes New PFAS Drinking Water Standards

Thanks Bob. Will share w EPA Office of Water too.

Sent from my iPhone

Alexandra Dapolito Dunn, J.D.
Regional Administrator
Region 1 New England
Ex. 6

This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act

On Jan 3, 2019, at 9:11 AM, Scott, Robert <Robert.Scott@des.nh.gov> wrote:

FYI

Robert R Scott
Commissioner
New Hampshire Department of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095
W:
C: Ex. 6
Robert.Scott@des.nh.gov

From: Martin, James
Sent: Wednesday, January 2, 2019 3:26 PM
Subject: Release: NHDES Proposes New PFAS Drinking Water Standards

News from the New Hampshire Department of Environmental Services

FOR IMMEDIATE RELEASE
DATE: January 2, 2019
CONTACT: Jim Martin, (603) 271-3710
des.nh.gov
twitter.com/NHDES

NHDES Proposes New PFAS Drinking Water Standards

Initiates Rulemaking for PFOA, PFOS, PFHxS and PFNA

Concord, NH – On December 31, 2018, the New Hampshire Department of Environmental Services (NHDES) initiated rulemaking to establish Maximum Contaminate Levels (MCLs) and Ambient Groundwater Quality Standards (AGQS) for four per- and polyfluoroalkyl substances (PFAS) - perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), perfluorononanoic acid (PFNA) and perfluorohexanesulfonic acid (PFHxS) to ensure greater protection of public health related to the consumption of drinking water. Specifically, NHDES filed a request for a fiscal impact statement for the new MCLs with the New Hampshire Legislative Budget Assistant, meeting the January 1 deadline established in New Hampshire Chapter Laws 345 and 368 of 2018 (i.e. SB 309).

These MCLs are drinking water quality standards that non-transient public water systems (water systems serving the same 25 people at least 60 days a year) must comply with. An AGQS is the standard used to require remedial action and the provision of alternative drinking water at a contaminated site. It also dictates the conditions under which treated and untreated wastewater may be discharged to groundwater. Current law requires AGQSs be the same value as any MCL established by NHDES and also that they be as stringent as health advisories set by the U.S. Environmental Protection Agency (EPA). In 2016, NHDES adopted EPA's health advisory for PFOA and PFOS as an AGQS (70 parts per trillion (ppt) combined).

To establish MCLs for PFOA, PFOS, PFHxS and PFNA, which by law then become AGQSs, NHDES had to also address the extent to which the contaminant is found in New Hampshire, the ability to detect the contaminant in public water systems, the ability to remove the contaminant from drinking water, and the costs and benefits to affected parties that will result from establishing the standard, and then develop a MCL for each compound that is protective of the most sensitive population at all life stages. The development of these standards was greatly enhanced by affected parties responding to NHDES' request for studies and information to be considered in deriving the MCLs (https://www.des.nh.gov/organization/commissioner/max-contaminant-levels.htm).

Using the most recent and best science available, NHDES is proposing the following drinking water standards that are protective of the most sensitive populations over a lifetime:

PFAS	Proposed MCL and AGQS
PFOA	38 ppt
PFOS	70 ppt
PFOA & PFOS (combined)	70 ppt
PFHxS	85 ppt
PFNA	23 ppt

Within the next few days, NHDES will release a summary report on the development of the drinking water standards (MCLs) including an explanation of the health risk assessment for each compound and information on cost, benefit, occurrence, and ability to detect and treat these chemicals. The report will be posted on the NHDES PFAS webpage - https://www4.des.state.nh.us/nh-pfas-investigation/

The majority of the work NHDES has performed to date has been focused on deriving the individual standards for PFOA, PFOS, PFNA and PFHxS that protect the most sensitive population through their lives. During the rulemaking process, NHDES expects to continue researching health studies on these chemicals as well as risk management approaches that are scientifically valid that could address any compounding effects between chemicals. Further exploration on quantifying benefit to affected parties will also occur. This continued effort will be done in tandem with considering public comments received on the initial rule proposal. NHDES recognizes and thanks the many stakeholder groups who have participated to date, and hopes they continue to be engaged throughout the public comment process.

Public hearings on the proposed MCLs will occur in southern NH, at Pease Tradeport, and at the NHDES offices in Concord in early March, which will provide the public more than a month to review the proposal and companion report. Depending on the comments received, it is anticipated that the final proposals will be filed by summer. The effective date of the new rules has yet to be determined.

# # #

James Martin
Public Information Officer
New Hampshire Department of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095
(603) 271-3710
www.des.nh.gov

<image001.png>Follow us on Twitter @NHDES
<image002.png>Like us on Facebook!
<image003.jpg>Subscribe to our YouTube Channel

Please consider the environment before printing this email <image004.jpg>

Message

From: Loyzim, Melanie [Melanie.Loyzim@maine.gov]
Sent: 3/15/2018 9:18:18 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
Subject: FW: Region 1 Memo RE: PFAS

Alex,
Do you have anything you can share in regards to the email below?
Thanks,
Melanie

From: Malinowski, Kerri
Sent: Thursday, March 15, 2018 4:04 PM
To: Loyzim, Melanie <Melanie.Loyzim@maine.gov>
Cc: Hodgeman, Christina S <Christina.S.Hodgeman@maine.gov>
Subject: Region 1 Memo RE: PFAS

Hi Melanie,
During a brief conversation I recently had with our new Region 1 Administrator, Alex mentioned a memo she recently sent to Administrator Pruitt which outlined five PFAS related challenges facing state agencies. As I understand it, there was a response from the federal office that gave Region 1 staff reason to believe that the PFAS issue may soon be handled in a more coordinated manner.
Have you seen this memo or have information about the five items discussed? It sounds like its contents could help inform our agency's efforts.
Thanks,
Kerri

Kerri Malinowski
Maine Department of Environmental Protection
Office of the Commissioner
Main Office: 207.287.7688
Direct: Ex. 6

http://www.maine.gov/dep/

Message

From: Kathy KH Ex. 6
Sent: 7/20/2018 4:38:00 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
CC: ecabanel@merrimacknh.gov; governorsununu@nh.gov; Laurene Allen Ex. 6
Subject: Latest test results from SG
Attachments: IISProxy (17).pdf

Good afternoon Ms Dunn, as you can see by the latest test results from SG, the numbers are still extremely high, and do not seem to be getting any lower.

We keep asking ourselves in Merrimack why these numbers continue to exceed State limits and it seems that nothing is being done by NHDES. As I have mentioned previously this is the groundwater that runs into our Brooks and Rivers and further contaminates our drinking water as these Brooks and Rivers are our main source of drinking water.

Also you will see in the test results that there are many more chemicals that are showing up in our water at consistently higher levels as well.

Again I thank you for your time and attention.

Katharine Hodge
😀

DES Waste Management Division
29 Hazen Drive; PO Box 95
Concord, NH 03302-0095

May 2018 Unvalidated Groundwater Data Submittal
Saint-Gobain Performance Plastics
701 Daniel Webster Highway
Merrimack, New Hampshire 03054
NHDES Site No.: 199712055
Project Number: 36430

Prepared For:
Saint-Gobain Performance Plastics Corp.
14 McCaffrey Street
Hoosick Falls, New York 12090
Phone Number (518) 686-6268
RP Contact Name: Chris Angier
RP Contact Email:
Christopher.Angier@saint-gobain.com

Prepared By:
Golder Associates Inc.
670 North Commercial Street
Manchester, New Hampshire 03101
Phone Number: (603) 688-0880
Contact Name: Ross Bennett
Contact Email: rbennett@golder.com

ross_bennett
@golder.com

Digitally signed by
ross_bennett@golder.com
DN:
cn=ross_bennett@golder.com
Date: 2018.07.13 16:10:01
-04'00'

Date of Report: July 13, 2018

GOLDER

July 13, 2018 Project No. 166-8623

Ms. Lea Anne Atwell
New Hampshire Department of Environmental Services
Waste Management Division
P.O. Box 95, 29 Hazen Drive
Concord, New Hampshire 03302-0095

RE: MAY 2018 UNVALIDATED GROUNDWATER DATA SUBMITTAL
SAINT-GOBAIN PERFORMANCE PLASTICS
701 DANIEL WEBSTER HIGHWAY, MERRIMACK, NEW HAMPSHIRE
NHDES SITE NO. 199712055

Dear Ms. Atwell:

Golder Associates Inc. (Golder) is pleased to provide this Data Submittal to the New Hampshire Department of Environmental Services (NHDES) on behalf of Saint-Gobain Performance Plastics (SGPP) for the SGPP facility located at 701 Daniel Webster Highway, Merrimack, New Hampshire (Site). This letter summarizes the May 2018 groundwater monitoring results.

At the request of the New Hampshire Department of Environmental Services (NHDES), Golder sampled three monitoring wells (GZ-1, GZ-2, and GZ-3) located on Flatley-owned tax lot 6E3-5 in Merrimack, New Hampshire on May 30, 2018. Golder sent the groundwater samples under chain-of-custody procedures to Eurofins Lancaster Laboratories Environmental, Inc. of Lancaster, Pennsylvania (ELLE) for analysis of per- and polyfluoroalkyl substances (PFAS) by Method 537.1.1. Laboratory analytical reports are included as Attachment A and field forms for the sampling event are provided as Attachment B. Analytical results are summarized in Table 1. Analytical results provided in this data submittal have not yet been validated. Validated data will be submitted to NHDES within 45 days of receipt of analytical data in all formats necessary for the validation process from ELLE, which have not been provided to Golder as of July 13, 2018. Golder measured the depth-to-water in the monitoring wells on May 30, 2018 after sampling was completed. Groundwater elevation data are summarized in Table 2.

Should you have any questions regarding this Data Submittal, please call Mr. Ross Bennett at (603) 668-0880.

Sincerely,

Golder Associates Inc.

Alistair Macdonald, P.G., LSP
Senior Program Leader and Principal

Ross Bennett, P.E.
Senior Engineer

Encl: Table 1 – Preliminary Groundwater Data Summary Table – May 2018
Table 2 – Groundwater Elevation Summary – May 2018
Attachment A – May 2018 Laboratory Analytical Reports
Attachment B – May 2018 Field Sampling Forms

LWL/RWB/drb

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Golder Associates Inc.
670 North Commercial Street, Suite 103, Manchester, NH 03101 T: +1 603 668-0880 F: +1 603 668-1199

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TABLES

Table 1: Preliminary Groundwater Data Summary Table - May 2018
Saint-Gobain Performance Plastics
Merrimack, New Hampshire

Location	Sample Date	Sample Type	Analyte Name	N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)		N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)		Perfluorobutanesulfonic acid (PFBS)		Perfluorobutanoic acid (PFBA)		Perfluorodecanoic acid (PFDA)		Perfluorododecanoic acid (PFDOA)		Perfluoroheptanoic acid (PFHPA)		Perfluorohexanesulfonic acid (PFHXS)		Perfluorohexanoic acid (PFHXA)		Perfluorononanoic acid (PFNA)		Perfluoro-octanesulfonic acid (PFOS)		Perfluorooctanoic acid (PFOA)		Perfluoropentanoic acid (PFPEA)		Perfluorotetradecanoic acid (PFTEDA)		Perfluorotridecanoic acid (PFTRDA)		Perfluoroundecanoic acid (PFUNA)	
			Validated (Y/N)	ng/l		ng/l		ng/l		ng/l		ng/l		ng/l		ng/l		ng/l		ng/l		ng/l		ng/l		ng/l		ng/l		ng/l		ng/l		ng/l	
GZ-1	5/30/2018	N	N	0.92	U	0.92	U	18		200		0.92	U	0.28	U	1500		58		1500		26		30		7000		610		0.28	U	0.28	U	0.37	U
		FD	N	0.90	U	0.90	U	16		180		0.90	U	0.27	U	1200		52		1400		23		25		5900		570		0.27	U	0.27	U	0.36	U
GZ-2	5/30/2018	N	N	9.0	U	9.0	U	12		350		9.0	U	2.7	U	3300		130		1200		5.3	J	3.8	J	11000		650		2.7	U	2.7	U	3.6	U
GZ-3	5/30/2018	N	N	9.0	U	9.0	U	5.9	J	310		9.0	U	2.7	U	1100		80		740		3.6	U	4.1	J	19000		590		2.7	U	2.7	U	3.6	U

Notes:

1. Samples were collected by Golder on the dates indicated and submitted to Eurofins Lancaster Laboratory Environmental, Inc. (ELLE) of Lancaster, PA for analysis of the indicated compounds. Data presented in the table are unvalidated.
2. U - analytical results below laboratory method detection limit
   J = analytical results above laboratory method detection limit but below laboratory reporting limit
3. N = indicates normal sample FD - indicates the sample is a field duplicate
4. ng/L - nanograms per liter

Prepared By: LWL
Checked By: STD
Reviewed By: RWB

TABLE 2: Groundwater Elevation Summary - May 2018
Saint-Gobain Performance Plastics
Merrimack, New Hampshire

Monitoring Location	Date	5/30/2018	
	Ref. Elev.	DTW (ft)	Elevation (ft amsl)
GZ-1	186.04	10.30	175.74
GZ-2	185.73	9.38	176.35
GZ-3	184.56	7.81	176.75

Notes:
1. Groundwater elevation data were collected by Golder Associates, Inc. after sampling was completed.
2. NM = not measured
   DTW = depth to water
   ft = feet
   amsl = above mean sea level

Prepared by: LWL
Checked by: STD
Reviewed by: RWB

ATTACHMENT A

ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Golder Associates
670 North Commercial Street
Suite 103
Manchester NH 03101

Report Date: June 18, 2018 16:05

Project: SGPP-Merrimack NH

Account #: 10253
Group Number: 1949637
SDG: GOA19
PO Number: PROJECT: 166-8623
State of Sample Origin: NH

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our current scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ . To request copies of prior scopes of accreditation, contact your project manager.

Electronic Copy To	Golder Associates	Attn: Scott Drew
Electronic Copy To	Golder Associates	Attn: Ross Bennett
Electronic Copy To	Environmental Standards	Attn: SaintGobain
Electronic Copy To	Environmental Standards	Attn: Meg Michell
Electronic Copy To	Golder Associates	Attn: Jim Peace

Respectfully Submitted,

Nancy Jean Bornholm

Nancy Jean Bornholm
Principal Specialist

(717) 556-7250

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SAMPLE INFORMATION

Client Sample Description	Sample Collection Date/Time	ELLE#
GZ-1 Grab Groundwater	05/30/2018 10:35	9636396
GZ-2 Grab Groundwater	05/30/2018 12:35	9636397
GZ-3 Grab Groundwater	05/30/2018 14:30	9636398
Dup-1 Grab Groundwater	05/30/2018 10:35	9636399
EB-1 Grab Water	05/30/2018 14:45	9636400
FB-1 Grab Water	05/30/2018 14:10	9636401
TB-1 Grab Water	05/30/2018 14:55	9636402

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

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Project Name: SGPP-Merrimack NH
ELLE Group #: 1949637

General Comments:

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below.
Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are not included in this data set.

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

Analysis Specific Comments:

EPA 537 Version 1.1 Modified, LC/MS/MS Miscellaneous

Sample #s: 9636397, 9636398

Reporting limits were raised due to interference from the sample matrix.

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Analysis Report

Sample Description: GZ-1 Grab Groundwater SGPP

Project Name: SGPP-Merrimack NH

Submittal Date/Time: 05/31/2018 10:10
Collection Date/Time: 05/30/2018 10:35
SDG#: GOA19-01

Golder Associates
ELLE Sample #: WW 9636396
ELLE Group #: 1949637
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1 Modified**		ng/l	ng/l	ng/l	
14473	NEtFOSAA	2991-50-6	0.92 U	0.92	2.8	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14473	NMeFOSAA	2355-31-9	0.92 U	0.92	2.8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14473	Perfluorobutanesulfonic Acid	375-73-5	18	0.28	0.92	1
14473	Perfluorobutanoic acid	375-22-4	200	1.8	5.5	1
14473	Perfluorodecanoic acid	335-76-2	0.92 U	0.92	1.8	1
14473	Perfluorododecanoic acid	307-55-1	0.28 U	0.28	0.92	1
14473	Perfluoroheptanoic acid	375-85-9	1,500	28	92	100
14473	Perfluorohexanesulfonic Acid	355-46-4	58	0.37	1.8	1
14473	Perfluorohexanoic acid	307-24-4	1,500	3.7	18	10
14473	Perfluorononanoic acid	375-95-1	26	0.37	1.8	1
14473	Perfluoro-Octanesulfonic Acid	1763-23-1	30	0.37	1.8	1
14473	Perfluorooctanoic acid	335-67-1	7,000	28	92	100
14473	Perfluoropentanoic acid	2706-90-3	610	18	55	10
14473	Perfluorotetradecanoic acid	376-06-7	0.28 U	0.28	0.92	1
14473	Perfluorotridecanoic acid	72629-94-8	0.28 U	0.28	0.92	1
14473	Perfluoroundecanoic acid	2058-94-8	0.37 U	0.37	1.8	1

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	16 PFAS Compounds	EPA 537 Version 1.1 Modified	1	18155013	06/14/2018 01:38	Joshua P Trost	1
14473	16 PFAS Compounds	EPA 537 Version 1.1 Modified	1	18155013	06/14/2018 03:42	Joshua P Trost	10
14473	16 PFAS Compounds	EPA 537 Version 1.1 Modified	1	18155013	06/14/2018 04:44	Joshua P Trost	100
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	18155013	06/04/2018 17:15	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: GZ-2 Grab Groundwater SGPP

Project Name: SGPP-Merrimack NH

Submittal Date/Time: 05/31/2018 10:10
Collection Date/Time: 05/30/2018 12:35
SDG#: GOA19-02

Golder Associates
ELLE Sample #: WW 9636397
ELLE Group #: 1949637
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1 Modified**		ng/l	ng/l	ng/l	
14473	NEtFOSAA	2991-50-6	9.0 U	9.0	27	10
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14473	NMeFOSAA	2355-31-9	9.0 U	9.0	27	10
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14473	Perfluorobutanesulfonic Acid	375-73-5	12	2.7	9.0	10
14473	Perfluorobutanoic acid	375-22-4	350	18	54	10
14473	Perfluorodecanoic acid	335-76-2	9.0 U	9.0	18	10
14473	Perfluorododecanoic acid	307-55-1	2.7 U	2.7	9.0	10
14473	Perfluoroheptanoic acid	375-85-9	3,300	27	90	100
14473	Perfluorohexanesulfonic Acid	355-46-4	130	3.6	18	10
14473	Perfluorohexanoic acid	307-24-4	1,200	3.6	18	10
14473	Perfluorononanoic acid	375-95-1	5.3 J	3.6	18	10
14473	Perfluoro-Octanesulfonic Acid	1763-23-1	3.8 J	3.6	18	10
14473	Perfluorooctanoic acid	335-67-1	11,000	27	90	100
14473	Perfluoropentanoic acid	2706-90-3	650	18	54	10
14473	Perfluorotetradecanoic acid	376-06-7	2.7 U	2.7	9.0	10
14473	Perfluorotridecanoic acid	72629-94-8	2.7 U	2.7	9.0	10
14473	Perfluoroundecanoic acid	2058-94-8	3.6 U	3.6	18	10

Reporting limits were raised due to interference from the sample matrix.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	16 PFAS Compounds	EPA 537 Version 1.1 Modified	1	18155013	06/14/2018 03:58	Joshua P Trost	10
14473	16 PFAS Compounds	EPA 537 Version 1.1 Modified	1	18155013	06/14/2018 05:00	Joshua P Trost	100
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	18155013	06/04/2018 17:15	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: **GZ-3 Grab Groundwater SGPP**

Project Name: **SGPP-Merrimack NH**

Submittal Date/Time: 05/31/2018 10:10
Collection Date/Time: 05/30/2018 14:30
SDG#: GOA19-03

Golder Associates
ELLE Sample #: WW 9636398
ELLE Group #: 1949637
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result		Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1 Modified**		ng/l		ng/l	ng/l	
14473	NEtFOSAA	2991-50-6	9.0	U	9.0	27	10
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.						
14473	NMeFOSAA	2355-31-9	9.0	U	9.0	27	10
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.						
14473	Perfluorobutanesulfonic Acid	375-73-5	5.9	J	2.7	9.0	10
14473	Perfluorobutanoic acid	375-22-4	310		18	54	10
14473	Perfluorodecanoic acid	335-76-2	9.0	U	9.0	18	10
14473	Perfluorododecanoic acid	307-55-1	2.7	U	2.7	9.0	10
14473	Perfluoroheptanoic acid	375-85-9	1,100		27	90	100
14473	Perfluorohexanesulfonic Acid	355-46-4	80		3.6	18	10
14473	Perfluorohexanoic acid	307-24-4	740		3.6	18	10
14473	Perfluorononanoic acid	375-95-1	3.6	U	3.6	18	10
14473	Perfluoro-Octanesulfonic Acid	1763-23-1	4.1	J	3.6	18	10
14473	Perfluorooctanoic acid	335-67-1	19,000		27	90	100
14473	Perfluoropentanoic acid	2706-90-3	590		18	54	10
14473	Perfluorotetradecanoic acid	376-06-7	2.7	U	2.7	9.0	10
14473	Perfluorotridecanoic acid	72629-94-8	2.7	U	2.7	9.0	10
14473	Perfluoroundecanoic acid	2058-94-8	3.6	U	3.6	18	10

Reporting limits were raised due to interference from the sample matrix.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	16 PFAS Compounds	EPA 537 Version 1.1 Modified	1	18155013	06/14/2018 04:13	Joshua P Trost	10
14473	16 PFAS Compounds	EPA 537 Version 1.1 Modified	1	18155013	06/14/2018 05:16	Joshua P Trost	100
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	18155013	06/04/2018 17:15	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: **Dup-1 Grab Groundwater SGPP**

Project Name: **SGPP-Merrimack NH**

Submittal Date/Time: 05/31/2018 10:10
Collection Date/Time: 05/30/2018 10:35
SDG#: GOA19-04FD

Golder Associates
ELLE Sample #: WW 9636399
ELLE Group #: 1949637
Matrix: Groundwater

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1 Modified**		ng/l	ng/l	ng/l	
14473	NEtFOSAA	2991-50-6	0.90 U	0.90	2.7	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14473	NMeFOSAA	2355-31-9	0.90 U	0.90	2.7	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14473	Perfluorobutanesulfonic Acid	375-73-5	16	0.27	0.90	1
14473	Perfluorobutanoic acid	375-22-4	180	1.8	5.4	1
14473	Perfluorodecanoic acid	335-76-2	0.90 U	0.90	1.8	1
14473	Perfluorododecanoic acid	307-55-1	0.27 U	0.27	0.90	1
14473	Perfluoroheptanoic acid	375-85-9	1,200	27	90	100
14473	Perfluorohexanesulfonic Acid	355-46-4	52	0.36	1.8	1
14473	Perfluorohexanoic acid	307-24-4	1,400	3.6	18	10
14473	Perfluorononanoic acid	375-95-1	23	0.36	1.8	1
14473	Perfluoro-Octanesulfonic Acid	1763-23-1	25	0.36	1.8	1
14473	Perfluorooctanoic acid	335-67-1	5,900	27	90	100
14473	Perfluoropentanoic acid	2706-90-3	570	18	54	10
14473	Perfluorotetradecanoic acid	376-06-7	0.27 U	0.27	0.90	1
14473	Perfluorotridecanoic acid	72629-94-8	0.27 U	0.27	0.90	1
14473	Perfluoroundecanoic acid	2058-94-8	0.36 U	0.36	1.8	1

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	16 PFAS Compounds	EPA 537 Version 1.1 Modified	1	18155013	06/14/2018 02:25	Joshua P Trost	1
14473	16 PFAS Compounds	EPA 537 Version 1.1 Modified	1	18155013	06/14/2018 04:29	Joshua P Trost	10
14473	16 PFAS Compounds	EPA 537 Version 1.1 Modified	1	18155013	06/14/2018 05:31	Joshua P Trost	100
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	18155013	06/04/2018 17:15	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: **EB-1 Grab Water SGPP**

Project Name: **SGPP-Merrimack NH**

Submittal Date/Time: 05/31/2018 10:10
Collection Date/Time: 05/30/2018 14:45
SDG#: GOA19-05EB

Golder Associates
ELLE Sample #: **WW 9636400**
ELLE Group #: **1949637**
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1 Modified**		ng/l	ng/l	ng/l	
14473	NEtFOSAA	2991-50-6	0.91 U	0.91	2.7	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14473	NMeFOSAA	2355-31-9	0.91 U	0.91	2.7	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14473	Perfluorobutanesulfonic Acid	375-73-5	0.27 U	0.27	0.91	1
14473	Perfluorobutanoic acid	375-22-4	1.8 U	1.8	5.5	1
14473	Perfluorodecanoic acid	335-76-2	0.91 U	0.91	1.8	1
14473	Perfluorododecanoic acid	307-55-1	0.27 U	0.27	0.91	1
14473	Perfluoroheptanoic acid	375-85-9	0.27 U	0.27	0.91	1
14473	Perfluorohexanesulfonic Acid	355-46-4	0.36 U	0.36	1.8	1
14473	Perfluorohexanoic acid	307-24-4	0.36 U	0.36	1.8	1
14473	Perfluorononanoic acid	375-95-1	0.36 U	0.36	1.8	1
14473	Perfluoro-Octanesulfonic Acid	1763-23-1	0.36 U	0.36	1.8	1
14473	Perfluorooctanoic acid	335-67-1	0.27 U	0.27	0.91	1
14473	Perfluoropentanoic acid	2706-90-3	1.8 U	1.8	5.5	1
14473	Perfluorotetradecanoic acid	376-06-7	0.27 U	0.27	0.91	1
14473	Perfluorotridecanoic acid	72629-94-8	0.27 U	0.27	0.91	1
14473	Perfluoroundecanoic acid	2058-94-8	0.36 U	0.36	1.8	1

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	16 PFAS Compounds	EPA 537 Version 1.1 Modified	1	18155013	06/14/2018 02:40	Joshua P Trost	1
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	18155013	06/04/2018 17:15	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: **FB-1 Grab Water SGPP**

Project Name: **SGPP-Merrimack NH**

Submittal Date/Time: 05/31/2018 10:10
Collection Date/Time: 05/30/2018 14:10
SDG#: GOA19-06FB

Golder Associates
ELLE Sample #: **WW 9636401**
ELLE Group #: **1949637**
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1 Modified**		ng/l	ng/l	ng/l	
14473	NEtFOSAA	2991-50-6	0.90 U	0.90	2.7	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14473	NMeFOSAA	2355-31-9	0.90 U	0.90	2.7	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14473	Perfluorobutanesulfonic Acid	375-73-5	0.27 U	0.27	0.90	1
14473	Perfluorobutanoic acid	375-22-4	1.8 U	1.8	5.4	1
14473	Perfluorodecanoic acid	335-76-2	0.90 U	0.90	1.8	1
14473	Perfluorododecanoic acid	307-55-1	0.27 U	0.27	0.90	1
14473	Perfluoroheptanoic acid	375-85-9	0.27 U	0.27	0.90	1
14473	Perfluorohexanesulfonic Acid	355-46-4	0.36 U	0.36	1.8	1
14473	Perfluorohexanoic acid	307-24-4	0.36 U	0.36	1.8	1
14473	Perfluorononanoic acid	375-95-1	0.36 U	0.36	1.8	1
14473	Perfluoro-Octanesulfonic Acid	1763-23-1	0.36 U	0.36	1.8	1
14473	Perfluorooctanoic acid	335-67-1	0.27 U	0.27	0.90	1
14473	Perfluoropentanoic acid	2706-90-3	1.8 U	1.8	5.4	1
14473	Perfluorotetradecanoic acid	376-06-7	0.27 U	0.27	0.90	1
14473	Perfluorotridecanoic acid	72629-94-8	0.27 U	0.27	0.90	1
14473	Perfluoroundecanoic acid	2058-94-8	0.36 U	0.36	1.8	1

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	16 PFAS Compounds	EPA 537 Version 1.1 Modified	1	18155013	06/14/2018 02:56	Joshua P Trost	1
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	18155013	06/04/2018 17:15	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: **TB-1 Grab Water SGPP**

Project Name: **SGPP-Merrimack NH**

Submittal Date/Time: 05/31/2018 10:10
Collection Date/Time: 05/30/2018 14:55
SDG#: GOA19-07TB

Golder Associates
ELLE Sample #: **WW 9636402**
ELLE Group #: **1949637**
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1 Modified**		ng/l	ng/l	ng/l	
14473	NEtFOSAA	2991-50-6	0.91 U	0.91	2.7	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14473	NMeFOSAA	2355-31-9	0.91 U	0.91	2.7	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14473	Perfluorobutanesulfonic Acid	375-73-5	0.27 U	0.27	0.91	1
14473	Perfluorobutanoic acid	375-22-4	1.8 U	1.8	5.4	1
14473	Perfluorodecanoic acid	335-76-2	0.91 U	0.91	1.8	1
14473	Perfluorododecanoic acid	307-55-1	0.27 U	0.27	0.91	1
14473	Perfluoroheptanoic acid	375-85-9	0.27 U	0.27	0.91	1
14473	Perfluorohexanesulfonic Acid	355-46-4	0.36 U	0.36	1.8	1
14473	Perfluorohexanoic acid	307-24-4	0.36 U	0.36	1.8	1
14473	Perfluorononanoic acid	375-95-1	0.36 U	0.36	1.8	1
14473	Perfluoro-Octanesulfonic Acid	1763-23-1	0.36 U	0.36	1.8	1
14473	Perfluorooctanoic acid	335-67-1	0.27 U	0.27	0.91	1
14473	Perfluoropentanoic acid	2706-90-3	1.8 U	1.8	5.4	1
14473	Perfluorotetradecanoic acid	376-06-7	0.27 U	0.27	0.91	1
14473	Perfluorotridecanoic acid	72629-94-8	0.27 U	0.27	0.91	1
14473	Perfluoroundecanoic acid	2058-94-8	0.36 U	0.36	1.8	1

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	16 PFAS Compounds	EPA 537 Version 1.1 Modified	1	18155013	06/14/2018 03:11	Joshua P Trost	1
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	18155013	06/04/2018 17:15	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result

Quality Control Summary

Client Name: Golder Associates
Reported: 06/18/2018 16:05

Group Number: 1949637

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result ng/l	MDL** ng/l	LOQ ng/l
Batch number: 18155013	Sample number(s): 9636396-9636402		
NEtFOSAA	1.0 U	1.0	3.0
NMeFOSAA	1.0 U	1.0	3.0
Perfluorobutanesulfonic Acid	0.30 U	0.30	1.0
Perfluorobutanoic acid	2.0 U	2.0	6.0
Perfluorodecanoic acid	1.0 U	1.0	2.0
Perfluorododecanoic acid	0.30 U	0.30	1.0
Perfluoroheptanoic acid	0.30 U	0.30	1.0
Perfluorohexanesulfonic Acid	0.40 U	0.40	2.0
Perfluorohexanoic acid	0.40 U	0.40	2.0
Perfluorononanoic acid	0.40 U	0.40	2.0
Perfluoro-Octanesulfonic Acid	0.40 U	0.40	2.0
Perfluorooctanoic acid	0.30 U	0.30	1.0
Perfluoropentanoic acid	2.0 U	2.0	6.0
Perfluorotetradecanoic acid	0.30 U	0.30	1.0
Perfluorotridecanoic acid	0.30 U	0.30	1.0
Perfluoroundecanoic acid	0.40 U	0.40	2.0

LCS/LCSD

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 18155013	Sample number(s): 9636396-9636402								
NEtFOSAA	5.44	5.40	5.44	5.57	99	102	55-169	3	30
NMeFOSAA	5.44	5.75	5.44	5.47	106	100	62-167	5	30
Perfluorobutanesulfonic Acid	4.81	4.48	4.81	4.59	93	95	73-128	2	30
Perfluorobutanoic acid	5.44	5.54	5.44	5.51	102	101	74-142	1	30
Perfluorodecanoic acid	5.44	5.30	5.44	5.78	98	106	69-148	9	30
Perfluorododecanoic acid	5.44	5.42	5.44	5.63	100	104	75-136	4	30
Perfluoroheptanoic acid	5.44	5.02	5.44	4.86	92	89	76-140	3	30
Perfluorohexanesulfonic Acid	5.14	4.86	5.14	5.18	94	101	71-131	6	30
Perfluorohexanoic acid	5.44	5.74	5.44	5.83	105	107	75-135	2	30
Perfluorononanoic acid	5.44	5.41	5.44	5.59	99	103	72-148	3	30
Perfluoro-Octanesulfonic Acid	5.20	5.15	5.20	5.08	99	98	67-138	1	30
Perfluorooctanoic acid	5.44	5.61	5.44	5.91	103	109	72-138	5	30
Perfluoropentanoic acid	5.44	5.59	5.44	5.82	103	107	74-134	4	30

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: Golder Associates
Reported: 06/18/2018 16:05

Group Number: 1949637

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Perfluorotetradecanoic acid	5.44	5.52	5.44	5.68	102	104	74-135	3	30
Perfluorotridecanoic acid	5.44	5.48	5.44	5.75	101	106	61-145	5	30
Perfluoroundecanoic acid	5.44	5.35	5.44	5.30	98	97	75-146	1	30

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: 16 PFAS Compounds
Batch number: 18155013

	13C4-PFBA	13C5-PFPeA	13C3-PFBS	13C5-PFHxA	13C3-PFHxS	13C4-PFHpA
9636396	73	79	119	87	99	84
9636397	91	98	107	114	107	98
9636398	92	98	109	114	117	116
9636399	82	90	133	95	108	99
9636400	81	86	92	83	82	82
9636401	74	79	85	75	70	74
9636402	73	77	81	75	74	76
Blank	84	92	95	87	84	84
LCS	83	90	93	80	81	80
LCSD	84	86	94	82	78	86
Limits:	33-123	39-135	26-148	31-128	34-126	35-126

	13C8-PFOA	13C8-PFOS	13C9-PFNA	13C6-PFDA	d3-NMeFOSAA	13C7-PFUnDA
9636396	53	75	83	76	59	76
9636397	84	90	91	96	81	91
9636398	79	95	98	93	82	91
9636399	60	86	98	85	70	81
9636400	85	82	101	85	69	78
9636401	76	75	90	76	62	73
9636402	75	75	99	74	65	73
Blank	84	83	97	89	74	88
LCS	82	81	93	84	70	78
LCSD	81	84	89	81	66	80
Limits:	43-112	43-115	32-134	40-115	17-120	30-128

	d5-NEtFOSAA	13C2-PFDoDA	13C2-PFTeDA
9636396	69	75	66
9636397	88	90	79

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: Golder Associates
Reported: 06/18/2018 16:05

Group Number: 1949637

Surrogate Quality Control (continued)

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: 16 PFAS Compounds
Batch number: 18155013

	d5-NEtFOSAA	13C2-PFDoDA	13C2-PFTeDA
9636398	98	91	79
9636399	78	84	72
9636400	82	82	72
9636401	69	74	63
9636402	69	71	64
Blank	81	92	79
LCS	77	84	71
LCSD	73	78	68
Limits:	21-135	28-127	26-119

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Environmental Analysis Request/Chain of Custody

eurofins

Lancaster Laboratories Environmental

For Eurofins Lancaster Laboratories Environmental use only

Acct. # 10253 Group # 1949637 Sample # 9636396-402

COC # 549581

Client Information

Client: Golder Associates

Acct. #:

Project Name/#: SLPP / 1668623

PWSID #:

Project Manager: Jim Peace

P.O. #:

Sampler: Scott Drew

Quote #:

State where samples were collected: NH

For Compliance: Yes ☐ No ☒

Matrix

Soil ☐ Tissue ☐ Sediment ☐ Water: Potable ☐ Ground ☒ Surface ☐ NPDES ☐ Other: ____

Analysis Requested

Preservation Codes

For Lab Use Only

FSC:

SCR#:

Preservation Codes

H=HCl T=Thiosulfate

N=HNO_3 B=NaOH

S=H_2SO_4 O=Other

Remarks

* site specific list

Sample Identification	Collected Date	Collected Time	Grab	Composite	Soil	Sediment	Tissue	Potable	Ground	Surface	NPDES	Other	Total # of Containers	PFAS (16 compound list)*	Remarks
GZ-1	5/30/18	1035	X					X					2	X	
GZ-2		1235	X					X					2	X	
GZ-3		1430	X					X					2	X	
Dup-1		~~1035~~ 1035	X					X					2	X	
EB-1		1445	X					X					2	X	
FB-1		1410	X					X					2	X	
TB-1		1455	X					X					2	X	

Turnaround Time (TAT) Requested (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed:

E-mail address: jpeace@golder.com Rbennett@golder.com scott_drew@golder.com

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) Type VI (Raw Data Only)

Type III (Reduced non-CLP) NJ DKQP TX TRRP-13

NYSDEC Category A or B MA MCP CT RCP

Relinquished by	Date	Time	Received by	Date	Time
[signature]	5/30/18	1700			
			[signature]	5-31-18	1010

EDD Required? Yes No

If yes, format:

Site-Specific QC (MS/MSD/Dup)? Yes No

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS ____ FedEx ✓ Other ____

Temperature upon receipt 0.9 °C

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The white copy should accompany samples to Eurofins Lancaster Laboratories Environmental. The yellow copy should be retained by the client.

7044 0216

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Sample Administration Receipt Documentation Log

Doc Log ID: 217832

Group Number(s): 1949637

Client: GOLDER ASSOCIATES

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Timestamp:	05/31/2018 10:10
Number of Packages:	1	Number of Projects:	1
State/Province of Origin:	NH		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	VOA Vial Headspace ≥ 6mm:	N/A
Samples Chilled:	Yes	Total Trip Blank Qty:	2
Paperwork Enclosed:	Yes	Trip Blank Type:	N/A
Samples Intact:	Yes	Air Quality Samples Present:	No
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Suegeily Mendez (14058) at 12:02 on 05/31/2018

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT42-02	0.9	DT	Wet	Y	Loose	N

2425 New Holland Pike
Lancaster, PA 17605-2425
T | 717-656-2300
F | 717-656-2681
www.LancasterLabs.com

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	**mg**	milligram(s)
C	degrees Celsius	**mL**	milliliter(s)
cfu	colony forming units	**MPN**	Most Probable Number
CP Units	cobalt-chloroplatinate units	**N.D.**	non-detect
F	degrees Fahrenheit	**ng**	nanogram(s)
g	gram(s)	**NTU**	nephelometric turbidity units
IU	International Units	**pg/L**	picogram/liter
kg	kilogram(s)	**RL**	Reporting Limit
L	liter(s)	**TNTC**	Too Numerous To Count
lb.	pound(s)	**µg**	microgram(s)
m3	cubic meter(s)	**µL**	microliter(s)
meq	milliequivalents	**umhos/cm**	micromhos/cm

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

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Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

ATTACHMENT B

SAMPLE COLLECTION INFORMATION FORM

GAI Project Name:	Saint-Gobain Performance Plastics	Project Number:	166-8623
Sample ID:	6-2-1	Sample Source:	GW
Golder Personnel Present:	S. Dew, L. Lopez		

PURGING INFORMATION (IF APPLICABLE)

Purge Date:	5/30/2018	Time (24 hr):	905	Elapsed hours/min:	see back
Purging Device:	C	Dedicated?:	no ~~Yes~~		
Casing Vol (Gal.):	—	Tubing Vol. (L)	—	Vol Purged (L):	see back
Material:	1/4" OD HDPE tubing				
(A) Air-Lift Pump; (B) Bladder Pump, (C) Peristaltic Pump; (D) Scoop / Shovel; (E) Bailer; (F) Foot Valve; (G) Other.					

Sampling Date:	5/30/2018	Time (24 hr):	1035	Matrix:	GW
Sampling Device	C	Dedicated?:	Yes	Filtered?:	No
Material:	1/4" OD HDPE tubing			Sample Type:	Grab
(A) Air-Lift Pump; (B) Bladder Pump, (C) Peristaltic Pump; (D) Scoop / Shovel; (E) Bailer; (F) Foot Valve; (G) Other.					
Analytical Parameters:	PFAS				

WELL INFORMATION (IF APPLICABLE)

Reference Point:	TPVC	Land Elevation (ft):	-	
Ref. Elevation (ft):	-	Historical Well Depth (ft):	19 feet	Common casing vol. factors
Depth to Water (ft):	-	Sounded Well Depth (ft):	-	1.5 = 0.09, 2.0 = 0.163, 4.0 = 1.96
Screen Interval:	8.5-18.5'	Stickup (ft):	Flush	0.25 = .003, 0.5 = 0.01, 1.0 = 0.041
Pump Intake:	13.5'	Well Diameter (in):	2.00	Casing Vol.= 0.163 * r^2
GW Elevation (ft):	-	Tubing Diameter (in)	0.25	WL - 1500, 10.30'

FINAL FIELD MEASUREMENTS

PLEASE CHECK UNITS VS. METER!!!

Parameter	Units (proposed) actual	Result	Parameter	Units (proposed) actual	Result
Temperature	(°C)	9.79	pH	(S.U.)	6.26
Spec Cond	(uS/cm)	855	ORP	(mV)	-11.8
Dissolved Oxygen	(mg/L)	1.11	Eh	(mV)	-
Flow Rate	(mL/min)	300	Turbidity	(NTU)	3.62
			Drawdown	(Ft)	-

COMMENTS / CALCULATIONS

Weather: Sunny, 70s

Sample Description:

Sampled @ 1035

Insect Repellant Used Today? Yes/No

Sampler Signature: [signature] Date: 5/30/2018

GOLDER

PURGING AND STABILIZATION INFORMATION

Sample ID:	G2-1
Initial DTW (ft):	-
Final DTW(ft):	-

FIELD MEASUREMENTS

Elapsed Time	Volume Purged	Flow Rate	Temp	Specific Cond.	DO	pH	ORP	Turb	DTW	
(Time)	(L) mL	(mL/min)	(°C)	(uS/cm)	(mg/L)	(S.U.)	(mV)	(NTU)	(ft)	
Stabilization Criteria:		± 10%	± 3%	± 3%	± 10%**	± 0.1 SU	± 10 mV	± 10%*	<0.3 FT	
905		350	9.09	825	0.67	6.24	-11.9	91.6	-	
910		300	9.62	855	0.67	6.20	-3.3	63.0	-	
915		300	9.65	878	0.63	6.22	-8.7	35.6	-	
920		300	9.54	875	0.64	6.23	-12.0	24.0	-	
925		300	9.56	861	0.73	6.25	-16.2	20.3	-	
930		300	9.59	861	0.79	6.27	-18.2	10.4	-	
935		300	9.56	863	0.88	6.26	-18.2	14.6	-	
940		300	9.53	865	1.02	6.28	-20.2	10.2	-	
945		300	9.66	853	1.08	6.27	-20.2	6.94	-	
950		300	9.56	858	1.17	6.27	-16.2	5.71	-	
955		300	9.60	862	1.32	6.26	-13.8	5.02	-	
1000		300	9.60	860	1.32	6.27	-16.1	6.35	-	
1005		300	9.61	862	0.69	6.26	-15.8	3.87	-	
1010		300	9.69	855	0.85	6.27	-14.8	4.53	-	
1015		300	9.68	857	0.58	6.26	-14.1	4.58	-	
1020		300	9.79	853	1.24	6.27	-13.2	3.65	-	
1025		300	9.79	855	1.11	6.26	-11.8	3.62	-	
1035 —	Sampled								-	
									-	
									-	
									-	
									-	
									-	
									-	
									-	

Comments: Depth to water and sounded well depth measurements are not collected during PFAS sampling.
the facility grounds were being sprayed w/ pesticide/herbicide

* ± 10% or 1.00, whichever is greater ** ± 10% or <0.5 for three consecutive readings

Sampler Signature: [signature] Date: 5/30/2016

GOLDER

SAMPLE COLLECTION INFORMATION FORM

GAI Project Name:	Saint-Gobain Performance Plastics	Project Number:	166-8623
Sample ID:	62-2	Sample Source:	GW
Golder Personnel Present:	S. Drew, L. Lampe		

PURGING INFORMATION (IF APPLICABLE)

Purge Date:	5/30/2018	Time (24 hr):	1135	Elapsed hours/min:	See back
Purging Device:	C	Dedicated?:	NO ~~Yes~~		
Casing Vol (Gal.):	—	Tubing Vol. (L)	—	Vol Purged (L):	See back
Material:	1/4" OD HDPE tubing				
(A) Air-Lift Pump; (B) Bladder Pump, (C) Peristaltic Pump; (D) Scoop / Shovel; (E) Bailer; (F) Foot Valve; (G) Other.					

Sampling Date:	5/30/2018	Time (24 hr):	1235	Matrix:	GW
Sampling Device	C	Dedicated?:	Yes	Filtered?:	No
Material:	1/4" OD HDPE tubing			Sample Type:	Grab
(A) Air-Lift Pump; (B) Bladder Pump, (C) Peristaltic Pump; (D) Scoop / Shovel; (E) Bailer; (F) Foot Valve; (G) Other.					
Analytical Parameters:	PFAS				

WELL INFORMATION (IF APPLICABLE)

Reference Point:	TPVC	Land Elevation (ft):	-	
Ref. Elevation (ft):	-	Historical Well Depth (ft):	19	Common casing vol. factors
Depth to Water (ft):	-	Sounded Well Depth (ft):	-	1.5 = 0.09, 2.0 = 0.163, 4.0 = 1.96
Screen Interval:	7-17'	Stickup (ft):	Flush	0.25 = .003, 0.5 = 0.01, 1.0 = 0.041
Pump Intake:	12	Well Diameter (in):	2.00	Casing Vol.= 0.163 * r^2
GW Elevation (ft):	-	Tubing Diameter (in)	0.25	

W.L. 1505, 9.38'

FINAL FIELD MEASUREMENTS

PLEASE CHECK UNITS VS. METER!!!

Parameter	Units (proposed) actual	Result	Parameter	Units (proposed) actual	Result
Temperature	(°C)	10.92	pH	(S.U.)	4.84
Spec Cond	(uS/cm)	27	ORP	(mV)	305.5
Dissolved Oxygen	(mg/L)	8.37	Eh	(mV)	-
Flow Rate	(mL/min)	300	Turbidity	(NTU)	0.23
			Drawdown	(Ft)	-

COMMENTS / CALCULATIONS

Weather: Sunny, 70s

Sample Description:

Insect Repellant Used Today? Yes/No

Sampler Signature: [signature] Date: 5/30/2018

GOLDER

PURGING AND STABILIZATION INFORMATION

Sample ID:	GZ-2
Initial DTW (ft):	-
Final DTW(ft):	-

FIELD MEASUREMENTS

Elapsed Time	Volume Purged	Flow Rate	Temp	Specific Cond.	DO	pH	ORP	Turb	DTW	
(Time)	(L)	(mL/min)	(°C)	(uS/cm)	(mg/L)	(S.U.)	(mV)	(NTU)	(ft)	
Stabilization Criteria:		± 10%	± 3%	± 3%	± 10%**	± 0.1 SU	± 10 mV	± 10%*	<0.3 FT	
1135		300	11.76	32	9.64	4.62	850.1	5.08	-	
1140		300	11.07	28	9.15	4.55	276.4	2.79	-	
1145		300	11.00	29	8.98	4.72	276.4	0.80	-	
1150		300	11.02	28	8.84	4.78	278.9	0.83	-	
1155		300	11.04	28	8.87	4.80	282.9	0.76	-	
1200		300	10.94	28	8.71	4.82	288.2	0.53	-	
1205		300	11.13	28	8.99	4.83	291.6	0.29	-	
1210		300	10.92	28	8.72	4.83	294.7	0.29	-	
1215		300	10.86	28	8.68	4.83	298.6	0.57	-	
1220		300	10.83	28	8.56	4.84	300.8	0.31	-	
1225		300	10.96	28	8.49	4.85	303.2	0.22	-	
1230		300	10.92	27	8.37	4.84	305.5	0.23	-	
1235 — Sampled									-	
									-	
									-	
									-	
									-	
									-	
									-	
									-	
									-	
									-	
									-	
									-	
									-	
									-	

Comments: Depth to water and sounded well depth measurements are not collected during PFAS sampling.

*± 10% or 1.00, whichever is greater **± 10% or <0.5 for three consecutive readings

Sampler Signature: [signature] Date: 5/30/2018

GOLDER

SAMPLE COLLECTION INFORMATION FORM

GAI Project Name:	Saint-Gobain Performance Plastics	Project Number:	166-8623
Sample ID:	62-3	Sample Source:	GW
Golder Personnel Present:	S. Drew, L. Lampo		

PURGING INFORMATION (IF APPLICABLE)

Purge Date:	5/30/2018	Time (24 hr):	1430	Elapsed hours/min:	see back
Purging Device:	C	Dedicated?:	no ~~Yes~~		
Casing Vol (Gal.):	—	Tubing Vol. (L)	—	Vol Purged (L):	see back
Material:	1/4" OD HDPE tubing				
(A) Air-Lift Pump; (B) Bladder Pump, (C) Peristaltic Pump; (D) Scoop / Shovel; (E) Bailer; (F) Foot Valve; (G) Other.					

Sampling Date:	5/30/2018	Time (24 hr):	1330	Matrix:	GW
Sampling Device	C	Dedicated?:	Yes	Filtered?:	No
Material:	1/4" OD HDPE tubing			Sample Type:	Grab
(A) Air-Lift Pump; (B) Bladder Pump, (C) Peristaltic Pump; (D) Scoop / Shovel; (E) Bailer; (F) Foot Valve; (G) Other.					
Analytical Parameters:	PFAS				

WELL INFORMATION (IF APPLICABLE)

Reference Point:	TPVC	Land Elevation (ft):	-	
Ref. Elevation (ft):	-	Historical Well Depth (ft):	17	Common casing vol. factors
Depth to Water (ft):	-	Sounded Well Depth (ft):	-	1.5 = 0.09, 2.0 = 0.163, 4.0 = 1.96
Screen Interval:	7-17'	Stickup (ft):	Flush	0.25 = .003, 0.5 = 0.01, 1.0 = 0.041
Pump Intake:	12	Well Diameter (in):	2.00	Casing Vol.= 0.163 * r^2
GW Elevation (ft):	-	Tubing Diameter (in)	0.25	

W.L. 15.10, 7.81'

FINAL FIELD MEASUREMENTS

PLEASE CHECK UNITS VS. METER!!!

Parameter	Units (proposed) actual	Result	Parameter	Units (proposed) actual	Result
Temperature	(°C)	11.35	pH	(S.U.)	5.39
Spec Cond	(uS/cm)	27	ORP	(mV)	282.8
Dissolved Oxygen	(mg/L)	6.60	Eh	(mV)	-
Flow Rate	(mL/min)	250	Turbidity	(NTU)	0.14
			Drawdown	(Ft)	-

COMMENTS / CALCULATIONS

Weather: Sunny, 70s

Sample Description:

Insect Repellant Used Today? Yes/No

Sampler Signature: [signature] Date: 5/30/2018

GOLDER

PURGING AND STABILIZATION INFORMATION

Sample ID:	62-3
Initial DTW (ft):	-
Final DTW(ft):	-

FIELD MEASUREMENTS

Elapsed Time	Volume Purged	Flow Rate	Temp	Specific Cond.	DO	pH	ORP	Turb	DTW	
(Time)	(L)	(mL/min)	(°C)	(uS/cm)	(mg/L)	(S.U.)	(mV)	(NTU)	(ft)	
Stabilization Criteria:		± 10%	± 3%	± 3%	± 10%**	± 0.1 SU	± 10 mV	± 10%*	<0.3 FT	
1330		250	12.05	37	8.07	5.46	260.0	1.26	-	
1335		250	11.35	29	7.26	5.40	259.9	1.10	-	
1340		250	11.35	28	6.85	5.33	267.4	0.34	-	
1345		250	11.19	26	6.75	5.35	270.8	0.20	-	
1350		250	11.15	27	6.66	5.37	274.1	0.17	-	
1355		250	11.19	27	6.70	5.38	277.0	0.16	-	
1400		250	11.16	26	6.67	5.39	278.9	0.21	-	
1405		250	11.08	26	6.81	5.39	280.2	0.14	-	
1410		250	11.17	26	6.71	5.40	281.7	0.16	-	
1415		250	11.21	26	6.74	5.39	281.9	0.18	-	
1420		250	11.24	26	6.61	5.40	282.4	0.15	-	
1425		250	11.35	27	6.60	5.39	282.8	0.14	-	
1430 →	sample									
									-	
									-	
									-	
									-	
									-	
									-	
									-	
									-	
									-	
									-	
									-	
									-	

Comments: Depth to water and sounded well depth measurements are not collected during PFAS sampling.

* ± 10% or 1.00, whichever is greater ** ± 10% or <0.5 for three consecutive readings

Sampler Signature: [signature] Date: 5/30/2018

GOLDER

Message

From: Moore, Julie [Julie.Moore@vermont.gov]
Sent: 10/26/2018 12:57:57 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
Subject: FW: Joint Petition for Rulemaking to Establish a Drinking Water Standard for PFAS
Attachments: 2018.10.25_Joint Petition to ANR for Rulemaking to Establish PFAS Drinking Water Standard.pdf

Good morning, Alex.

Nice to see you earlier this week in Portsmouth. I wanted to give you a heads up on the petition we just received, attached and below. I understand that MA and CT have received similar petitions, and expect that other NE states will also in short order.

We will keep EPA apprised as we chart a path forward.

Best,
Julie

From: Elena Mihaly <emmihaly@clf.org>
Sent: Thursday, October 25, 2018 2:40 PM
To: Moore, Julie <Julie.Moore@vermont.gov>
Cc: Levine, Mark <Mark.Levine@vermont.gov>; Vose, Sarah <Sarah.Vose@vermont.gov>; Boedecker, Emily <Emily.Boedecker@vermont.gov>; Redmond, Bryan <Bryan.Redmond@vermont.gov>; Schwer, Chuck <Chuck.Schwer@vermont.gov>; Chapman, Matt <Matt.Chapman@vermont.gov>; Englander, David <David.Englander@vermont.gov>; Donovan, Thomas <Thomas.Donovan@vermont.gov>; McDougall, Robert <robert.mcdougall@vermont.gov>; Jen Duggan <jduggan@clf.org>; Zak Griefen <zgriefen@clf.org>; Jon Groveman <jgroveman@vnrc.org>; Johanna de Graffenreid <johanna@radvt.org>; paul@vpirg.org; Shaina Kasper <shaina@toxicsaction.org>
Subject: Joint Petition for Rulemaking to Establish a Drinking Water Standard for PFAS

Dear Secretary Moore:

Attached please find a joint petition for rulemaking from Conservation Law Foundation, Vermont Natural Resources Council, Rights and Democracy, Vermont Public Research Interest Group, and Toxics Action Center requesting the Vermont Agency of Natural Resources to establish a drinking water standard for Per- and Polyfluoroalkyl Substances (PFAS) that is protective of public health.

CLF is mailing you a hard copy of this petition for rulemaking, along with a thumb drive containing the PDF sources to which we cite in the petition. If the cc'd parties wish to also receive a hard copy of the petition in the mail and/or a thumb drive containing cited PDF documents, please contact me directly with such a request.

Sincerely,

Elena

Elena M. Mihaly
Staff Attorney
Conservation Law Foundation

15 East State Street, Suite 4
Montpelier, VT 05602

P: Ex. 6
E: emihaly@clf.org

For a thriving New England

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conservation law foundation

For a thriving New England

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October 25, 2018

Julia S. Moore, Secretary
Vermont Agency of Natural Resources
1 National Life Drive, Davis 2
Montpelier, VT 05620
julie.moore@vermont.gov

Re: Petition for Rulemaking to Establish a Treatment Technique Drinking Water Standard for Per- and Polyfluoroalkyl Substances

Dear Secretary Moore:

Conservation Law Foundation (CLF), Vermont Natural Resources Council (VNRC), Rights and Democracy (RAD), Vermont Public Interest Research Group (VPIRG), and Toxics Action Center (hereinafter Petitioners) hereby petition the Vermont Agency of Natural Resources (Agency) to establish a drinking water standard for Per- and Polyfluoroalkyl Substances (PFAS) that is protective of public health.[1] Specifically, Petitioners request the Agency to adopt a treatment technique drinking water standard for the PFAS class of chemicals in lieu of setting a maximum contaminant level (MCL) for specific PFAS. At a bare minimum, if the Agency does not promulgate a treatment technique standard, the Agency should adopt an MCL for the PFAS class or MCLs for each PFAS chemical that poses a risk to public water systems in Vermont. As an interim step to protect public health, the Agency should immediately adopt the Vermont Department of Health's (VDH) Health Advisory (Health Advisory) as an MCL.[2] PFAS have been found in drinking water sources across Vermont and numerous studies have linked PFAS to significant health risks, including cancer. Although the State of Vermont has taken preliminary steps to limit exposure to this dangerous class of chemicals, the Agency must take additional affirmative steps to protect Vermonters from PFAS.

CLF protects New England's environment for the benefit of all people. Founded in 1966, CLF is a non-profit, member-supported organization with offices located in Vermont, Massachusetts, Rhode Island, Maine, and New Hampshire. CLF uses the law, science, and the market to create

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[1] Pursuant to Vermont's Administrative Procedure Act, codified at 3 V.S.A. §806, any person may submit a written request to an agency asking the agency to adopt a rule. Within 30 days of receiving the request, the agency must either initiate rule-making proceedings or shall deny the request, giving its reasons in writing.
[2] Although this petition has prioritized a drinking water standard for the PFAS class, there is also an urgent need to develop comprehensive standards for PFAS compounds, including but not limited to, surface water quality standards, pre-treatment standards for industrial users, and limits for land application of sludges.

solutions that protect public health, preserve natural resources, build healthy communities, and sustain a vibrant economy. CLF has been a leading advocate for clean water and safe drinking water in Vermont and throughout New England, and is engaged in numerous efforts to address the threat of emerging contaminants like PFAS throughout New England.

Through research, education, collaboration and advocacy, VNRC protects and enhances Vermont's natural environments, vibrant communities, productive working landscapes, rural character and unique sense of place, and prepares the state for future challenges and opportunities.

RAD's mission is to bring people together to take action to build healthy communities and make community values guide the policies of government. RAD works in partnership with community groups, progressive unions, faith communities, organizations fighting for human and civil rights, and environmental and climate action groups.

VPIRG is the largest nonprofit consumer and environmental advocacy organization in Vermont, with over 50,000 members and supporters. For over 45 years, VPIRG has brought the voice of average Vermont citizens to public policy debates concerning the environment, health care, consumer protection and democracy.

Founded in 1987, Toxics Action Center works side-by-side with communities across New England to clean up and prevent pollution at the local level.

Introduction

The Agency must immediately adopt a drinking water standard that protects Vermonters from exposure to unsafe levels of all PFAS compounds. PFAS are persistent in the environment; bioaccumulative; highly mobile in water; found in hundreds of different products; and are toxic in very small concentrations. PFAS have been found at unsafe levels in drinking water in Vermont, as well as in ground- and surface waters. Drinking water contaminated with PFAS is a significant source of exposure.[3] Without a drinking water standard, public water systems in Vermont are not required to regularly monitor for PFAS compounds or to treat water with unsafe levels of PFAS.

DuPont, 3M, and other chemical manufacturers recklessly produced these dangerous chemicals for decades despite being aware of the significant health risks associated with PFAS. Furthermore, in 1981, 3M and DuPont were aware that ingestion of perfluorooctanoic acid (PFOA) caused birth defects in rats.[4] After receiving this information, DuPont tested seven children of pregnant workers: two had birth defects.[5]

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[3] *See* Vt. Dep't of Health, *Health Department Releases PFOA Blood Test and Exposure Assessment Results,* Jan. 26, 2017,http://www.healthvermont.gov/sites/default/files/documents/2017/01/NEWS_PFOA%20Blood%20Test%20%26%20Exposure%20Assessment%20Results.pdf (noting that "PFOA levels in blood were strongly correlated with PFOA levels in well water.").

[4] Nathaniel Rich, *The Lawyer Who Became DuPont's Worst Nightmare*, N.Y. TIMES, Jan. 6, 2016, https://www.nytimes.com/2016/01/10/magazine/the-lawyer-who-became-duponts-worst-nightmare.html.

[5] *Id.*

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DuPont was also aware that at least one facility had contaminated local drinking water supplies with unsafe levels of PFOA by 1991, but failed to warn anyone.[6]

DuPont hid this vital health information from the public and the U.S. Environmental Protection Agency (EPA) while making billions of dollars in profits from continued production of PFOA.[7] Ultimately, DuPont was fined $16.5 million dollars in 2005 for failing to disclose information about toxicity and health risks cause by PFOA.[8] Although PFOA and perfluoro-octane sulfonic acid (PFOS) have now been phased out of production in the U.S.,[9] these compounds will remain in our drinking water, ground- and surface waters, as well as our bodies, for decades. In addition, manufacturers have rushed to produce thousands of alternative PFAS that are likely to pose similar health risks given the similarities in chemical structure.[10] There are now over 3,000 different kinds of PFAS.

To make matters worse, EPA has failed to take meaningful action to protect the public from exposure to PFAS in drinking water. After becoming aware of contamination of drinking water supplies and the significant health risks posed by these dangerous chemicals, EPA gave manufacturers almost a decade to phase out production and use of PFOA and PFOS through a voluntary program.[11] Despite learning in 2015 that millions of Americans were, and continue to be, exposed to PFAS-contaminated drinking water, EPA has not taken steps toward requiring public water systems to regularly monitor for PFAS and to treat unsafe water.[12] EPA even suppressed a scientific study suggesting that EPA's current health advisory for PFOA and PFOS does not protect public health.[13]

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[6] *Id.*

[7] *Id.*

[8] Memorandum from Grant Y. Nakayama, Assistant Administrator, to Environmental Appeals Board Re Consent Agreement and Final Order to Resolve DuPont's Alleged Failure to Submit Substantial Risk Information Under the Toxic Substances Control Act (TSCA) and Failure to Submit Data Requested Under the Resource Conservation and Recovery Act (RCRA) (Dec. 14, 2005), https://www.epa.gov/sites/production/files/2013-08/documents/eabmemodupontpfoasettlement121405.pdf.

[9] U.S. Envtl. Prot. Agency, *Assessing and Managing Chemicals Under TSCA, Fact Sheet: 2010/2015 PFOA Stewardship Program*, https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/fact-sheet-20102015-pfoa-stewardship-program#what.

[10] *See, e.g.*, Stephen Brendel et al., *Short-Chain Perfluoroalkyl Acids: Environmental Concerns and a Regulatory Strategy under REACH,* 30 ENVTL. SCI. EUR. 9 (2018), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5834591/pdf/12302_2018_Article_134.pdf.

[11] *See, e.g.*, U.S. Envtl. Prot. Agency, *In the matter of: Premanufacture Notice Numbers: Dupont Company,* April 9, 2009, https://assets.documentcloud.org/documents/2746607/Sanitized-Consent-Order-P08-0508-and-P08-0509.pdf.; Premanufacture Notification Exemption for Polymers; Amendment of Polymer Exemption Rule to Exclude Certain Perfluorinated Polymers, 75 Fed. Reg. 4295, 4296 (Jan. 27, 2010).

[12] David Andrews, *Report: Up to 110 Million Americans Could Have PFAS-Contaminated Drinking Water*, ENVTL. WORKING GROUP, May 22, 2018, https://www.ewg.org/research/report-110-million-americans-could-have-pfas-contaminated-drinking-water#.W6_7a2hKg2w.

[13] Abraham Lustgarten, et al., *Suppressed Study: the EPA Underestimated Dangers of Widespread Chemicals*, PROPUBLICA, June 20, 2018, https://www.propublica.org/article/suppressed-study-the-epa-underestimated-dangers-of-widespread-chemicals.

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After widespread public outcry, EPA announced the possibility of setting drinking water standards for just two out of more than 3,000 PFAS, but no enforceable regulatory standard has been proposed to date, and even this limited action will take years.[14]

In addition, the federal government's capacity to set a standard protective of public health has been compromised by the staggering liabilities of the United States for releases of PFAS at federal facilities nationwide.

Vermont can—and must—take the lead in the absence of federal safeguards. We will never be able to reverse the damage caused by chemical manufacturers and EPA's inaction, but the Agency has broad authority to promulgate rules that limit additional exposure to unsafe levels of PFAS in drinking water.[15] In the absence of such rules, the public will remain at risk, and the most vulnerable among us—nursing infants and children generally, who consume higher volumes of water for their body weight and have greater developmental susceptibility—will be at the greatest risk.

Moreover, in the absence of such rules, homeowners on well-water and municipalities and other drinking water system operators will be stymied in their efforts to recover the costs of adopting filtration and other safeguards from responsible polluters.

For all of these reasons, the Agency should stop putting public health at risk and adopt a treatment technique drinking water standard that will protect Vermonters from the class of PFAS. As an interim step, the Agency should immediately adopt the current Health Advisory for PFAS as a drinking water standard for public water systems.

I. Background

A. PFAS are harmful to human health.

PFAS are a public health crisis "perfect storm" because PFAS compounds are extremely persistent in the environment, highly mobile in water, bioaccumulative, toxic in very small quantities, and found in hundreds of products. PFAS compounds are man-made substances that do not occur naturally, and they have been used in non-stick cookware, water-repellent clothing, stain resistant fabrics and carpets, cosmetics, firefighting foams, and other products that resist grease, water, and oil.[16] These chemicals are extremely strong and highly resistant to degradation.[17]

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[14] *The Federal Role in the Toxic PFAS Chemical Crisis, Hearing on SD-342 Before the Subcomittee. on Homeland Security & Governmental Affairs*, 115th Cong. (2018) (statement of Chairman Rand Paul and Ranking Member Gary C. Peters), https://www.hsgac.senate.gov/hearings/the-federal-role-in-the-toxic-pfas-chemical-crisis.
[15] 10 VT. STAT. ANN. tit. 10, § 1672(b)(1).
[16] Seth Kerschner & Zachary Griefen, *Next Round of Water Contamination Suits May Involve CWA*, LAW 360, October 5, 2017, https://www.law360.com/articles/970995/next-round-of-water-contamination-suits-may-involve-cwa.
[17] New Jersey Dep't of Envtl. Prot. Division of Science, Research, and Envtl. Health, *Investigation of Levels of Perfluorinated Compounds in New Jersey Fish, Surface Water, and Sediment,* June 18, 2018,

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PFAS are toxic to humans in very small concentrations—in the *parts per trillion* (ppt).[18] PFAS are suspected carcinogens and have been linked to growth, learning and behavioral problems in infants and children; fertility and pregnancy problems, including pre-eclamsia; interference with natural human hormones; increased cholesterol; immune system problems; and interference with liver, thyroid, and pancreatic function.[19] PFAS have been linked to increases in testicular and kidney cancer in human adults.[20] The developing fetus and newborn babies are particularly sensitive to some PFAS.[21]

Alarmingly, epidemiological studies identify the immune system as a target of PFAS toxicity. Some studies have found decreased antibody response to vaccines, and associations between blood serum PFAS levels and immune system hypersensitivity (asthma) and autoimmune disorders (ulcerative colitis).[22] There are no medical interventions that will remove PFAS from the body.[23]

PFAS "have been detected in all environmental media including air, surface water, groundwater (including drinking water), soil, and food."[24] A study by the Centers for Disease Control and Prevention (CDC) found four PFAS (PFOS, PFOA, perfluorohexane sulfonic acid (PFHxS), and perfluorononanoic acid (PFNA)) in the serum of nearly all of the people tested, indicating widespread exposure in the U.S. population.[25] PFOA and PFOS were found in up to 99 percent of the U.S. general population between 1999 and 2012.[26] PFAS are found in human breast milk and umbilical cord blood.[27]

While a great deal of public attention has recently been paid to PFOA and PFOS, and VDH recently issued a Drinking Water Health Advisory for five PFAS compounds (PFOA, PFOS, perfluoroheptanoic acid (PFHpA), PFNA, PFHxS), EPA and other scientists have raised concerns that other chemicals in the PFAS class of compounds are similar in chemical structure

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https://www.nj.gov/dep/dsr/publications/Investigation%20of%20Levels%20of%20Perfluorinated%20Compounds%20in%20New%20Jersey%20Fish,%20Surface%20Water,%20and%20Sediment.pdf.

[18] Agency for Toxic Substances and Disease Registry, *Per- and Polyfluoroalkyl Substances (PFAS) and Your Health*, https://www.atsdr.cdc.gov/pfas/health-effects.html; Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Perfluoroalkyls*, https://www.atsdr.cdc.gov/toxprofiles/tp200.pdf, at 5–6.

[19] Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Perfluoroalkyls*, https://www.atsdr.cdc.gov/toxprofiles/tp200.pdf, at 5–6.

[20] *Id.* at 6; Vaughn Barry et al., *Perfluorooctanoic Acid (PFOA) Exposures and Incident Cancers among Adults Living Near a Chemical Plant*, 121 ENVTL. HEALTH PERSPECTIVES 11-12, 1313-18 (Nov.-Dec. 2013), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3855514/pdf/ehp.1306615.pdf.

[21] U.S. Envtl. Prot. Agency, *Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS)*, (May 2016), https://www.epa.gov/sites/production/files/2016-05/documents/pfoa_health_advisory_final_508.pdf, at 10.

[22] *Id.* at 39.

[23] Vermont Dep't of Health, *Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) in Drinking Water*, July 9, 2018, http://www.healthvermont.gov/sites/default/files/documents/pdf/ENV_DW_PFAS.pdf.

[24] Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Perfluoroalkyls*, *supra* note 18, at 2.

[25] Ctr. for Disease Control and Prevention, *Per- and Polyfluorinated Substances (PFAS) Factsheet* (Apr. 7, 2017), https://www.cdc.gov/biomonitoring/PFAS_FactSheet.html.

[26] U.S. Envtl. Prot. Agency, *Drinking Water Health Advisory for Perflourooctanoic Acid (PFOA)* (May 2016) at 9, https://www.epa.gov/sites/production/files/2016-05/documents/pfoa_health_advisory_final_508.pdf.

[27] Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Perfluoroalkyls*, *supra* note 18, at 3.

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and are likely to pose similar health risks.[28] For example, all PFAS share a strong carbon-flourine bond and "degrade very slowly, if at all, under environmental conditions."[29] Although some of the long-chain PFAS are being regulated or phased out, the most common replacements are short-chain PFAS with similar structures, or compounds with fluorinated segments joined by ether linkages.[30] While some shorter-chain fluorinated alternatives seem to be less bioaccumulative, they are still as environmentally persistent as long-chain substances or have persistent degradation products.[31] In addition, because some of the shorter-chain PFAS are less effective, larger quantities may be needed to provide the same performance.[32] Thus, drinking water rules must protect the public health from unsafe exposure to all compounds in the PFAS class.

B. PFAS have been found in Vermont drinking water, groundwater, and surface waters.

Not only are PFAS toxic in very small amounts (in the nanograms per liter or ppt), they are highly mobile in groundwater and surface water, and have been found in waters throughout Vermont.

1. Drinking Water

In February 2016, the Agency's Department of Environmental Conservation (DEC) discovered widespread PFAS contamination in over 400 drinking water wells in Bennington County, Vermont, 300 of which had contamination levels greater than the state's PFAS Health Advisory of 20 ppt.[33] Alarmingly, the highest level of PFOA detected in a private drinking water well was 4,600 ppt.[34]

DEC conducted further sampling throughout Vermont near known sources of PFAS, and found the following:

- In the Town of Pownal, near a former wire coating facility and a tannery superfund site, a contaminated public water well supplying water to 400 people measured above the PFAS Health Advisory.[35] DEC also found 30 private drinking water wells in Pownal that were

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[28] *See, e.g.*, U.S. Envtl. Prot. Agency, *supra* note 11 (stating that, with respect to "GenX" compounds (chemical substances intended to replace long-chain (C8) PFAS used in Teflon), "EPA has concerns that these PMN substances will persist in the environment, could bioaccumulate, and be toxic ("PBT") to people, wild mammals, and birds.").
[29] Arlene Blum et al., *The Madrid Statement on Poly- and Perfluoroalkyl Substances (PFASs)*, ENVTL. HEALTH PERSPECTIVES (May 2015), https://ehp.niehs.nih.gov/doi/pdf/10.1289/ehp.1509934.
[30] *Id. See also,* KEMI Swedish Chemicals Agency, *Occurrence and use of highly fluorinated substances and alternatives; Report from a government assignment,* 6-78, 26 (August 9, 2009), https://www.kemi.se/en/global/rapporter/2015/report-7-15-occurrence-and-use-of-highly-fluorinated-substances-and-alternatives.pdf.
[31] Blum, *supra* note 29.
[32] *Id.*
[33] Vt. Dep't of Envtl. Conservation, *Perfluoroalkyl Substances (PFAS) Contamination Status Report*, (July 2018), at 2, https://dec.vermont.gov/sites/dec/files/documents/PFAS%20Sampling%20Report%207.10.18%20FINAL.pdf.
[34] *Id.* at 2.
[35] *Id.* at 3.

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similarly contaminated with elevated levels of PFAS.[36] One well contained PFAS levels at more than five times the allowable limit.[37]

- At the Southern Vermont Airport in Clarendon, three private residential water supply wells and a public drinking water system with two bedrock wells serving the Rutland Business Park were contaminated with PFAS above the PFAS Health Advisory.[38]
- A drinking water supply near the Shaftsbury Landfill was contaminated with PFAS above the PFAS Health Advisory.[39]

PFAS have also been found at elevated levels in drinking water at Vermont schools. For example, sampling conducted by DEC at the Grafton Elementary School revealed PFAS concentrations at 22 ppt, which is above the Health Advisory.[40] In addition, PFAS was also detected at Eden Central School at 5.3 ppt.[41]

Finally, earlier sampling conducted by EPA at the former Kocher Drive Dump in Bennington as part of a national PFAS testing effort detected PFAS above the PFAS Health Advisory in four overburden monitoring wells, as well as one offsite private supply well, and an offsite geothermal well.[42]

2. Groundwater

DEC's PFAS investigation also found levels of contamination above the PFAS Health Advisory in groundwater at or near the following locations:

- A wire coating facility in Colchester (Champlain Cable facility);[43]
- A former wire coating operation in Shelburne;[44]
- A battery manufacturing facility in St. Albans;[45] and
- A groundwater recovery trench at the Air National Guard site in South Burlington, where Aqueous Film-Forming Foam Concentrations (AFFF) fire-fighting foam containing PFAS was used.[46]

Elevated levels of PFAS were also found in groundwater at several landfill sites in Bennington and Windham Counties. Specifically, the Burgess Brothers C&D landfill, Putney Paper sludge

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[36] *Id.*
[37] *Id.*
[38] *Id.* at 6.
[39] *Id.* at 8.
[40] Jim Therrien, *School water tests provide encouraging results*, VT DIGGER, Aug. 17, 2018, https://vtdigger.org/2018/08/17/school-water-tests-provide-encouraging-results/.
[41] *Id.*
[42] Vt. Dep't of Envtl. Conservation, *supra* note 33, at 8.
[43] *Id.* at 4.
[44] *Id.*
[45] *Id.* at 5.
[46] *Id.* at 6.

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landfill, Shaftsury MSW landfill, and Halifax landfill reported groundwater concentrations above the PFAS Health Advisory.[47]

PFAS have also been detected in the sludge of wastewater treatment facilities (WWTF). Sludge sample results from the Bennington WWTF showed PFOA and PFOS at an average concentration of 7 and 8 µg/kg (parts per billion or ppb), respectively.[48] The sludge samples were also analyzed using a synthetic precipitation leaching procedure (SPLP) to detect whether PFAS would leach into the groundwater from any sludge that was land-applied. The results of this testing showed PFOA at 68 ppt.[49]

In addition, PFOA sample results from sludge/biosolids at six WWTF that receive leachate from Vermont landfills reached levels of 13 ppb.[50] PFOS concentrations ranged from 5.6 to 17.7 ppb.[51] DEC also analyzed the sludge samples from two specific WWTFs, South Burlington-AP and Burlington-Main, using SPLP.[52] The results detected PFOA at concentrations ranging from 4.99 and 4.25 ppt, respectively, and PFOS at 22.7 and 3.34 ppt, respectively.[53]

Finally, PFAS was also detected in some samples of septage from residential septic tanks in Bennington in May and June of 2016.[54] Typical septic systems are not equipped to filter PFAS before water seeps through, thus these PFAS are likely to eventually reach groundwater sources.[55]

3. Surface Water

PFAS are also present at elevated levels in surface waters throughout Vermont due to several exposure pathways. First, PFAS can end up in surface waters based on proximity to PFAS-emitting facilities, like the former ChemFab site in Bennington. In its investigation, DEC found PFAS in surface waters, sediment, and fish tissue samples collected in Bennington, most likely due to contamination from airborne particles of PFAS from the former ChemFab plant.[56] Likewise, sludge sampled from Bennington's WWTF (which likely received PFAS through contaminated discharges associated with the former ChemFab facility), showed presence of

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[47] *Id.* at 8.
[48] *Id.* at 11.
[49] *Id.*
[50] *Id.* at 12-13.
[51] *Id.* at 13.
[52] *Id.*
[53] *Id.*
[54] *Id.* at 12.
[55] *See* Schaider et al., *Septic systems as sources of organic wastewater compounds in domestic drinking water wells in a shallow sand and gravel aquifer*, 547 SCIENCE OF THE TOTAL ENVIRONMENT(March 2016), at 470-481 ("Incomplete degradation or sorption during treatment in septic tanks and leach fields, as well as leaks of poorly treated sewage from aging and failing systems, allow some [organic wastewater compounds ("OWCs"), including PFAS] to percolate through vadose zone soils and enter groundwater. Some OWCs can persist during subsurface transport and end up in groundwater (Swartz et al., 2006, Phillips et al., 2015), surface water (Standley et al., 2008, Dougherty et al., 2010) and drinking water (Verstraeten et al., 2005, Schaider et al., 2014.)"), https://ac.els-cdn.com/S0048969715312353/1-s2.0-S0048969715312353-main.pdf?_tid=f51656d8-e7bb-4ef9-96d7-bff90ce97736&acdnat=1540398848_cd07935c02cf0a79c8151a72e785b2ac.
[56] Vt. Dep't of Envtl. Conservation, *supra* note 36, at 11.

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PFAS.[57] Because the Bennington WWTF is not designed to remove PFAS (as discussed below), this PFAS contamination eventually ends up in surface waters.

Second, PFAS are present in landfill leachate that is discharged to surface waters via a WWTF. Landfill leachate is the liquid pollutant resulting from water moving through the waste pile of a landfill. DEC found elevated levels of PFAS in the leachate of every landfill in Vermont that has an active leachate collection system, with the highest concentrations at the New England Waste Services of VT (NEWSVT) active landfill.[58]

While leachate gets collected and processed along with wastewater at WWTFs before being discharged to surface waters, this does not mean PFAS are removed. To the contrary, according to DEC, "it is not uncommon to observe higher concentrations of some PFAS in the [wastewater] effluent, then [sic] are observed in the influent."[59]

II. The Agency should establish a treatment technique drinking water standard for the PFAS class that is protective of human health.

In the absence of federal safeguards, Vermont must act to protect drinking water and limit Vermonters' exposure to PFAS. As described below, setting MCLs on a chemical-by-chemical basis does not adequately protect Vermonters from PFAS health impacts; nor does Vermont's current approach for investigating PFAS contamination. Instead, a treatment technique drinking water standard for the class of PFAS is needed. This regulatory approach is authorized by law and technically feasible.

A. The chemical-by-chemical, MCL approach to regulating toxic chemicals is not protective of public health and the environment.

The current chemical-by-chemical regulatory framework for toxic chemicals is so inefficient it puts public health at risk. For example, even after the 2016 amendment to the Toxic Substances Control Act (TSCA), "it could take decades to evaluate the 80,000 chemicals already in commerce that have yet to be tested, let alone the 2,000 new chemicals introduced each year." [60] The EPA "still treats each chemical individually, continuing the saga in which similar, but slightly different, chemicals can be regrettably substituted."[61]

This "whack-a-mole" approach is especially troublesome when it comes to setting drinking water standards for emerging contaminants like PFAS, because it is time consuming and expensive to assess them, it is "technically and financially challenging to identify and reverse environmental and human exposure to PFASs[,]" and both of these

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[57] *Id.*
[58] *Id.* at 9.
[59] *Id.* at 12.
[60] Joseph Allen, *Stop playing whack-a-mole with hazardous chemicals*, WASH. POST, December 15, 2016, https://www.washingtonpost.com/opinions/stop-playing-whack-a-mole-with-hazardous-chemicals/2016/12/15/9a357090-bb36-11e6-91ee-1adddfe36cbe_story.html?utm_term=.ba3a5ab70fce.
[61] *Id.*

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issues are exacerbated by the continual introduction of new PFAS compounds.[62] There are at least 3,000 PFAS compounds in use currently[63] and regulators don't know the names of all PFAS compounds, much less where they are located in their state. Recently developed PFAS are regarded as trade secrets and closely-guarded confidential business information, so manufacturers often do not apply for patents or supply regulators with information about molecular structure or usage.[64]

In light of the thousands of PFAS that have been introduced into commerce, and more introduced each year, establishing MCLs for each PFAS compound is simply not sustainable. The regulators fall farther behind every year, putting our citizens in harm's way. Thus, Vermont should adopt a treatment technique drinking water standard that protects Vermonters from exposure to unsafe levels of all chemicals in the PFAS class.

B. The current Health Advisory does not protect Vermonters.

Vermont's current Health Advisory for PFAS does not protect Vermonters from exposure to unsafe PFAS levels in public water systems. Even though Vermont has issued a Health Advisory for PFAS, public water systems in Vermont are not required to test for and treat unsafe concentrations of PFAS because there is no federal or state drinking water standard for any of the PFAS compounds. In August of 2018, VDH issued a revised Drinking Water Health Advisory for five PFAS compounds (PFOA, PFOS, PFHpA, PFNA, PFHxS).[65] The Agency has also promulgated an emergency rule to establish the Health Advisory for PFAS as a groundwater quality enforcement standard, which means that persons releasing any of the five PFAS into groundwater at concentrations greater than 20 ppt are responsible for cleaning up contamination.[66] However, the Agency has yet to adopt the Health Advisory for these five PFAS as an MCL or to establish an alternative drinking water standard for PFAS, which means that public water systems in Vermont are not required to monitor for or treat unsafe concentrations of PFAS. But, even if the Health Advisory was adopted as an MCL, it would not be protective of public health because it does not address the thousands of PFAS chemicals in the PFAS class.

Further, the Agency's approach to investigating potential PFAS contamination in public water systems is flawed. According to Vermont's 2016 guidance document on PFOA in drinking water, Vermont does not expect PFOA "to be a state-wide problem affecting many water systems."[67] This guidance is based on monitoring conducted by EPA in 2013 as part of EPA's Unregulated Contaminant Monitoring Rule (UCMR-3). Yet these results are not sufficient to assess the potential presence of PFAS in public water systems because (1) only ten out of more

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[62]Zhanyun Wang et al., *A Never-Ending story of Per- and Polyfluoroalkyl Substances (PFASs)?*, ENVTL. SCIENCE & TECH., (February 22, 2017) at 2511, https://pubs.acs.org/doi/pdf/10.1021/acs.est.6b04806.
[63]*KEMI Swedish Chemicals Agency, supra* note 30, at 6.
[64] *Id.* at 26.
[65] Vt. Dep't of Health *supra* note 23.
[66] *Id.*
[67] Vt. Dep't of Envtl. Conservation, Drinking Water and Groundwater Protection Division, *Guidance Re Perfluorooctanoic Acid (PFOA) in Drinking Water*, http://dec.vermont.gov/sites/dec/files/documents/pfoa_dw_guidance3.30.2016.pdf.

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than 413[68] public water systems in Vermont were tested for just six PFAS and (2) the reporting limits for the UCMR-3 Rule were significantly higher than the Health Advisory for PFAS, ranging from 10 ppt to 90 ppt.[69] For example, the minimum reporting level for PFOS for the UCMR-3 sampling event was 40 ppt, which is well above the *combined* 20 ppt Health Advisory.[70] The high reporting limits means that it is impossible for the Agency to know the full extent of PFAS contamination in Vermont.[71]

Moreover, DEC's summary conclusion that PFOA contamination is limited to areas near certain manufacturing processes is unsupported. PFAS contamination sources include firefighting and fire suppression training areas, food packaging, wire coatings and insulation, plastics, landfills, car washes, domestic sewage and septic systems, wastewater treatment plants, ski areas, outdoor textiles and sporting equipment, cleaning agents and fabric softeners, paints, windshield wipers, medical products and facilities, and potentially many others.[72] The State's recommendation to only test a small fraction of public water supplies located near a small selection of industrial manufacturing sites is woefully inadequate.

C. A treatment technique drinking water standard is appropriate for PFAS.

The Agency has broad authority to regulate unsafe chemicals in drinking water.[73] In this case, the unique nature of PFAS demands an alternative approach to chemical-by-chemical regulation through MCLs. Regulation of PFAS as a class and through a treatment technique standard is necessary. There are well-established drinking water treatment technologies that public water systems can install to remove unsafe levels of PFAS from drinking water. There is simply no excuse for the Agency to delay the promulgation of a drinking water standard for the PFAS class to address this public health crisis "perfect storm."

1. The Agency has the authority to adopt a treatment technique drinking water standard.

The Agency has authority to adopt a treatment technique drinking water standard for PFAS. Pursuant to 10 V.S.A. § 1672, the Secretary "shall regulate" drinking water "to prevent and

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[68] Vt. Dep't of Envtl. Conservation, *Consumer Confidence Reports*, http://dec.vermont.gov/water/drinking-water/public-drinking-water-systems/ntncws/consumer-confidence-reports.
[69] Vt. Dep't of Envtl. Conservation, Drinking Water and Groundwater Protection Division, *supra* note 67; U.S. Envtl. Prot. Agency, *Monitoring Unregulated Drinking Water Contaminants, Third Unregulated Contaminant Monitoring Rule*, https://www.epa.gov/dwucmr/third-unregulated-contaminant-monitoring-rule.
[70] Vt. Dep't of Envtl. Conservation, Drinking Water and Groundwater Protection Division, *supra* note 67 (emphasis added).
[71] In a May 2018 report, the Environmental Working Group suggested that the reporting limits for the UCMR-3 Rule likely dramatically underestimated the number of Americans drinking water with unsafe levels of PFAS. *Supra* note 12.
[72] See, e.g., Int'l Tech. Regulatory Council, *History and Use of Per- and Polyfluoroalkyl Substances (PFAS)*, https://pfas-1.itrcweb.org/wp-content/uploads/2017/11/pfas_fact_sheet_history_and_use__11_13_17.pdf.
[73] 10 VT. STAT. ANN., § 1672(a).

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minimize public health hazards."[74] The Secretary has broad authority to establish "standards or requirements for drinking water quality" so long as the standards or requirements are at least as stringent as the national primary drinking water regulations.[75] The Water Supply Rule does not expressly provide for how the Agency should establish drinking water standards other than stating that the Secretary may adopt a Health Advisory Level set by VDH as an MCL.[76]

"A treatment technique is an enforceable procedure or level of technological performance which public water systems must follow to ensure control of a contaminant."[77] Where a treatment technique is selected in lieu of an MCL, the treatment technique must "prevent known or anticipated adverse effects on the health of persons to the extent feasible."[78] EPA has adopted several treatment technique drinking water standards in lieu of an MCL where EPA has determined that it is "not economically or technologically feasible to ascertain the level of [a] contaminant."[79] For example, the Lead and Copper Rule is a treatment technique.[80] This rule requires public water systems to test drinking water in the homes of consumers and undertake additional treatment measures to control lead if 10 percent of the samples exceed 15 ppb.[81] The Surface Water Treatment Rule is also a treatment technique.[82] Under this rule, most public water systems that obtain water from surface water or groundwater under the direct influence of surface water must use filters and disinfectants to reduce pathogens.[83] In both cases, EPA had to establish a unique procedure to address the risks posed by a specific contaminant because an MCL would not have been practical or protective of public health due to the unique characteristics of the contaminants.

Similarly, the unique characteristics of the PFAS class pose a public health threat that cannot be adequately addressed with the establishment of an MCL for one or a few PFAS chemicals. The Agency has the authority to develop a procedure that would require installation of specific drinking water treatment technologies under certain circumstances. The Agency has multiple options to protect Vermonters from exposure to the PFAS class. For example, the Agency could

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[74] 10 VT. STAT. ANN., § 1672(a). The State of Vermont has primacy for the Safe Drinking Water Act in Vermont and has adopted the authority of the Safe Drinking Water Act via rulemaking. Vt. Dep't of Envtl. Conservation, *Vermont Water Supply Rule, Subchapter 21-1.*

[75] 10 VT. STAT. ANN., § 1672(b)(1). Several of the national primary drinking water standards are treatment technique rules. U.S. Envtl. Prot. Agency, *How EPA Regulates Drinking Water Contaminants*, https://www.epa.gov/dwregdev/how-epa-regulates-drinking-water-contaminants (citing Surface Water Treatment Rule, Lead and Copper Rule, and Acrylamide and Epichlorohydrin Rules). The Safe Drinking Water Act authorizes the Administrator to establish a treatment technique standard in lieu of a maximum contaminant level "if the Administrator makes a finding that it is not economically or technologically feasible to ascertain the level of the contaminant." 42 U.S.C. § 300g-1(b)(7)(A).

[76] Vt. Dep't of Envtl. Conservation, *Vermont Water Supply Rule, Subchapter 21-6 § 6.15.*

[77] U.S. Envtl. Prot. Agency, *How EPA Regulates Drinking Water Contaminants*, https://www.epa.gov/dwregdev/how-epa-regulates-drinking-water-contaminants.

[78] 42 U.S.C. § 300g-1(b)(7)(A).

[79] *Id.*

[80] U.S. Envtl. Prot. Agency, *How EPA Regulates Drinking Water Contaminants, supra* note 77.

[81] U.S. Envtl. Prot. Agency, *Lead and Copper Rule*, https://www.epa.gov/dwreginfo/lead-and-copper-rule.

[82] U.S. Envtl. Prot. Agency, *How EPA Regulates Drinking Water Contaminants, supra* note 77.

[83] U.S. Envtl. Prot. Agency, *Surface Water Treatment Rules, https://www.epa.gov/dwreginfo/surface-water-treatment-rules.*

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promulgate a rule that requires public water systems to install appropriate treatment technologies where (1) the sum of all measurable PFAS exceeds a conservative threshold level that is protective of public health and takes into account the cumulative impacts of all PFAS chemicals, or (2) the presence of PFAS compounds is detected using "non-targeted" laboratory analysis.[84] An alternative option would be to require a robust source water assessment for PFAS and require treatment where PFAS may be present in the source water. The Agency should determine a specific procedure for the drinking water standard through a robust stakeholder process as part of the rulemaking process.

2. Due to the unique characteristics of the PFAS class of compounds, a treatment technique is necessary to protect public health.

i. Regulation of PFAS chemicals as a class is necessary.

Even if the Agency were to adopt the current Health Advisory as an MCL, 20 ppt for five PFAS would not protect Vermonters from the 3,000 or more other PFAS.[85]

VDH guidance sets forth a process for regulating multiple chemicals together to protect public health. "For chemicals that do not have established toxicity values from authoritative sources but are part of a group of chemicals in which one or more chemicals do have toxicity values, a single Health Advisory may be developed that is applicable to the sum of multiple contaminants, including chemicals that do not have toxicity values."[86] VDH has already acknowledged that combined regulation of at least five PFAS (PFOA, PFOS, PFHxS, PFHpA, and PFNA)—even where toxicity values for some compounds are not available—is appropriate because these five compounds satisfy four criteria: (1) they are "currently being investigated in Vermont and have been found in drinking water," (2) they are all "members of the PFAS family . . . and are considered sufficiently similar," (3) they "are often found together," and (4) they "elicit similar health effects . . . ."[87]

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[84] EPA and other scientists have identified "non-targeted" laboratory testing methods to better investigate PFAS contamination. *See, e.g.*, U.S. Envtl. Prot. Agency, *EPA Researchers Use Innovative Approach to Find PFAS in the Environment*, https://www.epa.gov/sciencematters/epa-researchers-use-innovative-approach-find-pfas-environment (noting that non-targeted analysis allows "researchers [to] rapidly characterize thousands of never studied chemical compounds in a wide variety of environmental, residential, and biological media); Karl Leif Bates, *Duke Expert Helps Spearhead State's New Water-Testing Program*, DUKE TODAY, Aug. 8, 2018, https://today.duke.edu/2018/08/duke-expert-helps-spearhead-states-new-water-testing-program (noting that non-targeted analysis is used on the Rhine River in Europe, a drinking water source for 20 million people, to monitor emerging contaminants daily).

[85] KEMI Swedish Chemicals Agency, *Occurrence and use of highly fluorinated substances and alternatives; Report from a government assignment*, *supra* note 30, at 6.

[86] *See, e.g.*, Vermont Dep't of Health, *Drinking Water Guidance, Grouping Process for Drinking Water Health Advisories,* Aug. 24, 2018, http://www.healthvermont.gov/sites/default/files/documents/pdf/ENV_ECP_GeneralScreeningValues_Water.pdf.

[87] Memorandum from Mark A. Levine, Commissioner, Vermont Dep't of Health, to Emily Boedecker, Commissioner, Vermont Dep't of Envtl. Conservation Re Drinking Water Health Advisory for Five PFAS (per- and polyfluorinated alkyl substances) (July 10, 2018), http://www.healthvermont.gov/sites/default/files/documents/pdf/ENV_DW_PFAS_HealthAdvisory.pdf; *see also*

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The same four criteria are met with respect to the class of PFAS compounds. First, in addition to PFOA, PFOS, PFHxS, PFHpA, and PFNA, other PFAS that have been found or are being investigated in Vermont, including, for example, perfluorobutane sulfonic acid (PFBS), perfluorohexanoic acid (PFHxA), perfluoroundecanoate (PFUnA), perfluorodecanoic acid (PFDA), perfluorododecanoic acid (PFDoA), perfluorotridecanoate (PFTriA), and perfluorotetradecanoic acid (PFTeA).[88] There are likely many other PFAS in Vermont that the State of Vermont is simply not aware of yet given the speed and secrecy with which chemical manufacturers have introduced these dangerous chemicals into commerce.[89]

Second, as discussed in Section I.A above, PFAS are similar in chemical structure and some PFAS break down into each other. While long-chain PFAS compounds may be decreasing in the environment due to voluntary phase-outs by manufacturers, "the most common replacements are short-chain PFAS with similar structures."[90] Third, these PFAS chemicals are often found together, and fourth, they are likely to have similar health effects, as discussed in Section I.A.

EPA has applied similar concepts to establish an MCL for a group of chemicals.[91] For example, EPA established an MCL for five haloacetic acid disinfection byproducts (HAA5) because it did not have sufficient information regarding (1) the occurrence of individual haloacetic acids; (2) how water quality parameters affect the formation of haloacetic acids; (3) how "treatment technologies control the formation of individual . . . [haloacetic acids]; and (4) toxicity information for some of the individual haloacetic acids.[92] In light of the unique challenges associated with regulation of these chemicals, EPA promulgated a group MCL even in the absence of complete information about each individual haloacetic acid in order to better protect public health.[93] For all these reasons, it is appropriate to regulate PFAS chemicals as a class.

ii. A treatment technique in lieu of an MCL is necessary.

A treatment technique in lieu of an MCL for specific PFAS chemicals or small groups of PFAS chemicals is necessary. As discussed previously, scientists suspect that PFAS chemicals in the class may have similar adverse health effects as the handful of PFAS compounds that have been studied more extensively.[94] EPA has only developed targeted test methods for 14 PFAS

Vermont Dep't of Health, *Drinking Water Guidance,* Attachment 4 at 2 (August 24, 2018), http://www.healthvermont.gov/sites/default/files/documents/pdf/ENV_ECP_GeneralScreeningValues_Water.pdf.

[88] Vt. Dep't of Envtl. Conservation, Information for Impacted Communities, Clarendon, https://dec.vermont.gov/commissioners-office/pfoa/communities#Clarendon.

[89] Envtl. Working Group, *Environmental Working Group Comments on the Agency for Toxic Substances and Disease Registry (ATSDR) Draft Toxicological Profile for Perfluoroalkyls* August 20, 2018, https://cdn.ewg.org/sites/default/files/testimony/EWG%20Comments%20for%20ATSDR_Aug20..pdf?_ga=2.236461961.949885036.1539136763-1789323056.1527870942.

[90] Blum et al. *supra* note 29.

[91] Vt. Dep't of Health, *supra* note 86.

[92] 63 Fed. Reg. 69390, 69409 (Dec. 16, 1998), https://www.gpo.gov/fdsys/pkg/FR-1998-12-16/pdf/98-32887.pdf#page=1.

[93] *Id.*

[94] KEMI Swedish Chemicals Agency, *supra* note 30.

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chemicals out of more than 3,000 compounds.[95] Thus, it is simply not economically or technically feasible to ascertain the level of each specific PFAS chemical in the PFAS class that poses a risk to Vermonters.

As the Agency is well aware, establishing an MCL for one compound is resource intensive and time consuming. Adopting a treatment technique drinking water standard for the PFAS class in lieu of establishing MCLs for thousands of PFAS chemicals will require far fewer Agency resources and will provide protection from exposure to unsafe levels of PFAS on a much shorter timeline. For all of these reasons, a treatment technique drinking water standard is necessary to protect Vermonters.

3. Treatment technologies are available to remove long- and short-chain PFAS.

There are both established and novel methods to remove and destroy PFAS. While long- and short-chain PFAS may be difficult to treat with any one traditional technology—some new technologies are in development—, a "treatment train" of several technologies combining adsorbtion, separation, and destruction in sequence, for example, would be effective in treating drinking water and protecting public health.

Adsorbtion technologies such as granular activated carbon (GAC) and ion exchange "are currently the most commonly encountered interim response measures to achieve immediate compliance with drinking water standards and serve as the benchmark of practicality and effectiveness for other treatment technologies."[96]

While new adsorbtion technologies like organically modified silica adsorbents show promise,[97] GAC has long been used for adsorbtion of chemical pollutants, consistently removes PFOS with an efficiency of more than 90 percent,[98] and is the treatment technique specified in the Safe Drinking Water Act (SDWA) for the control of synthetic organic chemicals:

> granular activated carbon is feasible for the control of synthetic organic chemicals, and any technology, treatment technique, or other means found to be the best available for the control of synthetic organic chemicals must be at least as effective in controlling synthetic organic chemicals as granular activated carbon.[99]

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[95] U.S. Envt. Prot. Agency, *Method 537: Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography /Tandem Mass Spectrometry* 537-2 (EPA/600/R-08/092) (Sep. 2009), http://citeseerx.ist.psu.edu/viewdoc/download;jsessionid=ED20973987CE8E7A0E0944E8E31D66BE?doi=10.1.1.645.8401&rep=rep1&type=pdf.

[96] J. Horst et al., *Water Treatment Technologies for PFAS: The Next Generation,* 38 GROUNDWATER MONITORING & REMEDIATION (Spring 2018), at 15.

[97] *Id.* at 15–16.

[98] K.H. Kucharzyk et al., *Novel treatment technologies for PFAS compounds: a critical review* 204 JOURNAL OF ENVTL. MANAGEMENT (December 2017), at 759; 42 U.S.C. § 300g-1(b)(4)(D), 759.

[99] 42 U.S.C. § 300g-1(b)(4)(D).

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Separation technologies, including reverse osmosis, microfiltration, ultrafiltration and nanofiltration, are highly effective for PFAS removal and can remove PFAS at more than 99 percent effectiveness.[100] "Membrane filtration has several benefits including: achieving continuous separation, low energy consumption, ease of combination with other existing techniques, easy up-scaling, and low chemical costs."[101] Ozofractionation (a patented process by the company EVOCRA and available commercially as Ozofractionative Catalyzed Reagent Addition (OCRA)) is a novel separation technology that shows high (greater than 99.99 percent reduction) effectiveness for PFAS.[102]

Finally, novel destructive treatment technologies for PFAS are becoming available. Destructive technologies include sonochemical decomposition,[103] chemical/advanced photochemical oxidation,[104] and AECOM's DE-FLUORO™ technology.[105]

This treatment train solution will also confer significant co-benefits for public health, because the same technologies that are effective in PFAS treatment are effective in removing a host of other dangerous chemicals. GAC adsorbtion filters alone, for example, are effective in removing dozens of harmful contaminants in addition to PFAS (including, but not limited to: RDX, arsenic, benzene, cryptosporidium, MTBE, mercury, perchlorate, tetrachloroethylene (Perc), and trichloroethylene (TCE)).[106] Other technologies that should be considered as components of the treatment train confer similar co-benefits; for example, membrane separation technologies like reverse osmosis not only treat PFAS but, without limitation, also treat 1,4-dioxane, alachlor, chromium, malathion, and nitrates.[107]

For all these reasons, Petitioners urge the Agency to initiate a rulemaking for a treatment technique drinking water standard for the PFAS class.

III. In the alternative, the Agency should either adopt an MCL for the PFAS class or for each individual PFAS chemical.

The Agency must take action to establish drinking water standards for PFAS in the absence of federal safeguards even if the Agency does not establish a treatment technique standard. As discussed in Section II.C, the Agency has the authority to regulate PFAS as a class or on a chemical-by-chemical basis. PFAS are present in Vermont waters and are known to cause adverse health effects. Thus, at a bare minimum, the Agency should either adopt an MCL for the

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[100] Kucharzyk et al., *supra* note 98 at 759–60; Horst, supra note 96.
[101] V.A. Arias Espana et al., *Treatment technologies for aqueous perfluorooctanesulfonate (PFOS) and perfluorooctanoate (PFOA): A critical review with an emphasis on field testing*, ENVIRONMENTAL TECHNOLOGY & INNOVATION (2015), at 168, 177.
[102] Horst, *supra* note 96, at 17.
[103] Espana, *supra* note 101, at 174.
[104] *Id.* at 178.
[105] AECOM, *AECOM's Promising New PFAS Treatment Technology DE-FLUORO Shows Complete Destruction of PFAS*, https://www.aecom.com/content/wp-content/uploads/2018/04/PFAS-Treatment-Technology-DE-FLUORO_INFO-SHEET.pdf.
[106] U.S. Envtl. Prot. Agency, *Drinking Water Treatability Database, Granular Activated Carbon*, https://oaspub.epa.gov/tdb/pages/treatment/treatmentContaminant.do.
[107] *Id.*

ED_002545_00008667-00016

PFAS class or for each individual PFAS chemical that poses a risk to public water systems in Vermont.

IV. The Agency should immediately adopt the Health Advisory as a maximum contaminant level.

In the interim and until the Agency establishes a treatment technique drinking water standard for PFAS, the Agency should immediately adopt the Health Advisory as an MCL. For contaminants which may be detected in a public water system for which MCLs have not been adopted, and the Health Commissioner has established a Health Advisory Level for the compound, the Secretary may adopt the Advisory Level as an MCL.[108] For example, the Secretary adopted the VDH Health Advisory for nickel as an MCL.[109] In this case, VDH has established a Health Advisory of 20 ppt total for PFOA, PFOS, PFHxS, PFHpA, and PFNA combined.[110] The Secretary should immediately adopt these as MCLs.

CONCLUSION

For all the forgoing reasons, Petitioners request the Agency establish a drinking water standard for PFAS that is protective of public health. Specifically, the Agency should adopt a treatment technique drinking water standard for the PFAS class. In the alternative, the Agency should establish an MCL for the PFAS class or individual MCLs for each PFAS chemical that poses a risk to public water systems in Vermont. As an interim step, the Agency should immediately adopt the Health Advisory as an MCL.

The significant threats posed to human health and the environment by the PFAS class of compounds are clear. These compounds have been found in Vermont drinking water, groundwater, and surface waters. The dangers this class of chemicals pose to Vermonters demand immediate action to limit further exposure. Thank you for your consideration.

Sincerely,

Zak Griefen, Senior Enforcement Litigator
Conservation Law Foundation

Elena Mihaly, Staff Attorney
Conservation Law Foundation

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[108] Vt. Dep't of Envtl. Conservation, *Vermont Water Supply Rule, Subchapter 21-6 § 6.15* (December 1, 2010).
[109] *Id. Subchapter 21-6 § 6.12* (December 1, 2010).
[110] *Id.*

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Jon Groveman
Policy & Water Program Director
Vermont Natural Resources Council

Johanna de Graffenreid
Program Director, jobs, Justice, Climate Campaign
Rights and Democracy

Paul Burns
Executive Director
Vermont Public Interest Research Group

Shaina Kasper
Vermont State Director
Toxics Action Center

cc:

Mark Levine, Commissioner
Vermont Department of Health

Sarah Vose, State Toxicologist
Vermont Department of Health

Emily Boedecker, Commissioner
Vermont Department of Environmental Conservation

Bryan Redmond, Director
Drinking Water and Groundwater Protection Division
Vermont Department of Environmental Conservation

Chuck Schwer, Director
Waste Management & Prevention Division
Vermont Department of Environmental Conservation

Matt Chapman, General Counsel
Agency of Natural Resources

David Englander, Senior Policy and Legal Advisor
Vermont Department of Health

T.J. Donovan, Vermont Attorney General
Office of the Attorney General

ED_002545_00008667-00018

Rob McDougall, Assistant Attorney General
Office of the Attorney General

ED_002545_00008667-00019

Message

From: Katharine Hodge Ex. 6
Sent: 7/20/2018 3:24:19 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
CC: ecabanel@merrimacknh.gov; governorsununu@nh.gov; Laurene Allen Ex. 6
Subject: Follow up regarding Merrimack NH

Good morning Ms Dunn, just a quick follow-up in regards to my previous email about SG in Merrimack. I was just wondering if your staff had a chance to look over the test results and to observe how much contamination we are actually dealing with here in Merrimack.

Also, I would like to bring to your attention that a development by Flatley Company that is going in beside the property of SG, is also highly contaminated with water readings of 1400 PPT and multiple soil contamination readings.

Due to the contamination, it was told that this is an OSHA D1 problem and it has come to my attention that the construction workers were never told that they were dealing with contaminated water or soil and have not been given the proper hazardous material protection.

In regards to the contamination, the Flatley company is not allowed to remove the top 24 in of highly contaminated soil from the property and have it sitting in giant mounds on the property that affect the people of our town on a daily basis due to the fact it is not being properly contained. With every windy dry day that we have, the contaminated soil is being blown around and further contaminating the air, homes, local properties, soil and water. Also add to the fact that everybody is now breathing that contamination in once again.

We are also receiving major push-back by DES who doesn't seem to be willing to do their jobs in regards to protecting us from the contamination as they have allowed the Flatley property to go forward even though they have contamination readings of 1400 PPT in the water testings and our state suggested limit is 70 PPT. Once again contaminated groundwater is leaching into our Brooks and Rivers which are our main source of water for the town.

Also, on the DES One Stop website where certain documents were once available, they are now unable to be found. They have also buried the information so far and so deep and made it extremely difficult to get to, so that we are not able to question things that are going on in our town.

It is my opinion and the opinion of many in our town that we are not being protected by our state and that our state is working in favor of the polluters and contaminates.

In regards to the ATSDR report where it is spelled out in black and white the issues with these PFAS chemicals, our state has once again chosen to take the path of least resistance and they let us continue to be poisoned instead of focusing on the health and well-being of the residents of New Hampshire and continue to protect once again the polluters, the major businesses that are responsible.

I thank you for your time and attention

Katharine Hodge

Message

From: Laurene Allen Ex. 6
Sent: 10/1/2018 4:15:50 PM
To: Clark Freise [clark.freise@des.nh.gov]
CC: geoffdaly@mkd-usa.com; don@provencher.com; Dunn, Alexandra [dunn.alexandra@epa.gov]; Ex. 6
Subject: Re: Air emission tests

Thank you Clark
Looking forward to hearing more on
October 10
Regards,
Laurene

On Oct 1, 2018, at 11:48 AM, Freise, Clark <Clark.Freise@des.nh.gov> wrote:

Laurene,

PFOA has always had an air ambient limit (AAL). Saint-Gobain had once previously exceeded that limit, but they have been in compliance to that limit for years. The latest testing confirmed they are within that limit. That limit (AAL) is only for inhalation risk, it does not account for the risk of groundwater impacts. Under HB1101/SB309 we are now able to look at that potential impact. That is what the current testing and pilot treatment efforts address. The MS vs. MA is just which tower at the plant is being referenced. They have given them various designations over the years (one is called MA, one is called MS). I agree that our concerns do not end at PFOA and PFOS. That is why we worked with the legislation to be authorized to set MCLs for two additional compounds beyond those two. It is also why we have always tested for the broadest array of analytes that labs could cover, and why we are working with EPA Office of Research and Development, who has even more advanced capabilities than any of the commercial labs. While we may not know the health effects of every compound, we want to make sure people are informed to the greatest extent we can.

Clark

From: Laurene Allen [mailto: Ex. 6
Sent: Friday, September 28, 2018 11:20 PM
To: Freise, Clark
Cc: geoffdaly@mkd-usa.com; don@provencher.com; dunn.alexandra@epa.gov; Ex. 6
Subject: Air emission tests

Clark
I was reviewing the emails Geoff Daly initiated with you about the air stack testing completed in May of this year not being released yet and have some questions. I am not an engineer so perhaps I am missing something here, but I do review and read all one stop documents as do several others who advocate for the persistent and long term contamination of our communities.

You stated to Geoff that air test data was last done in 2016 and it did not exceed the approved permits.
Were you referencing Permitting for PFAS emissions (are they assigned EPA health advisories as are water and contact soil as they are not a regulated chemical class ?) or for the other manufacturing chemicals that are regulated by the EPA?
There seems to be a bit of a communication issue or I am misunderstanding, as I was certain I had seen tower tests from 2017 which I looked through my own files for and found the following:

<image001.jpg>

<image002.jpg>
Could you please clarify this issue for me?
Also what is the difference between an MS tower and an MA tower that would explain the higher test results in the MS tower residue?

And finally, one of the points of the PFAS Investigation that has always bothered me is from the start is that particles via air emissions was initially communicated as the source of our contamination yet the company was allowed to continue to do business as usual, emitting from 13 unfiltered air stacks. As I know DES is aware, the discontinuation of PFOA/PFOS and the use of replacement chemicals from approximately 2015 on does not make this chemical class safer, it's simply not acknowledged. While I do understand that your job is regulation, our health impacts are the elephant in the room and I do believe that many fine scientists I have spoken to in your agency are aware that our exposure must be considered as a complete cocktail of PFAS .
The air emissions bill does not give the health protections we need and I have grave concerns for children as well as vulnerable populations that have had and continue to have PFAS exposure via ingestion, inhalation, local produce, fish and biosolid and many other pathways. Sadly, we are far behind and need precautionary measures in place now as the qualities of Gen X that we have been exposed to via a steady stream of air emissions since 2015 are the most troubling threat we face and if a pass through gathering of health data were to be done it I believe it would be very damaging to the makers and users of this chemical class.
In the words of Dr Linda Birnbaum at the Senate hearing this week "we are not going to be able to test our way out of this"

Regards and Thank you for the difficult job you have,
Laurene

Message

From: Geoff Daly [geoffdaly@mkd-usa.com]
Sent: 11/6/2018 5:38:22 PM
To: 'd' [Ex. 6]; zkz1@cdc.gov; fjh1@cdc.gov; pjb7@cdc.gov; kif5@cdc.gov
CC: peter_clark@shaheen.senate.gov; mark.dailey@masenate.gov; ashley_coulombe@warren.senate.gov; russell.halliday@mail.house.gov; mindi@mindiforcongress.com; bilott@taftlaw.com; president@pffm.org; [Ex. 6] jason.burns@iafflocal1314.com; rriley08@northshore.edu; Grevatt, Peter [Grevatt.Peter@epa.gov]; Dunn, Alexandra [dunn.alexandra@epa.gov]; gpeaslee@nd.edu; lpetrick@iaff.org; pmorrison@iaff.org; paul.jacques@pffm.org; [Ex. 6] carignan@anr.msu.edu; kfent@cdc.gov; acaban@med.miami.edu; sshaw@meriresearch.org; jburgess@email.arizona.edu; pgrand@hsph.harvard.edu; hdavies@kingcounty.gov; geoff@geoffdiehl.com; holly.davies@kingcounty.gov; PaulJrCotter@charter.net; emily.sparer@mail.harvard.edu; mmaynard@NFPA.org; JPauley@nfpa.org; mustafa@hiphopcaucus.org; aropeik@nhpr.org; karen.hensel@nbcuni.com; alicia.rebello-pradas@massmail.state.ma.us; stefanit@sbcglobal.net; matthew.alba@sfgov.org; bobbyhalton@pennwell.com; [Ex. 6] billc@pennwell.com; sylvia@toxicsaction.org; shaina@toxicsaction.org; brandon.kernen@des.nh.gov; debra@cleanproduction.org; dbond@bennington.edu; cell@ffcancer.org; [Ex. 6] andres_hoyos@hassan.senate.gov; [Ex. 6] carey@careygillam.com; dalmatprod@outlook.com; esmaynard@lakeland.com [Ex. 6] [Ex. 6]; stephanie.ebbs@abc.com; gretchen@saferstates.org; gretchen@healthyhomeconsulting.net; ANNAISE.FOUREAU@STATE.MA.US; [Ex. 6] [Ex. 6] jeffknobbe@sbcglobal.net; [Ex. 6] info@attorneyjaymcmahon.com; mindi.messmer@leg.state.nh.us; saundrea.shropshire@mail.house.gov; sanfordlewis@strategiccounsel.net; cdubay@nfpa.org
Subject: RE: PFAS detected at New Hampshire Fire Academy.

Good morning *Diane and everyone,*

If you do not already have these NH Fire Stations with Well Contaminations from PFAS please include:-

- Kingston NH detected 140 PPT in their water wells around the station.
- The main NH Concord training center the East side of the Airport, the First site is as you enter where they train for Aircraft fires. Then at the Rear of the Main Building are several training areas near the Soucook River.
- Brentwood Fire Academy off Rte101 on North Road behind the Rockingham Jail, beyond the Water Works are three major wells over 2,000+ PPT
- Franklin NH main Fire Station.
- Windham Station on N. Lowell Rd and Fellows Rd.
- Bow NH has 6 Fire Stations where PFAS has been detected at Elevated levels. I believe there are several others out towards Keen and up near Lebanon airport area.
- In MA, there is Westfield NG fire station on the NG AFB affecting the whole NW side of Westfield.

Regards,

Geoff

Ex. 6

Skype: - Ex. 6
Phone: -
Fax: - Ex. 6

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Please consider the environment before printing this email

From: d Ex. 6
Sent: November 06, 2018 07:35
To: zkz1@cdc.gov; fjh1@cdc.gov; pjb7@cdc.gov; kif5@cdc.gov
Cc: peter_clark@shaheen.senate.gov; mark.dailey@masenate.gov; ashley_coulombe@warren.senate.gov; russell.halliday@mail.house.gov; mindi@mindiforcongress.com; bilott@taftlaw.com; president@pffm.org; Ex. 6; jason.burns@iafflocal1314.com; rriley08@northshore.edu; geoffdaly@mkd-usa.com; grevatt.peter@epa.gov; dunn.alexandra@epa.gov; gpeaslee@nd.edu; lpetrick@iaff.org; pmorrison@iaff.org; paul.jacques@pffm.org; Ex. 6 carignan@anr.msu.edu; kfent@cdc.gov; acaban@med.miami.edu; sshaw@meriresearch.org; jburgess@email.arizona.edu; pgrand@hsph.harvard.edu; hdavies@kingcounty.gov; geoff@geoffdiehl.com; holly.davies@kingcounty.gov; PaulJrCotter@charter.net; emily.sparer@mail.harvard.edu; mmaynard@NFPA.org; JPauley@nfpa.org; mustafa@hiphopcaucus.org; aropeik@nhpr.org; karen.hensel@nbcuni.com; alicia.rebello-pradas@massmail.state.ma.us; stefanit@sbcglobal.net; matthew.alba@sfgov.org; bobbyhalton@pennwell.com; Ex. 6 billc@pennwell.com; sylvia@toxicsaction.org; shaina@toxicsaction.org; brandon.kernen@des.nh.gov; debra@cleanproduction.org; dbond@bennington.edu; cell@ffcancer.org; Ex. 6; andres_hoyos@hassan.senate.gov; Ex. 6 carey@careygillam.com; dalmatprod@outlook.com; esmaynard@lakeland.com; Ex. 6 mariah@mariahblake.com; stephanie.ebbs@abc.com; gretchen@saferstates.org; gretchen@healthyhomeconsulting.net; ANNAISE.FOUREAU@STATE.MA.US; Ex. 6 jeffknobbe@sbcglobal.net; mick.tisbury@gmail.com; info@attorneyjaymcmahon.com; mindi.messmer@leg.state.nh.us; saundrea.shropshire@mail.house.gov; sanfordlewis@strategiccounsel.net; cdubay@nfpa.org
Subject: PFAS detected at New Hampshire Fire Academy.

All,

I will add this latest site to my list of growing fire stations/training facilities that have tested positive for PFOS/PFOA water exposure. There are over 58,000 fire stations in the nation. Is this the tip of the spear?

http://amp.wmur.com/article/pfas-detected-at-new-hampshire-fire-academy/24497676?fbclid=IwAR18Cj-Q7Mame-gDS88rFR8wvZI5ZXO-Po0EsoqQnUJX7zBUuhsV3IC6ybw

Meanwhile, I ask again, who is responsible to send the word to every fire

station in the nation to test their water wells? CDC? EPA? NFPA? IAFF?

If we know all of the military sites are testing positive for PFOS due to AFFF, why are we not testing the 'fire stations' where 'fire fighting foam' has/may have been used since the 80's?

This fire academy in NH should give the EPA and CDC cause to sound the alarm for the fire service.

October 2, 2017 NH DES sends this letter to every fire station in NH:

https://www4.des.state.nh.us/nh-pfas-investigation/wp-content/uploads/2017/11/Fire_Department_H20Sample.pdf

Again I ask, what agency of our government is going to sound the alarm for the fire service as is being done in the military?

The water issue at our fire stations does not exceed the need to protect the fire service regarding their turnout gear and the PFAS laden coatings of which we have no idea what chemicals are being used. Today we received this message:

We just got fitted for new turnouts not long ago. And I raised the question "is this gear free from PFOAs?" He stated that they were" is this bs? Or have they in fact stopped manufacturing with this chemical?

Manufacturers are able to state they do not make PPE with PFOA. They do not mention that the PFAS chemicals they use **may** degrade to form PFOA. If the testing done by Professor Peaslee on new, never-worn gear from 2004 has taught us anything, it is that there was PFOA/PFNA etc, in the PPE, and, that we have no idea how much is used. **It may very well exceed the minimum amount needed to achieve the NFPA standard for water resistance**. No one is watching how much is used. Concerning is that these manufacturers sit on our NFPA committees making decisions on everything from the balance of a helmet to the width of reflecting tape.

In California, labeling legislation under Prop 65 covers endocrine disrupting potential cancer risks. We have no such warning labels in PPE. Yet, we have no such warning in the fire service. While NFPA standardizes everything from the balance of the helmet to the width of reflecting tape, we have no PFAS labels in turnout gear, boots or gloves. Yet, should you purchase less fluorinated items in California, you would see these items labeled with Prop 65's statement that these items may contain endocrine disrupting chemicals.

In 2016 Dr Roger Klein gave an excellent presentation on the issue of PFAS and turnout gear. His presentation begins on page 43:

https://m.hemmingfire.com/news/get_file.php3/id/306/file/burlington+presentations+for+web+rev1.pdf

Please note, since 2006 the manufacturers of our PPE, and our AFFF have been made aware of the European Union's decision to phase out and restrict PFOA nationally.

http://hemmingfire.com/news/fullstory.php/aid/2660/PPE___Duty_of_Care_Forum_-_condensed.html

Here, EPA is still asking for comments.

If I knew how to sue the EPA and CDC for dereliction of duty I would do so today.

https://echa.europa.eu/documents/10162/13641/rest_pfoa_final_bd_en.pdf/61e81035-e0c5-44f5-94c5-2f53554255a8

Respectfully,

Ex. 6

http://amp.wmur.com/article/pfas-detected-at-new-hampshire-fire-academy/24497676?fbclid=IwAR18Cj-Q7Mame-gDS88rFR8wvZI5ZXO-Po0EsoqQnUJX7zBUuhsV3IC6ybw

-----Original Message-----
From: d[redacted]
To: cdubay <cdubay@NFPA.org>; zkz1 <zkz1@cdc.gov>; fjh1 <fjh1@cdc.gov>; pjb7 <pjb7@cdc.gov>; kif5 <kif5@cdc.gov>
Cc: peter_clark <peter_clark@shaheen.senate.gov>; mark.dailey <mark.dailey@masenate.gov>; ashley_coulombe <ashley_coulombe@warren.senate.gov>; russell.halliday <russell.halliday@mail.house.gov>; mindi <mindi@mindiforcongress.com>; bilott <bilott@taftlaw.com>; president <president@pffm.org>; president.local1009 <[redacted]>; jason.burns <jason.burns@iafflocal1314.com>; rriley08 <rriley08@northshore.edu>; geoffdaly <geoffdaly@mkd-usa.com>; grevatt.peter <grevatt.peter@epa.gov>; dunn.alexandra <dunn.alexandra@epa.gov>; gpeaslee <gpeaslee@nd.edu>; lpetrick <lpetrick@iaff.org>; pmorrison <pmorrison@iaff.org>; paul.jacques <paul.jacques@pffm.org>; [redacted]; carignan <carignan@anr.msu.edu>; kfent <kfent@cdc.gov>; acaban <acaban@med.miami.edu>; sshaw <sshaw@meriresearch.org>; jburgess <jburgess@email.arizona.edu>; pgrand <pgrand@hsph.harvard.edu>; hdavies <hdavies@kingcounty.gov>; mindi <mindi@mindiforcongress.com>; geoff <geoff@geoffdiehl.com>; holly.davies <holly.davies@kingcounty.gov>; PaulJrCotter <PaulJrCotter@charter.net>; emily.sparer <emily.sparer@mail.harvard.edu>; mmaynard <mmaynard@NFPA.org>; JPauley <JPauley@nfpa.org>; mustafa <mustafa@hiphopcaucus.org>; aropeik <aropeik@nhpr.org>; karen.hensel <karen.hensel@nbcuni.com>; alicia.rebello-pradas <alicia.rebello-pradas@massmail.state.ma.us>; stefanit <stefanit@sbcglobal.net>; matthew.alba <matthew.alba@sfgov.org>; bobbyhalton <bobbyhalton@pennwell.com>; marr.jon [redacted]; billc <billc@pennwell.com>; sylvia <sylvia@toxicsaction.org>; shaina <shaina@toxicsaction.org>; brandon.kernen <brandon.kernen@des.nh.gov>; debra <debra@cleanproduction.org>; dbond <dbond@bennington.edu>; cell <cell@ffcancer.org>; quintquilts [redacted]; andres_hoyos <andres_hoyos@hassan.senate.gov>; wuc1959 [redacted]carey <carey@careygillam.com>; [redacted]; esmaynard <esmaynard@lakeland.com>; [redacted]; geoffdaly <geoffdaly@mkd-usa.com>; [redacted]; mariah <mariah@mariahblake.com>; stephanie.ebbs <stephanie.ebbs@abc.com>; aropeik <aropeik@nhpr.org>; gretchen <gretchen@saferstates.org>; gretchen <gretchen@healthyhomeconsulting.net>; shaina <shaina@toxicsaction.org>; rwalsh4justice <rwalsh4justice@outlook.com>; lpetrick <lpetrick@iaff.org>; lpetrick <lpetrick@iaff.org>; pmorrison <pmorrison@iaff.org>; ANNAISE.FOUREAU <ANNAISE.FOUREAU@STATE.MA.US>
Sent: Sat, Oct 6, 2018 11:47 am
Subject: Robert Bilott has filed a Natiowide Class Action on behalf of all persons exposed to PFAS. His plaintiff; A Firefighter.

https://theintercept.com/2018/10/06/dupont-pfas-chemicals-lawsuit/

While we have been omitted from the National PFAS PEASE AFB Concept Plan, as we are occupationally exposed,
and as we can secure no funding from our government, and are holding bake sales and car washes to fund our own studies, I am beyond elated to see this news today.

Thank you Robert Bilott, Thank you Sharon Lerner.

Sent: Wed, Aug 22, 2018 2:36 pm
Subject: Fire Station Contamination Across the Nation and reply to NFPA IS COMPLACENT IN THE ISSUE OF REVEALING THE CHEMICAL ADDITIVES AND AMOUNTS USED IN OUR PPE.

Chris,

I will be submitting a TIA.

Thank you,

Diane

Two outstanding updates:

8/21/18, Senator Shaheen's office notified us of the funding passed for the FF Cancer Registry that
Senator was an originator for. Passed 85/0.

Please let me know what questions you may have. Senator Shaheen was a co-sponsor of this amendment as well as the original authorizing legislation last month:

Menendez-Murkowski #3705: Firefighter Cancer Registry

Summary This amendment would provide $1 million in funding for the National Institute of Occupational Safety and Health (NIOSH) within the Centers for Disease Control to implement the Firefighter Cancer Registry Act of 2018. The Firefighter Cancer Registry Act was enacted on June 26th and establishes voluntary cancer registries for firefighters to track data on cancer rates among firefighters and help identify cancer-related environmental risk factors associated with firefighting. The Firefighter Cancer Registry Act authorized $2.5 million for implementation over FY 2018 to 2022, but did not actually appropriate any funding. To offset the $1 million in new funding, the amendment would reduce General Departmental Management funding within the HHS Office of the Secretary by $1 million. This amendment would help address concerns raised by firefighters and their families about the potential cancer implications due to per- and polyfluoroalkyl substances (PFAS) firefighting foams and other compounds used by civilian firefighting forces.

8/22/2018
Hi Diane –

I wanted to flag for you that Senator Warren filed an appropriations amendment which would require the Centers for Disease Control and Prevention (CDC) to conduct a study on the health implications for firefighters, police officers, and first responders of exposure to per and polyfluoroalkyl (PFAS) substances.Here is a link to the full text of the amendment. It would authorize $5M for the study.

Thank you for your continued efforts to bring this issue to our attention, and I know the Senator was pleased to file this amendment in an effort to address this issue. Please let me know if you have any questions. Here is the quote from the Senator on the amendments. Best- Ashley

"As they work to keep our families and neighborhoods safe, firefighters and first responders in Massachusetts and across the country expose themselves to harsh chemicals and put their health at risk," **said Senator Warren.** "The amendments I filed today would allow us to collect better data on this problem so we can better protect all of our first responders who put their lives on the line for us every day. We owe it to them to do everything we can to protect their health and safety."

https://www.warren.senate.gov/imo/media/doc/PFAS%20amdt.pdf

Such great news for the fire service ... funding for the registry, and the potential PFAS studies that
are long overdue.

All, please see below for the numerous *fire stations* that have been contaminated by AFFF.

https://docs.google.com/spreadsheets/d/1HxLAzOmFdMh7V-mey4ExTPsnNKarEcGG6klBWZH8auA/edit#gid=676990244

ALASKA:

Fairbanks Regional Fire Training Center,

PFASs found in 26/33 private wells, 19 exceeded EPA health advisory (2015); {GHU municipal water 2018 -- PFOS: 2.4-2.9 ppt, PFOA: 2.9-3.5 ppt}; {Airport -- PFOA: 6.4 - 762 ppt} GHU municipal water 2018 -- PFHxS: 5.1-5.9 ppt, PFHxA: 2.8-3.2 ppt

Firefighting foam used from 1984 to 2004 in fire training exercises at the Regional Fire Training Center, and at Fairbanks International Airport since the 1980s

https://dec.alaska.gov/spar/csp/sites/fairbanks-fire-training-center

COLORADO:

Sugarloaf Fire Department

Station 1 Well: [PFOA = 79 ppt; PFOS = 950 ppt], Station 2 Well: [above 70 ppt, numbers unavailable]
Firefighting foam used at Sugarloaf Fire Department

Fire district board members will join representatives from EPA, Boulder County Health Dept, and Colorado Dept. of Health & Environment in a community meeting to brief residents on the status of contamination. Boulder County Health Dept. paid for testing of 12 wells near the two fire stations. "The water quality control division of (the department) has allocated funds that we will be distributing to Boulder County Public Health and then we will work with both the Fire District and Boulder County Public Health and our Region 8 EPA office to determine the best path forward in determining where and when we should best sample," said Dr. Kristy Richardson, environmental toxicologist for the Colorado Dept of Public Health & Environment

MASSACHUSETTS

Barnstable County Firefighting Training Academy.

Please see page 18 for PFOS contamination map of over 70,000 ppt noted in red dots.

http://www.newmoa.org/events/docs/259_227/GallagherMA_May2017_final.pdf

MINNESOTA (by far the most comprehensive study of what was used, how stored, and when used)

DELTA PROJECT NO. 19382-DEL0

These three reports are based mainly on municipal/rural AFFF at fire fighting training locations:

2008: https://www.pca.state.mn.us/sites/default/files/pfc-foamreport-addendum.pdf

2009: https://www.pca.state.mn.us/sites/default/files/c-pfc1-05.pdf

2010: https://www.pca.state.mn.us/sites/default/files/c-pfc1-09.pdf

from page 22:

The PFOA HRL was exceeded in several groundwater sample collected during the current scopes of work and previous scopes of work with laboratory results being presented in this report: 1,260 ng/L PFOA was detected in the groundwater sample collected from the Burnsville B-3 boring;
and, **PFOA concentrations ranging from 958 ng/L to 286,000 ng/L were detected in all four groundwater samples collected in May 2009 from borings B-1 through B-4 at the MSP Airport.** PFOA concentrations detected in other groundwater samples collected during the current scopes of work and in Fridley and Luverne were less than 300 ng/L

page 23:

The PFOS HRL was exceeded in several samples collected during the current scopes of work: 522 ng/L PFOS was detected in the Burnsville B-3 groundwater sample; 483 ng/L and 789 ng/L PFOS were detected in the Bemidji B-1 and B-2 groundwater samples, respectively;
and, PFOS concentrations ranging from 731 ng/L to 14,900 ng/L were detected in five of the six groundwater samples collected at the Marathon Refinery, including the duplicate sample. The only groundwater sample collected at the Marathon Refinery with a PFOS concentration of less than 300 ng/L was MW-101, which is located near Tank 120 upgradient of the firefighting training area.
The PFOS concentrations in other groundwater samples collected during the current scopes of work and in Fridley and Luverne were less than 300 ng/L

NEW HAMPSHIRE

http://amp.wmur.com/article/pfas-detected-at-new-hampshire-fire-academy/24497676?fbclid=IwAR18Cj-Q7Mame-gDS88rFR8wvZI5ZXO-Po0EsoqQnUJX7zBUuhsV3IC6ybw

Windham, NH Fire Station

Combined PFOA/PFOS: (Senior Center: 96 ppt; Fire Department building: 112 ppt; Dunkin Donuts/Bodega: 100 ppt)

Firefighting foam used at local fire station

In addition see also: NH DES Oct 2, 2017 letter to all fire stations after 6 of 7 wells tested elevated for PFOA.

https://www4.des.state.nh.us/nh-pfas-investigation/wp-content/uploads/2017/11/Fire_Department_H20Sample.pdf

New York State

Suffolk County Firematics Training Facility

PFOS (<2 ppt - 2540 ppt), PFAS (<2 ppt - 133 ppt) PFHxS: 528 ppt, PFHpA: 137 ppt, PFNA: 252 ppt

Firefighting foam used at Suffolk County Firematics Training Facility

Firematics served as Suffolk County's firefighting training facility since 1959 and used PFC-containing foam until May 2016,
when chemicals in the foam were classified as hazardous substances by NYS.

Hampton Bays Fire Station

Combined PFOA/PFOS (as high as 85.8 ppt)
Firefighting foam used at Fire Station

"In September 2017, two public water supply wells were closed in Hampton Bays when PFCs were detected.
The suspected culprit is fire fighting suppressant foam that contained PFCs. A two-acre site that is owned by
the Hampton Bays Fire District is now listed as a "potential hazardous waste site"

WASHINGTON

Issaquah

Fire Station; Tanker crash site PFOA (20-80 ppt; non-detect at tap). PFOS (600-2,200 ppt; non-detect at tap)
PFBS: 69.5 ppt; PFHpA: 5.31 ppt; PFHxS: 47.3 ppt; PFNA: 22.1 ppt
Firefighting foam used at Eastside Fire Rescue and firefighting foam sprayed during a tanker fire in 2002

Wisconsin

Tyco-Ansul Fire Technology Center Marinette, Wisconsin
Jan.22.2018: [Groundwater -- combined PFOA/PFOS: ND-1,653 ppt], [well water -- combined PFOA/PFOS: ND-690 ppt]
June 2018: [Out of the 137 wells tested during winter 2017, 97 showed no contamination, 29 had PFAS below the EPA health advisory level of 70 ppt, and 11 had PFAS above the health advisory level. Tyco offered bottled water to homes that had their wells tested, and is still providing bottled water to 126 recipients. For the homes above the health advisory level, Tyco offered GAC water filtration systems to clean the water before use. Seven accepted the filters. In Spring of 2018, Tyco tested 129 wells, most of which were repeat tests but some of which were new. 71 showed no contamination, 23 showed PFAS below the health advisory level, and 1 showed above the advisory level.]

AUSTRALIA:

http://fbeu.net/2007/03/safety-first-3m-foam-banned-return-to-sender/

Safety First. 3M foam banned – return to sender

March 26, 2007 Besides banning its use, Members are also instructed to search the Station for these chemicals, collect and tag them as a hazard and to notify the

Department's Health Services Unit so that they can be removed from your workplace.

Members at Retained Stations in particular should have a good look for this foam as the Union believes that this foam constitutes both an unacceptable and avoidable risk to members and their families. It has come to light that the Australian Military believes this product can cause serious health problems including:

- Central nervous system depression,
- nausea,
- vomiting and sometimes diarrhoea in humans.

Other symptoms include:

- abdominal and lumbar pain,
- changes in the urine or absence of urine, and
- pathological lesions in the brain, lung, liver and heart.

Observations in animals suggest a remote possibility or pulmonary oedema (swelling and/or fluid accumulation in the lungs) and bone marrow depression. Experimental animal studies have also shown injury to the liver, kidney, spleen, and testes.

On that basis, Members should treat this material as hazardous by (as a minimum) not allowing it to come into contact with the skin or breath in its fumes.

All of these fire fighting training contamination sites are only a representation of the unknown sites. With the focus on military sites, the fire stations that support careers of 25-35 years are going largely unnoticed, and undisclosed.

NH has been the only state to send a letter to every fire station in the state.

Many fire stations train in their own yards or in close proximity.

I am at a loss to understand why the organizations in power are not sounding the alarm as NH DES has done. IAFF, NFPA, CDC, EPA.

Who is going to warn the fire service to test their water?

Sincerely,

Diane Cotter

Ex. 6

-----Original Message-----
From: Dubay, Chris <cdubay@NFPA.org>
To: d [Ex. 6]; zkz1 <zkz1@cdc.gov>; fjh1 <fjh1@cdc.gov>; pjb7 <pjb7@cdc.gov>; kif5 <kif5@cdc.gov>
Cc: peter_clark <peter_clark@shaheen.senate.gov>; mark.dailey <mark.dailey@masenate.gov>;

ashley_coulombe <ashley_coulombe@warren.senate.gov>; russell.halliday <russell.halliday@mail.house.gov>; mindi <mindi@mindiforcongress.org>; bilott <bilott@taftlaw.com>; president <president@pffm.org>; Ex. 6 ; jason.burns <jason.burns@iafflocal1314.com>; rriley08 <rriley08@northshore.edu>; geoffdaly <geoffdaly@mkd-usa.com>; grevatt.peter <grevatt.peter@epa.gov>; dunn.alexandra <dunn.alexandra@epa.gov>; gpeaslee <gpeaslee@nd.edu>; lpetrick <lpetrick@iaff.org>; pmorrison <pmorrison@iaff.org>; paul.jacques <paul.jacques@pffm.org>; rwalsh4justice Ex. 6 ; carignan <carignan@anr.msu.edu>; kfent <kfent@cdc.gov>; acaban <acaban@med.miami.edu>; sshaw <sshaw@meriresearch.org>; jburgess <jburgess@email.arizona.edu>; pgrand <pgrand@hsph.harvard.edu>; hdavies <hdavies@kingcounty.gov>; mindi <mindi@mindiforcongress.com>; geoff <geoff@geoffdiehl.com>; holly.davies <holly.davies@kingcounty.gov>; PaulJrCotter <PaulJrCotter@charter.net>; emily.sparer <emily.sparer@mail.harvard.edu>; Maynard, Mary <mmaynard@NFPA.org>; Pauley, James <JPauley@nfpa.org>; mustafa <mustafa@hiphopcaucus.org>; aropeik <aropeik@nhpr.org>; karen.hensel <karen.hensel@nbcuni.com>; alicia.rebello-pradas <alicia.rebello-pradas@massmail.state.ma.us>; stefanit <stefanit@sbcglobal.net>; matthew.alba <matthew.alba@sfgov.org>; bilott <bilott@taftlaw.com>; bobbyhalton <bobbyhalton@pennwell.com>; Ex. 6 ; billc <billc@pennwell.com>; sylvia <sylvia@toxicsaction.org>; shaina <shaina@toxicsaction.org>; Dubay, Chris <cdubay@NFPA.org>
Sent: Fri, Aug 10, 2018 3:40 pm
Subject: RE: NFPA IS COMPLACENT IN THE ISSUE OF REVEALING THE CHEMICAL ADDITIVES AND AMOUNTS USED IN OUR PPE.

Dear Ms. Cotter – Attached is NFPA's response as well as our previous correspondences from May and June to you addressing NFPA's actions around contamination control and the NFPA standards development process. As always please do not hesitate to reach out if you have any questions or need any further assistance.

Respectfully,
Chris

Christian Dubay, P.E.
Vice President and Chief Engineer| **NFPA**
1 Batterymarch Park
Quincy, MA 02169-7471
+1 Ex. 6
www.nfpa.org

National Fire Protection Association
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From: d [mailto: Ex. 6
Sent: Wednesday, July 25, 2018 12:04 PM
To: Ex. 6 ; zkz1@cdc.gov; fjh1@cdc.gov; pjb7@cdc.gov; kif5@cdc.gov
Cc: peter_clark@shaheen.senate.gov; mark.dailey@masenate.gov; ashley_coulombe@warren.senate.gov; russell.halliday@mail.house.gov; mindi@mindiforcongress.org; bilott@taftlaw.com; president@pffm.org; Ex. 6 jason.burns@iafflocal1314.com; rriley08@northshore.edu; geoffdaly@mkd-usa.com;

grevatt.peter@epa.gov; dunn.alexandra@epa.gov; gpeaslee@nd.edu; lpetrick@iaff.org; pmorrison@iaff.org; paul.jacques@pffm.org; Ex. 6 carignan@anr.msu.edu; kfent@cdc.gov; acaban@med.miami.edu; sshaw@meriresearch.org; jburgess@email.arizona.edu; pgrand@hsph.harvard.edu; hdavies@kingcounty.gov; mindi@mindiforcongress.com; geoff@geoffdiehl.com; holly.davies@kingcounty.gov; PaulJrCotter@charter.net; emily.sparer@mail.harvard.edu; Maynard, Mary <mmaynard@NFPA.org>; Pauley, James <JPauley@nfpa.org>; Dubay, Chris <cdubay@NFPA.org>; mustafa@hiphopcaucus.org; aropeik@nhpr.org; karen.hensel@nbcuni.com; alicia.rebello-pradas@massmail.state.ma.us; stefanit@sbcglobal.net; matthew.alba@sfgov.org; bilott@taftlaw.com; bobbyhalton@pennwell.com; Ex. 6 billc@pennwell.com; sylvia@toxicsaction.org; shaina@toxicsaction.org

Subject: NFPA IS COMPLACENT IN THE ISSUE OF REVEALING THE CHEMICAL ADDITIVES AND AMOUNTS USED IN OUR PPE.

Good Morning,

I am still awaiting a reply from NFPA on now the 3rd request to initiate a task force surrounding the chemical additives in PPE, and station wear.

Some of you may not know that in station wear, the fire service is also wearing 'insect repellency, odor repellency, in addition to flame retardants and water resistant. *This is in addition to the 'turnout gear' chemicals.*

If NFPA is focused on exposing the products of combustion, they are negligent in any action to reveal and determine the chemicals used without regulation as 'coatings' and 'protection' in station wear, and turnout gear.

I have attached a 2017 document showing the NFPA's participation, initiation, and knowledge of permeation of particles dangerous to the firefighter's body.

http://www.dupont.com/dpt/nomex-knowledge-center/industries/emergency-response/smoke-particle-risk-exposure.html

While we await Commander Kenny Fent's response to our plea for a national protocol for the PFAS contamination of the fire service, I have place a call to Massachusetts Attorney General's office and will be speaking to Chief of Staff Alicia Pradas.

How may we form a group with the agencies in this email chain, to act on this issue?

EPA With the chemicals used in the gear Dr Gravett was concerned about waste/landfill/water,
CDC Exposure to the fire service in PPE, what is degrading in our stations?
NFPA Initiate and fast track exposure to chemicals used in manufacturing process and coatings. Mandate Chemical labels in our gear. Contents and amounts there of.
IAFF Take full charge of this issue for all above. You are the body to do this

Congressman McGovern, Senator Warren, Senator Shaheen, Please expedite our request to add the fire service to the National PFAS Registry.

This week, we saw the first 'PFAS Warning Label' in fire fighter equipment, it was sent to us by a firefighter in California. It is the direct result of SB 6413

https://www.shelbyglove.com/index.php?main_page=product_info&cPath=1_16&products_id=53

If we are putting warning labels in FF equipment, and the NFPA is not acting to protect the body of this nation's fire service. We have a much bigger problem than I thought.

One of the messages from today... these messages from fireifhters with testicular cancer, prostate cancer, kidney cancer, come all day.,

EVERY, SINGLE, DAY.

PFOA IS A KNOWN CARCINOGEN. We did not know it was a byproduct of production., we had no idea it was degrading in our stations, we had no idea we were bringing it home to our families.... We had no idea of the staggering amounts used. NOW WE DO...

We have no idea what is being used in new gear.

All of the above agencies must act.

Sincerely,
Diane Cotter

Diane - Hi my name is Terry . My husband is a retired firefighter who was diagnosed 6/29/17 with Stage 4 Prostate cancer. It's a Gleason 9 with 1 metastasis to his sacrum. We have been told he has about a 30% chance of beating this . He is 52 yrs old. I was reading the article regarding the bunker gear . We are fighting with the State of Texas for workers compensation. My husband is the 7th man with the Bedford Fire Dept , during my husband's time (24 yrs)to be diagnosed. He is the only one of the 7 to still be alive .

Texas at this point is not recognizing cancer as a work related issue therefore the men here are dying with 1,000 of dollars in medical bills left to their spouses. I really feel the only way to get the government to recognize cancer has a work related illness at this point is - Class Action. I feel like this is the same fight that people had to go through to get asbestos recognized .

-----Original Message-----

From: d [Ex. 6]
To: [Ex. 6]; zkz1 <zkz1@cdc.gov>; fjh1 <fjh1@cdc.gov>; pjb7 <pjb7@cdc.gov>; kif5 <kif5@cdc.gov>
Cc: peter_clark <peter_clark@shaheen.senate.gov>; mark.dailey <mark.dailey@masenate.gov>; ashley_coulombe <ashley_coulombe@warren.senate.gov>; russell.halliday <russell.halliday@mail.house.gov>; mindi <mindi@mindiforcongress.org>; bilott <bilott@taftlaw.com>; president <president@pffm.org>; [Ex. 6]; jason.burns <jason.burns@iafflocal1314.com>; rriley08 <rriley08@northshore.edu>; geoffdaly <geoffdaly@mkd-usa.com>; grevatt.peter <grevatt.peter@epa.gov>; dunn.alexandra <dunn.alexandra@epa.gov>; gpeaslee <gpeaslee@nd.edu>; lpetrick <lpetrick@iaff.org>; pmorrison <pmorrison@iaff.org>; paul.jacques <paul.jacques@pffm.org>; [Ex. 6] [Ex. 6]; carignan <carignan@anr.msu.edu>; kfent <kfent@cdc.gov>; acaban <acaban@med.miami.edu>; sshaw <sshaw@meriresearch.org>; jburgess <jburgess@email.arizona.edu>; pgrand <pgrand@hsph.harvard.edu>; hdavies <hdavies@kingcounty.gov>; mindi <mindi@mindiforcongress.com>; geoff <geoff@geoffdiehl.com>; holly.davies <holly.davies@kingcounty.gov>; PaulJrCotter <PaulJrCotter@charter.net>; emily.sparer <emily.sparer@mail.harvard.edu>; mmaynard <mmaynard@NFPA.org>; jpauley <jpauley@nfpa.org>; cdubay <cdubay@nfpa.org>; mustafa <mustafa@hiphopcaucus.org>; aropeik <aropeik@nhpr.org>; karen.hensel <karen.hensel@nbcuni.com>; alicia.rebello-pradas <alicia.rebello-pradas@massmail.state.ma.us>
Sent: Wed, Jul 11, 2018 3:16 pm
Subject: Re: Dangers of firefighting foam discussed in 2001, document shows

Good Afternoon,

It is now July 11th, with no reply from CDC, NFPA, or EPA. Someone must act. IMMEDIATELY PLEASE.

It these toxins were bright green, instead of invisible, with no smell or feel to them, I'm certain you would be acting.

They have no taste, no smell, no color. Yet, it is there. In STAGGERING AMOUNTS.

We need a task force formed specific for the fire service. We need to add the names of the fire service to the PFAS Registry that Senator Shaheen has negotiated for active military and veterans.

Also, I wish to add here, in this Wednesday July 11th note, that I was contacted by a 2nd level sales director from a FOAM Manufacturer in Scandinavia. Please read his dire message:

1. We will have a big big problem

2.

Do you know the FFFC group ?

3.

Delete this message sent from yourturnoutgear&pfoa

Jun 28Sent

4.

That is the fire fighting foam coalition.

Jun 28

5.

6. There was a meeting in India last week. A lot of company's that are also taking place in this FFFC where present

Jun 28

7.

Delete this message sent from yourturnoutgear&pfoa

Jun 28Sent

8.

I heard from my source they are going to start a big global lobby to all environmental groups/ communitys, governments to delay the regulations of C6 PFAS chemicals that are being used in AFFF, FFFP foam agent's

The NFPA will soon start working on investigating yo include pfas free fire fighting foams in the next addition of NFPA 11. FFFC will also lobby to influence the committee of the NFPA that when using PDAs free you need a lot more foam then using AFFF products, but this is not the case. If this happens, the industry will still need to use PFAS foam agents.

Jun 28

EPA, YOU MUST BEGIN TESTING WATER/DUST STUDIES IN OUR FIRE STATIONS ..

CDC YOU MUST PROTECT THE FIRE SERVICE. WE NEED BLOOD TESTING AS IS NOW BEING DONE IN THE STATE OF CALIFORNIA.

ZONYL WAS USED IN OUR PPE FOR YEARS, HERE IS THE PROOF: DUPON'TS OWN LAUNDERING RECOMMENDATIONS FOR
TURNOUT GEAR FROM 1978.

**This could literally mean we have 40 years worth of long-chain PFAS covering the walls in our stations where your fire fighters
work, train, eat, sleep.**

http://www.dupont.com/content/dam/dupont/products-and-services/personal-protective-equipment/thermal-protective-apparel-and-accessories/documents/DPT_Nomex_Laundering_Guide.pdf

**NFPA THERE ARE DANGEROUS CHEMICALS IN THE COATING OF OUR PPE.
PLEASE ACT TO PROTECT US AND IDENTIFY THE CHEMICALS USED AS YOU FAST TRACED TO PROTECT THE
FIRE SERVICE FROM ACTIVE SHOOTER. THIS ISSUE IS VALID AND IT EFFECTS EVERY FIRE FIGHTER THAT
DONS AND DOFFS PPE.**

**3RD REQUEST NFPA. FAST TRACK THE NEW INITIATION PROJECT I SUBMITTED THIS YEAR AS YOU DID FOR ACTIVE SHOOTER
SCENARIO. .**

AGAIN.. THIS ISSUE DOES NOT BELONG IN THE HANDS OF A RETIRED HOUSEWIFE.

IAFF YOUR VOICE IS NEEDED.

Sincerely,
Diane Cotter
Ex. 6

-----Original Message-----

From: d [redacted] Ex. 6
To: zkz1 <zkz1@cdc.gov>; fjh1 <fjh1@cdc.gov>; pjb7 <pjb7@cdc.gov>; kif5 <kif5@cdc.gov>
Cc: peter_clark <peter_clark@shaheen.senate.gov>; mark.dailey <mark.dailey@masenate.gov>; ashley_coulombe <ashley_coulombe@warren.senate.gov>; russell.halliday <russell.halliday@mail.house.gov>; mindi <mindi@mindiforcongress.org>; bilott <bilott@taftlaw.com>; president <president@pffm.org>; [redacted] Ex. 6 jason.burns <jason.burns@iafflocal1314.com>; rriley08 <rriley08@northshore.edu>; geoffdaly <geoffdaly@mkd-usa.com>; grevatt.peter <grevatt.peter@epa.gov>; dunn.alexandra <dunn.alexandra@epa.gov>; gpeaslee <gpeaslee@nd.edu>; lpetrick <lpetrick@iaff.org>; pmorrison <pmorrison@iaff.org>; paul.jacques <paul.jacques@pffm.org>; [redacted] Ex. 6 [redacted] Ex. 6 carignan <carignan@anr.msu.edu>; kfent <kfent@cdc.gov>; acaban <acaban@med.miami.edu>; sshaw <sshaw@meriresearch.org>; jburgess <jburgess@email.arizona.edu>; pgrand <pgrand@hsph.harvard.edu>; hdavies <hdavies@kingcounty.gov>; mindi <mindi@mindiforcongress.com>; geoff <geoff@geoffdiehl.com>; holly.davies <holly.davies@kingcounty.gov>; PaulJrCotter <PaulJrCotter@charter.net>; emily.sparer <emily.sparer@mail.harvard.edu>; mmaynard <mmaynard@NFPA.org>; jpauley <jpauley@nfpa.org>; cdubay <cdubay@nfpa.org>
Sent: Sun, Jul 1, 2018 1:13 pm
Subject: Dangers of firefighting foam discussed in 2001, document shows

Dear NIOSH Members; Dr Breysse, Dr Redfield, Dr Howard, and Dr Fent,

I am asking your immediate action on the matter of PFAS contamination in the fire-service for career, volunteer, wildland, and military first responders.

I ask you to take the time needed to read through this very long email, to understand what has happened to the fire service, and what we have found within the coatings of turnout gear PRIOR to ever being used, in addition to the known PFAS in AFFF.

Someone must initiate an investigation into the amount of PFAS in the fire stations including dust studies, water well (rural) and water systems (municipal) for the health and protection of this nations fire service members.

I have exhausted all possible avenues and efforts thus far. No one is acting on this issue within the federal government. It is imperative you take action to ensure the fire stations have immediate tests to verify the amounts of these chemicals within the walls and water systems.

In light of the newly released PFAS Study with much lower MRLs this issue must receive priority.

A synopsis of this entire decades long issue can be heard here on this link to a statement I read at the June 25th, 2018 New England EPA PFAS Community Agenda:

https://www.facebook.com/1808869939437081/videos/2080367175620688/UzpfSTE4MDg4Njk5Mzk0MzcwODE6MjA4NTI5ODI1MTc5NDI0Nw/

All, attached please see the link to the article I spoke of in the 9 minute video regarding the statement that in 2001 a NFPA Foam representative knew the AFFF was a PBT and word never filtered down to us:

http://www.theintell.com/news/20170609/dangers-of-firefighting-foam-discussed-in-2001-document-shows#tncms-source=article-nav-prev

Sincerely,
Diane Cotter

[redacted] Ex. 6

From: d [mailto: [redacted] Ex. 6
Sent: Monday, June 12, 2017 10:54 AM

To: Pauley, James <JPauley@nfpa.org>; Dubay, Chris <cdubay@NFPA.org>
Subject: Dangers of firefighting foam discussed in 2001, document shows

Dear Jim,
We entrust our safety and health to the manufacturers that sit at the NFPA tables.
http://www.theintell.com/news/horsham-pfos/dangers-of-firefighting-foam-discussed-in-document-shows/article_d4a5bbbc-4a25-11e7-ae80-4314c84eab0c.html#tncms-source=article-nav-prev
However, when this type of alarming discussion is happening during a NFPA committee, formed for the very reason to protect our fire fighters, and then remains secret for 16 years, it erodes the hard work of all committee members and the NFPA itself. It adds to the suspicion of organizations, and manufacturers who many now regard as deceptive. I realize this was before your time Jim, however, with a NFPA liaison present, how is it word never reaches our FF's?

Jim, we need to hear from you,directly. Please inform us what measures are in place to ensure, when word of any known toxin from a substance that our firefighters wear, or that is used in their duties, is uttered, that word gets through to the front lines.

In 2001, with all these committee members sitting at a NFPA table, not one person thought it their moral or legal duty to tell FF Nation.
This is why I am calling on NFPA, in their framework, require each (M) manufacturing committee member, who uses a known toxin, or a toxin is generated in the production of the product of gear or equipment used by firefighters, that it be mandatory the toxin be reported during the committee meeting and a chain be in place that it reach all FF's in this nation.

That if there is chemical registration in another country that classifies a substance as hazardous and it is used in our turnout gear, that NFPA be notified and that information be forwarded in the chain and posted on your NFPA website.
In addition, to restore faith, each (M) manufacturing committee member should sign a oath of knowledge, that their company has or has not been made aware of a hazard or toxin and should there be a toxin/hazard, that the NFPA liaison report that directly to you during that committee revision meeting.
Also, in lieu of the recent disclosure from the manufacturers, information should also posted on your website by the trade name of the end product, such as 'Kombat, Pioneer, Brigade, etc., and the contents of the DWRs used on the material, so that each firefighter can check for themselves what the toxins are in their gear, as well as and amounts used of toxin. This is no longer an option.
We have been lied to by the manufacturers and now demand to know what was in our gear and the amounts of same.

I am no longer able to keep up with the many daily messages from the Facebook page I manage titled 'Your Turnout Gear and PFOA' from fire fighters asking if PFOA is in their gear or was in their gear from 5, 10 or even 20 years ago.

We can no longer accept the position that it is **proprietary information** from manufacturers. With 65 of 100 firefighters diagnosed with cancer, and the knowledge of these toxins are in our gear, we have the right to expect all material be labeled. Manufacturers lost the CBI privilege when they neglected to tell us about the PFCs yet continued to produce literature about fire fighters and cancer while never acknowledging past and present PFC use.

In the released minutes of the 2001 NFPA Foam meeting, multiple manufacturers sat together and not one party told the firefighters who use the end product. In the case of the PFOA on the gear, the chemical giants all knew in 2006 what was happening in Europe as they also served on the NFPA PPE committees and did not say a word. Nor did they bother to submit the form **"Statement of Problem and Substantiation for Public Input"** that I saw referenced in Structural FF PPE ROP's.)

For example, the financial statement of DuPont in 2007 references the European Union and new regulatory framework. This manufacturer should have told NFPA of the risks associated with their treated textiles in 2006 when they were informed by ECHA European Chemicals Agency:

https://s2.q4cdn.com/752917794/files/doc_financials/2007/DD_2007_10-K.pdf
Page 42, under Item 7. Part II :

In December 2006, the European Union adopted a new regulatory framework concerning the Registration, Evaluation and Authorization of Chemicals. This regulatory framework known as REACH entered into force on June 1, 2007. One of its main objectives is the protection of human health and the environment. REACH requires manufacturers and importers to gather information on the properties of their substances

that meet certain volume or toxicological criteria and register the information in a central database to be maintained by a Chemical Agency in Finland. The Regulation also calls for the progressive substitution of the most dangerous chemicals when suitable alternatives have been identified. Pre-registration will occur between June 1, 2008 and November 30, 2008; complete registrations containing extensive data on the characteristics of the chemical will be required in 2010 if production usage or tonnage exceeds 1,000 metric tons per year; 2013 if it is between 100 and 1,000 metric tons per year; and 2018 if it is 100 metric tons per year or less. By June 1, 2013, the Commission will review whether substances with endocrine disruptive properties should be authorized if safer alternatives exist. By June 1, 2019, the Commission will determine whether to extend the duty to warn from substances of very high concern to those that could be dangerous or unpleasant. Management does not expect that the costs to comply with REACH will be material to its operations and consolidated financial position.

Should they not report a known SVHC they use in the gear they distribute to our firefighters, they do not deserve to be on NFPA committees deciding safety measures for our firefighters. Had the chemical giants told our firefighters of the issues they were facing in Europe back in 2006, we could have avoided much mis-information now. I receive messages daily from fire-fighters saying they were told the PFOA in the gear only happened in Europe. Or that they have been told there is nothing to worry about.
In this document, Dupont states the presence of PFOA:
http://www2.dupont.com/Media_Center/en_US/assets/downloads/pfoa/WhatisPFOA.pdf
• **PFOA may be found at very low trace levels in some fluorotelomers. Fluorotelomer derivatives are a family of compounds used as ingredients in making firefighting foams and coatings because of their unique properties. They are also intermediates, or building blocks, used to manufacture stain-, oil- and water-resistant additives for some textiles, paper, coatings and other surfaces.**
Yet here, in DuPont's May 2017 statement on PFOA there is no mention of the unintended by products:
http://www.dupont.com/corporate-functions/our-company/insights/articles/position-statements/articles/pfoa.html

Also confusing is the the conflicting information released over the last few years by the IAFF.
In 2011 the IAFF PFC Fact Sheet under Toxic Exposure (**see attached**), IAFF stated " ***It is possible fire fighters are exposed to PFCs through fire fighting foam and to PFCs used to make fire fighting gear water and stain resistant.***"

As well as the 2015 IAFF Publication; Fire Fighters and the Evaluation of Cancer Causation, Pages 53 - 62: http://services.prod.iaff.org/ContentFile/Get/10183 (**see attached**)

Perfluorinated Alkyl Substances (PFAS) Stain-resistant coating on upholstery, carpets, performance clothing, non-stick coatings on cookware, food wrapping, surfactants in firefighting foams Endocrine disruptors, liver, heart disease, cancer (PFOA)

and:
Teflon Chemical Might Be Unsafe at Any Level New study shows EPA drinking water standards 100X too high (Grandjean and Clapp 2015) PFOA (C8) Levels in Fire Fighters vs General Population

These messages contrast the IAFFs 2017 PFOA and Turnout Gear Statement that summaries the word of the manufacturers is sufficient, without the actual numbers of PFOA amounts used in the MSDS of the chemical coatings:

Conclusions

Exposure to PFOA is very common in US and Canadian populations due to its extensive past use in a wide range of products from carpets to stain and water resistant fabrics and upholstery to nonstick cookware. Importantly, PFOA use has been almost completely phased out in the US under the PFOA Stewardship Program and in Canada through recent regulation. Fire fighters may have additional PFOA exposure sources such as older Class B fire fighting foams. If PFOA is a combustion product of PFOA-containing consumer products made prior to phasing out use of this chemical, fire fighters will be exposed in fire suppression activities. However, the data are too limited at present to determine this. PFOA is unlikely to be a component in recently US manufactured turnout gear. However, if PFOA is a combustion product, it may be present as a contaminant on turnout gear. PFOA may also be present as a manufactured component of legacy turnout gear, or in turnout gear manufactured in other juridictions. The exposure contribution from any such PFOA content is likely to be minimal since volatilization from the manufactured product would be required.

Recommendations *At this time, IAFF does not recommend that legacy turnout gear be replaced outside of its lifecycle. Fire fighters wishing to minimize PFOA exposure should continue to wear their PPE, including SCBA,*

and regularly decontaminate their turnout gear. IAFF will continue to monitor developments and update this fact sheet should new information become available.

Jim, as you are well aware past history in the fire service indicates many organizations working together, to support safety measures when brought to the attention of chiefs, NIOSH, NFPA, IAFF, etc. As was the case with Diesel Exhaust:

Diesel exhaust exposure is addressed by the National Fire Protection Agency (NFPA) in its 1500 standard. The standard states, "The fire department shall prevent exposure to firefighters and contamination of living and sleeping areas to exhaust." Many different products are available to remove diesel exhaust and minimize exposure to firefighters, including in-station exhaust systems, ventilation systems and apparatus-mounted removal systems. The above information can be used to justify the cost of these systems to help decrease the risk of cancer and improve the overall health of firefighters. http://www.firehouse.com/.../cancer-and-the-fire-service
see also: https://firefightercancersupport.org/wp-content/uploads/2013/06/diesel_emissions_in-fire_stations.pdf

As well as the IAFFs strong movement on Flame Retardants: Resolution 34 by the IAFF (**attached**) http://iaffconvention2014.org/resolution-no-34/

84 RESOLVED, That the position of the IAFF will
85 continue to support affiliates at the local, state and
86 provincial level in any attempt to ban flame
87 retardants, industrial chemicals and other known
88 toxins through legislation, regulation or standard
89 changes; and be it further
90 RESOLVED, That the IAFF work to ensure that
91 the use of carcinogenic flame retardants and other
92 toxic chemicals are eliminated and safer alternatives
93 or methods are pursued, such as California's standard
94 TB-117-2013, including the development of non-
95 toxic standards through the National Fire Protection
96 Association, International Code Council,
97 Underwriters Laboratories and similar testing
98 Organizations; and be it further
100 RESOLVED, That the IAFF gather additional
101 scientific research and studies regarding fire fighter
102 exposure to carcinogens, toxic flame retardants and
103 other toxic chemicals, as well as continue to educate,
104 train and heighten the awareness of its members to
105 the dangers of these toxic chemicals and seek
106 preventative measures to lessen fire fighters risk of
107 developing cancer

Fire fighters need to see the same combined efforts again of these organizations working together to ensure that each fire fighter that dons the gear daily, is not wondering what they are wearing. They deserve nothing less.

In December of 2016, the International Agency for Research on Cancer, shows PFOA as a Group 2B toxin.
It is no longer good enough to let manufacturers dictate what they will and won't share about the garments they provide. Not in light of the released minutes.

IARC Volume 110 / Perfluorooctanoic Acid, classifies PFOA (see IARC PFOA attached):
6.3 Overall evaluation Perfluorooctanoic acid (PFOA) is possibly carcinogenic to humans (Group 2B).
In the case of PFOA, we are not given the opportunity to see amounts as it is called 'proprietary information', as was noted in the notes and comments of the **ECHA Annex XV Early Comments, where textile manufacturers stated their amouts were 'proprietary' over and over.**

Our firefighters should have knowledge of what they are donning. They do not provide substance amounts, and leave it for firefighters to wonder if they will be the next to be diagnosed. In light of this weeks release of the NFPA 11 2001 minutes, the manufacturers have dug themselves quite a hole. I I question if a chemical giant would put their child in turnout gear for decades at a time knowing what the amounts of PFCs were used (past or present).

While we are not discussing PFOA here in PPE in the US, there is plenty of discussion in Europe.
In February 2015, Delegates attending the highly successful **PPE & Duty of Care Forum** (see attached) held in Birmingham where manufacturers and health officials discussed PFOA and turnout gear.

Highlights:

https://www.firerescueforum.com/content

PPE & Duty of Care Forum 2016

Personal protective equipment (PPE) is the last line of defence for firefighters yet few Fire & Rescue Services fully understand how the latest generation of protective clothing works or how it should be managed effectively in the light of imminent EU-wide chemical restrictions. At this one-day conference, you can.

What will it cover?

* Disposal of firefighting clothing that contains restricted chemicals
* Maintenance of clothing containing restricted chemicals
* Legal and financial obligations regarding current contracts
* Legal and financial obligations of service contracts
* Managing a potential transition to non-PFOA PPE

* **Dr Roger Klein of Cambridge (UK) and Christian Regenhard Center for Emergency Response Studies, John Jay College of Criminal Justice, CUNY, New York** *provided an insightful presentation on the history and latest developments regarding PPE and fluorochemicals in the fire service.*
Around three quarters of all global fluorotelomer production is used for treating textiles and paper in order to give water and oil repellent coatings. However, concern over the potential environmental impact of fluorochemicals has grown since the announcement in May 2000 that 3M would be phasing out PFOS-based production involving Lightwater and ATC foams as well as Scotchgard protective coatings.

Modern emergency services' PPE makes extensive use of fluorotelomer-treated fabrics for protection against both polar, i.e., water and alcohols, and non-polar, i.e., hydrocarbons, oils and greases, contaminants. The commonly used fluorotelomer acrylate and methacrylate polymers have been characterised traditionally by predominantly C8, C10, and C12 chain lengths, in order to get the required performance and durability of finish
However, increasing concern by regulatory authorities over the environmental and human health impact of releasing PFOA – and longer chain perfluorocarboxylic acids (PFCAs) –to the environment based on unacceptable PBT (persistent, bio-accumulative, toxic) profiling has led first to the voluntary PFOA Stewardship Program 2010/2015 by the US Environment Protection Agency and, more recently, to the European Chemical Agency (ECHA) PFOA Restriction Proposal initiated by the German and Norwegian governments.

The ECHA PFOA Restriction Proposal sets out to limit free PFOA to 25 parts per billion and PFOA precursors to 1,000ppb (or 1ppm) in all manufactured articles. This is a modification to the original overly strict limit of 2ppb for both free PFOA and PFOA precursors which followed an industry-wide consultation.

In order to give industry time to develop alternative technologies, however, there are specific time-limited derogations for firefighting foam of 1ppm for both PFOA and PFOA precursors, and for protective clothing used by the emergency services, police and military.

The situation is particularly acute for all-weather clothing and hazardous materials PPE since these applications have relied on using fluorotelomer polymers especially rich in C8, C10 and C12 fluorotelomer chains. All C8 fluorotelomer derivatives are known to breakdown to PFOA in the environment. By analogy, C10 and C12 fluorotelomers will yield perfluoro-n-decanoic acid and perfluorododecanoic acid, both of which are more toxic and bioaccumulative than PFOA. All PFCAs are highly environmentally persistent.

Since the introduction of the PFOA Stewardship Program industry has switched to fluorotelomer derivatives using so-called pure C6 compounds. Unfortunately even the very best of these are still contaminated with significant levels of C8 derivatives (and possibly C10, C12…) in terms of achieving the very low levels of PFOA precursors required by the ECHA Restriction Proposal, although free PFOA levels have been drastically reduced. Moreover, switching to pure C6 fluorotelomer derivatives

has highlighted problems of achieving functional efficiency, especially in terms of the required levels of oil and water repellency, durability, and maintenance costs.

The PPE industry is thus left with the pressing problem of developing an alternative to fluorochemical treatment that retains functionality and durability.

**** Product development engineer Pavla Krizman Lavric at Tencate Protective Fabrics** concentrated on the importance of the outer shell as the first line of defence as well as the impact that the transition in chemistry from C8 chemicals to C6 chemicals will have on the protection level given by the gear when it comes to protection against splashes of oil, water and chemicals. These substances are found in AFFF surfactants in firefighting foams, wetting agents as well as textile finishes on the outer shell of firefighters' protective clothing.*

This shell not only provides resistance to mechanical effects such as abrasion, rips, cuts and tears but also provides water, oil and chemical protection via a chemical film on the fibres' surface. This film prevents droplets from penetrating the fabric whilst allowing moisture vapour and air to transfer through.

Fluorocarbon finishes are currently used because the alternatives do not provide the water and oil repellence required by EN469, the European standard for firefighting protective clothing. These finishes are durable but do not last the lifetime of the garment. In fact, their performance reduces with every wash. The only way to reactivate their properties is to treat the garment with heat and eventually the finish needs to be reapplied.

Krizman outlined the complexity and the many challenges presented by current spray and liquid chemical resistance testing required to meet EN469. A whole load of factors influences the results, ranging from the pre-test wash treatment, the tightness of the weave of the fabric, the smoothness of the fabric and the type of fibres being tested.

Industry is currently working to meet these stringent tests using C6 chemicals rather than C8 chemicals, but research so far has shown that the only way of reaching similar levels of performance without C8 is to use more concentrated chemicals or in larger volumes, which in the future could create a new environmental issue. 'The performance goes down as the chain size of fluorocarbon goes down from C8 to C6.'

While the expectations are that these challenges will be met, many misconceptions remain. First is that the life of the fluorocarbon finish determines the life of PPE clothing. This is not the case. Proper care and maintenance and timely reapplication will result in optimal finish performance during the lifetime of a garment. The only way to ensure the performance of a garment is to have a good track-and-trace system in place, by working with laundries with the experience of treating these kinds of garments. 'Don't rely only on what you think you know, and be aware that fabric testing in a laboratory does not reflect real life,' concluded Krizman.

*** Bernhard Kiehl of WL Gore** *drilled down on the role of durable water-repellent (DWR) finishes and their role in firefighting as well as the challenges being faced with the phasing out of C8 chemicals.*

Kiehl demonstrated what happens when the DWR fails on the outer textile layer – it gets wet leading to thermal insulation loss and to discomfort for the wearer. If the garment is a pair of gloves, for example, hands get cold and lose tactility, making it difficult for the firefighter to perform simple tasks.

Commenting on the phasing out of PFOA, Kiehl highlighted that even though traces of PFOA had been found in apparel it had never been considered an immediate risk for end users: 'There are several agencies around the world looking into that and because the trace amount was so small and dermal intake isn't really a major route, studies have concluded that wearing the apparel or footwear is not a risk to the consumer.'

Jim, the statement from Kiehl regarding the 'trace amounts' as no PPE has been tested for PFOA past or present is untrue. Past amounts of DWRs on turnout gear have not been shared with anyone. For a statement like this to be made I wish to see the documents that support the amounts being called minute. There are tests that have shown the amounts on raincoats etc. but to equate the heavy duty repellents used on turnout gear to these amounts is a dangerous deception in my opinion.

The 2017 FIERO Symposium did not mention PFOA. Another missed opportunity. The 2019 schedule is not yet available, Hopefully discussion of PFOA will be llisted : http://fireppesymposium.com/schedule.php

We also have documents confirming that fire fighters have higher numbers of pfoa in their serum:(see attachment): Community Exposure to Perfluorooctanoate: Relationships Between Serum Concentrations and Exposure Sources

In the general US population, median serum PFOA values are around 4 to 5 ng/mL, occasional values are above 20 ng/mL (4,5,9) with no significant gender differences.
Among those with potential occupational exposure, the highest median values were observed for firefighters at 453 ng/mL

We have spent years trusting the manufacturers, but the 2001 NFPA 11 minutes have changed that. With the knowledge of how the manufacturers operate in a professoinal setting such as NFPA which is intended to keep the health and safety of FF nation as its priority, and the deception practiced by omission, why would any man or woman don turnout gear without the labels showing exactly what is in it?

In 1999, this 3M document shows Protective Clothing as a 'end use' under their Apparel and Leather Fluorochemical Use, Distribution, and Release Overview Major Markets and End Uses See attachment: 3M Fluorochemical Use and Distribution...

In light of the dermal absorption routes, inhalation route, oral route, the fact that our fire fighters were never made aware of this toxin. Where it degraded in their stations where they work, eat, and sleep. Urgent attention should be given to this matter to test their fire-stations, and each fire fighter at the cost of the manufacturers. The same attention should be given to this matter as was done for Diesel Exhaust, including the NIOSH testing and the Flame Retardants.

Also concerning is how much PFOA is in the serum of fire fighters from years of exposure in their stations where they work, eat, and sleep from the PFOA that has degraded from the gear and is deposited in the dust and surfaces of the stations. Please see page 125 of the ECHA BACKGROUND DOUCMENT (attached) regarding BACK CALCULATING:

The back-calculated intakes from serum concentrations for occupationally exposed workers were in the range 0.8 to 13189 ng/kg bw/day with an overall mean intake of 298 ng/kg bw/day

Jim, the suspicion now raised by the recent release of comments made by manufacturers will only be overcome with full disclosure and knowledge. Below is a excerpt from a shareholders manual regarding the 2005 discussion of PFOA:
E.I. du Pont de Nemours and the GrowingFinancial Challenges of PFOA
https://www.healthandenvironment.org/docs/xaruploads/DuPont_Shareholders_Know_More.pdf (attached)

2005 - The Shareholder's Right To Know More Potential Impact on Product Lines

In the event that PFOA is restricted through regulation, or in the event that markets migrate away from the use of products made with PFOA, or that break down into PFOA, the impact on DuPont could be substantial. Analysts at JP Morgan have estimated that DuPont's PFOA-related product lines, fluoropolymers and telomers products, contributed about $1.23 billion to 2003 sales and $100 million to profit. DuPont's earnings in 2003 were $973 million on revenue of $27 billion. (page 23)

This report highlights the billion dollar buisiness of protective gear each year in the US alone: https://www.bccresearch.com/market-research/advanced-materials/advanced-protective-gear-armor-report-avm021h.html
The U.S. market for advanced protective gear and armor has reached $4.5 billion and $4.7 billion in 2013 and 2014, respectively. **This market is expected to reach at compound annual growth rate (CAGR) of 4.4% to nearly $5.9 billion in 2019.**

In light of Chris Hanauska's statement during the NFPA 2001Foam Committee; "Persistant, Bioaccumulative, Toxic. Exhibition of one of these traits is bad, two makes its use questionable, and when all three are present, it is a death warrant. PFOS has all three.

So does PFOA Since 2012. Yet still no formal word to US Firefighters.

https://enveurope.springeropen.com/articles/10.1186/2190-4715-24-16

Conclusion

Due to its intrinsic properties, PFOA fulfills the REACH PBT-criteria. The next regulatory step will be the identification of PFOA and its ammonium salt (APFO) as SVHC according to REACH and the addition to the REACH Candidate List. As a second step, a restriction proposal will be prepared to include both substances and precursors into REACH Annex XVII.

Lastly Jim, the elephant in the room. All of these manufacturers are purchasing advertising in our fire related publications, magazines, online, at trade shows, supporting cancer studies, fire fighter cancer organizations, making videos, etc. The list is endless. It is suspicious when these manufacturers lecture our firefighters about washing their gear and their bodies and not storing their gear in UV, when the reality now shows they have known about PFOA and PFOS for decades. It appears that they are able to do what they wish as their pockets are so deep.

Jim, thank you for the time you have spent reading this letter today. I'm sure it wasn't easy to do at times, but please keep pushing forward in this
matter as I'm certain you have every intention to. I will be mailing a letter to each of the parties listed below to secure their awareness and posting
same to the page I manage.

Sincerely,
Diane Cotter

cc.

-
Congressman James McGovern (MA)
Congressman Brian Fitzpatrick
State Rep Todd Stephens (PA)
State Rep office of Ken Donnelly (MA)
State Rep Bob Casey (PA)
Russell Halliday, Legislative Assistant/McGovern
David Swanson, General Counsel/Ken Donnelly

-
-
Christopher Dubay, VP/Chief Engineer NFPA

-
-
John Howard, MD, Director NIOSH
Frank Hearl, PE, Chief of Staff NIOSH

-
Harold Allen Schaitberger, General President IAFF
Patrick Morrison, IAFF Assistant to the General President
Larry Petrick, IAFF IAFF Deputy Director Occupational Health and Safety

-----Original Message-----
From: d Ex. 6
To: jpauley <jpauley@nfpa.org>; cdubay <cdubay@nfpa.org>
Cc: peter_clark <peter_clark@shaheen.senate.gov>; mark.dailey <mark.dailey@masenate.gov>;

ashley_coulombe <ashley_coulombe@warren.senate.gov>; russell.halliday <russell.halliday@mail.house.gov>; mindi <mindi@mindiforcongress.org>; bilott <bilott@taftlaw.com>; president <president@pffm.org>; Ex. 6 ; jason.burns <jason.burns@iafflocal1314.com>; rriley08 <rriley08@northshore.edu>; geoffdaly <geoffdaly@mkd-usa.com>; grevatt.peter <grevatt.peter@epa.gov>; dunn.alexandra <dunn.alexandra@epa.gov>; gpeaslee <gpeaslee@nd.edu>; lpetrick <lpetrick@iaff.org>; pmorrison <pmorrison@iaff.org>; paul.jacques <paul.jacques@pffm.org>; Ex. 6 Ex. 6 ; carignan <carignan@anr.msu.edu>; kfent <kfent@cdc.gov>; acaban <acaban@med.miami.edu>; sshaw <sshaw@meriresearch.org>; jburgess <jburgess@email.arizona.edu>; pgrand <pgrand@hsph.harvard.edu>; hdavies <hdavies@kingcounty.gov>; mindi <mindi@mindiforcongress.com>; geoff <geoff@geoffdiehl.com>; holly.davies <holly.davies@kingcounty.gov>; PaulJrCotter <PaulJrCotter@charter.net>; emily.sparer <emily.sparer@mail.harvard.edu>; mmaynard <mmaynard@NFPA.org>
Sent: Thu, Jun 28, 2018 1:08 pm
Subject: NFPA notification of PFOA statement at New England EPA PFAS Community Engagement, Exeter NH 6.25.2018

Good afternoon Jim and Chris,

This past week I attended the New England EPA PFAS Community Engagement :

https://www.epa.gov/newsreleases/epa-hold-new-england-community-engagement-pfas

This EPA agenda came about due to the PFAS contamination of waterways contaminated by AFFF, and, on the heels of the newly released ATSDR PFAS study. https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=1117&tid=237

I was able to give a statement on PFAS in the fire service (below).

After I was approached by Senator Shaheen's aide, Peter Clark, whom I spoke with this morning.

Yesterday I received two replies from both Peter Grevatt Dir, Office of Water and Alexandria Dunn RA of EPA District 1 New England.
They were unaware of the amounts of chemicals used in the coatings of our gear.

They have the same concerns as Professor Peaslee regarding the degradation and water run off from the chemical coatings in turnout gear during wash cycles and end of service.(see attached Professor Peaslee's reply..)

In March, I submitted a New Projects Initiation to NFPA (attached NEW PROJECT INITIATION 3.18) seeking to identify and label the chemical additives and amounts used in turnout gear.

The recent ATSDR PFAS Report has now recommended PFOA MRL at 11ppt. The fraction of the potential of PFOA that came from new, never worn turnout gear was 157 ppb PFOA. That is 14,000 times higher in just the fraction of the potential that is in the gear.

Although the manufacturers no longer use PFOA, it does occur as a by product of production. As well, the new 'short chain' chemistry aka Gen-X has yet to be proven safe.

I did receive a response from NFPA via phone call and email in regards to this initiation request and was given the guidelines on how to the to comment on the upcoming standards cycle.

Respectfully Jim and Chris in light of the newly released PFAS STUDY, **I wish to resubmit the NEW PROJECT INITIATION (attached) to you both today here publicly,** and ask again that this matter be 'fast tracked' to form a task force surrounding this issue.

h.	**Provide an estimate on the amount of time needed to develop the new project/document**

	This issue is IDLH. PFOA and some precursors are PBT. NFPA must act to 'fast track' this project. We have no knowledge of the chemicals and amounts we are wearing. We have no save handling methods for our new PPE and station wear. Without knowing chemicals and amounts we may be exposing ourselves unnecessarily to more carcinogens or potential carcinogens.

Sincerely,
Diane Cotter

I also wish to state publicly, to all reading this email, THIS ISSUE NO LONGER BELONGS IN THE HANDS OF A RETIRED HOUSEWIFE.

-----Original Message-----
From: d Ex. 6
To: peter_clark <peter_clark@shaheen.senate.gov>
Cc: mark.dailey <mark.dailey@masenate.gov>; ashley_coulombe <ashley_coulombe@warren.senate.gov>; russell.halliday <russell.halliday@mail.house.gov>; bilott <bilott@taftlaw.com>
Sent: Thu, Jun 28, 2018 10:50 am
Subject: Fwd: Your Turnout Gear and PFOA statement at New England EPA PFAS Community Engagement, Exeter NH 6.25.2018

Peter, than you for our conversation this morning.
We are desperate for help on this issue.

As mentioned, we need blood testing and dust studies in our stations desperately. We need to know what is in the new coatings of our turnout gear. We have NO idea what is being used other than it is of the PFAS GenX family.

I have cc'd Russell Halliday from Congressman McGovern's office, Environmental Attorney Robert Bilott , Ashley Coulombe of Senator Warren's office, as well as Mark Dailey from Madam President Senator Harriet Chandler's office.

We have met with Congressman McGovern, Ashley Coulombe, and Mark Dailey in person. I did see Senator Warren in person at the Holen MA town hall in May. I was able to hand her a 160 page document on this issue regarding the deceptions, omissions, conflict of interest of the manufacturers that immerse themselves in our fire fighter cancer research and studies and say nothing to the fire service about PFOA/PFOS.

I have submitted the 160 page document to the DOJ at least 4 times now since February. No response. Except they did confirm they have it. But no one has called to ask any questions.

Please help. The manufactures have been able to line their pockets off the backs of fire fighters as there are no regulations on the chemicals. No regulations on how much they can use in our gear. They could be pumping much more than is necessary to inflate their stock price.

Thank you.

Diane Cotter

-----Original Message-----
From: d Ex. 6
To: grevatt.peter <grevatt.peter@epa.gov>; Dunn.alexandra <Dunn.alexandra@Epa.gov>; geoffdaly <geoffdaly@mkd-usa.com>
Cc: gpeaslee <gpeaslee@nd.edu>; mindi <mindi@mindiforcongress.com>
Sent: Wed, Jun 27, 2018 10:56 am
Subject: Your Turnout Gear and PFOA statement at New England EPA PFAS Community Engagement, Exeter NH 6.25.2018

Good Morning all,

Dr Grevatt, Ms Dunn, thank you for hearing my statement Monday evening at the EPA PFAS Community Engagement.

Please understand we have been trying for well over one year to bring immediate attention to this issue for the fire service. I'm sure it may have been a shock to see how much PFAS was in our turnout gear.

I wanted to bring Professor Peaslee into the conversation please, as he first tested the gear last year for PFAS content, then he tested for PFOA content. He has the same concerns about the water as you folks do. (see Professor Peaslee's reply...attachment)

My grave concern is for what is degrading in the fire stations. But if we can address that while you folks look at the water issue then by all means. (See attachments PPE storage 1-4 for examples)

Geoff Daly, your input to Paul and I was invaluable and I'd like you to meet Professor Graham Peaslee.

Mindi has been working since last August to shed light on this issue, speaking at fire stations and writing articles to bring insight to the issue that the turnout gear coatings need nation wide recognition.

But truly, we are desperate for CDC to get on board with this issue. The staggering amounts of PFOA/PFNA that collect over and over in the area where a FF hangs their gear is keeping me up at night.

Please see below for supporting links to statements I made Monday evening.

Thank you all.
Diane Cotter

https://www.facebook.com/1808869939437081/videos/2080367175620688/UzpfSTUwNzc0MDA5MToxMDE2MDU5MjUxNDcwMDA5Mg/

Transcript from the first in the nation New England EPA PFAS Summit in Exeter, NH. 6.25.18

Thank you Organizers and EPA Panel Members for allowing me this opportunity to speak.

My name is diane cotter, I am here with my husband, Lt Paul Cotter, retired, 28 year veteran, Worcester Fire Department . And cancer survivor.

My community is the 1.3 million firefighters in this nation who have been completely overlooked in this PFAS catastrophe.

America's firefighters have been on the front line of PFAS exposure since 1983 using it in AFFF, being sprayed in our faces, wading in it, having turnout gear soaked in it, and exposing our families to it after bringing gear home.

We were not aware how toxic this substance was. This turnout gear I have is from 2004, it is new and never worn or 'contaminated' as the fire service would say. Jan of 2018 our grassroots effort acquired Professor of Physics Graham Peaselee, of Notre Dame Univ to test it for PFAS content. Just the 'fraction of the potential' that is in this gear tested at 157 ppb PFOA and 257 PFNA.

THAT IS 14, 000 times the newly set recommended limit of PFOA.

Turnout gear has been impregnated with PFOA since 1999 (at least) to meet NFPA water repellent STANDARDS. We were never made aware. We do not know how much. Only our gear manufacturers have that information. We sweat in this gear, our body temperature rises and our skin absorbs these toxins. We start our careers in our child bearing years. PFOA and PFOS are designated by California Prop65 as causing 'reproductive cancers'.

In 2006 the European Chemical Agency (ECHA) notified gear manufacturesr they would be restricting PFOA in 'textiles'. One of those textiles is firefighter PPE. By 2012 PFOA was designated a Substance of Very High Concern there. Gear manufacturers were made aware of the decision to restrict the amount of PFOA in turnout gear to 25ppb and 'precursors' to 1ppm.

http://www.hemmingfire.com/news/fullstory.php/aid/2601/Six-year_PFOA_reprieve_for_firefighters__protective_clothing.html

To date they have not advised the US of this issue. While the manufacturers are discussing and teaching about the issue in Europe, they have not mentioned it here. https://www.firerescueforum.com/content

They minimized the issue when it came up recently in a firefighting trade magazine published by 'Station Pride' titled 'The Real Cancer in Your Gear'. https://station-pride.com/2017/03/28/the-real-cancer-in-your-gear/

We are in a particularly high risk exposure setting as our gear has been degrading in our fire stations where we work, eat, sleep, since 1999.

The coating degrades in UV lighting, in many stations our gear is stored in open lighting next to apparatus in bays. Paul's station had 80 sets of gear rotating through his station in one week. The gear is designed to be used for 10 years. Over 20 years we have had thousands of sets releasing particles of PFOA into our stations.

The new short chain coatings are also a concern. NH State Rep and Enviro Scientist Mindi Messmer wrote an article on this issue titled Firefighter Cancer Quadfecta.

https://www.firefighternation.com/articles/2018/06/firefighter-cancer-quadfecta.html ;;

From trade magazine FireFighter Nation:

The replacements, termed "short chain PFCs" were sported as better for the environment and public health. However, scientific studies conducted in laboratory animals indicate that the short chain replacements could be more toxic to humans since they accumulate longer in organs than the long chain legacy compounds. This may be the cause of cancer incidence in younger firefighters.
I have been advocating for a national health study specifically focused on firefighters to assess the health outcomes because they are highly exposed. It is often difficult to tie causation with cancer or other chronic diseases. Focusing on the highly exposed populations is more likely to carefully evaluate possible negative health outcomes for exposures to PFCs. This should include, at a minimum, thorough cancer screening and annual serum PFC monitoring of firefighters to provide longitudinal data to assess health outcomes (see Table 2). It is not enough to have a cancer registry, we have to prevent cancer by taking proactive steps to identify and prevent exposures in while firefighting, in fire stations, and in the turnout gear before they make firefighters sick.

To date there has not been a PFAS dust study done in our stations. Yet, biomonitoring has shown firefighters PFOA serum tested in ranges from 243 ng/mL to 423 ng/mL from a 'yet unknown source'. The 'DuPont Water Works' plant workers were considered high at 32 ng/mL.

Adding to this concern is the October 2, 2017 NH DES letter to every fire station in NH that of 6 of 7 New Hampshire fire stations water wells tested at 'elevated' levels of PFAS.

https://www4.des.state.nh.us/nh-pfas-investigation/wp-content/uploads/2017/11/Fire_Department_H20Sample.pdf

In 1992 DuPont's own scientist learned their PFOA casuesd testicular cancer. Testicular cancer is the number one cancer in the fire service. . DuPont is a manufacturer of our gear. They have yet to tell us about this. They are immersed in every aspect of fire fighter cancer research, and teaching prevention methods. In 2006 they notified shareholders that 'any attempt to regulate PFOA would impact their bottom line'. They never shared that with us either. In 2005 the United Steelworkers Union advised Gore also a turnout gear manufacturer, and DuPont, to notify the end user of the harmful effects of PFOA. Neither did.
See attached (DuPont Shareholders.... page 29)

https://www.cleanlink.com/news/article/Steelworkers-Union-Warn-of-Harm-from-Teflon-Related-Chemical--3717

On September 5, 2017, Environmental Attorney Robert Bilott, C8 Science panel's Dr Paul A Brooks, and Fire Chief Jeff Hermes demanded testing and studies of the EPA, CDC/ATSDR, and US Attorney General on behalf of all first responders US due to their exposure from foam and gear.

https://www.documentcloud.org/documents/3988104-Firefighter-Letter.html

With NO regulations for these chemicals, manufacturers are under NO obligation to tell us what we are wearing, or spraying. They defiantly refuse to give us that information citing 'proprietary information'. They have even lobbied for and win the right to NOT put warning labels in our turnout gear. See here for the 'Liability Bill'; https://www.femsa.org/whois_femsa/history/ ;;

Our manufacturers sit on NFPA committees deciding safety standards of gear, from the balance of a helmet to the width of reflective tape. but are under no obligation to advise of the chemicals in our gear. They never did. Not once.

The newly released PFAS study mentions FF occupational and high risk of exposure numerous times.

Yet the fire service has been omitted from the multi million dollar PFAS Study award.

We respectfully ask Senator Shaheen and Massachusetts Senator Elizabeth Warren to immediately add this nations fire fighters to the PFAS Registry along with the already chosen active military and veterans.

The EPA and NIOSH have been kicking this issue of occupational exposure and setting limits down the road for over 40 years. Last week I shared a 1977 NIOSH report titled " Criteria for a recommended standard - occupational exposure to DECOMPOSITION PRODUCTS of FLUOROCARBON POLYMERS" . Here in 2018 we are seeing the same thing.

(see attached cdc_19394_DS1)

Under both Democratic and Republican leadership the EPA and CDC have been a catastrophic failure to the fire service. Hasn't anyone wondered about the firefighter they see covered head to toe in A-tripleF?

After 40 yeras of undecisivness, the fire service took matters into its own hands. Washington State Council of Fire Fighters and Toxic Free Futer passed SB 6413 (attached) limiting the use PFAS in AFFF and requiring labels be added advising the wearer of PFAS exposure in turnout gear.

The Professional Fire Fighters of Massacusetts and Toxics Action Center are both on board with this.

Last week the PFFM has voted unanimously to make PFAS legislation a priority.

The fire service can do this state to state to protect ourselves and fellow citizens.

And we WILL get it done.

But isn't that your job?

thank you.

Message

From: Katharine Hodge [Ex. 6]
Sent: 7/23/2018 4:47:58 AM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
CC: governorsununu@nh.gov; Laurene Allen [Ex. 6] ecabanel@merrimacknh.gov
Subject: Saint Gobain Stormwater outfall

Good morning, I have added a link at the bottom of the page to the latest testing for the storm water outfall located on the Saint Gobain property. Currently at 2200 PPT for PFOA alone!

I have been specifically told by NHDES that this an EPA issue and they are NOT responsible for it. NHDES is seriously dropping the ball on ALL things SG and in my opinion seems to be derelict in their duties to protect the people of Merrimack.

If you recall, SG left Vermont and moved to NH because of the less restrictive regulations and even after all of the PFAS issues of the last 2 years, (known by us) and the ATSDR report, NHDES has not made any move to PROTECT us. NHDES continues to allow SG to poison us on a daily basis. We have NO ONE looking to help us, improve our contamination or PROTECT OUR CHILDREN. Our state motto is "Live free or Die", I feel it should be "Move to NH AND DIE"

As always, I thank you for your time and attention.

Katharine Hodge
Merrimack

https://drive.google.com /file/d/1hPGg2DhL-uz5dRQ0BNL5WlPu_K87YVOG/view

Message

From: Boedecker, Emily [Emily.Boedecker@vermont.gov]
Sent: 7/10/2018 6:12:09 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
Subject: RE: Vermont Health Department Updates Health Advisory for PFAS to include 3 Additional Compounds
Attachments: Drinking water health advisory for five PFAS_071018.pdf

Of course just as I send. Please use this updated version of the Health Advisory. Minor edits.
Thank you
Emily

Emily Boedecker, Commissioner
Vermont Department of Environmental Conservation
1 National Life Dr., Main 2
Montpelier, VT 05602
emily.boedecker@vermont.gov
(802)
(802) Ex. 6

From: Boedecker, Emily
Sent: Tuesday, July 10, 2018 2:04 PM
To: 'Alexandra Dapolito Dunn, J.D.' <dunn.alexandra@epa.gov>
Subject: Vermont Health Department Updates Health Advisory for PFAS to include 3 Additional Compounds

Alex,
We have completed our individual outreach on the updated PFAS health advisory. Attached and below are the Health Advisory from the Vermont Dept. of Health, the media release sent out at noon today, and the email to the community sent out shortly after. I have had an opportunity to speak with most of our New England commissioners.
Please let me know if you have any questions.
Thank you for all of your support and attention to the PFAS issue.
Warm regards
Emily

Emily Boedecker, Commissioner
Vermont Department of Environmental Conservation
1 National Life Dr., Main 2
Montpelier, VT 05602
emily.boedecker@vermont.gov
(802)
(802) Ex. 6

From: O'Casey, Elle
Sent: Tuesday, July 10, 2018 12:06 PM
Subject: NEWS: Health Department Updates Health Advisory for PFAS, State Expands Testing Plan to include 10 Schools in Pilot Project

VERMONT AGENCY OF NATURAL RESOURCES
DEPARTMENT OF HEALTH

FOR IMMEDIATE RELEASE – July 10, 2018

CONTACT:
Ben Truman
Department of Health
Ex. 6

Elle O'Casey
Agency of Natural Resources
Ex. 6 | elle.ocasey@vermont.gov

Health Department Updates Health Advisory for PFAS
State Expands Testing Plan to include 10 Schools in Pilot Project

MONTPELIER – The Vermont Department of Health has updated its health advisory for drinking water of 20 parts per trillion (ppt) to cover five per- and polyfluoroalkyl substances (PFAS). PFAS are a large group of human-made chemicals that have been used in industry and consumer products worldwide since the 1950s. Exposure to certain PFAS may affect different systems in the human body.

The previous health advisory of 20 ppt for PFOA and PFOS combined was issued in 2016 following the discovery of PFOA in private drinking water wells in Bennington and a public drinking water supply well in Pownal, Vermont.

Vermont Health Advisory for Drinking Water = 20 parts per trillion
The health advisory for PFAS in drinking water now includes three more PFAS in addition to PFOA and PFOS. Added together, the levels of these PFAS may not exceed 20 parts per trillion (ppt):

- PFOA - perfluorooctanoic acid
- PFOS - perfluorooctane sulfonic acid
- PFHxS - perfluorohexane sulfonic acid
- PFHpA - perfluoroheptanoic acid
- PFNA - perfluorononanoic acid

Some studies show that these PFAS may affect growth, learning and behavior in babies and older children, lower a woman's chance of getting pregnant, interfere with the body's natural hormones, increase cholesterol levels, affect the immune system, and increase the risk of cancer. The likelihood of having a health effect due to PFAS exposure depends on how much an individual was exposed to, and for how long.

To date, all analytical methods used to examine PFAS in drinking water test for these five compounds. Until 2018, the PFAS predominantly found in drinking water in Vermont was PFOA. With the Department of Environmental Conservation's (DEC) expanded testing of sites around the state, other PFAS – including PFHxS and PFHpA – have been found at levels that triggered the Health Department to expand its health advisory. All five PFAS compounds now included in the health advisory can be effectively removed from drinking water with the use of carbon filtration point-of-entry treatment systems (POETS).

Working with Affected Residents and Businesses
The DEC has reviewed all PFAS test results and has notified the limited number of locations that have exceeded the updated health advisory. These locations will be re-sampled and bottled water offered to those affected. POETS have been installed in the impacted homes and businesses in Bennington, Shaftsbury, Pownal and Clarendon to remove all five PFAS compounds. If the combined results of the five PFAS compounds are found to be above 20 ppt, the DEC will work with the property owner to install a permanent drinking water solution.

State Launches Statewide Testing Pilot for PFAS at 10 Schools

PFAS is often found in floor cleaning products, stripping chemicals, waxes, and polish that may be used to maintain flooring at schools. Schools with on-site drinking water wells are more likely to have been affected by PFAS used in floor cleaners and waxes than schools on public drinking water systems. Schools that are on a public drinking water system are not affected. This week, the DEC will begin sampling at 10 schools to determine if PFAS entered the environment and impacted groundwater when cleaning water carrying PFAS was emptied directly onto the ground or into a school's septic system. This project is a partnership with the Department of Health and Agency of Education.

The school testing is part of the DEC's broader PFAS sampling approach. After the discovery of PFAS in drinking water in Bennington, the DEC developed the statewide PFAS sampling plan to strategically investigate numerous sources of PFAS. DEC officials have already tested several locations where PFAS was used, including wire coating facilities, semi-conductor facilities, battery manufacturing facilities, and airports. The sampling report located on DEC website provides an overview of the findings and offers a look ahead into additional work needed in the future.

More information is available
To find out more about Vermont's PFAS sampling plan and information for affected communities, visit the DEC PFOA webpage http://dec.vermont.gov/commissioners-office/pfoa.

For more information about health and PFAS in drinking water, visit the Health Department's website: www.healthvermont.gov/environment/drinking-water/perfluoroalkyl-and-polyfluoroalkyl-substances-pfas-drinking-water

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From: Vermont Department of Environmental Conservation <elle.ocasey@vermont.gov>
Sent: Tuesday, July 10, 2018 12:08 PM
To: Boedecker, Emily <Emily.Boedecker@vermont.gov>
Subject: Vermont Health Department Updates Health Advisory for PFAS to include 3 Additional Compounds

VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

July 10, 2018
View as Webpage

PFAS Health Advisory Update

Health Department Updates Health Advisory for PFAS
State Expands Testing Plan to Include 10 Schools In Pilot Project

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Vermont Health Advisory for Drinking Water = 20 parts per trillion

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1. PFOA - perfluorooctanoic acid
2. PFOS - perfluorooctane sulfonic acid
3. PFHxS - perfluorohexane sulfonic acid
4. PFHpA - perfluoroheptanoic acid
5. PFNA - perfluorononanoic acid

To date, all analytical methods used to examine PFAS in drinking water test for these five compounds. Until 2018, the PFAS predominantly found in drinking water in Vermont was PFOA. With the Department of Environmental Conservation's (DEC) expanded testing of sites around the state, other PFAS – including PFHxS and PFHpA – have been found at levels that triggered the Health Department to expand its health advisory. All five PFAS compounds now included in the health advisory can be effectively removed from drinking water with the use of carbon filtration point-of-entry treatment systems (POETS).

Working with Affected Residents and Businesses

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PFAS is often found in floor cleaning products, stripping chemicals, waxes, and polish that may be used to maintain flooring at schools. Of the schools that have on-site drinking

water wells, DEC has identified 10 schools for the pilot testing project. These schools were most likely to have been affected by PFAS used in floor cleaners and waxes. Schools that are on a public drinking water system are not affected. This week, the DEC will begin sampling at 10 schools to determine if PFAS entered the environment and impacted groundwater when cleaning water carrying PFAS was emptied directly onto the ground or into a school's septic system. This project is a partnership with the Department of Health and Agency of Education.

The school testing is part of the DEC's broader PFAS sampling approach. After the discovery of PFAS in drinking water in Bennington, the DEC developed the statewide PFAS sampling plan to strategically investigate numerous sources of PFAS. DEC officials have already tested several locations where PFAS was used, including wire coating facilities, semi-conductor facilities, battery manufacturing facilities, and airports.

The sampling report located on DEC website provides an overview of the findings and offers a look ahead into additional work needed in the future.

More information is available

To find out more about Vermont's PFAS sampling plan and information for affected communities, visit the DEC PFOA webpage.

For more information about health and PFAS in drinking water, visit the Health Department's website.

Another community update regarding Bennington and East Clarendon will be sent out later this week.

For More Information

- To find out more about Vermont's PFAS sampling plan and information for affected communities, visit the DEC PFOA webpage
- For more information about health and PFAS in drinking water, visit the Health Department's website

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You are receiving this e-mail because you have requested to be updated on Vermont's PFOA response efforts, or because your well was recently sampled. If you wish to stop receiving these updates, you may unsubscribe at any time using the link at the bottom of this e-mail.

Department of Environmental Conservation
Vermont Agency of Natural Resources
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Keep in touch

Vermont Agency of Natural Resources | 1 National Life Drive, Davis 2, Montpelier, VT 05620-3901

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State of Vermont
Department of Health
Commissioner's Office
108 Cherry Street • PO Box 70
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HealthVermont.gov

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Agency of Human Services

MEMORANDUM

TO: Emily Boedecker, Commissioner

FROM: Mark A. Levine MD, Commissioner

DATE: July 10, 2018

SUBJECT: Drinking Water Health Advisory for Five PFAS (per- and polyfluorinated alkyl substances)

Summary
The Department of Health (Department) has derived a Drinking Water Health Advisory (Health Advisory) of 20 parts per trillion (ppt) applicable to the sum of PFOA (perfluorooctanoic acid), PFOS (perfluoro-octane sulfonic acid), PFHxS (perfluorohexane sulfonic acid), PFHpA (perfluoroheptanoic acid) and PFNA (perfluorononanoic acid). These chemicals belong to the PFAS family (per- and polyfluorinated alkyl substances). According to the Centers for Disease Control and Prevention, "some studies in people show that certain PFAS may affect growth, learning and behavior of infants and older children; lower a woman's chance of getting pregnant; interfere with the body's natural hormones, increase cholesterol levels, affect the immune system, and increase the risk of cancer[1]." Until 2018, the PFAS species predominantly found in drinking water in Vermont was PFOA. Recently, other PFAS including PFHxS and PFHpA were found in drinking water in Vermont at concentrations that warrant review. This Health Advisory updates the Drinking Water Health Advisory for the sum of PFOA and PFOS that was issued on June 22, 2016.

During the evaluation of PFHxS, PFHpA and PFNA, the Department looked to federal and other state partners. The Department consulted with colleagues at U.S. Environmental Protection Agency (US EPA) and the Agency of Toxic Substances and Disease Registry (ATSDR). The Department reviewed work conducted by the Connecticut Department of Health[2], as Connecticut issued a Drinking Water Action Level of 70 ppt for the sum of the five PFAS. The Department reviewed Massachusetts Department of Environmental Protection's Drinking Water Guidance Values[3] for the sum of five PFAS, equal to 70 ppt. Colorado issued a Health Advisory of 70 ppt applicable to the sum of PFOA, PFOS and PFHpA[4]. Minnesota Department of Health recommends the drinking water level for PFOS be used as a surrogate for PFHxS[5].

There is no federal maximum contaminant level (MCL) for PFOA, PFOS, PFHxS, PFHpA, PFNA or any other PFAS. No finalized toxicity values exist for PFHxS, PFHpA and PFNA from authoritative sources (such as US EPA and ATSDR). The Department has not derived a noncancer toxicity value for PFHxS, PFHpA or PFNA. These five PFAS meet the criteria for grouping chemicals under one Health Advisory level according to the Department's chemical grouping process[6] for the following reasons:

1. PFOA, PFOS, PFHxS, PFHpA and PFNA are currently being investigated in Vermont and have been found in drinking water.
2. PFHxS, PFHpA and PFNA are members of the PFAS family along with PFOA and PFOS and are considered sufficiently similar to PFOA and PFOS.

ED_002545_00008689-00001

3. PFHxS, PFHpA, PFNA, PFOA and PFOS are often found together.
4. PFHxS, PFHpA and PFNA elicit similar health effects as PFOA and PFOS.

PFOA, PFOS, PFHxS, PFHpA and PFNA are all long-chain members of the PFAS family[7]. PFOA and PFOS are man-made fluorinated chemicals that contain eight carbons[7]. PFHxS, PFHpA, and PFNA contain six, seven and nine carbons and are structurally similar to PFOA and PFOS[8]. These PFAS have similar and long biological half-lives[7]. PFAS chemicals are often found together in the environment, and some PFAS chemicals degrade to other PFAS chemicals[7].

ATSDR published a draft Toxicological Profile for PFAS on June 20, 2018[9]. This draft Toxicological Profile provides intermediate oral minimal risk levels for PFOA and PFOS that are roughly an order of magnitude more stringent than the chronic oral reference dose provided by US EPA Office of Water in 2016[10]. The draft Toxicological Profile also provides intermediate oral minimal risk levels for PFHxS and PFNA, which are equal to or lower than the 2016 US EPA Office of Water chronic oral reference dose for PFOA and PFOS[10]. The intermediate oral minimal risk levels are provided as draft, and the ATSDR draft Toxicological Profile for PFAS is subject to revision in response to public comments and when additional data become available. The Department has not used the intermediate oral minimal risk levels to derive Health Advisories for individual PFAS. The draft Toxicological Profile supplements the Department's understanding of PFAS, and supports Vermont's approach of summing the five PFAS.

Supporting Information

PFOA and PFOS are the most well-studied of the PFAS. The US EPA Office of Water has provided toxicity values for PFOA and PFOS, and advice to apply a single guidance value to the sum of them[10]. PFOA and PFOS target many organ systems, including but not limited to the liver[11,12], endocrine[11,12] and the immune system. The National Toxicology Program, a Division of the National Institute of Environmental Health Sciences, concludes that PFOA and PFOS are presumed to be immune hazards to humans, based on a high level of evidence in animals that PFOA and PFOS suppress the antibody response[13]. Exposure to PFOA and PFOS is also associated with developmental toxicity. The offspring of mice exposed to PFOA showed neurodevelopmental effects[14], skeletal alterations[15], and reduced ossification and accelerated puberty in males[10]. The offspring of rats exposed to PFOS showed delayed eye opening and decreased pup weight [16,10]. Toxicity information for PFHxS, PFHpA and PFNA is summarized below.

PFHxS- A single dose of PFHxS in mice at postnatal day 10 resulted in altered spontaneous behavior and habituation at two and four months[17]. Increased thyroid follicular cell damage was observed in male rats given PFHxS for 42 days[18]. In vitro studies show PFHxS has the potential to bind thyroid transporter protein[19].

PFHpA- Data from two in vitro studies suggest PFHpA has the potential to exhibit developmental toxicity[20] and bind PPARa[21]. Colorado Department of Public Health and Environment issued a Health Advisory applicable to the sum of PFOA, PFOS and PFHpA, as they concluded PFHpA may have similar effects as PFOA and PFOS[4].

PFNA- Toxicity studies indicate that exposure to PFNA may have similar impacts as exposure to PFOA and PFOS including but not limited to; immunotoxicity, developmental toxicity, and liver toxicity. Decreased thymus and/or spleen weight, and changes in immune cell ratios were observed in rats and mice after PFNA exposure[22-25]. Decreased pup weight and delayed development was observed in mice exposed

gestationally to PFNA[26]. The New Jersey Drinking Water Quality Institute developed an MCL for PFNA of 13 ppt, based on increased liver weight in mice[27].

Derivation of the Health Advisory

The Health Advisory of 20 ppt for the combination of PFOA, PFOS, PFHxS, PFHpA and PFNA is based on a non-cancer endpoint and derived[6] using the oral reference dose of 0.00002 mg/kgBW-d provided in US EPA's 2016 Health Effects Support Documents for PFOA[11] and PFOS[12]. The Department applied the oral reference dose for PFOA and PFOS to the sum of PFOA, PFOS, PFHxS, PFHpA, and PFNA. The Department also calculated a candidate drinking water advisory for consideration based on the cancer endpoint using the information provided in EPA's 2016 Health Effects Support Documents for PFOA[11] and PFOS[12] and determined that derivation of the Health Advisory based on the noncancer endpoint is more protective.

The Health Advisory for the combination of PFOA, PFOS, PFHxS, PFHpA and PFNA is based on direct exposure via ingestion of drinking water only. As is standard practice [28,29], a relative source contribution is incorporated in the development of the advisory value to account for potential exposure to these chemicals from other sources.

Details of the derivation of the Drinking Water Health Advisory of 20 ppt are found below.

<u>Drinking Water Health Advisory - Noncancer</u>

1. The general equation used to derive a noncancer-based Drinking Water Health Advisory:

   $DWHA = (HQ)(RfD_o)(1/BW_AIR)(CF)(RSC)$

   DWHA = Drinking Water Health Advisory
   HQ= Hazard Quotient
   RfD_o= chronic oral reference dose
   BW_AIR= Body Weight adjusted Water Intake Rate
   CF= Units Conversion Factor
   RSC= Relative Source Contribution

2. Derivation of the Health Advisory for the combination of PFOA, PFOS, PFHxS, PFHpA and PFNA

   $DWHA = (HQ)(RfD_o)(1/BW_AIR)(CF)(RSC)$
   $= (1)(2 \times 10^{-5}$ mg/kg BW-day)(1/0.175 L/kg BW-day)(1000 µg/mg)(0.2)
   = 0.02285 µg/L (ppb)
   = 0.02285 µg/L (ppb) x 1000 ng/ µg = 22.9 ng/L (ppt) ≈ 20 ppt

   Exposure Assumptions, Parameter Values and Descriptions

   HQ = 1
   Target Hazard Quotient employed in the development of Department of Health Drinking Water Guidance Values

   RfD_o = 2×10^{-5} mg/kgBW-d
   Oral reference dose provided in EPA's 2016 Health Effects Support Documents for PFOA[11] and PFOS[12]

BW_AIR = 0.175 L/kgBW-d
The 2016 US EPA Drinking Water Health Advisories for PFOA[10] and PFOS[30] state that "the developing fetus and newborn are particularly sensitive to PFOA- and PFOS-induced toxicity." US EPA has recommended that fine age groupings be used in the assessment of potential exposure to children[31]. A series of ten ranges between birth and 21 years of age is recommended for consideration as appropriate. The 95th percentile Body Weight Adjusted Water Intake Rate for the first year of life based on combined direct and indirect water intake from community water supplies for consumers only is 0.175 L/kgBW-d[32,33].

CF= 1000 µg/mg
Unit conversion from milligrams to micrograms

RSC = 0.2 (20%)
Consistent with US EPA guidance[28,29], an RSC is incorporated in the development of Health Advisories that are based upon a threshold type, primarily noncarcinogenic, health effect. The RSC represents the portion of an individual's total daily exposure to a specific chemical that is attributed to or allocated to drinking water. An RSC of 20% is incorporated to account for exposure to PFOA, PFOS, PFHxS, PFHpA and PFNA from other sources. This follows EPA's recommendation to use an RSC of 20% when quantitative data on other sources of exposure are not available. The 2016 US EPA PFOA Health Advisory states "In cases where environmental or exposure data are lacking, the Exposure Decision Tree approach results in a recommended RSC of 20%. This 20% RSC value may be replaced where sufficient data are available to develop a scientifically defensible alternative value."[10]

References

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Message

From: Matthews, Lisa [Matthews.Lisa@epa.gov]
Sent: 6/14/2018 9:48:03 PM
To: Clark Freise [clark.freise@des.nh.gov]; Good, Alicia (DEM) [alicia.good@dem.ri.gov]; terry.gray@dem.ri.gov; angelo.liberti@dem.ri.gov; slongsworth@ecos.org; melanie.loyzim@maine.gov; Nicole Lugli [Nicole.Lugli@ct.gov]; paul.mercer@maine.gov; julie.moore@vermont.gov; Moran, Gary (DEP) [gary.moran@state.ma.us]; Elizabeth Scott [elizabeth.scott@dem.ri.gov]; Dunn, Alexandra [dunn.alexandra@epa.gov]; Szaro, Deb [Szaro.Deb@epa.gov]; Dixon, Sean [dixon.sean@epa.gov]; Wagner, Kenneth [wagner.kenneth@epa.gov]; Chancellor, Erin [chancellor.erin@epa.gov]; Smith, Bernicel [Smith.Bernicel@epa.gov]
CC: Orme-Zavaleta, Jennifer [Orme-Zavaleta.Jennifer@epa.gov]; Robbins, Chris [Robbins.Chris@epa.gov]; Yamada, Richard (Yujiro) [yamada.richard@epa.gov]; Cheatham-Strickland, Latonia [Cheatham-Strickland.Latonia@epa.gov]; Kuhn, Kevin [Kuhn.Kevin@epa.gov]; LaVay, Maggie [LaVay.Maggie@epa.gov]; Munns, Wayne [Munns.Wayne@epa.gov]; Gillespie, Andrew [Gillespie.Andrew@epa.gov]; Rea, Anne [Rea.Anne@epa.gov]; Sams, Reeder [Sams.Reeder@epa.gov]; Keith, Darryl [Keith.Darryl@epa.gov]; Wigand, Cathleen [Wigand.Cathleen@epa.gov]; Sherman, Barbara [Sherman.Barbara@epa.gov]; Scheuer, Amy [Scheuer.Amy@epa.gov]
Subject: Final agenda and materials: New England States' Visit to EPA ORD's Atlantic Ecology Division (June 19)
Attachments: Agenda_June 19 (final).docx; Attendee list_AED (final).docx; AED Logistics.pdf; Panera_AED boxed lunches.pdf

Importance: High

Good afternoon,
We are looking forward to the New England states' visit to EPA Office of Research and Development's (ORD) Atlantic Ecology Division (AED), Tuesday, June 19. We are very glad that you'll have the opportunity to tour the laboratory and learn more about EPA ORD science and technical capabilities, and meet to identify how we can better collaborate on solving complex environmental issues. The meeting will include presentations and discussion focused on topics of interest to New England states such as nutrients, algal blooms, PFAS, coastal resilience as well as an overview of EPA's CompTox Chemistry Dashboard. Many of you have let us know also that you will be able to participate in the Nutrients Meeting at Woods Hole the day prior, June 18, and if you have not already done so, please RSVP to Amy Scheuer and me if you will be able to join for the group dinner at the Coast Guard House restaurant, June 18 at 6:45 PM (seating limited).

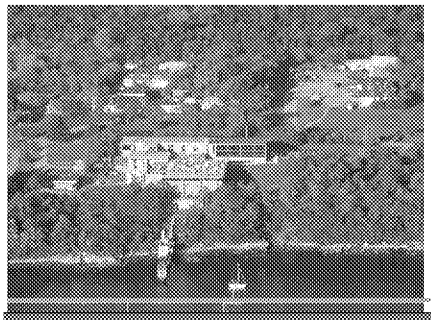
To help you prepare for the event, attached please find the final meeting agenda, attendee list, logistics sheet and lunch menu.

Hard copies of the materials will be available at the meeting. Attire is business casual (no jackets required); closed-toe shoes are required for the lab tour. We will plan to meet in the hotel lobby Tuesday at 7:50 AM to drive to the lab for those needing to coordinate transportation. We will be ordering boxed lunches from Panera, and lunch money will be collected that morning (exact change is appreciated).

Again, we are very much looking forward to your visit to AED, and please let me Ex. 6 cell) know if you have any questions or need additional information.

Best regards,
Lisa

Lisa Matthews
Senior Advisor and State Liaison
US EPA Office of Research and Development
202-564-6669 office
Ex. 6 mobile



USEPA Region 1 States' Visit
to ORD's Atlantic Ecology Division
June 19, 2018

27 Tarzwell Drive
Narragansett, RI 02882

LOGISTICAL INFORMATION

The one-day meeting will be held on **Tuesday, June 19, 2018**. There is also an opportunity to participate in a meeting focusing on nutrient management at Woods Hole on **Monday, June 18**, including presentations that will highlight some of innovative technologies and strategies to address nutrient pollution.

PARKING AND SECURITY AT EPA

Directions to the Narragansett facility are provided below. Visitor parking is available in the west lot past the main entrance. Please enter the EPA facility using the front lobby where you will sign in. Please notify the receptionist in the front lobby that you are here for a meeting with ORD and Wayne Munns. Someone on our staff will meet you in the main lobby and escort you to the conference room. All visitors must be accompanied by an EPA representative when inside EPA's facility. Please allow at least 10 minutes for security and parking, and bring a government-issued photo ID (e.g., RI driver's license).

Closed-toe shoes are required to participate in the laboratory tour.

Immediately following the nutrient management meeting on **June 18**, we hope you will join us for a **group dinner** for the Region 1 states and EPA at the Coast Guard House in Narragansett, RI at 6:45 PM ET. Please RSVP for this dinner to Amy Scheuer and Lisa Matthews if you are able to attend.

NOTE: It is EPA's policy to make reasonable accommodation to persons with disabilities wishing to participate in EPA's programs, pursuant to the Rehabilitation Act of 1973, 29 U.S.C. 791. Any request for accommodation should be made to Peter Celone, EPA, at celone.peter@epa.gov.

ACCOMMODATIONS

As you prepare for your travels to Narragansett, please feel free to consider staying at the Hampton Inn South Kingstown at the discounted rate of $101/night, plus tax. Limited rooms have been set aside for June 18 and 19. To reserve your room, please call (401) 788-3500 asking for group reservations, and please provide the assigned code (**ORD**) for our guest room block June 18 and 19. Please note, since the cutoff date for the block has past, rooms are subject to the rack rate and minimum stay requirements. Guests must cancel 48-hours in advance in order to avoid cancellation fees. ***Please contact Lisa Matthews or Amy Scheuer*** (scheuer.amy@epa.gov) ***before cancelling your reservation as we are short on rooms.***

EVENT CONTACTS

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Wayne Munns
Director, US EPA ORD Atlantic Ecology Division
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DRIVING DIRECTIONS TO EPA (NARRAGANSETT, RI FACILITY)

EPA's Atlantic Ecology Division is located 27 Tarzwell Drive, Narragansett, RI 02882, approximately 30 miles south of Providence, RI on the West Passage of Narragansett Bay. The Main Office/Laboratory building houses a reception area, office space for administrative support and scientific staff, conference rooms, and dry and wet laboratory space.

DIRECTIONS

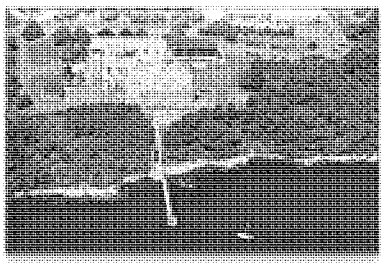
From the North:
Take Interstate 95 South. If coming from T.F. Green Airport in Warwick, follow the signs to join I-95 South towards New York. Take Exit 9 (a left exit) onto Route 4 South. Stay on Route 4 and it will become Route 1 South. Continue on Route 1 until the traffic light at the intersection with Route 138 West and Bridgetown Road. Turn left onto Bridgetown Road. At the next traffic light (intersection of Bridgetown Rd and Route 1a), go straight through the intersection onto South Ferry Road, pass the old South Ferry Church at the top of a hill on the left, and turn left onto Tarzwell Drive. Go straight after the guard post. Visitor parking is available in the west lot past the main entrance.

From the South:
From Route 1 North. At the intersection of Routes 1 & 138, bear right onto Bridgetown Road. At the next traffic light (intersection of Bridgetown Road and Route 1a), go straight through the intersection onto South Ferry Road, pass the old South Ferry Church at the top of a hill on the left, and turn left onto Tarzwell Drive. Go straight after the guard post. Visitor parking is available in the west lot past the main entrance.

From the West:
Take Interstate 95 North to Exit 3A in Rhode Island (URI/Kingston exit). Yield onto Route 138 East. Continue on Route 138 past the University of Rhode Island (Kingston Campus) until the traffic light at the intersection with Routes 1 & 138. From the far right lane, go straight across the intersection onto Bridgetown Road. At the next traffic light (intersection of Bridgetown Road & Route 1a), go straight through the intersection onto South Ferry Road, pass the old South Ferry Church at the top of a hill on the left, and turn left onto Tarzwell Drive. Go straight after the guard post. Visitor parking is available in the west lot past the main entrance.

From the East:
Take Interstate 195 West to 24 South to 138 West. Cross the Newport Bridge (toll) and the Jamestown Bridge. Take the first exit after the Jamestown Bridge onto Route 1a. At the end of the ramp, bear right towards Narragansett. Travel on Route 1 South until the traffic light at the intersection with South Ferry Road and Bridgetown Road. Make a left onto South Ferry Rd. Continue past the old South Ferry Church on the left. Turn left onto Tarzwell Drive. Go straight after the guard post. Visitor parking is available in the west lot past the main entrance.

From the Hampton Inn South Kingstown:
From the hotel to EPA AED facility, it will be approximately a 12-minute drive. Leaving the hotel, head east on Hotel Dr. toward Front St. Hotel Dr. turns left and becomes Front St. Turn right at South County Commons Way. Use the left 2 lanes to turn left onto US-1 N. Then, turn right onto Bridgetown Rd and continue onto South Ferry Rd. Turn left onto Tarzwell Dr., and EPA AED will be on the right. Go straight after the guard post. Visitor parking is available in the west lot past the main entrance.



New England State Commissioners' Visit to
US EPA Office of Research and Development (ORD)
Atlantic Ecology Division (AED)

June 19, 2018

27 Tarzwell Drive
Narragansett, RI 02882

AGENDA

8:15 am **Registration in AED Front Lobby**
US EPA staff will meet you in the main lobby and escort you to the meeting room.
Lisa Matthews, Senior Advisor and State Liaison, EPA ORD

8:30 am **Welcome and Introductions**
- *Chris Robbins, Acting Deputy Assistant Administrator for Management, EPA ORD*
- *Paul Mercer, Commissioner, Maine DEP and ERIS Board Member*
- *Alexandra Dunn, Regional Administrator, EPA Region 1*
- *Ken Wagner, Senior Advisor to the Administrator for Regional and State Affairs, EPA*

8:45 am **Overview of US EPA ORD: Science and Technical Capabilities**
Jennifer Orme-Zavaleta, Principal Deputy Assistant Administrator for Science, EPA ORD

9:05 am **States' Perspectives/Topics of Interest**
States are requested to informally talk about some of their most pressing environmental challenges and related science needs.
- Connecticut DEEP
- Maine DEP
- Massachusetts DEP
- New Hampshire DES
- Rhode Island DEM
- Vermont ANR

10:00 am **Break**

10:15 am **Nutrients**
- State perspective (Massachusetts DEP)
  States will tee up issues for the topic sessions, and if possible, give examples from their state's experiences.
- EPA research (Anne Rea)
- Roundtable discussion

11:00 am **Algal Blooms**
- State perspective (Vermont DEC)
- EPA research and Cyanobacteria Assessment Network (CyAN) mobile app demonstration (Darryl Keith)
- Roundtable discussion

11:30 pm **PFAS**
- State perspective (New Hampshire DES)

- EPA research on human health/toxicity, analytical methods, site characterization, exposure and remediation/treatment (Andy Gillespie)
- Roundtable discussion

12:30 pm **Working Lunch**
Order in from Panera, self-pay

1:00 pm **EPA's CompTox Chemistry Dashboard**
- Brief overview and demonstration of potential use applications (e.g., Endocrine Disrupting Chemicals and PFAS)
  Reeder Sams, EPA ORD

1:20 pm **Coastal Resilience**
- State perspective (Maine DEP)
- EPA research (Cathy Wigand)
- Roundtable discussion

1:50 pm **Break**

2:00 pm **ORD Leadership Update**
Jennifer Orme-Zavaleta and Chris Robbins, EPA ORD
- ORD Strategic Plan
- State engagement in ORD's Strategic Research Action Plans refresh
- EPA Science Inventory
- Budget

2:30 **AED Overview**
Wayne Munns, Director, ORD Atlantic Ecology Division

2:45 pm **Facility Tour**
Including analytical laboratories, an estuarine "wet" laboratory, a research greenhouse, boat house, field sampling capabilities and green roof

4:00 pm **Break**

Return to Conference Room

4:15 pm **Recap today's discussion, state feedback and next steps**
Lisa Matthews and Paul Mercer

4:30 pm **Adjourn**

Agenda Topic Descriptions

Overview of EPA Office of Research and Development

The Office of Research and Development (ORD) is the scientific research arm of EPA, whose leading-edge research helps provide the solid underpinning of science and technology for the Agency. ORD supports six research programs that identify the most pressing environmental health research needs with input from EPA program and regional offices, partners and stakeholders. Strategic Research Action Plans outline the research underway in the programs. The research is conducted by ORD's three national laboratories, four national centers, and two offices located in 12 facilities across the country and in Washington, DC.

Nutrients

Nutrient pollution (i.e., nitrogen and phosphorus) remains one of the most challenging environmental and human health issues in the US, with a considerable impact on local and regional economies and can cause adverse environmental impacts (e.g., acid rain, harmful algal blooms, and degradation of drinking-source waters). EPA ORD's research efforts span multiple types of water bodies, and coordinate across media (water, land and air) and various temporal and spatial scales to develop numeric nutrient criteria, decision support tools, and cost-effective approaches to nutrient reduction. These efforts are being used by New England to assist with: informing development of nutrient and related criteria and standards, evaluating approaches to nutrient management and mapping, evaluating the effects of excess nutrients on aquatic resources, using data-intensive models to predict occurances of harmful algal blooms, developing methods for quantification of cyanotoxins in drinking water, and encouraging development of nutrient sensors.

Cyanobacteria Assessment Network (CyAN): An early warning indicator for toxic and nuisance blooms using ocean color satellites

Harmful blooms of cyanobacteria (blue-green algae) in drinking water reservoirs and other freshwater systems cause public health concerns and increase drinking water processing costs. Early detection of emerging blooms can inform management actions to minimize these and other adverse effects. The CyAN mobile app, available on Android devices, helps water quality managers monitor cyanobacterial harmful algal blooms (HABs). The app uses satellite data to map the location of cyanobacterial HABs in fresh and coastal waters across US – providing rapid information about concentrations in US water bodies that can be used to inform decisions regarding recreational and drinking water safety. EPA is collaborating with NASA, NOAA and USGS; the app uses data from the European Space Agency Copernicus Sentinel-3 satellite Ocean. The app provides intuitive ability to scan water bodies for changes in cyanoHAB abundance all without having to filter through numerous satellite images of water bodies not associated with their region of interest. The app allows managers to select a location of interest to quickly visualize the quantified cyanoHAB value, provides a spatial context for the larger water body, and temporal time series capabilities. The app is currently available for beta testing; if interested, contact Blake Schaeffer (schaeffer.blake@epa.gov).

PFAS

Per- and polyfluoroalkyl substances (PFAS) are of growing concern across the US. PFAS have physicochemical properties that make them ideal in many commercial products and applications such as fire-fighting foams and water-repellant textiles. However, these same properties lead to persistence in environmental media and exposed ecological and mammalian populations. There is evidence that PFAS induce a host of health outcomes with hepatic, reproductive, developmental, immunological and metabolic syndrome (e.g., lipid homeostasis) effects in humans and other organisms. There is growing public concern about exposure and effects of PFAS, driven in part by increasing public reports of potential human exposure to PFAS primarily via water, often in association with industrial activities or contaminated sites. The growing public concern combined with the general lack of information about newer generation PFAS, such as GenX or ADONA, is creating challenges for states, tribes and other entities responsible for protecting public health and the environment. States, tribes and other responsible officials often lack the resources to collect, assemble and evaluate the evolving landscape of basic PFAS exposure, hazard and mitigation science needed to inform decisions about potential risks to human health and the environment among respective constituencies. EPA is currently conducting

several lines of research to develop and apply scientific information and tools to enable states, tribes and EPA's program and regional offices to make informed decisions for protecting protect public health and the environment from harm associated with PFAS.

EPA's CompTox Chemistry Dashboard

Information and data on chemicals is used by scientists to evaluate potential health and ecological risks due to environmental exposures. EPA's CompTox Chemistry Dashboard helps evaluate the safety of chemicals by providing public access to a variety of information on over 760,000 chemicals currently in use. Within the Dashboard, users can access chemical structures, chemistry information, toxicity data, hazard data, exposure information, and additional links to relevant websites and applications. These data are compiled from sources including the EPA's computational toxicology research databases, and public domain databases such as the National Center for Biotechnology Information's PubChem database. EPA's CompTox Chemistry Dashboard is available at https://www.epa.gov/chemical-research/chemistry-dashboard

Coastal Resilience: Development and implementation of an adaptive restoration strategy for management of coastal marsh systems

Sea level rise is causing shoreline erosion, increased coastal flooding, and marsh vulnerability to the impact of storms. Coastal marshes provide flood abatement, water quality maintenance, and habitat for fish, shellfish and wildlife. In partnership with RI Coastal Resource Management Council, Department of Environmental Management, US Fish and Wildlife Service, and others, EPA ORD developed and is implementing an adaptive restoration strategy. This adaptive restoration framework supports stakeholders for managing coastal marshes and enhancing system resiliency in Rhode Island. A common adaptive management approach previously used for restoration projects was modified to identify climate-related vulnerabilities and plan adaptive actions. The strategy recommends an experimental BACI (Before-After, Control-Impact) design, described as pre- and post-sampling at the impact site and one or more control sites. Specific adaptive restoration actions are either under consideration or underway in Rhode Island, including increasing marsh elevation (i.e., beneficial use of dredged materials), shoreline stabilization, and enabling upland marsh migration.

EPA ORD's Atlantic Ecology Division

The Atlantic Ecology Division (AED), located in Narragansett, RI, is part of EPA ORD's National Health and Environmental Effects Research Laboratory. AED performs research to identify and quantify the ecological effects of anthropogenic stressors on coastal waters and watersheds of the Atlantic seaboard. This research provides data, models, decision support tools and technical support to EPA program and regional offices, state and local governments, and others to support our joint mission to protect human health and the environment. AED's research addresses national scale issues, with special emphasis given to Northeast estuaries and their watersheds, providing information that informs decision making at multiple levels of governance. AED actively promotes science communication, translation and outreach, by hosting and participating in numerous educational events each year. AED laboratory facilities consist of office space, "dry" analytical laboratories, an estuarine "wet" laboratory, a research greenhouse, and field sampling capabilities. Ongoing renovations, aimed at modernizing facility infrastructure and enhancing energy and water usage efficiencies, include installation of solar panels, a gylcol solar collector to heat domestic water, and green roofs. Large portions of AED's grounds have been converted to native meadows to promote pollinator health.

New England States' Visit to
EPA ORD's Atlantic Ecology Division
June 19, 2018

State

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Darryl Keith
Atlantic Ecology Division
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keith.darryl@epa.gov

Anne Rea
Associate National Program Director, Nutrients & HABs
Safe & Sustainable Water Resources Research Program
US EPA Office of Research and Development
rea.anne@epa.gov

Reeder Sams
Acting Deputy Director
National Center for Computational Toxicology
US EPA Office of Research and Development
sams.reeder@epa.gov

Cathleen Wigand
Atlantic Ecology Division
US EPA Office of Research and Development
wigand.cathleen@epa.gov

PANERA BOXED LUNCHES

Sandwich Box – adding a dollar for delivery
Any Signature ($10.99) or Cafe Sandwich ($9.99) including potato chips, a cookie and pickle

Salad Box – adding a dollar for delivery
Any Premium Signature ($11.99), Signature ($10.99) or Cafe Salad ($9.99) including a cookie and bread
Dressings will be on the side

Half Sandwich, Half Salad Box ($11.99) **– adding a dollar for delivery**
Any Signature or Cafe Sandwich and ½ Salad including a cookie and bread

Cookie options: Chocolate chip, oatmeal, or lemon drop cookie

SANDWICHES:

Signature Sandwiches $10.99 ($12 including delivery)

Bacon Turkey Bravo® Sandwich
Smoked turkey breast, applewood-smoked bacon, smoked Gouda, lettuce, tomatoes, signature sauce, Tomato Basil bread

Napa Almond Chicken Salad Sandwich
Chicken, diced celery, seedless grapes, almonds, dressing, lettuce, tomatoes, Sesame Semolina bread

Cafe Sandwiches $9.99 ($11 including delivery)

Mediterranean Veggie Sandwich
Zesty sweet Peppadew™ piquant peppers, feta, cucumbers, lettuce, tomatoes, red onions, cilantro-jalapeño hummus, Tomato Basil bread

Turkey Sandwich
Oven-roasted turkey breast, lettuce, tomatoes, red onions, mayo, spicy mustard, salt and pepper, whole grain bread

Tuna Salad Sandwich
Special recipe tuna salad, lettuce, tomatoes, red onions with salt and pepper, whole grain bread

Ham & Swiss Sandwich
Smoked ham, Swiss, lettuce, tomatoes, red onions, mayo, spicy brown mustard, salt and pepper, whole grain bread

SALADS:

Premium Signature Salads $11.99 ($13 including delivery)

Strawberry Poppyseed Salad with Chicken
Chicken, romaine, mandarin oranges, strawberries, blueberries, pineapple, fat-free poppyseed dressing, toasted pecan pieces

Southwest Chile Lime Ranch, Chicken, Salad
Smoked pulled chicken, romaine, arugula, adobo corn blend, quinoa tomato sofrito blend, fresh cilantro and masa crisps, chile lime rojo ranch, feta, avocado

Green Goddess Chicken Cobb Salad
Chicken, arugula, romaine, kale and radicchio blend, tomatoes, pickled red onions, Green Goddess dressing & topped with avocado, bacon, cage-free hard-boiled egg

Signature Salads $10.99 ($12 including delivery)

Spicy Thai Chicken Salad
Chicken, romaine, roasted cashew pieces, fire-roasted edamame, red pepper and carrot blend, cilantro and wonton strips, low-fat Thai chili vinaigrette, drizzled peanut sauce

Fuji Apple Chicken Salad
Chicken, arugula, romaine, kale and radicchio blend, tomatoes, red onions, toasted pecan pieces, Gorgonzola, apple chips, sweet white balsamic vinaigrette

Chicken Caesar Salad
Chicken, romaine, parmesan, homemade black pepper focaccia croutons, Caesar dressing

Asian Sesame Chicken Salad
Chicken, romaine, cilantro, sliced toasted almonds, sesame seeds, crispy wonton strips, reduced-sugar Asian sesame vinaigrette

Modern Greek with Quinoa Salad
Romaine, kale, quinoa, tomato sofrito blend, diced cucumbers, Kalamata olives, Greek dressing, feta, toasted almonds

Cafe Salads $9.99 ($11 including delivery)

Seasonal Greens
Arugula, romaine, kale and radicchio blend, tomatoes, red onions, diced cucumbers, and reduced-fat balsamic vinaigrette

Caesar Salad
Romaine, parmesan, homemade black pepper focaccia croutons, Caesar dressing

Greek Salad
Romaine, tomatoes, feta, red onions, Kalamata olives, salt and pepper, Greek dressing

Message

From: Schwer, Chuck [Chuck.Schwer@vermont.gov]
Sent: 6/14/2018 8:09:53 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
CC: Szaro, Deb [Szaro.Deb@epa.gov]; St. Fleur, Marilyn [StFleur.Marilyn@epa.gov]; tgoldberg@newmoa.org
Subject: RE: Invitation to Join the NEWMOA Board of Directors Meeting on June 14
Attachments: ATT00001.txt

Access Code: Ex. 6

Department of Environmental Conservation

Chuck Schwer, Division Director
Waste Management and Prevention Division
1 National Life Drive - Davis 1
Montpelier, VT 05620-3704
Telephone number Ex. 6
chuck.schwer@vermont.gov

From: Dunn, Alexandra <dunn.alexandra@epa.gov>
Sent: Thursday, June 14, 2018 4:08 PM
To: Schwer, Chuck <Chuck.Schwer@vermont.gov>
Cc: Szaro, Deb <Szaro.Deb@epa.gov>; St. Fleur, Marilyn <StFleur.Marilyn@epa.gov>; tgoldberg@newmoa.org
Subject: Re: Invitation to Join the NEWMOA Board of Directors Meeting on June 14

It is asking for an access code.

Sent from my iPhone

Alexandra Dapolito Dunn, J.D.
Regional Administrator
Region 1 New England
(617) 918-1012

This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act

On Jun 14, 2018, at 4:01 PM, Schwer, Chuck <Chuck.Schwer@vermont.gov> wrote:

> You can also dial in using your phone.
> United States
> United States Ex. 6
>
> Alex – You can call in anytime now.

Department of Environmental Conservation

Chuck Schwer, Division Director
Waste Management and Prevention Division
1 National Life Drive - Davis 1
Montpelier, VT 05620-3704
Telephone number: Ex. 6
chuck.schwer@vermont.gov

From: Dunn, Alexandra <dunn.alexandra@epa.gov>
Sent: Thursday, June 14, 2018 4:00 PM
To: Szaro, Deb <Szaro.Deb@epa.gov>; Schwer, Chuck <Chuck.Schwer@vermont.gov>
Cc: St. Fleur, Marilyn <StFleur.Marilyn@epa.gov>; tgoldberg@newmoa.org
Subject: Re: Invitation to Join the NEWMOA Board of Directors Meeting on June 14

What is the dial in and what time?

Sent from my iPhone

Alexandra Dapolito Dunn, J.D.
Regional Administrator
Region 1 New England
(617) 918-1012

This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act

On Jun 13, 2018, at 6:48 PM, Dunn, Alexandra <dunn.alexandra@epa.gov> wrote:

> Terri,
>
> Just saw these went to my ECOS address which is why I looked confused today about this event!
>
> Alexandra Dapolito Dunn, J.D.
> Regional Administrator
>
> Region 1 New England
> 5 Post Office Sq. Suite 100
> Mail Code: ORA01-4
> Boston, MA 02109-3912
>
> Desk: (617) 918-1012
> Mobile: Ex. 6
> Fax: (617) 918-0012
> dunn.alexandra@epa.gov

From: Dunn, Alexandra
Sent: Wednesday, June 13, 2018 6:46 PM
To: Szaro, Deb <Szaro.Deb@epa.gov>; 'Chuck.Schwer@vermont.gov' <Chuck.Schwer@vermont.gov>
Cc: St. Fleur, Marilyn <StFleur.Marilyn@epa.gov>
Subject: RE: Invitation to Join the NEWMOA Board of Directors Meeting on June 14

Yes, I can do this from the car. Let me know exact time; I presume it is not an hour? I have an event that ends at 330 and will be in the car.

Alexandra Dapolito Dunn, J.D.
Regional Administrator

Region 1 New England
5 Post Office Sq. Suite 100
Mail Code: ORA01-4
Boston, MA 02109-3912

Desk: (617) 918-1012
Mobile: Ex. 6
Fax: (617) 918-0012
dunn.alexandra@epa.gov

From: Szaro, Deb
Sent: Wednesday, June 13, 2018 3:29 PM
To: Dunn, Alexandra <dunn.alexandra@epa.gov>
Subject: FW: Invitation to Join the NEWMOA Board of Directors Meeting on June 14

Do you want to speak to NEWMOA Board tomorrow at 4 pm by phone regarding our upcoming PFAS event?

From: Schwer, Chuck [mailto:Chuck.Schwer@vermont.gov]
Sent: Wednesday, June 13, 2018 1:47 PM
To: Szaro, Deb <Szaro.Deb@epa.gov>
Subject: FW: Invitation to Join the NEWMOA Board of Directors Meeting on June 14

Deb – Please see a follow-up quest from Terri. The thought would be to have someone from EPA join us by phone at 4 pm to discuss the upcoming event in NH.

Chuck

<image001.jpg>
Department of Environmental Conservation

Chuck Schwer, Division Director
Waste Management and Prevention Division
1 National Life Drive - Davis 1
Montpelier, VT 05620-3704
Telephone number: Ex. 6
chuck.schwer@vermont.gov

From: Terri Goldberg <tgoldberg@newmoa.org>
Sent: Wednesday, June 13, 2018 1:45 PM
To: Schwer, Chuck <Chuck.Schwer@vermont.gov>
Subject: Re: Invitation to Join the NEWMOA Board of Directors Meeting on June 14

Chuck-

Does Deb or Alex want to join us for the PFAS discussion tomorrow afternoon, particularly to talk about the upcoming event in NH?

I did see Alex this morning and asked her if she planned to join us. She said her scheduler has been on vacation so my emails fell through the cracks. I told her that I would share our agenda.

Terri

Get Outlook for Android

From: Schwer, Chuck <Chuck.Schwer@vermont.gov>
Sent: Wednesday, June 13, 2018 1:13:03 PM
To: Terri Goldberg
Subject: FW: Invitation to Join the NEWMOA Board of Directors Meeting on June 14

See response from Deb. Alex is out.

<image001.jpg>
Department of Environmental Conservation

Chuck Schwer, Division Director
Waste Management and Prevention Division
1 National Life Drive - Davis 1
Montpelier, VT 05620-3704
Telephone number Ex. 6
chuck.schwer@vermont.gov

From: Szaro, Deb <Szaro.Deb@epa.gov>
Sent: Wednesday, June 13, 2018 12:20 PM
To: Schwer, Chuck <Chuck.Schwer@vermont.gov>
Subject: RE: Invitation to Join the NEWMOA Board of Directors Meeting on June 14

Hi Chuck,

I'm sorry but she will not be attending. She is completely booked.

Deb

From: Schwer, Chuck [mailto:Chuck.Schwer@vermont.gov]
Sent: Wednesday, June 13, 2018 9:56 AM
To: Szaro, Deb <Szaro.Deb@epa.gov>
Subject: FW: Invitation to Join the NEWMOA Board of Directors Meeting on June 14

Deb – It was great seeing you in DC at the PFAS summit. I was wondering if you would be able to help me. We, myself as the NEWMOA chair and Terri Goldberg, executive director were hoping we could get Alex Dunn at our Board meeting in Portland tomorrow. See email below from Terri. We have not heard back which sounds like a no. I was hoping that you could confirm whether or not she will be able to attend.

Thanks.

Chuck

<image001.jpg>

Department of Environmental Conservation

Chuck Schwer, Division Director
Waste Management and Prevention Division
1 National Life Drive - Davis 1
Montpelier, VT 05620-3704
Telephone number Ex. 6
chuck.schwer@vermont.gov

From: Terri Goldberg <tgoldberg@newmoa.org>
Sent: Friday, June 8, 2018 4:59 PM
To: 'Alexandra Dapolito Dunn' <adunn@ecos.org>
Cc: Schwer, Chuck <Chuck.Schwer@vermont.gov>
Subject: RE: Invitation to Join the NEWMOA Board of Directors Meeting on June 14

Alexandra-

I wanted to follow-up on my emails below to see if you have made a decision about whether you can join the NEWMOA Board next week in Portland, Maine on Thursday afternoon for our meeting and for dinner in the evening. Attached is the latest meeting agenda. We would particularly welcome your participation in the 4:00 discussion on PFAS and the upcoming event in New Hampshire. If you are unable to join us in person, we are making accommodations for people to join us by webinar and would offer that.

Please let me know about your thoughts on this so we can plan accordingly. Thank you so much.

Terri

From: Terri Goldberg
Sent: Friday, June 01, 2018 1:22 PM
To: 'Alexandra Dapolito Dunn' <adunn@ecos.org>
Cc: Chuck Schwer <chuck.schwer@vermont.gov>
Subject: FW: Invitation to Join the NEWMOA Board of Directors Meeting on June 14

Alexandra-

I wanted to follow-up on this invitation to see if you have been able to review your schedule and clear some time to join us on the 14th in Portland, ME. We have set aside time at the end of our meeting on June 14 to discuss PFAS and the upcoming June 25-26 event in NH. See attached draft Board meeting agenda. We would love to have you join us for that discussion and then have dinner with us. So far we have a good turnout of state officials for the meeting. We are still working on a location/reservation for dinner. Lots of good choices in Portland.

Let me know.

Terri

From: Terri Goldberg
Sent: Friday, May 18, 2018 10:36 AM
To: 'Alexandra Dapolito Dunn' <adunn@ecos.org>
Subject: Invitation to Join the NEWMOA Board of Directors Meeting on June 14

Alexandra-

Great seeing you on Wednesday night at the Environmental Business Council event. I appreciated hearing your remarks. As I mentioned, the NEWMOA Board of Directors would like to invite you to join them in Portland, Maine during their Board meeting on June 14. The Board consists of the waste and pollution prevention program directors from the New England states, New York, and New Jersey. This includes the hazardous waste, solid waste, waste site cleanup, P2, UST, emergency response, and toxics reduction programs. I can provide you with a list of the attendees as far as we know. We were hoping you could join us toward the end of the meeting and then stay to have dinner with the Board. We will be meeting at the Westin Portland Harborview Hotel. Honestly, the dinner is the best and sometimes most productive part of the meeting. We are still picking a restaurant. I know you are extremely busy, but we would love to have you join us. Thank you.

Terri Goldberg, Executive Director
Northeast Waste Management Officials' Association
89 South Street, Suite 600, Boston, MA 02111

Ex. 6

<image002.png>
Leading the Northeast to a sustainable, waste-free future
<image003.png>

Message

From: Melanson, Kate [Melanson.Kate@epa.gov]
Sent: 6/13/2018 4:08:56 PM
To: melanie.loyzim@maine.gov
CC: Dunn, Alexandra [dunn.alexandra@epa.gov]
Subject: RE: Regional PFAS Engagement Session

Absolutely –

Information below.

Thank you!

Dial-In Number: Ex. 6

Conference Code: Ex. 6

From: Loyzim, Melanie [mailto:Melanie.Loyzim@maine.gov]
Sent: Wednesday, June 13, 2018 12:07 PM
To: Melanson, Kate <Melanson.Kate@epa.gov>
Cc: Dunn, Alexandra <dunn.alexandra@epa.gov>
Subject: RE: Regional PFAS Engagement Session

Hi Kate,
Commissioner Mercer has asked me to participate on the Commissioner's call today at 1:30 to discuss plans for the NH event. Can you send me the call-in information?

We have some pretty significant concerns about how the agenda seems to be shaking out, and appreciate the Commissioners being engaged to discuss this.

Thank you,
Melanie Loyzim
Deputy Commissioner, Maine Department of Environmental Protection
Ex. 6
www.maine.gov/dep

From: Dunn, Alexandra
Sent: Monday, June 11, 2018 1:14 PM
To: 'Paul.mercer@maine.gov' <Paul.mercer@maine.gov>
Cc: Szaro, Deb <Szaro.Deb@epa.gov>; Cassidy, Meghan <Cassidy.Meghan@epa.gov>
Subject: Regional PFAS Engagement Session

Good afternoon, Commissioner Mercer.

As part of our Regional PFAS Engagement Session, our Tuesday June 26th agenda includes a Moderated State Panel. The goal of this panel is to provide a brief overview of how each of our state partners is addressing PFAS, and to hear state thoughts for consideration in the development of EPA's PFAS Management Plan.

Each state will be provided with 10 minutes to provide information related to the following areas of interest:

1. Overview of state approach/strategy related to PFAS.
2. Presentation of state-specific PFAS benchmarks.
3. Challenges state faces in identifying, addressing and communicating about PFAS.

Given the limited timeframe for each state to speak, we request that the environmental commissioners/directors for CT, RI and ME coordinate with your drinking water public health counterparts to include any information pertinent to their programs.

I hope that you or a member of your staff will participate on this panel. My Point of Contact for this panel is Meghan Cassidy. Please confirm your participation and identify the state speaker via email to cassidy.meghan@epa.gov by COB Friday, June 15th.

Alexandra Dapolito Dunn, J.D.
Regional Administrator

Region 1 New England
5 Post Office Sq. Suite 100
Mail Code: ORA01-4
Boston, MA 02109-3912

Desk: (617) 918-1012
Mobile: Ex. 6
Fax: (617) 918-0012
dunn.alexandra@epa.gov

Message

From: Loyzim, Melanie [Melanie.Loyzim@maine.gov]
Sent: 6/13/2018 4:07:03 PM
To: Melanson, Kate [Melanson.Kate@epa.gov]
CC: Dunn, Alexandra [dunn.alexandra@epa.gov]
Subject: RE: Regional PFAS Engagement Session

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Thank you,
Melanie Loyzim
Deputy Commissioner, Maine Department of Environmental Protection
Ex. 6
www.maine.gov/dep

From: Dunn, Alexandra
Sent: Monday, June 11, 2018 1:14 PM
To: 'Paul.mercer@maine.gov' <Paul.mercer@maine.gov>
Cc: Szaro, Deb <Szaro.Deb@epa.gov>; Cassidy, Meghan <Cassidy.Meghan@epa.gov>
Subject: Regional PFAS Engagement Session

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2. Presentation of state-specific PFAS benchmarks.
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I hope that you or a member of your staff will participate on this panel. My Point of Contact for this panel is Meghan Cassidy. Please confirm your participation and identify the state speaker via email to cassidy.meghan@epa.gov by COB Friday, June 15th.

Alexandra Dapolito Dunn, J.D.
Regional Administrator

Region 1 New England

5 Post Office Sq. Suite 100
Mail Code: ORA01-4
Boston, MA 02109-3912

Desk: (617) 918-1012
Mobile: Ex. 6
Fax: (617) 918-0012
dunn.alexandra@epa.gov

Message

From: Boedecker, Emily [Emily.Boedecker@vermont.gov]
Sent: 10/16/2018 4:54:10 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]; Moore, Julie [Julie.Moore@vermont.gov]
CC: Neil Kamman [Neil.Kamman@vermont.gov]; Melanson, Kate [Melanson.Kate@epa.gov]; Gutro, Doug [Gutro.Doug@epa.gov]
Subject: RE: Lake Memphremagog Article

Alex,
Thank you, we appreciate the attention of the R1 team. I just spoke with Jane and hope to find a time that you and I can talk in the next day or so. There was an interesting development yesterday concerning the Newport WWTF which is one of the five facilities that is authorized to receive the landfill leachate.
Warm regards
Emily

Emily Boedecker, Commissioner
Vermont Department of Environmental Conservation
1 National Life Dr., Main 2
Montpelier, VT 05602
emily.boedecker@vermont.gov
Ex. 6 (office)
(cell)

From: Dunn, Alexandra <dunn.alexandra@epa.gov>
Sent: Monday, October 15, 2018 8:05 AM
To: Moore, Julie <Julie.Moore@vermont.gov>
Cc: Kamman, Neil <Neil.Kamman@vermont.gov>; Melanson, Kate <Melanson.Kate@epa.gov>; Gutro, Doug <Gutro.Doug@epa.gov>; Boedecker, Emily <Emily.Boedecker@vermont.gov>
Subject: Lake Memphremagog Article

Julie,

I have our team in R1 keeping close touch w me and HQ on the questions coming in to USEPA from Environment Canada about the Lake discharge. Also coordinating closely with your team.

Saw this article this am. Let's touch base if we need to in the coming weeks.

State OKs Landfill Expansion, With PFAS Conditions
The Caledonian-Record | 10/12/2018
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COVENTRY — The ***Vermont*** Department of Environmental Conservation issued a recertification Friday to the landfill in Coventry owned by Casella, allowing expansion and operation until 2028.

The recertification of the state's only operating landfill sets deadlines for the state and the operator, New England Waste Services of ***Vermont*** (NEWS-***VT***) to remove per- and polyfluoralkyl substances (***PFAS***) from waste going to the landfill and leachate coming from it.

PFAS in groundwater from manufacturing processes are "***emerging contaminants***" which have shut down wells and ***drinking water*** systems in parts of the state. Recent testing at one monitoring well near the old unlined Nadeau landfill next to the NEWS-***VT*** landfill shows a higher level of ***PFAS*** than the ***Vermont drinking water***standard.

Elevated levels of ***PFAS*** but within state guidelines were found in leachate from the landfill.

The recertification allows NEWS-***VT*** to expand the landfill into a Phase VI of operation, opening cells in a 50-acre site next to the Northeast Kingdom International Airport on Airport Road in Coventry.

NEWS-***VT*** can accept up to 5,000 tons of waste a day and 250,000 tons a year, with the potential to accept up to 600,000 tons a year with state permission.

NEWS-***VT*** still needs an Act 250 permit. The solid waste certification is one of the essential conditions for NEWS-***VT*** to receive an Act 250 permit amendment.

While awaiting recertification, Casella began to research how to remove ***PFAS*** from the leachate on site before it is sent for treatment at ***wastewater*** treatment plants on international Lake Memphremagog in Newport City and elsewhere. The research is ongoing, NEWS-***VT*** engineer Joe Gay said Friday.

The certification sets deadlines for that research, with reports to ***Vermont*** and Quebec authorities.

The presence of ***PFAS*** became a dominant issue in the permit process. Quebec and ***Vermont*** activists pressed the state over how the leachate is being treated in Newport City.

More than 150,000 Quebec residents get their ***drinking water*** from sources coming from Lake Memphremagog.

The results of the sampling plus public comments prompted solid waste officials to add or amend conditions to the final recertification report.

Among the conditions are requirements for ***PFAS*** monitoring twice a year of wells and under drains around the lined landfill.

NEWS-***VT*** also has to review the types of waste accepted at the landfill and "develop a testing plan to evaluate the concentration of ***PFAS*** within sources identified as having a high probability of elevated ***PFAS***concentrations." It also has to develop a schedule for that testing.

NEWS-***VT*** has until Dec. 31 to submit that plan to the secretary of the Agency of Natural Resources.

And by next October, NEWS-***VT*** must finish research to find other ways to treat the leachate. In a response summary that was posted Friday with the recertification, DEC says NEWS-***VT*** "shall complete a conceptual scoping study of a minimum of two on-site and two off-site leachate treatment options and submit a report to the secretary on this work."

NEWS-***VT*** also must send that data to the Quebec government, the Memphremagog Municipal Regional Council in the Eastern Townships of Quebec and the City of Sherbrooke.

Meanwhile, the state detailed its own responsibilities.

By the end of 2019, the DEC "will conduct a more detailed investigation into the concentrations of ***PFAS*** in ***Vermont*** leachate" along with the influent and effluent from ***wastewater*** treatment plants.

The state and NEWS-***VT*** will keep the landfill oversight committee abreast of its work.

By next fall, the DEC also intends to complete research with other states on how to treat wastes that contain ***PFAS*** before it reaches the landfill and the feasibility of applying the best practices in ***Vermont***.

State research will continue on monitoring surface water in ***Vermont*** for the presence of ***PFAS***.

In another new condition, NEWS-***VT*** is required to report odors within 24 hours or by the next business day, a tighter deadline for reporting.

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Sent from my iPhone

Alexandra Dapolito Dunn, J.D.
Regional Administrator
Region 1 New England
(617) 918-1012

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Message

From: Freise, Clark [Clark.Freise@des.nh.gov]
Sent: 8/31/2018 2:30:06 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]; Grevatt, Peter [Grevatt.Peter@epa.gov]
Subject: RE: John Flatley Development and removal of contaminated soils to Londonderry/Litchfield area ; Mohawk Tannery Meeting Weds.

Alex and Peter,

Just so you are aware, I am providing a response to Mr. Provencher and Mr. Daly today. I do not believe that you need to respond to them.

Best regards,
Clark

From: Don Provencher [mailto:Don@Provencher.com]
Sent: Tuesday, August 28, 2018 12:23 PM
To: Freise, Clark; geoffdaly@mkd-usa.com
Cc: Kernen, Brandon; Atwell, LeaAnne; Durgin, Kimberly; 'Rusty Russell'; 'gene porter'; 'Dunn, Alexandra'; 'Grevatt, Peter'; wolfram@vonschoen.de; 'Laurene Allen'; 'Klee, Patricia'
Subject: RE: John Flatley Development and removal of contaminated soils to Londonderry/Litchfield area ; Mohawk Tannery Meeting Weds.

Hi Clark & Geoff:

I wanted to add my thoughts on the subject, in hopes that they can be addressed as well.

Geoff, thanks for bringing this topic up. I have been wondering the same thing regarding the relationship between the PFOA/PFOS risk-based direct contact soil screening level of 500 ug/kg, versus the Ambient Groundwater Quality Standard (AGQS) of 70 ng/L . The 500 ug/kg soil standard has nothing to do with the groundwater limit of 70 ng/L, because the soil limit is only a direct human contact screening level, does not consider the leaching potential of contaminants passing from the soil into groundwater, and therefore is not appropriate to be used as an indicator of potential for groundwater contamination, because that soil limit is much too high!

Clark, I attach the DES letter dated May 14, 2018 from Karlee Kenison (DES Hazardous Waste Remediation Bureau) to John Flatley. As you know, bullet no. 4 indicates that the highest soil concentration found on Flatley property was 120 ug/kg (well below the 500 ug/kg limit). That letter references other states soil limits as low as 1.5 -7.5 ug/kg that **ARE related to the protection of groundwater**. The letter also states that "***NHDES does not know if the levels of PFAS present in site soils pose a risk to groundwater quality***." I find that statement to be incorrect, and I offer the following for your consideration toward that assertion.

Clark, I understand as you and I have discussed, that some of the groundwater contamination at SGPP / Flatley might be a result of PFAS plumes from releases of PFAS directly into the groundwater. However, consider for example, the PFAS contamination in Litchfield. I believe we would all agree that contaminated groundwater above 70 ng/L in Litchfield **could NOT** be a result of a PFAS releases to the groundwater causing groundwater plumes flowing across the Merrimack River from SGPP to Litchfield.

Therefore, as it has been generally accepted and stated by DES that Litchfield groundwater contamination is a result of air borne PFAS emissions from SGPP, the only way for the Litchfield groundwater contamination to exist is due to the air emissions contaminating the soil through which precipitation passes, and contaminates the groundwater. Consequently, that is proof that levels of soil contamination much lower than 500 ug/kg causes groundwater contamination. If there is another hypothesis for this contamination, I would like to hear it.

Similar to the groundwater limits being lowered from 400, to 100, now at 70, and with other reports currently suggesting limits at high single digits of PFAS, it is obvious that the soil limits need to be lowered to reflect the potential for leaching of contaminants into the groundwater. I think that research on this topic would be a timely and high priority subject for our newly hired toxicologist to evaluate, along with the lowering of the ambient groundwater quality standards in an effort to set MCLs or both soil and groundwater.

Once the dust settles out, like the decreasing groundwater limits, I believe (hope) that the soil limits are likely to be reduced significantly, when consideration is given to the contaminated soils leaching impacts to the groundwater, and not just considering the direct human contact soil limit. There is no other explanation given the facts we've observed, particularly in Litchfield. Unfortunately, I am concerned, despite DES's prudent and strong recommendation that Flatley not export soils off of the site, that Flatly may consider the fact that since they have been told that their soil is below the 500 ug/kg human contact screening limit, that implies that soil at their site is not contaminated, and they may not care, or understand the difference between a human contact soil limit, versus a much lower leaching soil limit that causes contamination of the underlying groundwater, and consequently believes that exporting soils off of the site is not a problem, despite their statements to not remove soil.

Consequently, in my opinion, I believe it would be prudent to advise Flatley that it is possible, or hopefully likely, that leaching-based soil limits could / will be implemented in the future, at much lower limits than the direct human contact limit of 500 ug/kg, which would render their soils to be contaminated, and that they could be responsible retroactively for the potential remediation of all parties receiving these contaminated soils from Flatley. It is possible / likely that groundwater contamination can be expected at those site in the future, depending on the amount of soil received. From photographic evidence and personal recounts that I have seen and heard from our concerned citizens, it is apparent that soil is leaving the site! That soil export although discouraged, remains entirely legal today.

The intent of the point of my e-mail here, is that I am trying to head off the next DES "witch hunt", where we will again be using DES resources in tracking down after the fact, where any soil leaving the site has gone, and we will all be left to deal with the environmental, public safety, public perception, and groundwater contamination issues that have been allowed to happen, and all the fallout associated, at all of those receiving locations. I trust that this is an endeavor DES would like to try to avoid, unless it is already too late, as this is likely to apply to other sites across the entire state.

Thanks for your time. Don

Donald A. Provencher, P.E.
Provencher Engineering, LLC
6 Wasserman Heights
Merrimack, NH 03054
Phone/Fax (603) 883-4444
Don@Provencher.com
ProvencherEngineering.com
Please consider the environment before printing this email

-----Original Message-----
From: Freise, Clark [mailto:Clark.Freise@des.nh.gov]
Sent: Tuesday, August 28, 2018 9:28 AM
To: geoffdaly@mkd-usa.com
Cc: Kernen, Brandon <Brandon.Kernen@des.nh.gov>; Atwell, LeaAnne <LeaAnne.Atwell@des.nh.gov>; Durgin, Kimberly <Kimberly.Durgin@des.nh.gov>; 'Rusty Russell' <rrussell@merrimack.org>; 'gene porter' Ex. 6; don@provencher.com; 'Dunn, Alexandra' <dunn.alexandra@epa.gov>; 'Grevatt, Peter' <Grevatt.Peter@epa.gov>; wolfram@vonschoen.de; 'Laurene Allen' Ex. 6 'Klee, Patricia' <KleeP@nashuanh.gov>
Subject: RE: John Flatley Development and removal of contaminated soils to Londonderry/Litchfield area ; Mohawk Tannery Meeting Weds.

Geoff

I am out of the office until Friday. Is it OK if I get you your response on Friday?

Best regards
Clark

Sent with BlackBerry Work
(www.blackberry.com)

From: Geoff Daly <geoffdaly@mkd-usa.com<mailto:geoffdaly@mkd-usa.com>>
Date: Monday, Aug 27, 2018, 5:55 PM
To: Freise, Clark <Clark.Freise@des.nh.gov<mailto:Clark.Freise@des.nh.gov>>
Cc: Kernen, Brandon <Brandon.Kernen@des.nh.gov<mailto:Brandon.Kernen@des.nh.gov>>, Atwell, LeaAnne <LeaAnne.Atwell@des.nh.gov<mailto:LeaAnne.Atwell@des.nh.gov>>, Durgin, Kimberly <Kimberly.Durgin@des.nh.gov<mailto:Kimberly.Durgin@des.nh.gov>>, 'Rusty Russell' <rrussell@merrimack.org<mailto:rrussell@merrimack.org>>, 'gene porter' <Ex. 6>, don@provencher.com <don@provencher.com<mailto:don@provencher.com>>, 'Dunn, Alexandra' <dunn.alexandra@epa.gov<mailto:dunn.alexandra@epa.gov>>, 'Grevatt, Peter' <Grevatt.Peter@epa.gov<mailto:Grevatt.Peter@epa.gov>>, wolfram@vonschoen.de <wolfram@vonschoen.de<mailto:wolfram@vonschoen.de>>, 'Laurene Allen' Ex. 6, 'Klee, Patricia' <KleeP@nashuanh.gov<mailto:KleeP@nashuanh.gov>>
Subject: John Flatley Development and removal of contaminated soils to Londonderry/Litchfield area ; Mohawk Tannery Meeting Weds.

Good afternoon Clark,

I would like to know has the John Flatley Co, obtained the necessary permits to remove the PFAS Top soils from the current Development site [especially as NH DEA has issued a dust control letter to the company AND Non-removal of any of the [contaminated] Soils from, the whole Site?] Trucks (Hiltz-Plate # JHE115 NH is one of the trucks used) are leaving the site during the day and late in the PM, driving over to the Londonderry Fish and Game Club just off Lund St, where it is dumped.

Dust is still emanating from the site as they worked their last Saturday Aug 25th, 2018. Equipment was moving around delivering materials from various prior deliveries stacked on site and a lot of dust was flying [a back hoe was being used near the River side of the property for digging and soil moving].

* Industrial and Federal EPA/OSHA construction standards require all excavation and site work to employee "Dust Control Mitigation" by Code and prevent outside contamination from occurring from a site!
  Is the Air division still monitoring the site or not?

As all the soils have been evaluated and tested by Golders, Barr and now GZA [As per NH DES requests] and found to be highly contaminated, some to the depth of 15 feet and this included ground waters. As confirmed in all three companies reports requested via NH DES and the Flatley Co.

Clarke, I have a question which has been put to the ASTDR/IRTC and CDC about PFAS in soils and ground water – being intertwined; in that the PFAS will percolate below the soils surface into the subsurface water/dendritic Aquifer Structures as a normal ground recharge and natural attenuation to flow downwards.
Based on the May 2016 EPA advisory whereby, the Lifetime Exposure to PFAS was lowered to 70 PPT from the original 400 to 500 PPT.

* Therefore logically, soils should also be at 70 PPT for the Lifetime Exposures and several folks at the CDC/ASTDR agree in principal, especially as there several areas on the Flatley are vernal wetlands near the Dumple Brook, which have tested very high for PFAS and would percolate via rains downwards.

All this is referenced to the Flatley Development of the 153 Acres, they have owned since 1933. When John Flatley Snr purchased the undeveloped land, which runs from the North next to the Powerlines crossing Rte. 3 all the way South to the Merrimack FD/Silo Restaurant and parallel to the Merrimack river.

* Flatley built for GE after the WWII the building you see now, to produce Transformers and Electrical Switch gear and move via the RR siding they had built [the Building was paid for by GE and Flatley leased the land under the building.

* GE than with agreement with Flatley transferred the Property Land lease with the Purchase/Sale of the building to ChemFab which eventually became Saint Gobain in the late 90's and remains as of today.

* I see from the latest Eurofins analysis of the GZA Wells on the Flatley site and along the Dumple Brook, are showing high # of PFAS [GZA well # 3 is reading 19,000 PPT and is extremely close to the damaged waste water pipes and the Storm drain that empties into the Merrimack – was flowing slowly the other day when we looked from our Kayaks on the Merrimack shore side below the outlet. [Please note PFAS has been found at the WW Plant for Merrimack and Nashua in low levels and end up in the Merrimack river]

* This land use is also of concern to many residents of Merrimack, in how did NHDES/EPA approval, be granted to the Flatley Co to build a development for Human Occupation and use in and around a known POLLUTTER and contaminated soils [which will have young children traversing and play on, with possible Wells drilled to supply water if MVWD cannot or is unable to lay water distribution lines? [DOT has denied access alongside Rte. 3 for now?]

I look forward to hearing from you on the above

Will anyone from NH DES be attending the Mohawk Tannery EPA meeting here in Nashua this Wednesday at 6:30 PM.

Regards,

Geoff

Ex. 6

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Message

From: Jillian Lane Ex. 6
Sent: 6/12/2018 12:43:42 PM
To: andrew.hoffman@des.nh.gov [Andrew.Hoffman@des.nh.gov]; Hull, Richard [Hull.Richard@epa.gov]; Dunn, Alexandra [dunn.alexandra@epa.gov]
Subject: ND levels

Good morning Drew,
I' m following up in regard to our conversation last Thursday evening concerning the non detect levels for both the original sampling event as well as the fall sampling event from 2017. I was hoping you could forward the information regarding the non detect levels the EPA requested be applied to these labs. I had noted that the non detect levels appeared high, I believe 16 ppt for PFOA and 8 ppt for PFOS.

Thank you,
Jillian

Sent from my iPhone
Please excuse any typos

Message

From: Freise, Clark [Clark.Freise@des.nh.gov]
Sent: 6/12/2018 12:30:04 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
Subject: RE: Regional PFAS Engagement Session

Thank you!

From: Dunn, Alexandra [mailto:dunn.alexandra@epa.gov]
Sent: Monday, June 11, 2018 2:10 PM
To: Freise, Clark
Subject: FW: Regional PFAS Engagement Session

Alexandra Dapolito Dunn, J.D.
Regional Administrator

Region 1 New England
5 Post Office Sq. Suite 100
Mail Code: ORA01-4
Boston, MA 02109-3912

Desk: (617) 918-1012
Mobile: Ex. 6
Fax: (617) 918-0012
dunn.alexandra@epa.gov

From: Dunn, Alexandra
Sent: Monday, June 11, 2018 1:58 PM
To: 'robert.scott@des.nh.gov' <robert.scott@des.nh.gov>
Cc: Szaro, Deb <Szaro.Deb@epa.gov>; Cassidy, Meghan <Cassidy.Meghan@epa.gov>
Subject: Regional PFAS Engagement Session

Good afternoon, Commissioner Scott.

As part of our Regional PFAS Engagement Session, our Tuesday June 26th agenda includes a Moderated State Panel. The goal of this panel is to provide a brief overview of how each of our state partners is addressing PFAS, and to hear state thoughts for consideration in the development of EPA's PFAS Management Plan.

Each state will be provided with 10 minutes to provide information related to the following areas of interest:

1. Overview of state approach/strategy related to PFAS.
2. Presentation of state-specific PFAS benchmarks.
3. Challenges state faces in identifying, addressing and communicating about PFAS.

Given the limited timeframe for each state to speak, we request that the environmental commissioners/directors for CT, RI and ME coordinate with your drinking water public health counterparts to include any information pertinent to their programs.

I hope that you or a member of your staff will participate on this panel. My Point of Contact for this panel is Meghan Cassidy. Please confirm your participation and identify the state speaker via email to cassidy.meghan@epa.gov by COB Friday, June 15th.

Alexandra Dapolito Dunn, J.D.
Regional Administrator

Region 1 New England
5 Post Office Sq. Suite 100
Mail Code: ORA01-4
Boston, MA 02109-3912

Desk: (617) 918-1012
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Fax: (617) 918-0012
dunn.alexandra@epa.gov

Message

From: Klee, Robert [Robert.Klee@ct.gov]
Sent: 6/11/2018 7:34:32 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
CC: Szaro, Deb [Szaro.Deb@epa.gov]; Cassidy, Meghan [Cassidy.Meghan@epa.gov]; robert.kaliszewski@ct.gov; Colon, Carmen [Carmen.Colon@ct.gov]; Bryan-Powell, Juliet [Juliet.Bryan-Powell@ct.gov]
Subject: RE: Regional PFAS Engagement Session

HI Alex,

Adding my Deputy, Bob Kaliszewski, who will be attending for CT, and will be able to coordinate with our public health folks.

Cheers,

Rob

Robert J. Klee
Commissioner
Connecticut Department of Energy and Environmental Protection
79 Elm Street, Hartford, CT 06106-5127
P: Ex. 6 | F: 860.424.4051 | E: robert.klee@ct.gov

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

www.ct.gov/deep

Conserving, improving and protecting our natural resources and environment;
Ensuring a clean, affordable, reliable, and sustainable energy supply.

From: Dunn, Alexandra [mailto:dunn.alexandra@epa.gov]
Sent: Monday, June 11, 2018 1:11 PM
To: Klee, Robert
Cc: Szaro, Deb; Cassidy, Meghan
Subject: Regional PFAS Engagement Session

Good afternoon, Commissioner Klee.

As part of our Regional PFAS Engagement Session, our Tuesday June 26th agenda includes a Moderated State Panel. The goal of this panel is to provide a brief overview of how each of our state partners is addressing PFAS, and to hear state thoughts for consideration in the development of EPA's PFAS Management Plan.

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I hope that you or a member of your staff will participate on this panel. My Point of Contact for this panel is Meghan Cassidy. Please confirm your participation and identify the state speaker via email to cassidy.meghan@epa.gov by COB Friday, June 15th.

Alexandra Dapolito Dunn, J.D.
Regional Administrator

Region 1 New England
5 Post Office Sq. Suite 100
Mail Code: ORA01-4
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Fax: (617) 918-0012
dunn.alexandra@epa.gov

Message

From: Berry, John [JBerry@ect2.com]
Sent: 6/27/2018 1:55:00 AM
To: melanie.loyzim@maine.gov; Dunn, Alexandra [dunn.alexandra@epa.gov]
Subject: PFAS Summit

Hi Alexandra and Melanie,

I attended the PFAS Summit last night and today and found that the structure of the event was very well planned out and I think there was a lot of great information sharing that occurred throughout the conference. I tried to meet with you during one of the breaks, but there weren't many breaks and you both were pretty popular with the crowd.

The reason I'm reaching out to you is to let you know that our company, ECT2 (www.ect2.com), is doing a lot of work with PFAS treatment using ion exchange resins. We are the only company in the world that has developed a treatment system that uses resin that can be regenerated on-site with a solvent/brine solution. Our technology is currently being used at the Pease AFB, Site 8 treatment system (200 gpm capacity) that was installed for the US Air Force. We also have built several systems for the Australia DOD. We are currently operating 3 non-regenerable resin treatment systems (50 gpm, 50 gpm, and 200 gpm drinking water capacity) in Australia and are in the middle of starting up our first regenerable PFAS treatment system there now. We have a contract to build 3 more regenerable systems for AUDOD over the next year and half.

Our ultimate goal for our regenerable treatment systems is to take the spent Regenerant solution (where all the PFAS compounds are concentrated) and use a separate technology to destroy the PFAS compounds, essentially creating a "zero PFAS waste" treatment system. We are partnering with other entities (including universities) to test this out.

One of the issues that was brought to light by Melanie during the conference was what to do with all the PFAS waste that is currently being generated and landfilled. I wanted to let you know that we recognize this problem and are spending most of our R&D funds on figuring out a solution to this problem. If you would like any more information on our technology or what we are doing to develop "zero PFAS waste" treatment system, please feel free to give me a call or send me an email. We be happy to set up a meeting with you or anyone in your department(s) either in person or via webex to review our results to date.

Thank you again for holding the Summit this week. I hope the future planned summits are just as successful and are as well-attended.

Regards,

John C. Berry, P.E. (NH, MA, FL)
Process Design Leader
jberry@ect2.com
Ex. 6 (direct)
(mobile)

ECT
www.ect2.com

Message

From: Scott, Robert [Robert.Scott@des.nh.gov]
Sent: 10/31/2018 9:05:22 PM
To: Dunn, Alexandra [dunn.alexandra@epa.gov]
Subject: RE: NHPR story on today's grant event

Thanks

Robert R Scott
Commissioner
New Hampshire Department of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095
W:
C: Ex. 6
Robert.Scott@des.nh.gov

From: Dunn, Alexandra [mailto:dunn.alexandra@epa.gov]
Sent: Wednesday, October 31, 2018 4:48 PM
To: Scott, Robert; Freise, Clark
Subject: Fwd: NHPR story on today's grant event

Sent from my iPhone

Alexandra Dapolito Dunn, J.D.
Regional Administrator
Region 1 New England
(617) 918-1012

This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act

Begin forwarded message:

> **From:** "Senn, John" <Senn.John@epa.gov>
> **Date:** October 31, 2018 at 4:46:48 PM EDT
> **To:** "Dunn, Alexandra" <dunn.alexandra@epa.gov>, "Dixon, Sean" <dixon.sean@epa.gov>, "Szaro, Deb" <Szaro.Deb@epa.gov>, "Deegan, Dave" <Deegan.Dave@epa.gov>, "Brownell, Sandra" <Brownell.Sandra@epa.gov>, "Wintrob, Paul" <Wintrob.Paul@epa.gov>, "Melanson, Kate" <Melanson.Kate@epa.gov>, "Dumville, Kelsey" <Dumville.Kelsey@epa.gov>, "Gutro, Doug" <Gutro.Doug@epa.gov>
> **Cc:** "Conroy, Kristen" <Conroy.Kristen@epa.gov>, "Grantham, Nancy" <Grantham.Nancy@epa.gov>, "Milbourn, Cathy" <Milbourn.Cathy@epa.gov>
> **Subject: NHPR story on today's grant event**
>
> Here's the story from the NH Public Radio reporter who was at today's event—I'll check back on their site tomorrow to see if they post an audio piece.
>
> http://www.nhpr.org/post/epa-awards-health-community-grants-projects-keene-and-nashua#stream/0
>
> **EPA Awards Health Community Grants to Projects in Keene and Nashua**

The New England office of the EPA has awarded grants to Keene State College and the Nashua Regional Planning Commission for projects that aim to reduce kids' exposure to toxins.

Keene State College will use the $25,000 for a project that trains citizen scientists to monitor and reduce air pollution from wood smoke, which exacerbates childhood asthma.

The Nashua Regional Planning Commission will use the $25,000 to conduct bilingual outreach on how to store and dispose of hazardous household products.

At an awards announcement in Merrimack on Wednesday, EPA New England Regional Administrator Alexandra Dunn said kids are more vulnerable to toxins than adults.

"We really need to think about where do children play and live and go to school and interact with their environment and how can we make that environment healthier for them," she said.

Senator Maggie Hassan praised the projects for their emphasis on community-based work.

'We are really empowering our communities to engage, to learn, to take responsibility, and then to give us information that will allow us to do this kind of environmental protection work and public health work as effectively as possible."

Both Senator Hassan and Alexandra Dunn commended the New Hampshire Department of Environmental Services for starting to address the PFAS crisis in the Merrimack region and Portsmouth.

But Hassan said the work had just begun.

“I’m going to continue to fight to protect the health and safety of our drinking water,” she said.

John Senn
Public Affairs Specialist
U.S. EPA - Boston Regional Office
617-918-1019
senn.john@epa.gov

Message

From: Matthews, Lisa [Matthews.Lisa@epa.gov]
Sent: 6/21/2018 8:46:59 PM
To: Clark Freise [clark.freise@des.nh.gov]; Good, Alicia (DEM) [alicia.good@dem.ri.gov]; terry.gray@dem.ri.gov; angelo.liberti@dem.ri.gov; slongsworth@ecos.org; melanie.loyzim@maine.gov; Nicole Lugli [Nicole.Lugli@ct.gov]; paul.mercer@maine.gov; julie.moore@vermont.gov; Moran, Gary (DEP) [gary.moran@state.ma.us]; Elizabeth Scott [elizabeth.scott@dem.ri.gov]; Dunn, Alexandra [dunn.alexandra@epa.gov]; Szaro, Deb [Szaro.Deb@epa.gov]; Dixon, Sean [dixon.sean@epa.gov]; Wagner, Kenneth [wagner.kenneth@epa.gov]; Chancellor, Erin [chancellor.erin@epa.gov]; Smith, Bernicel [Smith.Bernicel@epa.gov]
CC: Orme-Zavaleta, Jennifer [Orme-Zavaleta.Jennifer@epa.gov]; Robbins, Chris [Robbins.Chris@epa.gov]; Yamada, Richard (Yujiro) [yamada.richard@epa.gov]; Cheatham-Strickland, Latonia [Cheatham-Strickland.Latonia@epa.gov]; Kuhn, Kevin [Kuhn.Kevin@epa.gov]; LaVay, Maggie [LaVay.Maggie@epa.gov]; Munns, Wayne [Munns.Wayne@epa.gov]; Gillespie, Andrew [Gillespie.Andrew@epa.gov]; Rea, Anne [Rea.Anne@epa.gov]; Sams, Reeder [Sams.Reeder@epa.gov]; Keith, Darryl [Keith.Darryl@epa.gov]; Wigand, Cathleen [Wigand.Cathleen@epa.gov]; Scheuer, Amy [Scheuer.Amy@epa.gov]
Subject: Thank you! Visit to EPA ORD's Atlantic Ecology Division
Attachments: ORD Overview (AED).pdf; AED Overview_Munns (final).pdf; PFAS_Gillespie (final).pdf; Chemistry Dashboard_Sams (final).pdf; HABs_Keith (final).pdf; Coastal Resilience_Wigand (final).pdf; Nutrients_Rea (final).pptx

Sent on behalf of Chris Robbins

Dear New England States and EPA Region 1,
It was great seeing everyone this past week in Narragansett! On behalf of US EPA's Office of Research and Development (ORD), thank you for taking the time out of your busy schedules to visit ORD's Atlantic Ecology Division. We were so glad that you were able to learn about EPA's research, meet our scientists and see first-hand some of the innovative work being done by EPA ORD researchers. We appreciated having the opportunity to share and collaborate with all of you.

It is very helpful for us to hear more about the environmental issues the New England states are confronting and receive feedback on how ORD's research, tools and methods can more effectively support states' efforts to protect the environment. We hope you found the research presented this week useful and relevant. We look forward to continuing our dialogue and sharing more of our applied science tools with you to help inform environmental decision making.

Attached are the presentations from Tuesday. We are compiling notes from the meeting and will share action items with you soon. We look forward to continued discussions with you and your staff. Please feel free to contact Lisa Matthews, ORD's State Liaison (matthews.lisa@epa.gov or 202-577-4035) with any questions or follow-up.

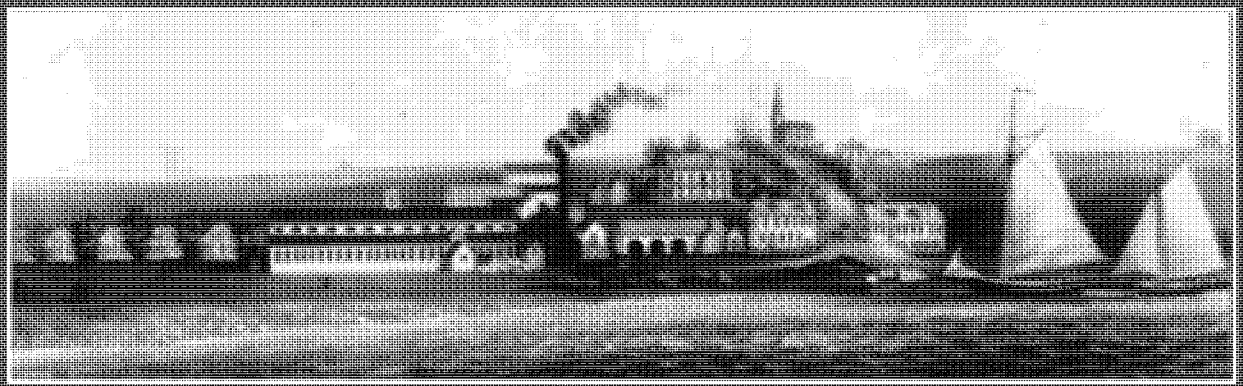
Sincerely,
Chris Robbins

Christopher S. Robbins
Deputy Assistant Administrator for Management (Acting)
US EPA Office of Research and Development
919-541-0605

Attached presentations:
- ORD Overview
- AED Overview
- PFAS
- Chemistry Dashboard
- HABs
- Coastal Resilience
- Nutrients

EPA
United States
Environmental Protection
Agency

Overview of US EPA ORD's Atlantic Ecology Division (AED)

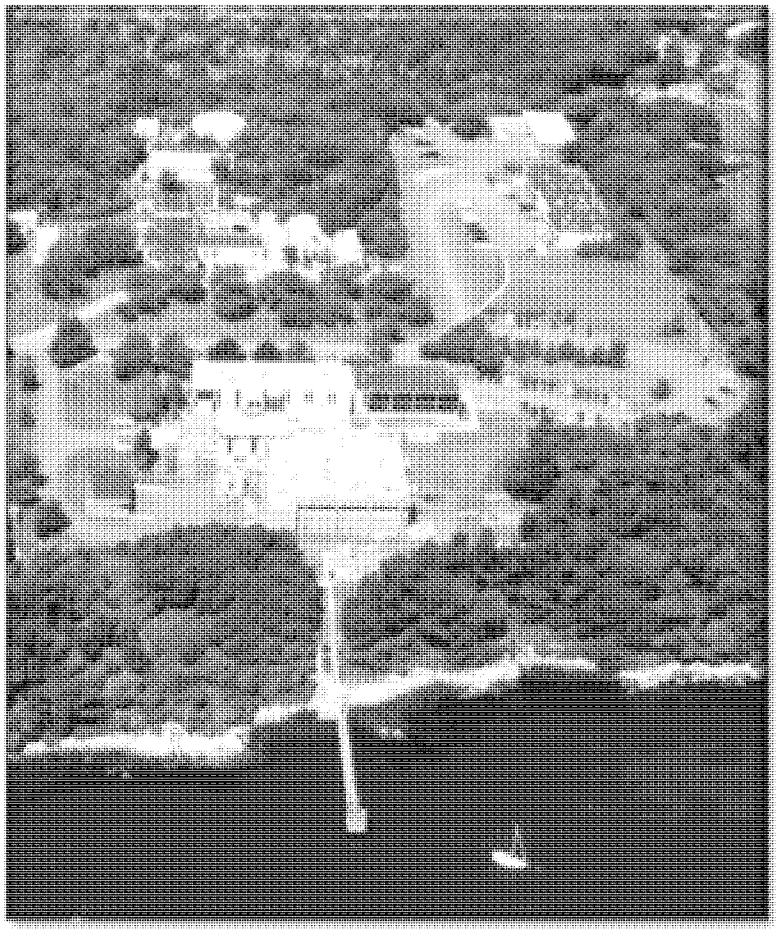


Wayne Munns
Director, US EPA ORD AED

New England State Commissioners' Visit to AED
June 19, 2018

AED Supports EPA's Mission

Quantifying the socio-ecological effects of anthropogenic stressors on coastal waters and watersheds of the Atlantic seaboard to inform decision making in a systems context



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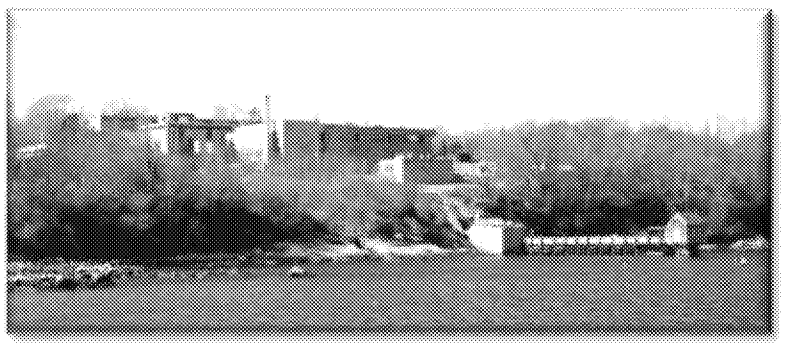
Expertise & Capabilities

Historic Strengths

- Aquatic toxicity test method development
- Marine chemistry
- Monitoring & assessment
- Ecological risk assessment



Current Strengths

- Coastal stress & restoration ecology
- Landscape ecology & spatial analysis
- Ecological modeling
- Wetlands & watershed ecology
- Integrated systems research
  - Human-eco interactions
  - Social sciences, ecosystem services (nature's benefits) & valuation
  - Decision science & tools
  - Sustainable systems

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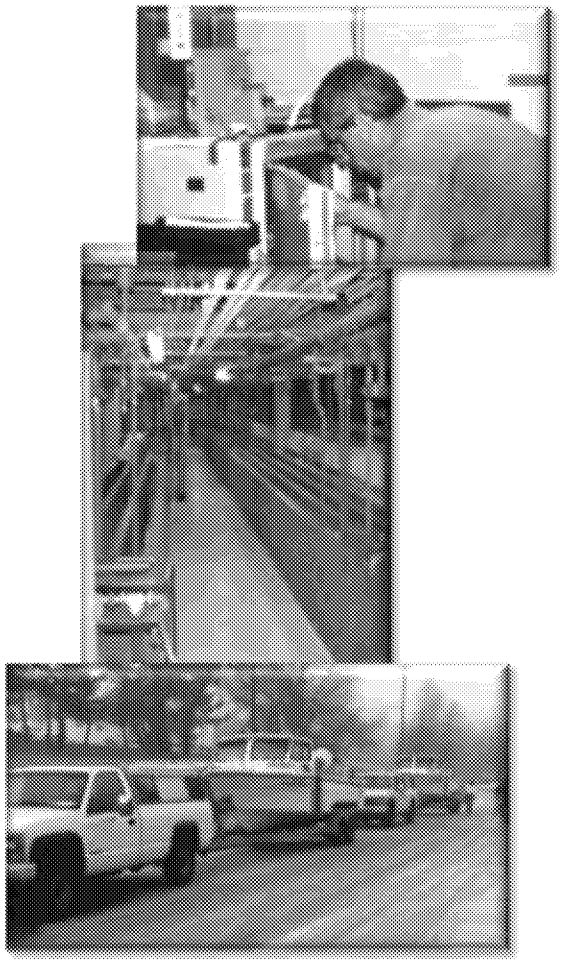
AED at a Glance

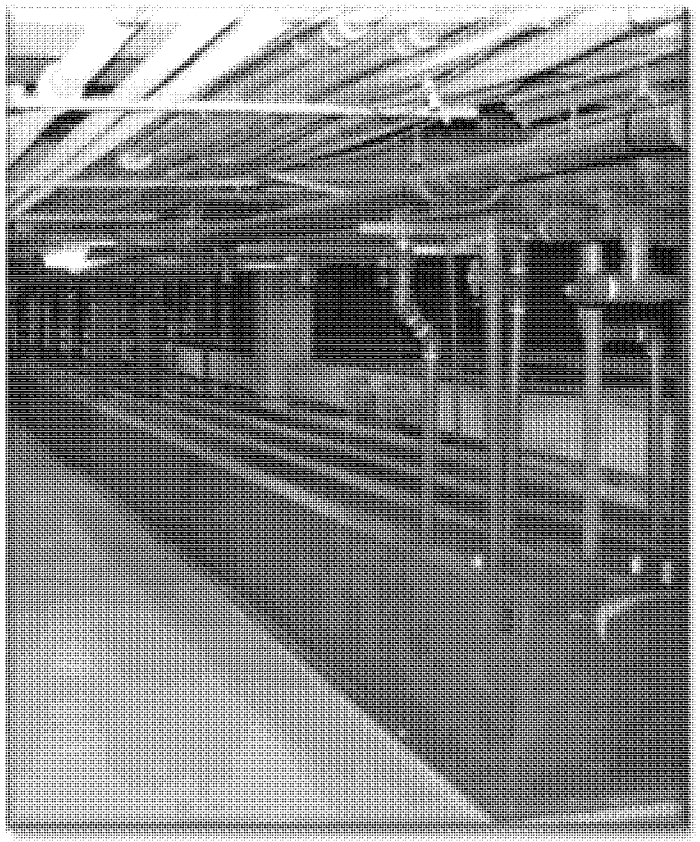


Location	• Coastal southern New England • 11 federally-owned acres • Co-located with academic, state and federal labs with ~600 research-associated personnel
Federal Workforce	• ~70 FTE • Majority hold advanced degrees (MS or PhD)
Additional Personnel	• ~25 contractors (O&M, IT, Security, Library) • SEEs, student services contractors • Post docs, students, interns, visiting scientists
Facilities	• 100,000 ft^2 workspace • 7 buildings – promoting green operations • Year-round supply of natural seawater
Core Capabilities	• Highly-trained, enthusiastic workforce • Analytical labs & instruments for coastal ecology, aquatic toxicology, chemistry • Seawater system & wet lab facilities • Information technology • Research fleet & field support

ED_002545_00008718-00004

Unique Seawater Delivery System & Analytical Capabilities

- 2 wet laboratories
  - Clean Narragansett Bay seawater
  - 300,000 gallons seawater daily flow
  - Raw, filtered, heated, chilled
  - Controllable dissolved oxygen levels
  - Controllable salinity
- Experimental greenhouse
- Analytical equipment
  - Organics, metals
  - Nutrients
  - Stable isotopes
  - Sediments



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Accessing Coastal Environments to Solve Current Problems

- Transportable sampling platforms
- Safe, quick, cost-effective and with minimum impact on the environment
- Diverse sampling gear

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Translating Data into Useful Information

- Geographic Information System (GIS) lab
  - Entry, analysis & display of spatially oriented data
  - Development of communication & education materials
- "Big data" capabilities
  - Access to & distribution of data
  - State-of-science analysis methods
- Printers, drivers, digitizer access for users

ED_002545_00008718-00007

Addressing National Problems with Local Applications

- Centralized ORD planning driven by needs of
  - EPA program and regional offices
  - States & tribes
- Coordinated research across ORD & partners
- Producing knowledge & tools to inform decisions at multiples scales

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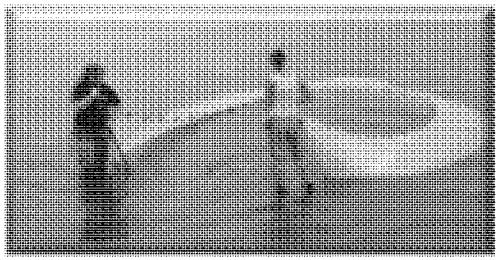
Addressing State Needs

- Science & Technology Advisory Board to RI Executive Climate Change Coordinating Committee (EC4)
- Newport, RI Water Supply TMDL
- Sampling support to states for National Coastal Condition Assessment
- Narragansett Bay and Watershed Sustainability Demonstration Project
- Social-ecological systems on Cape Cod, MA
- Triple Value Simulation (3VS) models in multiple states
- Southeast New England Program
- State fish consumption advisories
- Stormwater Low Impact Development (LID) Guidance Manual for RI
- Developing approaches for dissolved oxygen & nutrient criteria for multiple states
- Monitoring & analysis of Superfund remediation effectiveness



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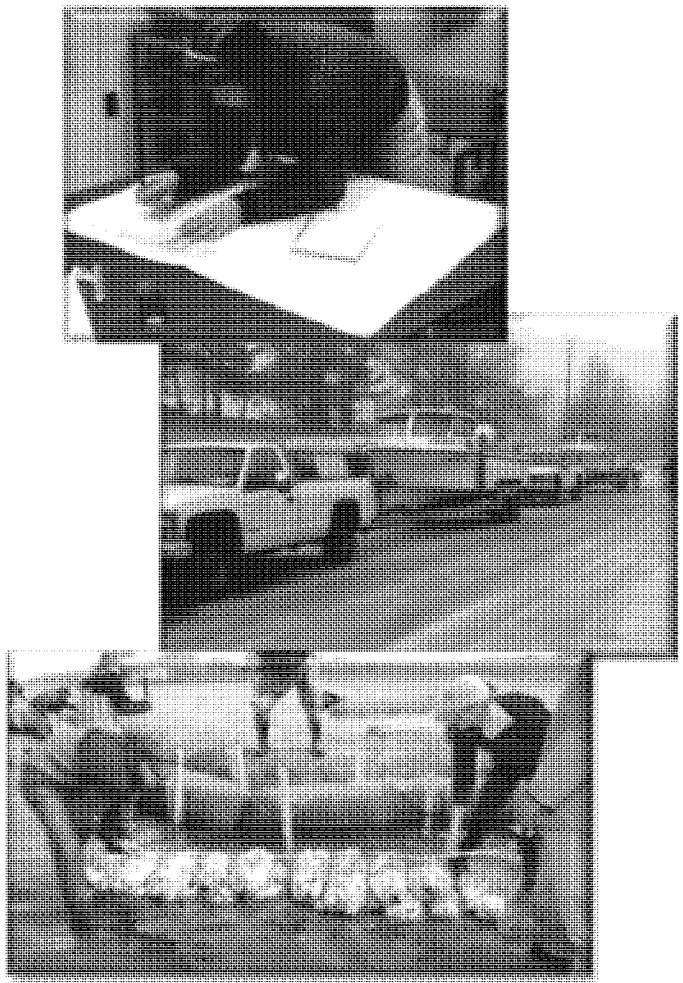
Key Messages

- AED's research
  - Addressing national problems with regional & local applications & benefits
  - Integrated & transdisciplinary in approach, engaging partners throughout
  - Flexible strengths evolve to meet emerging national & state needs
- AED provides key science services to states
  - Unique research capabilities informing regulatory missions
  - Expert knowledge of local & regional ecological, social & economic issues
  - Highly valued partnerships & key stakeholder networks
  - Rapidly deployable field capability responding to environmental emergencies



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For More Information

- **AED web pages**
  https://www.epa.gov/aboutepa/about-national-health-and-environmental-effects-research-laboratory-nheerl#aed

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ED_002545_00008718-00011

EPA CompTox Chemistry Dashboard: *Data and Tools to Support Chemical and Environmental Risk Assessment*

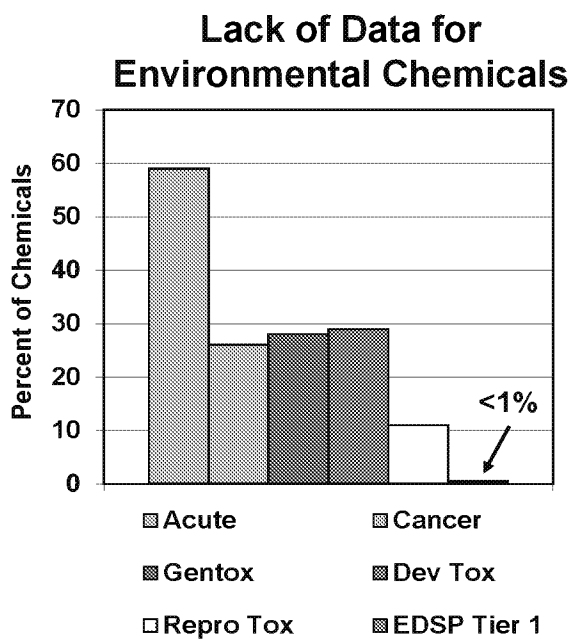
Reeder Sams, PhD
National Center for Computational Toxicology
US EPA Office of Research and Development

New England State Commissioners' Visit to AED
June 19, 2018

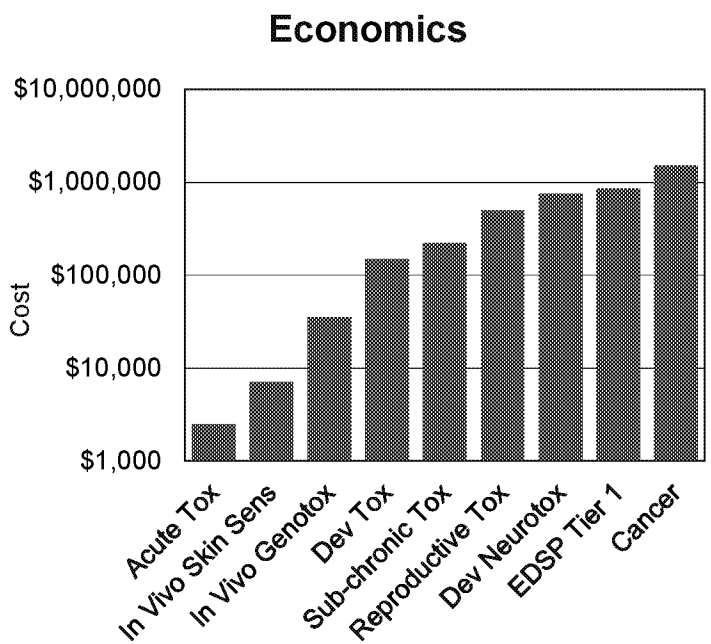
ED_002545_00008719-00001

Problem: Too Many Chemicals, Too Little Data

- **Timely characterization of human and ecological risk posed by thousands of existing and emerging chemicals is a critical challenge to protect public health and the environment**
  - Nearly 60% of chemicals on various EPA lists have acute toxicity data, less than 30% have data on other types of toxicity
  - Cost and time associated with traditional animal toxicity testing is significant



Modified from Judson *et al.*, EHP 2010



Approach

- Develop a “one-stop-shop” for data as an integration node for environmental chemical data to support EPA and partner decision making:
  - Centralized location for relevant chemical safety data:
    - Chemistry, exposure, hazard, dosimetry
  - Combination of existing data and predictive models
  - Publicly accessible, periodically updated, curated
- Ease of access to data results in efficiency and accelerates chemical risk assessment

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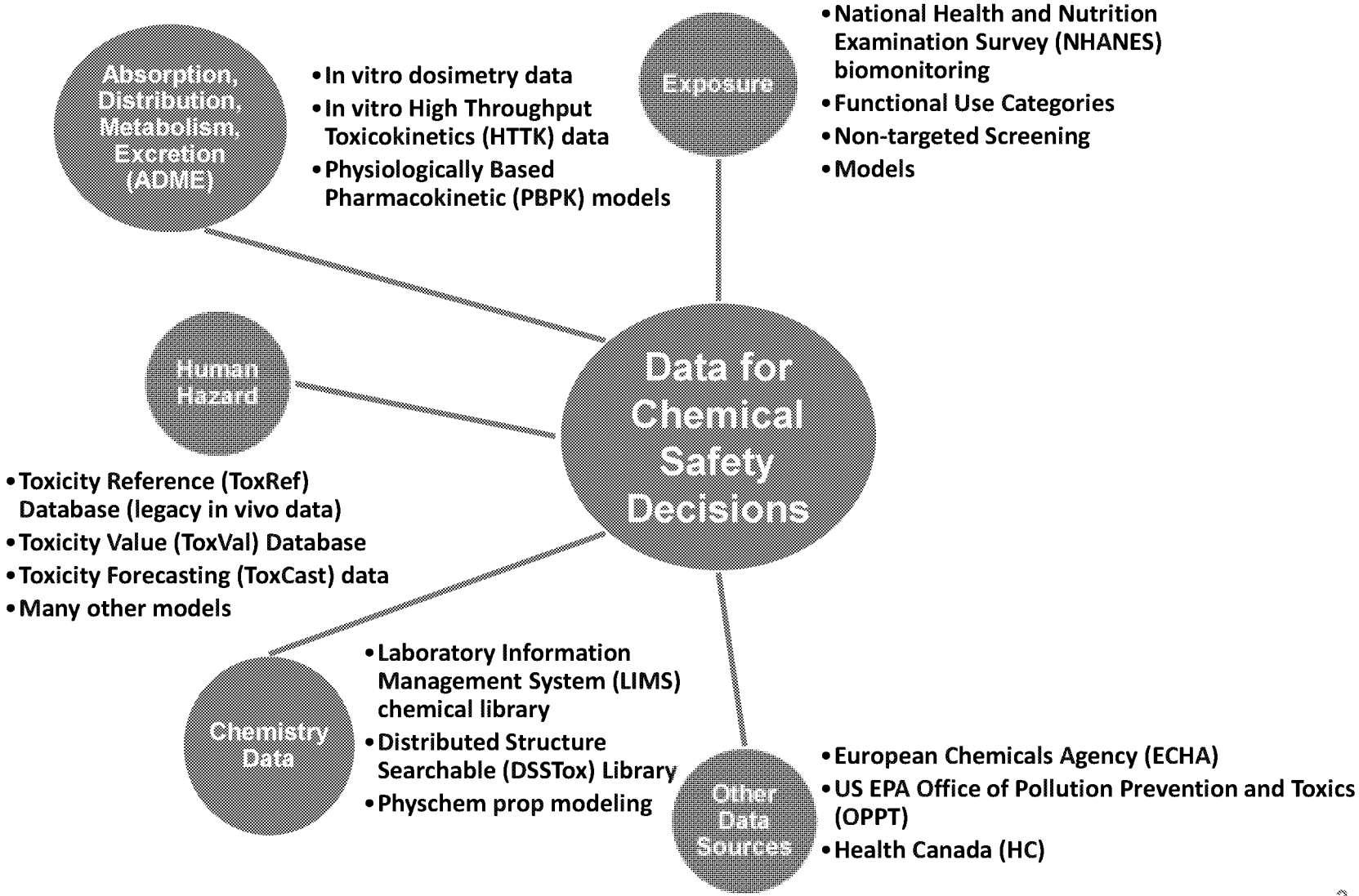
Approach



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Results: EPA CompTox Chemistry Dashboard

EPA United States Environmental Protection Agency

- A **publicly accessible website** delivering:
  - ~760,000 chemicals with related property data
  - Experimental and predicted physicochemical property data
  - Integration to “biological assay data” for 1000s of chemicals
  - Information regarding consumer products containing chemicals
  - Links to other agency websites and public data resources
  - “Literature” searches for chemicals using public resources
  - “Batch searching” for thousands of chemicals
  - Downloadable Open Data for reuse and repurposing
  - Many features (only highlighting a few)
  - Access to multiple tools (direct data interpolation and predictive) for multiple disciplines

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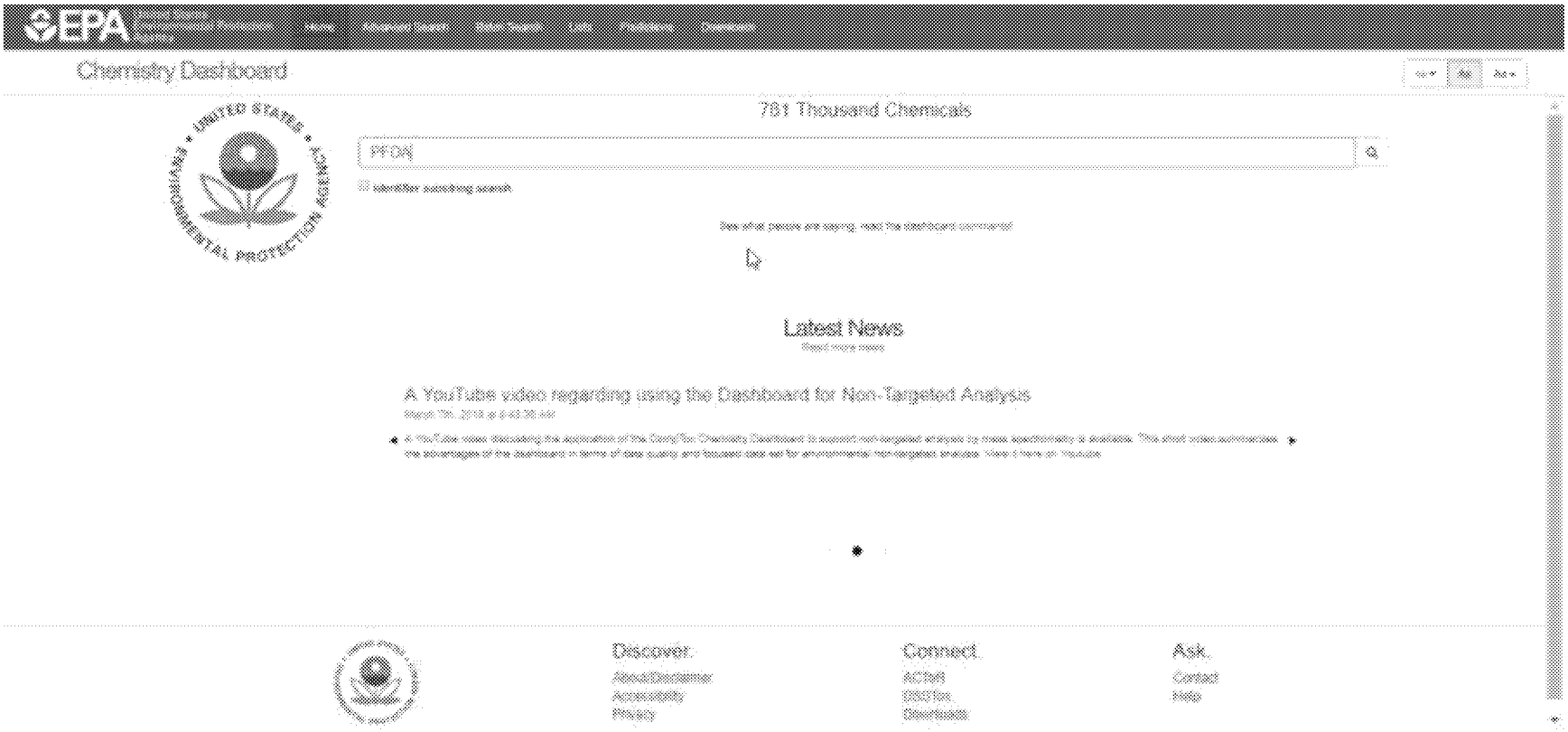
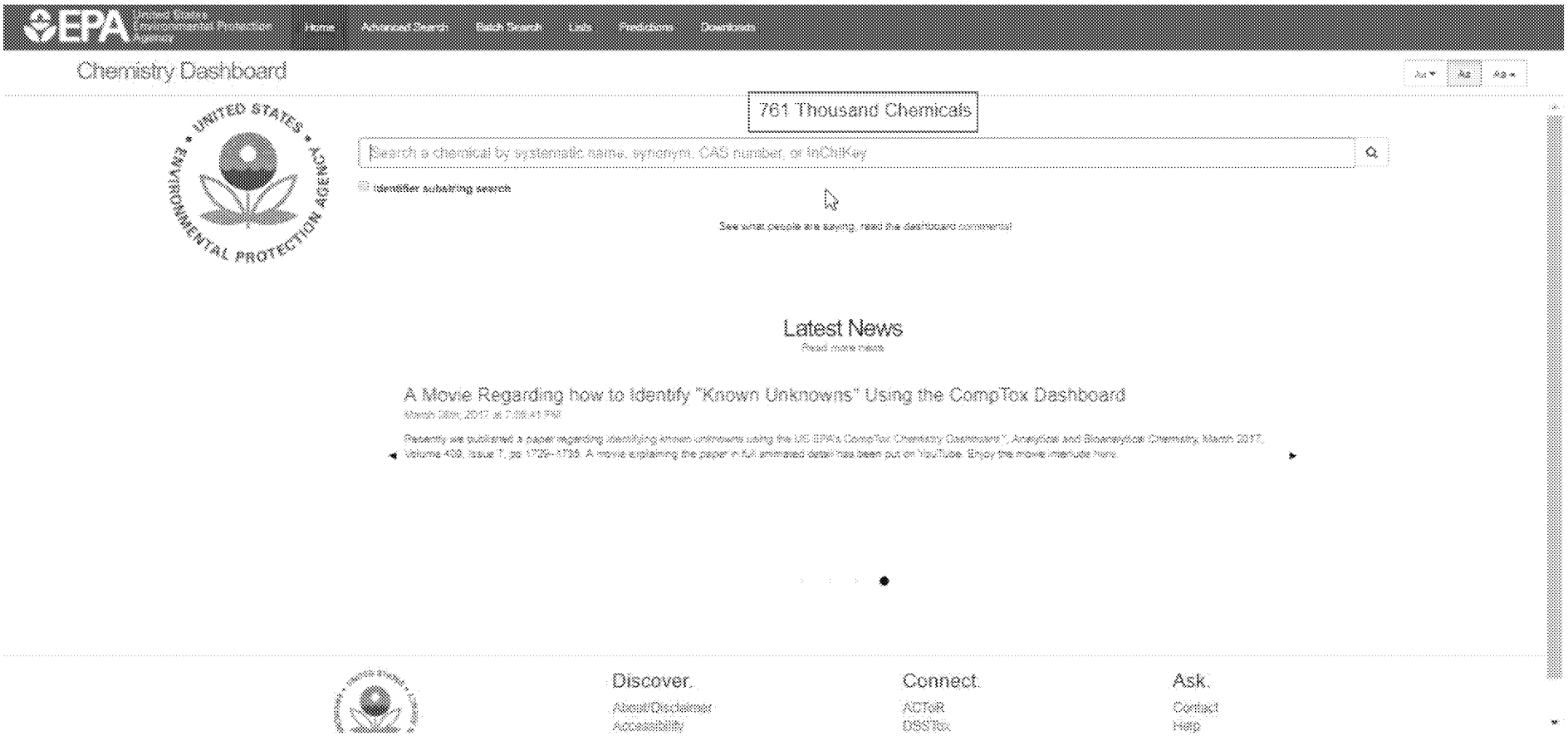
EPA CompTox Chemistry Dashboard: Live Demo Time



CompTox Chemistry Dashboard

https://comptox.epa.gov/dashboard

EPA United States Environmental Protection Agency



Detailed Chemical Pages

EPA United States Environmental Protection Agency

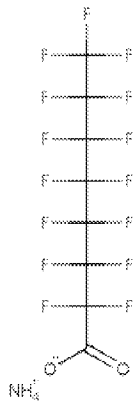
EPA United States Environmental Protection Agency | Home | Advanced Search | Batch Search | Lists | Predictions | Downloads | Copy | Share | Submit Comment

Ammonium perfluorooctanoate

3825-26-1 | DTXSID8037708

Searched by DSSTox Substance Id.

- DETAILS
- EXECUTIVE SUMMARY
- PROPERTIES
- ENV. FATE/TRANSPORT
- HAZARD
- ADME
- EXPOSURE
- BIOACTIVITY
- IGENRA
- SIMILAR COMPOUNDS
- RELATED SUBSTANCES
- SYNONYMS
- LITERATURE
- LINKS
- COMMENTS



Intrinsic Properties

Molecular Formula: $C_8H_4F_{15}NO_2$ | Mol File | Find All Chemicals

Average Mass: 431.101 g/mol

Isotope Mass Distribution

Monoisotopic Mass: 431.000251 g/mol

Structural Identifiers

Linked Substances

Presence in Lists

Record Information

Quality Control Notes

Data Quality

Citation

U.S. Environmental Protection Agency. Chemistry Dashboard. https://comptox.epa.gov/dashboard/DTXSID0021206 (accessed March 29, 2018).

Data Quality

- Level 1:Expert curated, highest confidence in accuracy and consistency of unique chemical identifiers
- Level 2:Expert curated, unique chemical identifiers using multiple sources
- Level 3:Programmatically curated from high quality EPA source, unique chemical identifiers have no conflicts in ChemID and PubChem
- Level 4:Programmatically curated from ChemID, unique chemical identifiers have no conflicts in PubChem
- Level 5:Programmatically curated from ACToR or PubChem, unique chemical identifiers with low confidence, single public source

Properties, Fate and Transport

EPA United States Environmental Protection Agency

EPA United States Environmental Protection Agency | Home | Advanced Search | Batch Search | Lists | Predictions | Downloads | Copy | Share | Submit Comment | Search All Data

Ammonium perfluorooctanoate

3825-26-1 | DTXSID8037708

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- GENRA
- SIMILAR COMPOUNDS
- RELATED SUBSTANCES
- SYNONYMS
- LITERATURE
- LINKS
- COMMENTS

Property

Summary

Summary

Download

Columns

Search Table

Property	Experimental average	Predicted average	Experimental median	Predicted median	Experimental range	Predicted range	Unit
Melting Point	154 (2)	78.477	154	65.8646	154	3.53 to 164.247	°C
LogP: Octanol-Water	-	5.5266		5.2847	-	3.79814 to 7.749	
Vapor Pressure	-	0.1817		0.21623	-	0.0203908 to 0.274	mm-Hg
Water Solubility	-	0.28444		0.00012	-	0.00000473151 to 0.553196	mol/L
Boiling Point	-	189.58135		189.043	-	187.969 to 190.241	°C
Flash Point	-	65.8365		65.8365	-	52.109 to 69.47	°C
Surface Tension	-	18.819			-	18.819	dyn/cm
Index of Refraction	-	1.299			-	1.299	
Molar Refractivity	-	42.893			-	42.893	cm^3
Polarizability	-	17.004			-	17.004	Å^3
Density	-	1.731		1.731	-	1.717 to 1.745	g/cm^3
Molar Volume	-	237.288			-	237.288	cm^3
Thermal Conductivity	-	85.258			-	85.258	mW/(m*K)
Henry's Law	-	2.02278e-10			-	2.02278e-10	atm-m3/mole
LogKoa: Octanol-Air	-	4.15598			-	4.15598	

Chemical Hazard Data

EPA United States Environmental Protection Agency

EPA United States Environmental Protection Agency | Home | Advanced Search | Batch Search | Lists | Predictions | Downloads | Copy | Share | Submit Comment | Basic Action

Ammonium perfluorooctanoate

3825-26-1 | DTXSID8037708

Searched by DSSTox Substance Id.

- DETAILS
- EXECUTIVE SUMMARY
- PROPERTIES
- ENV. FATE/TRANSPORT
- HAZARD
- ADME
- EXPOSURE
- BIOACTIVITY
- GENRA
- SIMILAR COMPOUNDS
- RELATED SUBSTANCES
- SYNONYMS
- LITERATURE
- LINKS
- COMMENTS

DataType

Point of Departure

Download

Human | Eco

Columns | 10

More	Priority	Toxval type	Subtype	Risk assessment class	Value	Units	Study type	Exposure route	Species	Subsource	Source
	7	NOAEL	systemic	chronic	15.1	mg/kg-day	chronic	oral	rat	unpublished_submission	ToxRefDB
	7	NOAEL	systemic	chronic	15	mg/kg-day	chronic	oral	rat	open_lit	ToxRefDB
	7	NOAEL	systemic	chronic	15	mg/kg-day	chronic	oral	rat	open_lit	ToxRefDB
	7	NOAEL	systemic	chronic	14.2	mg/kg-day	chronic	oral	rat	unpublished_submission	ToxRefDB
	7	NOAEL	systemic	chronic	15	mg/kg-day	chronic	oral	rat	open_lit	ToxRefDB
	3	LOEL	Recovery study - 6days	short-term	30	mg/kg-day	short-term	oral	mouse	Toxicol. Sci. 2008; 105 (1):86-96	HAWC
	3	LOEL	Recovery study - 6days	short-term	30	mg/kg-day	short-term	oral	mouse	Toxicol. Sci. 2008; 105 (1):86-96	HAWC
	3	LOEL	Recovery study - 6days	short-term	30	mg/kg-day	short-term	oral	mouse	Toxicol. Sci. 2008; 105 (1):86-96	HAWC
	3	LOEL	Recovery study - 6days	short-term	30	mg/kg-day	short-term	oral	rat	Toxicol. Sci. 2008; 105 (1):86-96	HAWC
	3	LOEL	Recovery study - 6days	short-term	30	mg/kg-day	short-term	oral	mouse	Toxicol. Sci. 2008; 105 (1):86-96	HAWC

First | << | < | 11 | 12 | 13 | 14 | 15 | 16 | > | >> | Last

https://epa.gov

In Vitro Bioassay Screening

ToxCast and Tox21

EPA United States Environmental Protection Agency

Ammonium perfluorooctanoate

3825-26-1 | DTXSID8037708

Searched by DSSTox Substance Id.

DETAILS
EXECUTIVE SUMMARY
PROPERTIES
ENV. FATE/TRANSPORT
HAZARD
ADME
EXPOSURE
BIOACTIVITY
TOXCAST SUMMARY
TOXCAST DATA
PUBCHEM
GENRA
SIMILAR COMPOUNDS
RELATED SUBSTANCES
SYNONYMS
LITERATURE
LINKS
COMMENTS

Assay Selection 4 Selected

A Single Assay Can Have Multiple Charts

Number of Charts: 4

Active Inactive All

Filter

Assay Set: ER (3 of 10 Selected)

ACEA_T47D_96hr_Positive

ATG_ERE_CIS_up

ATG_ERa_TRANS_up

NVS_NR_bER

NVS_NR_hER

NVS_NR_mERa

OT_ER_ERaERa_0480

OT_ER_ERaERa_1440

OT_ER_ERaERb_0480

OT_ER_ERaERb_1440

OT_ER_ERbERb_0480

OT_ER_ERbERb_1440

OT_ERa_EREGFP_0120

Sources of Exposure to Chemicals

EPA United States Environmental Protection Agency

EPA United States Environmental Protection Agency | Home | Advanced Search | Batch Search | Lists | Predictions | Downloads | Copy | Share | Submit Comment

Ammonium perfluorooctanoate

3825-26-1 | DTXSID8037708

Searched by DSSTox Substance Id.

- DETAILS
- EXECUTIVE SUMMARY
- PROPERTIES
- ENV FATE/TRANSPORT
- HAZARD
- ADME
- EXPOSURE
  - PRODUCT & USE CATEGORIES
  - CHEMICAL WEIGHT FRACTION
  - CHEMICAL FUNCTIONAL USE
  - TOXICS RELEASE INVENTORY
  - MONITORING DATA
  - EXPOSURE PREDICTIONS
  - PRODUCTION VOLUME
- BIOACTIVITY
- GENRA
- SIMILAR COMPOUNDS
- RELATED SUBSTANCES
- SYNONYMS

Product and Use Categories (PUCs)

Download

Columns

Search Results

Product or Use Categorization	Categorization type	Number of Unique Products
automotive	CPCat Cassette	4
consumer_use_AIOTARUseDB	CPCat Cassette	1
food_contact_articles	CPCat Cassette	1
impregnation_consumer_use_detected	CPCat Cassette	1
industrial_manufacturing_AIOTaRUseDB	CPCat Cassette	1
manufacturing_chemical	CPCat Cassette	1
manufacturing_plastics	CPCat Cassette	1
process_regulator	CPCat Cassette	1

8 records

Searching For More Than One Chemical – Batch Searching

EPA United States Environmental Protection Agency

EPA United States Environmental Protection Agency Home Advanced Search Batch Search Lists Predictions Downloads

Batch Search

Step 1 Step 2 Step 3 Step 4 Step 5 Step 6

Step Six: Click "Download"

Please enter one identifier per line

Select Input Type(s):

- Identifiers
  - Chemical Name
  - CASRN
  - InChiKey
  - DSSTox Substance ID
- InChiKey Skeleton
- MS-Ready Formula(e)
- Exact Formula(e)
- Monoisotopic Mass

Enter Identifiers to Search (searches should be limited to <1000 identifiers):

Ethylene oxide
Chloromethane
1-Chloropropan-2-one
n-Hexane
Ammonia
Nickel carbonyl
Phosgene
Potassium cyanide
Chlorodimethylsilane
Trimethoxysilane

Display All Chemicals | Download Chemical Data

Select Output Format:

Excel

Download

Customize Results

- Select All
- Select All in Lists

Chemical Identifiers

- DTXSID
- Chemical Name
- CAS-RN
- InChiKey
- IUPAC Name

Structures

- Mol File
- SMILES

Presence in Lists:

- 40CFR355
- Algal Toxins
- APCRA Chemicals for Prospective Analysis
- APCRA Chemicals for Retrospective Analysis
- ATSDR Toxic Substances Portal Chemical List
- Bisphenol Compounds
- California Office of Environmental Health Hazard Assessment
- Chemicals with interesting names
- CMAP
- CNT Screening Library
- Drinking Water Suspects, KWR Water, Netherlands
- EDSP Universe

Impact

EPA United States Environmental Protection Agency

Absorption, Distribution, Metabolism, Excretion (ADME)

- In vitro dosimetry data
- In vitro High Throughput Toxicokinetics (HTTK) data
- Physiologically Based Pharmacokinetic (PBPK) models

Exposure

- National Health and Nutrition Examination Survey (NHANES) biomonitoring
- Functional Use Categories
- Non-targeted Screening
- Models

Dashboards / Portals

- Chemistry Dashboard
- Endocrine Disruptors Screening Program (EDSP21) Dashboard
- Toxicity Forecasting (ToxCast) Dashboard

Human Hazard

- Toxicity Reference (ToxRef) Database (legacy in vivo data)
- Toxicity Value (ToxVal) Database
- Toxicity Forecasting (ToxCast) data
- Many other models

Data for Chemical Safety Decisions → **Data Delivery**

Chemistry Data

- Laboratory Information Management System (LIMS) chemical library
- Distributed Structure Searchable (DSSTox) Library
- Physchem prop modeling

Other Data Sources

- European Chemicals Agency (ECHA)
- US EPA Office of Pollution Prevention and Toxics (OPPT)
- Health Canada (HC)

RapidTox Workflows

- Screening level risk assessments
- Chemical Prioritization

Impact

- An integration hub for multiple "modules"
  - Experimental and predicted properties
  - Human and Ecological Hazard data
  - Exposure data – products, data in the environment
  - *In vitro* bioassay data – ToxCast/Tox21
  - Literature searching – Google Scholar and PubMed
  - Specialized searches – mass/formula for analytical support
  - Batch searching and Real Time Predictions
- Chemistry Dashboard integrates chemical data
- Used by EPA and others to support chemical safety decisions
  - EPA examples: Endocrine Disruptor Screening Program in the 21st Century (EDSP21), Future (RapidTox)

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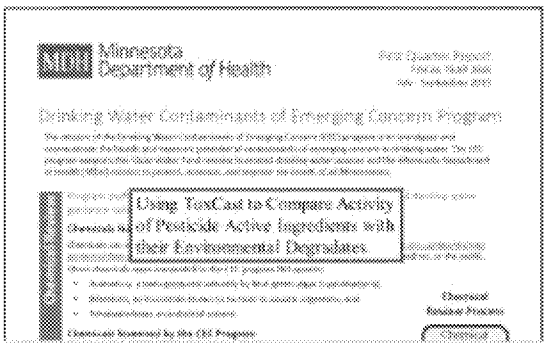
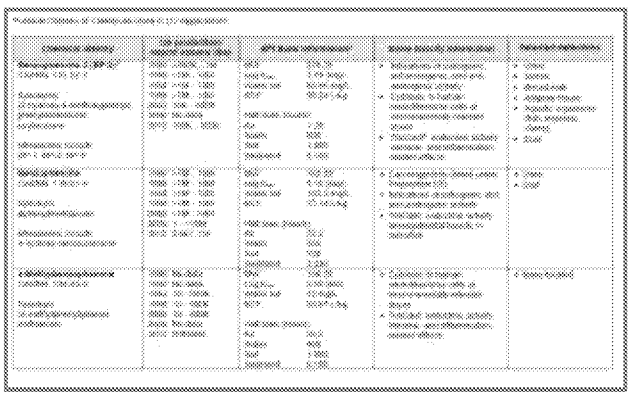
Impact

MN Department of Health Risk Assessments for Water Contaminants



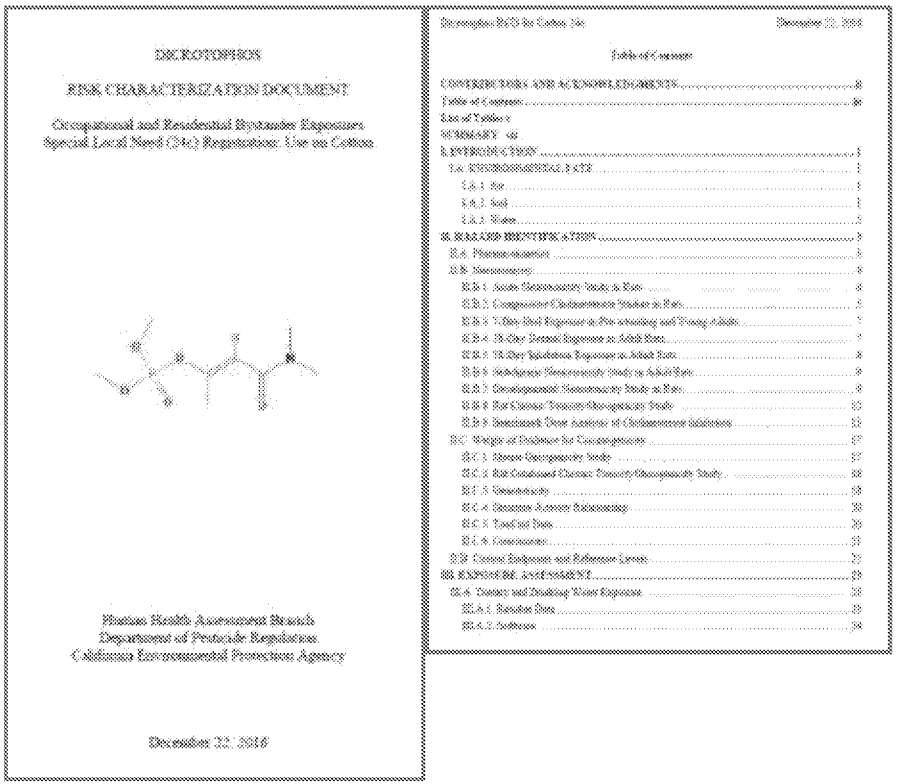
- Pilot study to utilize ToxCast data in drinking water contaminants of emerging concern

Prioritization for Biomonitoring CA



- Data surfaced through the CompTox Chemistry Dashboard utilized to prioritize biomonitoring for of emerging contaminants

CalEPA Pesticide Assessments



- ToxCast data used for weight of evidence decisions regarding health effects for pesticides

*Not a comprehensive list

Conclusion

- EPA's CompTox Chemistry Dashboard provides access to data for ~760,000 chemicals
- High quality data from ongoing curation efforts
- An integration hub for multiple "modules" and tools to support multiple environmental applications
- Major update to CompTox Chemistry Dashboard in August 2018
  - Endocrine Disrupting Compounds (EDCs)
  - Per- and Polyfluoroalkyl Substances (PFAS)

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Contacts

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The views expressed in this presentation are those of the author and do not necessarily reflect the views or policies of the US EPA.

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EPA
United States
Environmental Protection
Agency

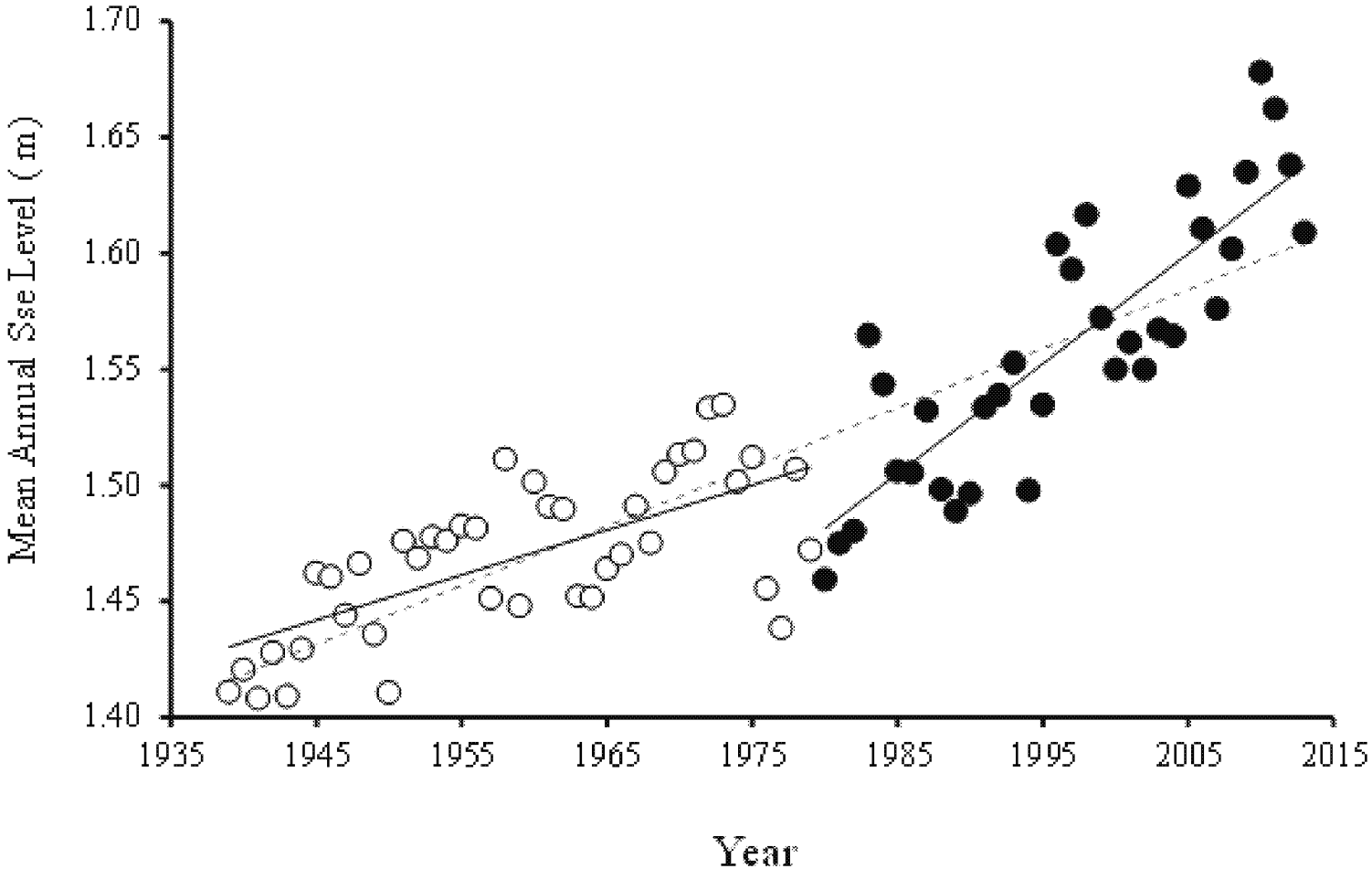
Coastal Resilience: Salt Marsh Sustainability in New England

Cathleen Wigand
US EPA ORD Atlantic Ecology Division (AED)

New England State Commissioners' Visit to AED
June 19, 2018

Office of Research and Development

Problem: Accelerated Sea Level Rise



Annual average sea level at New London, CT. Open circles indicate sea levels from 1939-1979 (2 mm/y) and filled circles indicate sea levels from 1980-2013 (4.7 mm/y).

United States Environmental Protection Agency

Accelerated Sea Level Rise

Resulting in:

1. Increased flooding of coastal communities
2. Loss of habitat for fish, shellfish and wildlife

What are the vulnerabilities of coastal marshes from sea level rise, and how can this inform restoration strategies?

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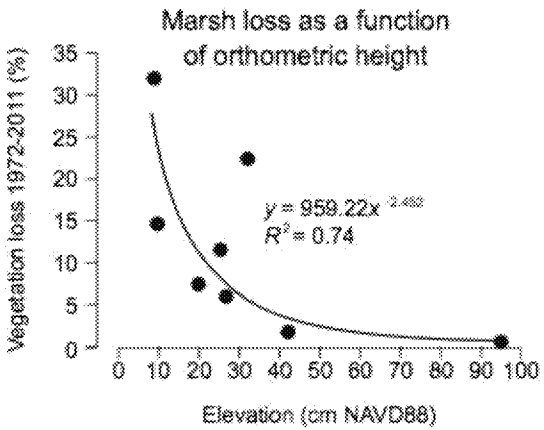
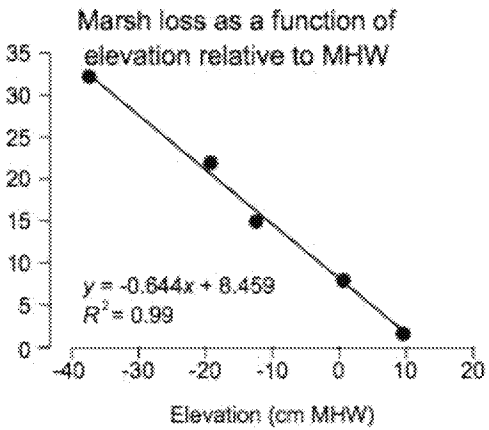
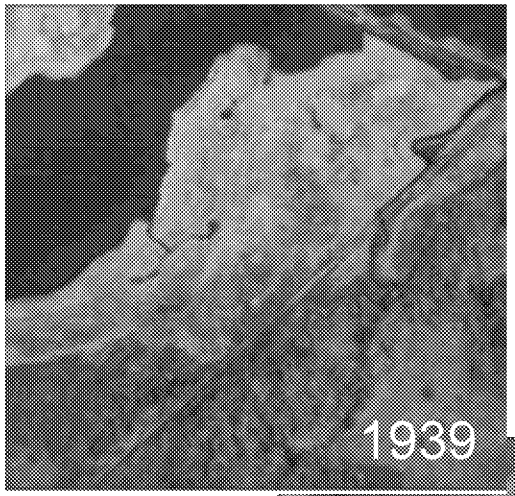
Key Observations

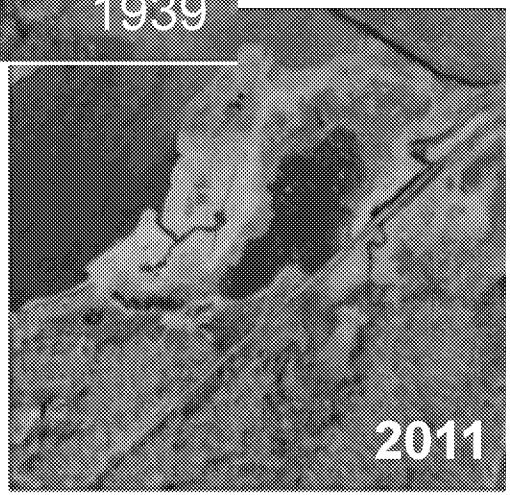
- Many marshes in Narragansett Bay lack "elevation capital"
- Tidal marsh vegetation changes are linked with marsh elevation





MHW = mean high water





Workshops to Discuss Management Actions

EPA ORD-AED partnered with local, state and federal groups to **organize a workshop** in **2014** to discuss management actions for sustainability of New England coastal marshes.

EPA ORD-AED **helped set the stage for a follow-up workshop** in **2018** to assess the progress made and challenges remaining to promote coastal marsh sustainability.

Hundreds of New England local, state and federal partners **attended both meetings**.

Link to special issue in Estuaries and Coasts summarizing the 2014 workshop and results (8 articles). https://link.springer.com/article/10.1007/s12237-016-0166-1

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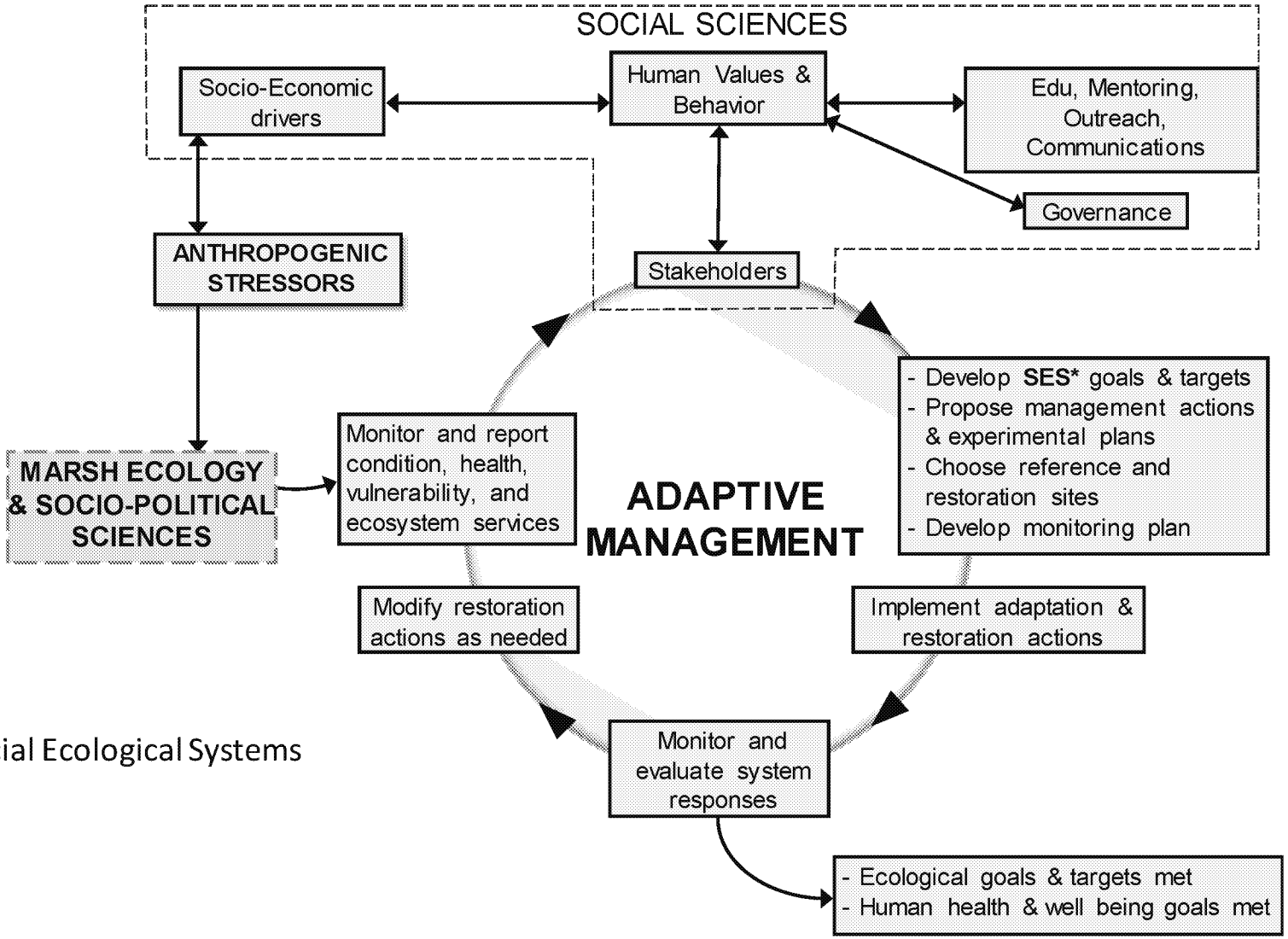
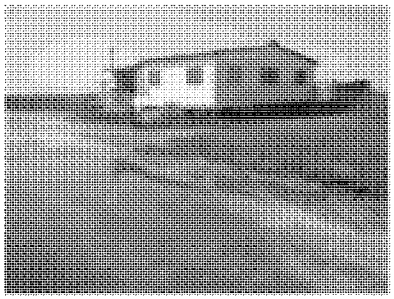
Coastal Marsh Adaptive Restoration Framework



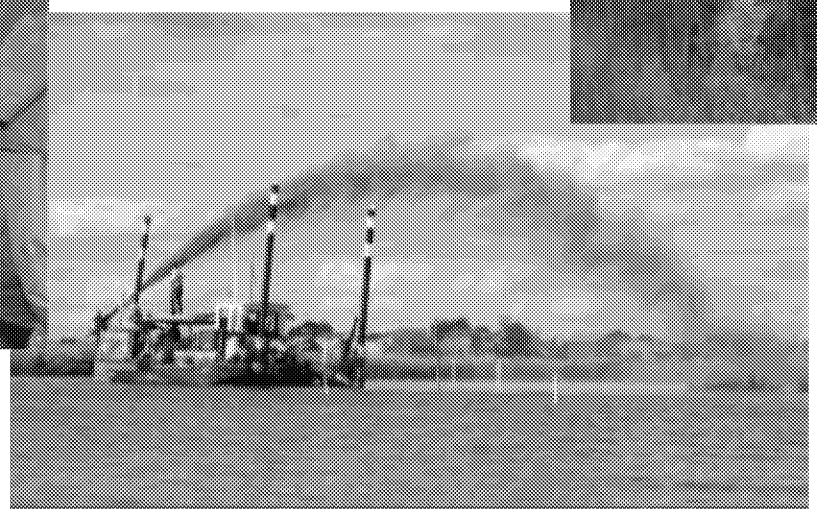
*(**SES**) Social Ecological Systems

United States Environmental Protection Agency

Restoration & Adaptation Actions



- Land conservation/Land use planning
- Removal of barriers to future migration
- Tidal restoration and hydrologic modifications
- Elevation enhancement with sediment
- Living shorelines



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Case Study: Bride Brook, CT Restoration Project

United States Environmental Protection Agency

Alewife Run restored and the subsiding marshes are recovering. Marsh restoration is ongoing.

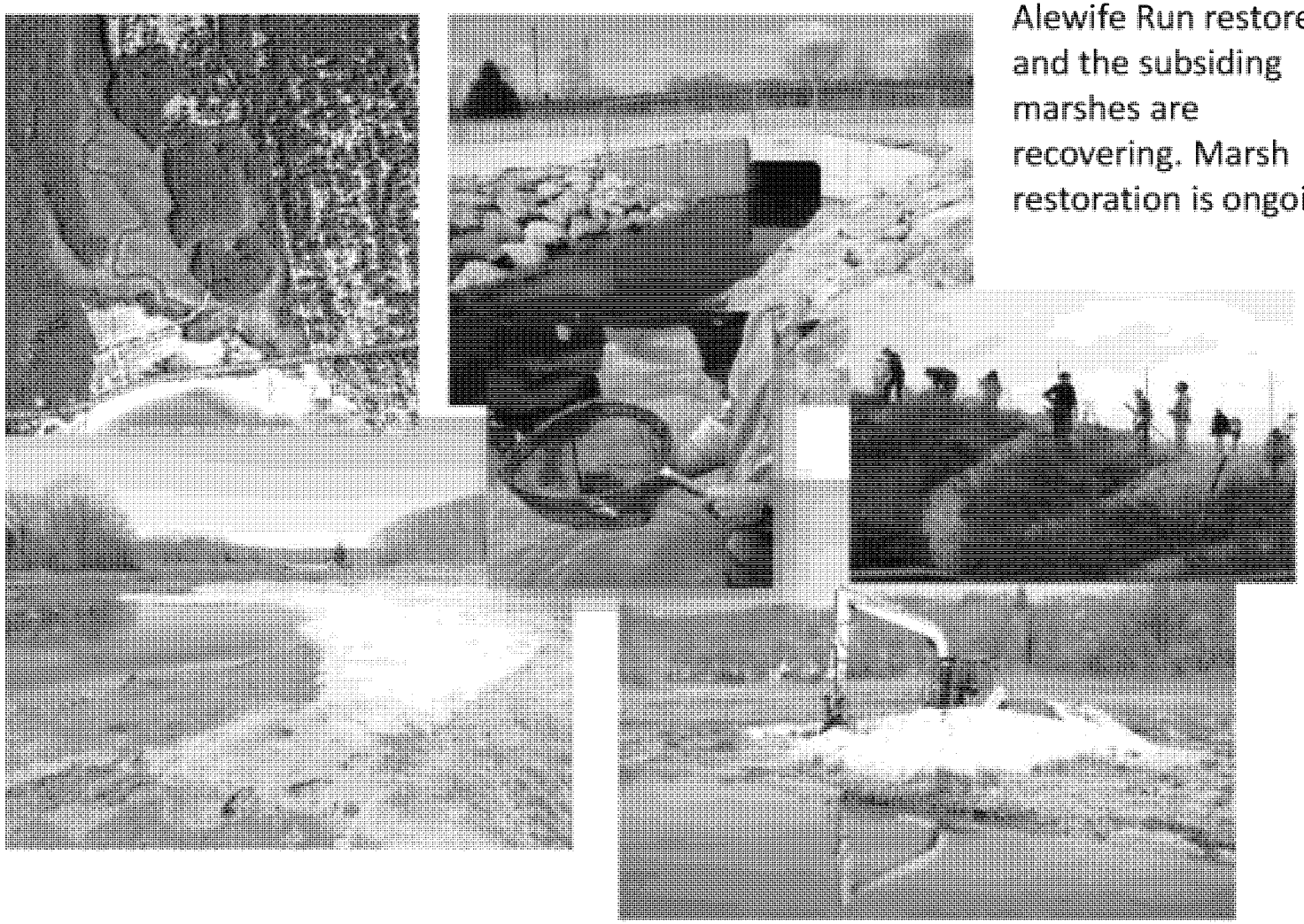

Photo credits and points-of-contact: Roger.Wolfe@ct.gov and Harry.Yamalis@ct.gov

Case Study: Ninigret Pond, RI Thin Layer Placement

- Back-barrier marsh adjacent to man-made breachway, state-owned public access point, beach and campground
- Salt marsh habitat exhibiting areas of prolonged flooding, vegetative die-off, subsidence and marsh edge erosion

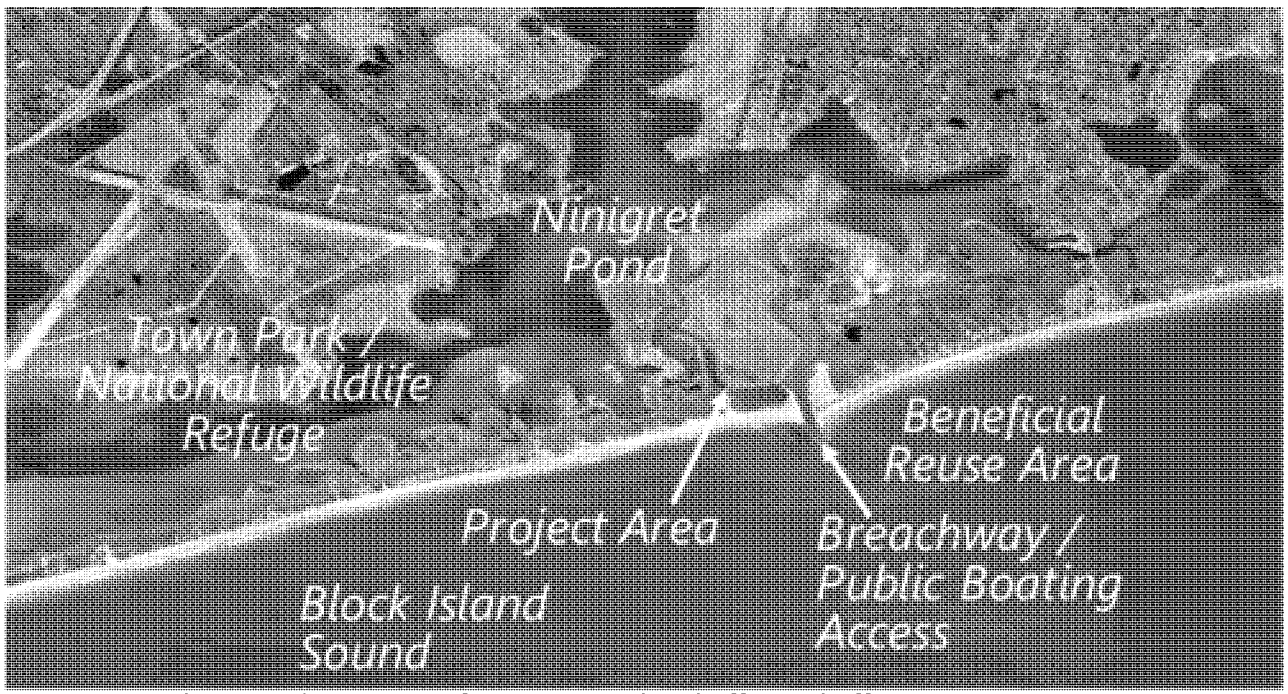

Photo credit & point-of-contact: Caitlin Chaffee, cchaffee@crmc.ri.gov

Governance: Permitting & Regulatory Compliance

- NEPA Environmental Assessment/Section 106 (USFWS lead federal agency)
- USACE Section 404 Permit (includes sign-off by EPA, NOAA National Marine Fisheries Service)
- State Section 401 Water Quality Certification
- CRMC Assent

US Army Corps of Engineers

Rhode Island Department of Environmental Management

NOAA FISHERIES

CRMC Coastal Resources Management Council

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Project Costs

Approx. 68,000 cubic yards dredged material to restore ~20 acres of marsh

- Design, Engineering and Permitting: $110,453
- Construction
  - Mobilization/Demobilization: $334,400
  - Dredging, spreading & grading of material: $543,900
  - Alternate dredging: $530,812
- Planting: $100,000
- TOTAL: $1,619,565

  (includes cost sharing with USACE, beneficial use of dredged materials; ~$81K per acre restored)

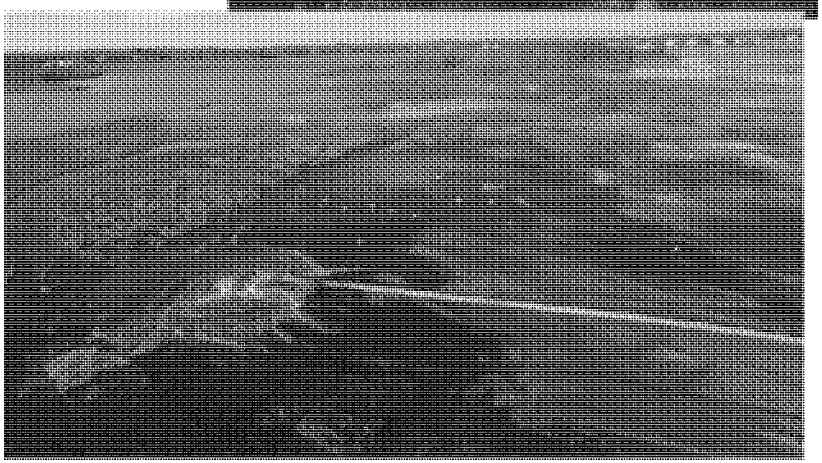

Photo credits & point-of-contact: Caitlin Chaffee, cchaffee@crmc.ri.gov

Post Thin Layer Placement at Ninigret Pond, RI

EPA
United States Environmental Protection Agency

Citizen Volunteers & Outreach Tours

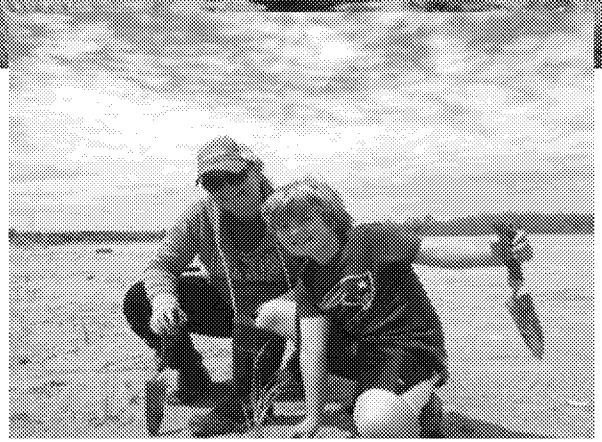

Photo credits: Caitlin Chaffee, cchaffee@crmc.ri.gov

United States Environmental Protection Agency

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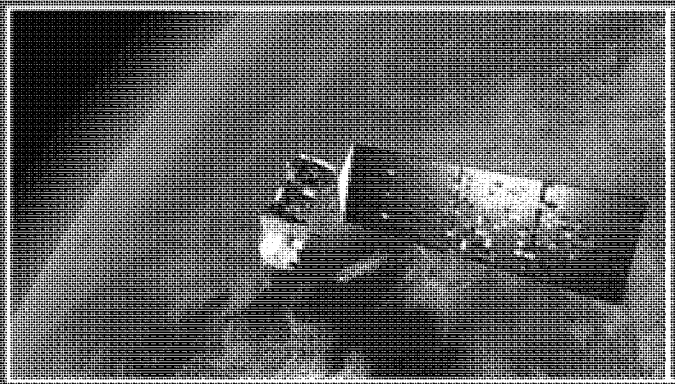
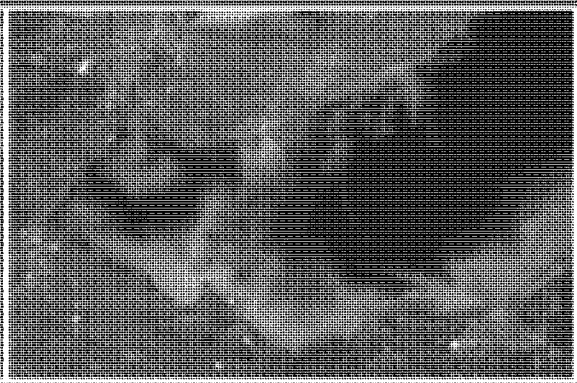
EPA
United States
Environmental Protection
Agency

Cyanobacteria Assessment Network (CyAN) for Freshwater Systems:

Early warning indicator for toxic & nuisance blooms using ocean color satellites



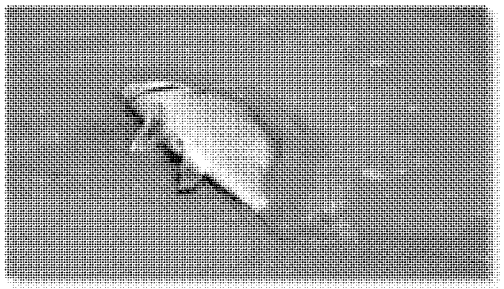


Darryl Keith
US EPA ORD Atlantic Ecology Division (AED)

New England State Commissioners' Visit to AED
June 19, 2018

Office of Research and Development

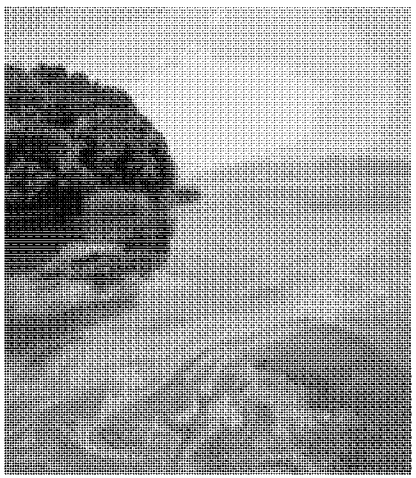
HABs: Overall Problems



Harmful algal blooms (HABs) have the potential to generate adverse health, ecosystem and economic impacts.

- Many different types of toxins
- Pure toxins in laboratory studies exert toxic effects on liver and nervous system
- Exposure through ingestion
- Exposure though recreational activity body contact—associated with gastrointestinal effects, breathing difficulty, skin irritation, and animal deaths

- Water treatment facilities alter operational practices and/or invest in new equipment → economic burden
- Health effects → beach closures → loss of recreational/aesthetic value → economic burden
- Large blooms upset water chemistry (pH, dissolved oxygen) and limit the penetration of sunlight → declines in fish populations → loss of recreational/aesthetic value → economic burden, long term ecosystem damage
- Large blooms are odorous and unsightly → reluctance to swim → economic burden



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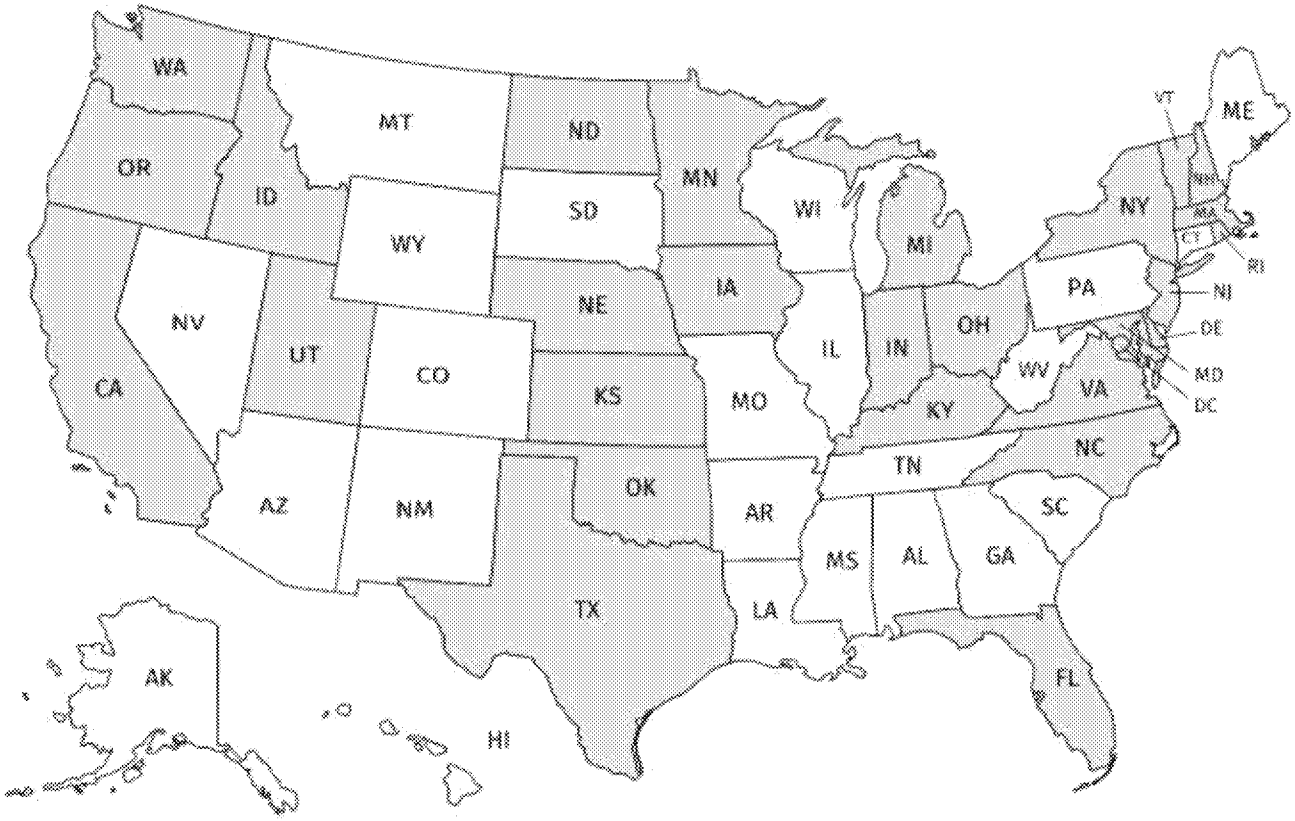
HABs: Overall Problems

During the 2017 bloom season, US EPA was aware of blooms, beach closures and/or health advisories in 27 states and DC.



https://www.epa.gov/water-research/cyanobacteria-assessment-network-cyan

Program Vision Statement

- *CyAN will use NASA, USGS, NOAA and European Space Agency satellite data products to improve the decision-making ability of water managers responsible for monitoring and assessing both freshwater and estuarine systems.*

- *Using the CyAN app, managers and the public will have the opportunity to access satellite imagery on their mobile device and view a map of their surroundings in terms of water quality.*

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EPA United States Environmental Protection Agency

CYAN

Cyanobacteria Assessment Network

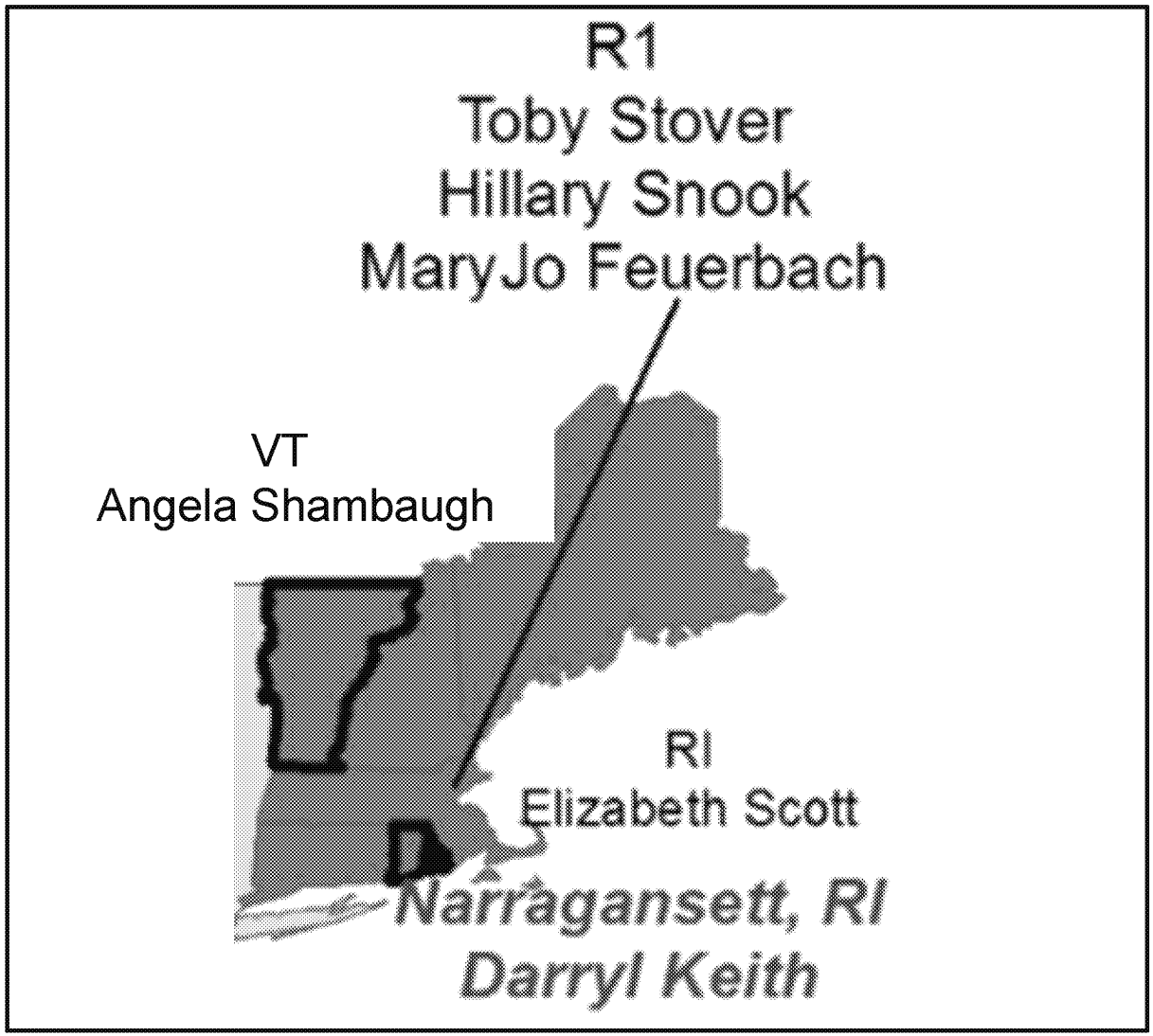
- ***Problem**:* How to support the use of US waters with satellite monitoring?
- ***Opportunity**:* Water quality indicators can be monitored with satellites and used to protect public health.
- ***Approach**:* Strengthen cross-agency research to mainstream satellite capabilities for water quality management decisions.
- ***Results**:* New methods and tools to monitor cyanobacteria HABs.
- ***Impact**:* Scalable information across any geo-political boundary, and ability to prioritize locations for management actions.

NOAA USGS science for a changing world NASA

Schaeffer et al. 2015. Agencies collaborate, develop a cyanobacteria assessment network. Eos. 96:16-20.

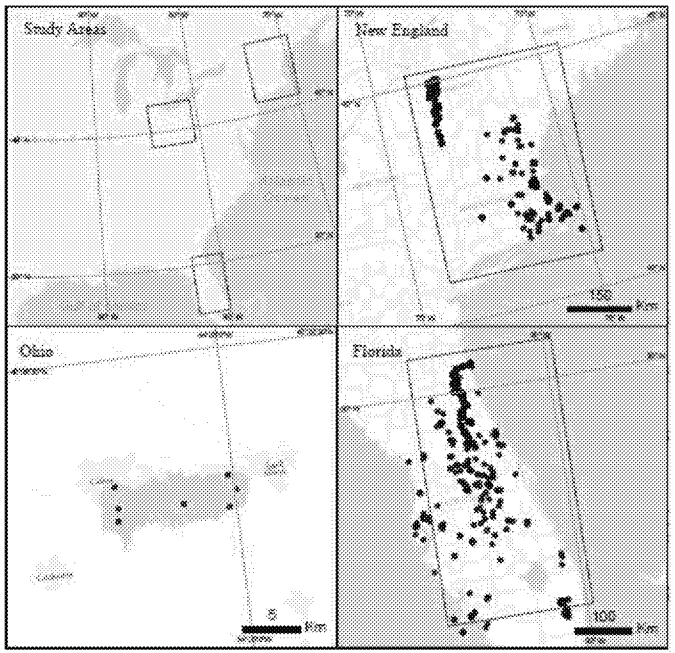
Cyanobacteria Assessment Network

New England Partners



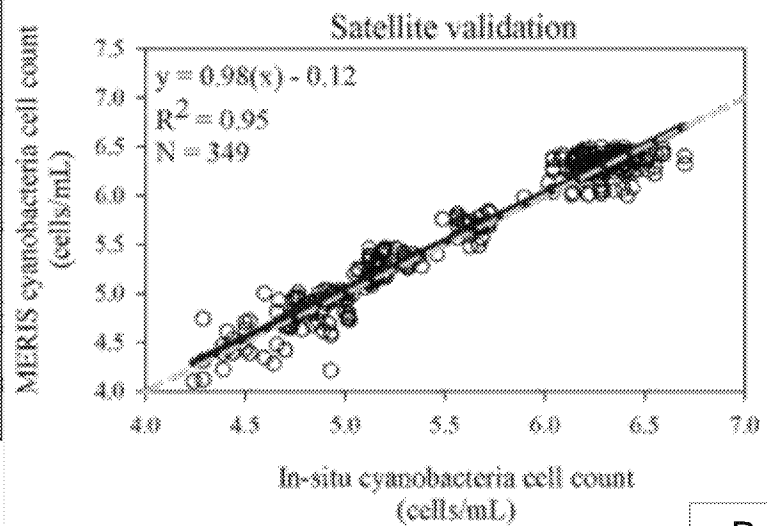
Remote Sensing

Uniform and systematic approach for identifying cyanobacteria blooms.

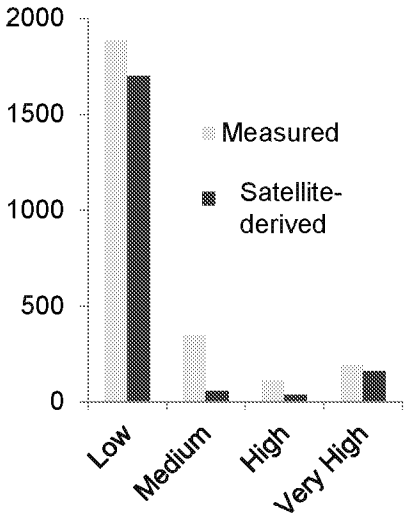


Retrieve satellite data from lakes and reservoirs

Derive numerical models which predict cyanobacteria abundance



Validate predictions using data from state environmental and health agencies



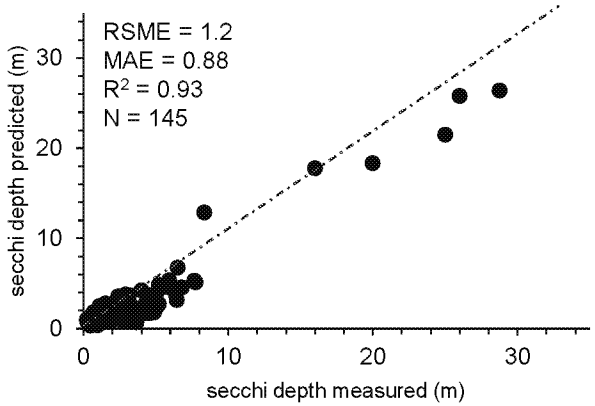
Present validated results in a meaningful format.

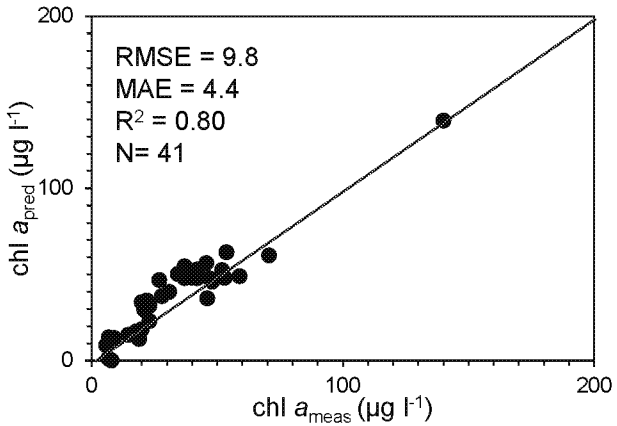
MERIS = Medium Resolution Imaging Spectrometer

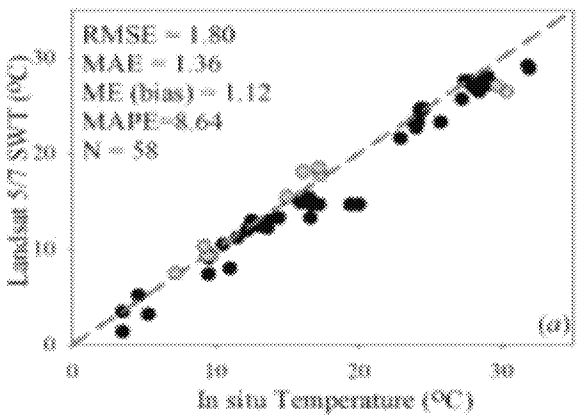
Satellite Application to Water Indicators

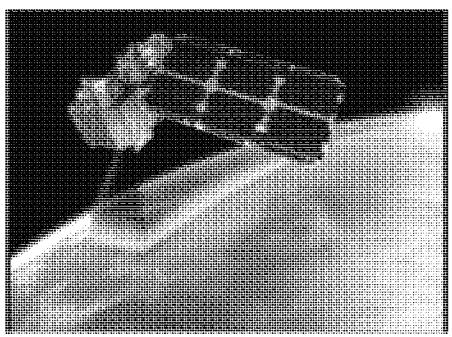
(measured vs model results)

- ***Problem:*** How do we quantify water quality in smaller lakes?
- ***Action:*** Testing Landsat-8 and Sentinel-2 satellite algorithms.
- ***Results:*** Some promise with chlorophyll-*a* and water clarity; excellent results with temperature.
- ***Anticipated Impact:*** Provide measures from 1980-present for 170,240 lakes and reservoirs.





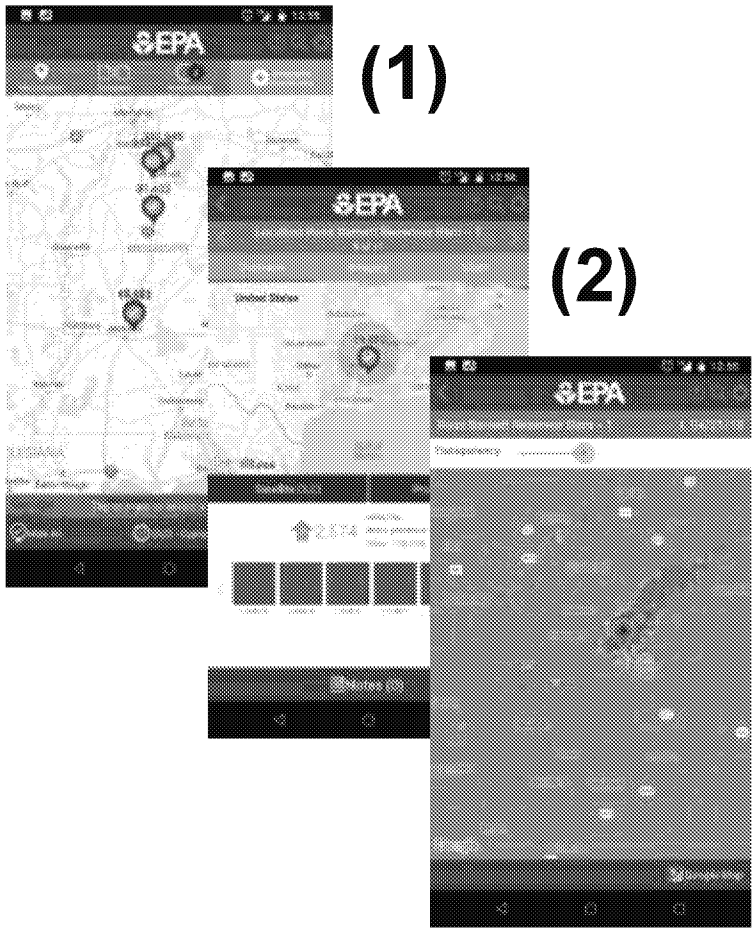




Keith et al. (*2017*). Monitoring algal blooms in drinking water reservoirs using the Landsat 8 Operational land Imager. International Journal of Remote Sensing. 38:9, 2818-2846

Android Phone Application

- Cyanobacteria estimates derived from European Sentinal-3 satellite
- Populate database that can be accessed by Android app
- (1) View available data
- (2) Zoom to targeted lake or reservoir ... see stats on bloom
- (3) View image of harmful algae bloom



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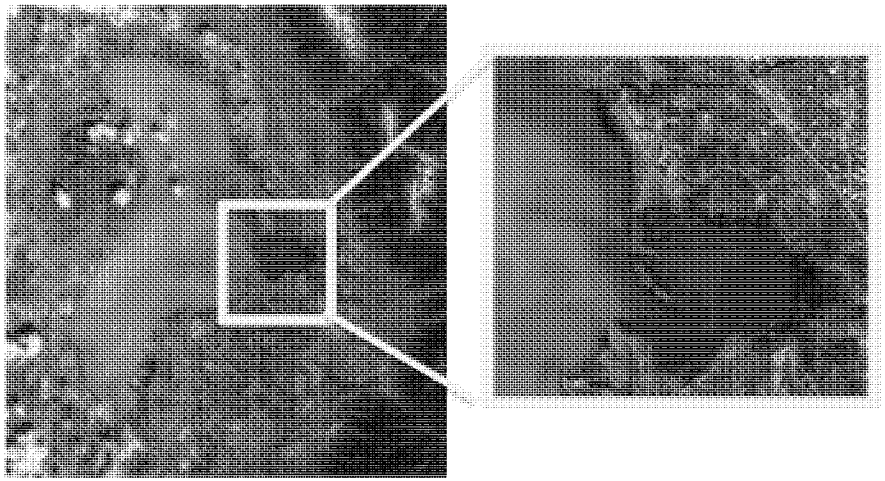
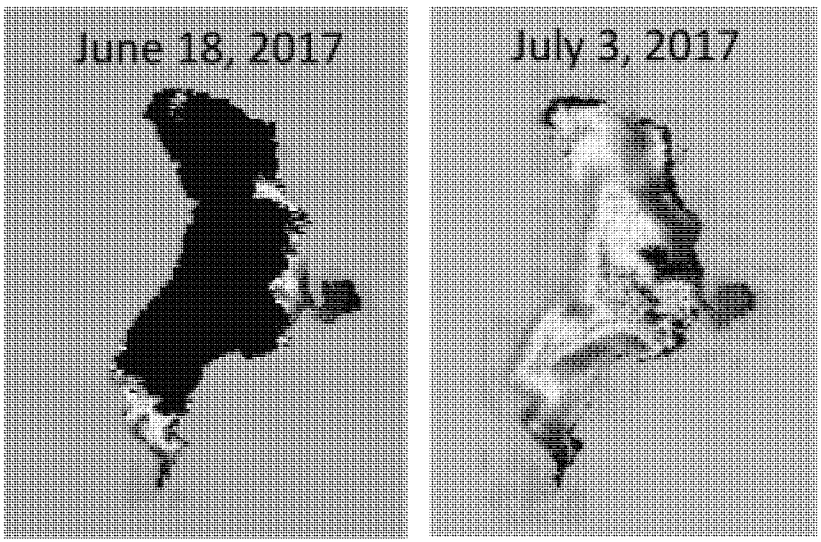
Actions and Impact: Utah Lake, UT

United States Environmental Protection Agency

- Utah Department of Environmental Quality (DEQ)/Division of Water Quality (DWQ) conducted routine monthly sampling June 12, 2017.
- CYAN imagery provided the following week indicated a bloom was developing in a Utah lake used for recreation.
- Utah DEQ/DWQ scientists returned to the area June 22, 2017.
- On June 29, Utah DEQ issued an advisory warning that the public and pets should stay out of Utah Lake and Provo Bay.



Sentinel-2 image showing an algal bloom in Provo Bay.



Sentinel-3 image showing areas of highest cyanobacteria concentrations.

Satellite remote sensing data provided by ORD augmented state monitoring and ensured public health and safety

United States Environmental Protection Agency

Contacts

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*The CyAN Mobile App is currently available for beta testing; if interested please contact:

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US EPA Office of Research and Development
919-541-5571
schaeffer.blake@epa.gov

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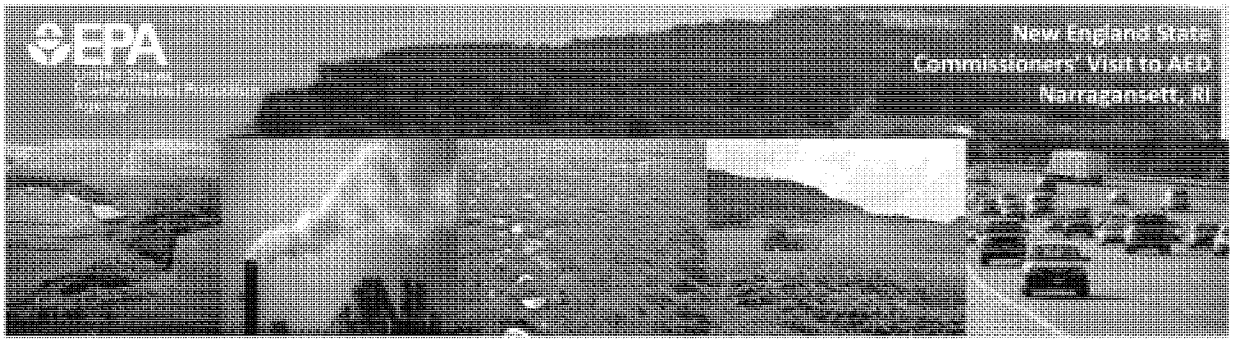
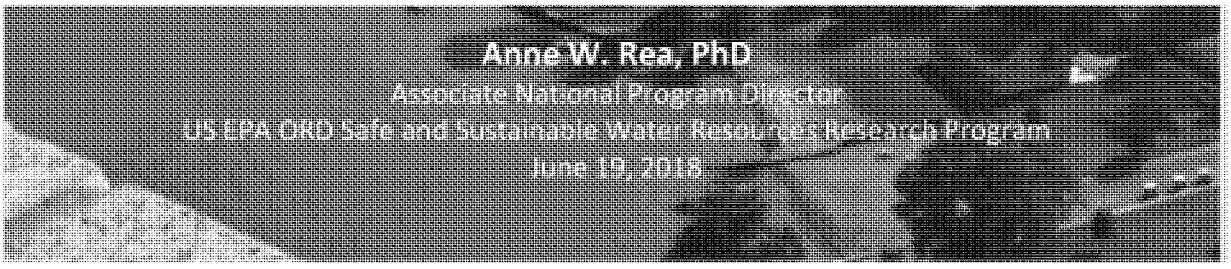
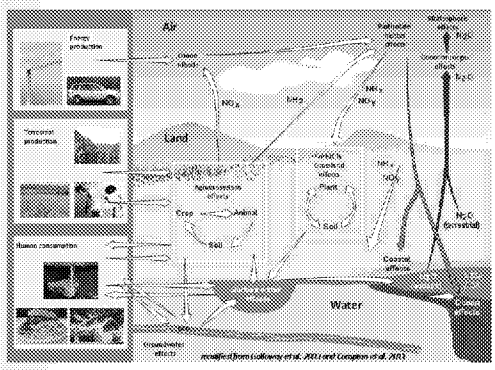


Nutrients and Harmful Algal Blooms



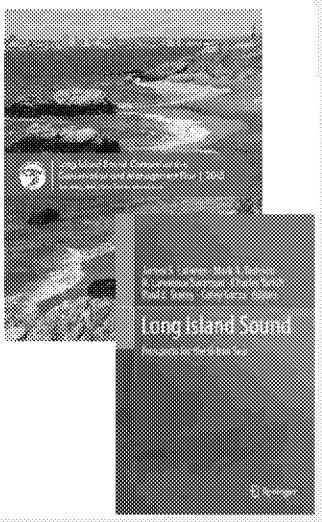
Managing Nutrients in New England



- Excess nitrogen & phosphorous decreases the quality of fresh & estuarine waters, impacting their use by people
- Nutrient management involves multiple environmental media, work by multiple agencies & management interventions at multiple points
- ORD has assisted New England states by
  - Informing nutrient criteria development
  - Evaluating approaches to nutrient management & mapping
  - Evaluating the effects of excess nutrients on aquatic resources
  - Using data-intensive models to predict occurances of harmful algal blooms & methods for cyanotoxins
  - Encouraging development of nutrient sensors

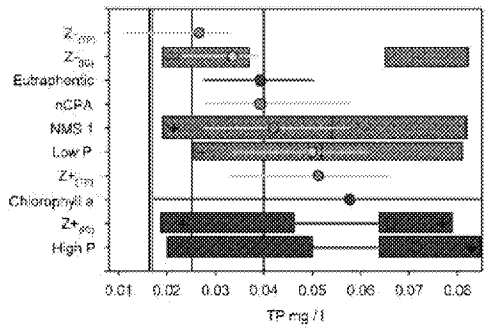
Nutrient Criteria: Technical Support to CT, ME & NH

- New England states need technical advice on nutrient related issues for estuarine systems to inform nutrient management & criteria development
- ORD is providing expertise to the Long Island Sound(LIS) Study (CT, NY), Suffolk County (NY), and the Great Bay Estuary (NH/ME) to inform development of nitrogen thresholds for embayments
- This work continues
  - 25 year synthesis of LIS research, monitoring & assessment (2014)
  - Update of the 24 year old Comprehensive Conservation and Management Plan for Long Island Sound (2015)
  - Draft of technical report for Great Bay Estuary expected summer 2018



Nutrient Criteria: CT Streams

- CT required quantitative information on nutrient-response relationships to support stream nutrient criteria development
- ORD worked with CT Department of Energy and Environmental Protection to analyze state monitoring data and develop ecological & non-ecological approaches for setting criteria
- Resulting in scientifically defensible & ecologically relevant total phosphorous criteria
- Analyses informed stream nutrient criteria development for phosphorus



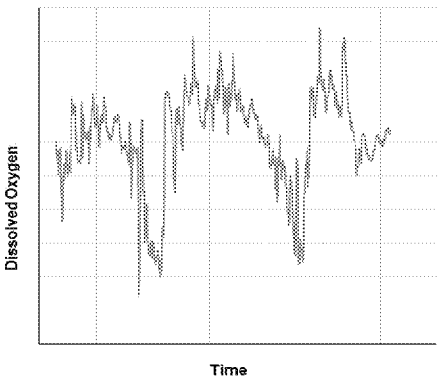
4

Results: Scientifically defensible and ecologically relevant TP criteria were identified at (1) 0.020 mg/l for designating highest quality streams and restoration targets, above which sensitive taxa steeply declined, tolerant taxa increased, and community structure changed, (2) 0.040 mg/l, at which community level change points began to occur and sensitive diatoms were greatly reduced, (3) 0.065 mg/l, above which most sensitive diatoms were lost and tolerant diatoms steeply increased to their maxima, and (4) 0.082 mg/l, which appeared to be a saturated threshold, beyond which substantially altered community structure was sustained.

Figure: Summary of change points and threshold generated from non-ecological approaches (vertical black line from left to right are modeled TP and t25th percentiles of study sites, ecoregion, and nutrient region XIV) and ecologically based approaches. Circles represent change points and horizontal lines are 90th percentiles. Textured boxes represent ranges of TP within which metrics had substantial changes as indicated by boosted regression trees, and symbols represent steep sections of response curves where the greatest increases (+) or decreases (_) occurred. The 90th percentail (0.222mg TP/l) of chlorophyll a is beyond

Dissolved Oxygen Standards for MA & NH

- MA and NH are reevaluating their marine dissolve oxygen standards
- ORD provided technical assistance through Region 1 for the application of EPA's saltwater dissolved oxygen criteria and its implementation with time-varying dissolved oxygen in MA & NH marine waters
- Assistance increased confidence in how the 2000 Virginian Province criteria document was created & its applicability to MA & NH
- Anticipated improvement to MA & NH dissolved oxygen standards



Managing Phosphorus: Monponsett Ponds, MA

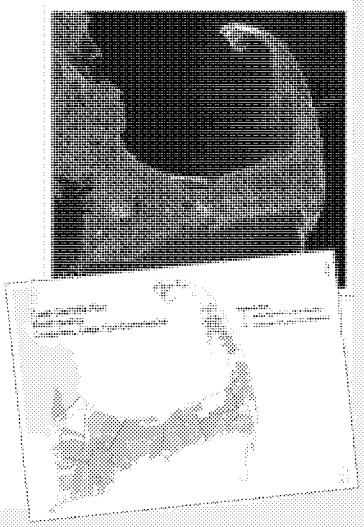
- Water supply management of Monponsett Ponds in Halifax, MA increased retention time of phosphorus, resulting in extended blue-green algal blooms
- ORD worked with local watershed group to apply Watershed Management Optimization Support Tool (WMOST*) to evaluate solutions to meet water demands while minimizing interbasin transfers

- WMOST identified need to reduce interbasin transfers, with green infrastructure best management practices (BMPs) a common element in least cost solutions
- Halifax Board of Health used results in applying for grants to implement stormwater BMPs in watershed to increase infiltration (water supply) & reduce runoff to ponds

*https://www.epa.gov/ceam/wmost

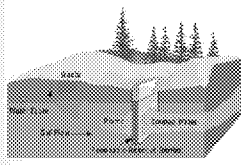
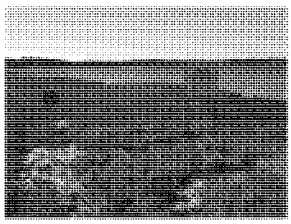
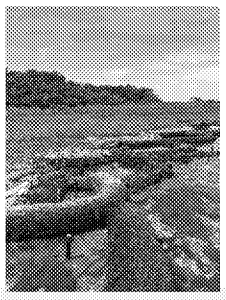
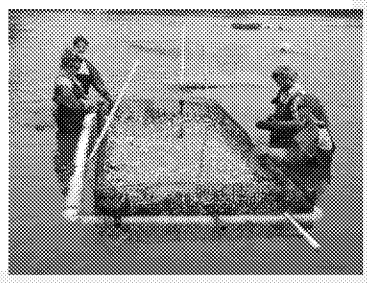
Managing Nitrogen on Cape Cod, MA

- Approximately 34 watersheds on Cape Cod, MA with Total Maximum Daily Loads for nitrogen not being met currently
- 2014 Conservation Law Foundation sued US EPA for not meeting the Clean Water Act limits for nitrogen in Cape Cod's estuaries
- Responsibility had been delegated to the state of Massachusetts
- The state had delegated responsibility to the Cape Cod Commission
- Organizations & communities are revisiting their roles & how to address the loading limits



How ORD Is Helping MA & Cape Cod Communities

- Integrating social and ecological data
- Evaluate effectiveness of alternative solutions
- Support towns to weigh the tradeoffs & co-benefits of alternative solutions
- Customized solutions appropriate for communities to achieve Clean Water Act goals

8

Decision support tool—approach to evaluate different solution sets on alternatives
Evaluating peoples' acceptance of various alternative approaches

Alternative septic systems such as permeable reactive barriers (PRBs) can offer an efficient means of controlling nitrogen loads in areas where N inputs are dominated by septic systems
In coastal areas, PRBs may be most beneficial (most bang for the buck) in densely populated near-shore locations where they may also be susceptible to seawater intrusion
Our experiment examined how saltwater intrusion affects the nutrient removal capacity of woodchip-based PRBs
Preliminary results (for one species of nitrogen, nitrate) suggest that nitrogen removal efficiency is not substantially impacted by episodic seawater intrusion
Results will help to inform decisions to install woodchip-based PRBs in coastal areas prone to episodic flooding events by providing data on their potential efficiency in these environments

10/19/2017

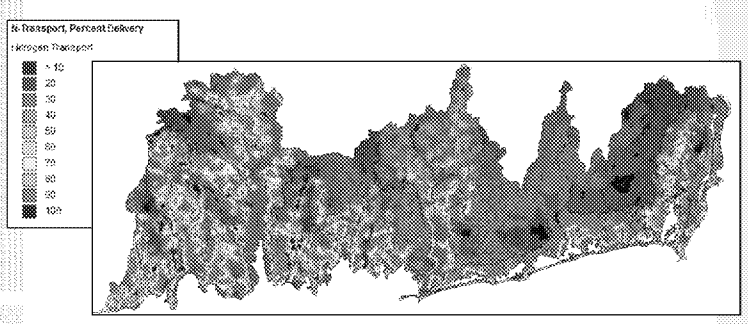
Mapping Nutrients: N-SINK

Purpose

- N-Sink is a useful web-based decision support tool built on biogeochemistry, hydrology, and GIS that shows locations sensitive to nitrogen pollution within a watershed
- N-Sink uses hydrology, land-cover, and best available biogeochemistry data to estimate Nitrogen retention along the flowpath
- Developed in collaboration with University of Connecticut and the University of Rhode Island

Application

- N-Sink is used by land use planners and managers as a planning and prioritization tool for N decision making in watersheds
- Web based with maps for users
- Provides insight to decision makers about nitrogen retention and locations sensitive to nitrogen loading



Heat map of nitrogen retention in some New England HUC 12 "watersheds." Red indicates N is not retained with watershed. Blue indicates low N delivery or high retention of N.

http://clear.uconn.edu/projects/nsink/

9

ORD continues N-Sink Tool Development with U Conn, ORD, and R1 EPA

N-Sink team works with R1, U Conn, and ORD on watersheds for inclusion in the current N-Sink web tool. Available now for watersheds in New England.

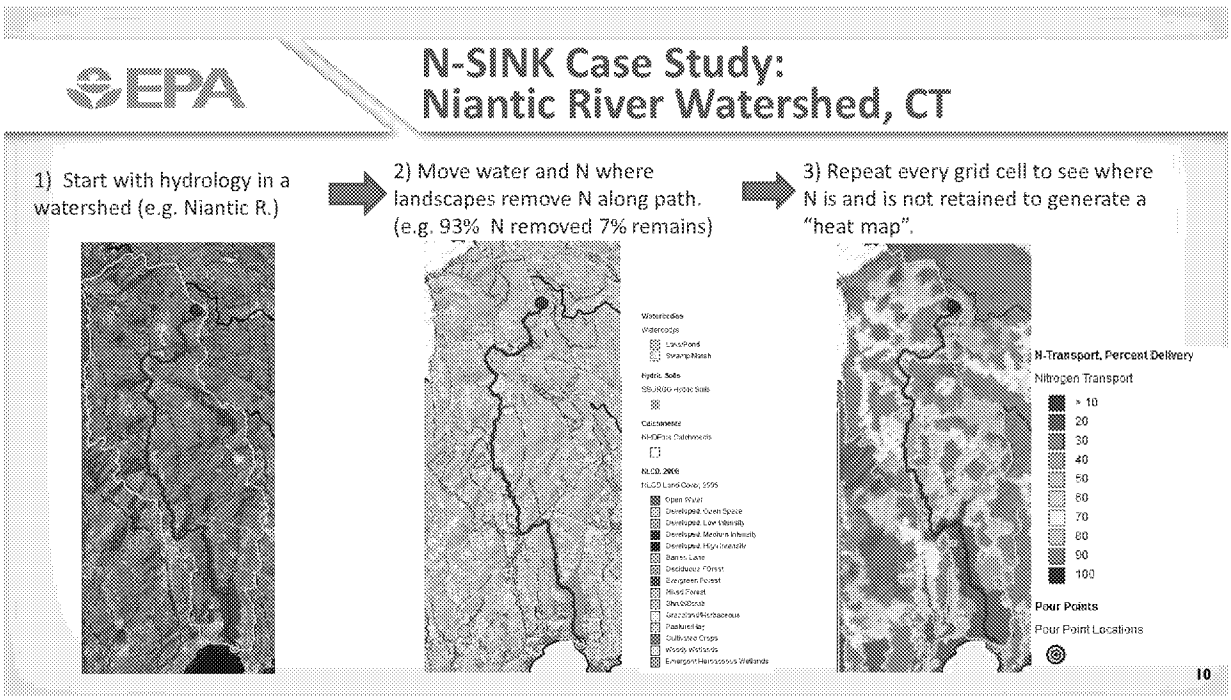
Applying N-Sink in its current form to new watersheds of interest. The goal is to improve the web tool and make heat maps for more watersheds.

Cooperative Agreement funded to expand N-Sink platform for broader application.

Convert N-Sink to support greater spatial coverage. Go national. Requires further model development (Vector based to Raster based for broader application)

Evaluating inclusion of BMP's, other nutrients like P, and export layers for other applications

Continued outreach for community input to improve the tool.



How: N-sink step by step:
Water moves down hill. Water transport is used as N transport (that is ok because Nitrate is mobilized by water)
Nitrogen is retained by each landscape feature at a certain biogeochemical rate x duration of water/nitrogen staying in that feature as it moves out of the watershed. Back calculate to the original location and assign a %retention and %exit.
Repeat for every grid cell in the watershed and you have a retention surface that tells users where the sensitive areas are and where the robust areas are located.

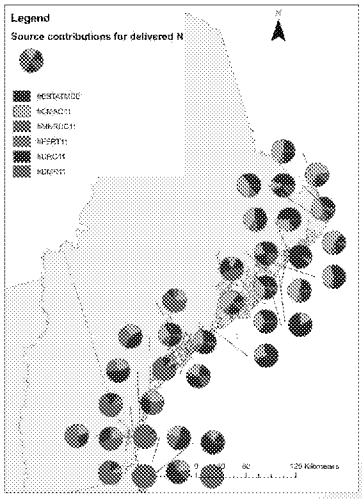
What: So far we have funded URI and Uconn to produce reports on case study use of the tool, the limitations of the tool, and feasibility of expansion. Part of this work included heat maps that are now expanded to the entire study area.

Based on published science, nationally available data, and best available Biogeochemical functions ported to a web-based tool.
Uconn and URI are our partners and have an outreach component that we can tap directly into for tool development and enhancement.
http://clear.uconn.edu/projects/nsink/index.htm
ORD continues N-Sink Tool Development with U Conn, ORD, and R1 EPA
N-Sink team works with R1, U Conn, and ORD on watersheds for inclusion in the current N-Sink web tool. Available now for watersheds in New England.
Applying N-Sink in its current form to new watersheds of interest. The goal is to improve the web tool and make heat maps for more watersheds.
Cooperative Agreement funded to expand N-Sink platform for broader application.

Convert N-Sink to support greater spatial coverage. Go national. Requires further model development (Vector based to Raster based for broader application)
Evaluating inclusion of BMP's, other nutrients like P, and export layers for other applications
Continued outreach for community input to improve the tool.

Mapping Nutrients: Estuary Data Mapper

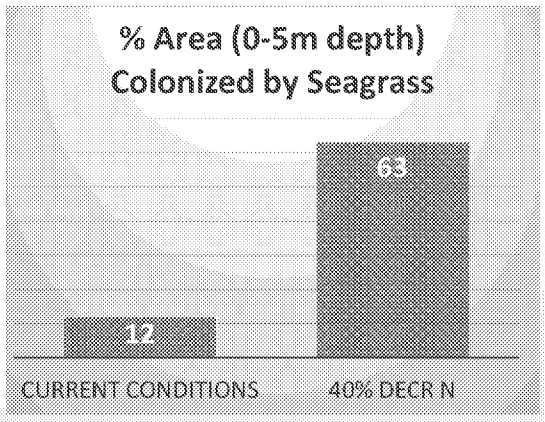
- Status & trends of nitrogen loads & sources to estuaries are needed to inform Comprehensive Conservation and Management Plans, Coastal Zone Management Plans & Total Maximum Daily Loads
- ORD developed a virtual data portal for information on estuaries & coastal watersheds of the US
- Existing data on nitrogen sources & loadings to estuarine watersheds added to Estuary Data Mapper
- When combined with regional SPARROW* models, Estuary Data Mapper can inform managers about relative sources, loads & trends in their estuaries



*USGS Spatially Referenced Regression On Watershed Attributes (SPARROW)

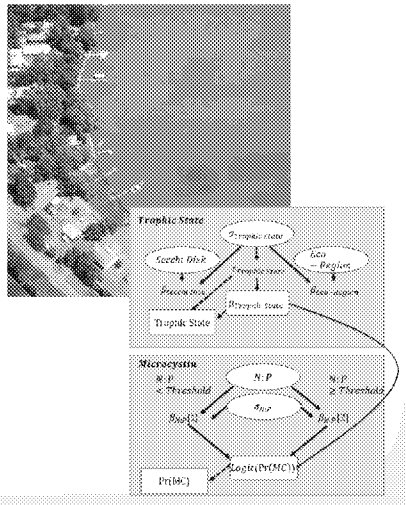
Evaluating Effects of Nitrogen on Eelgrass

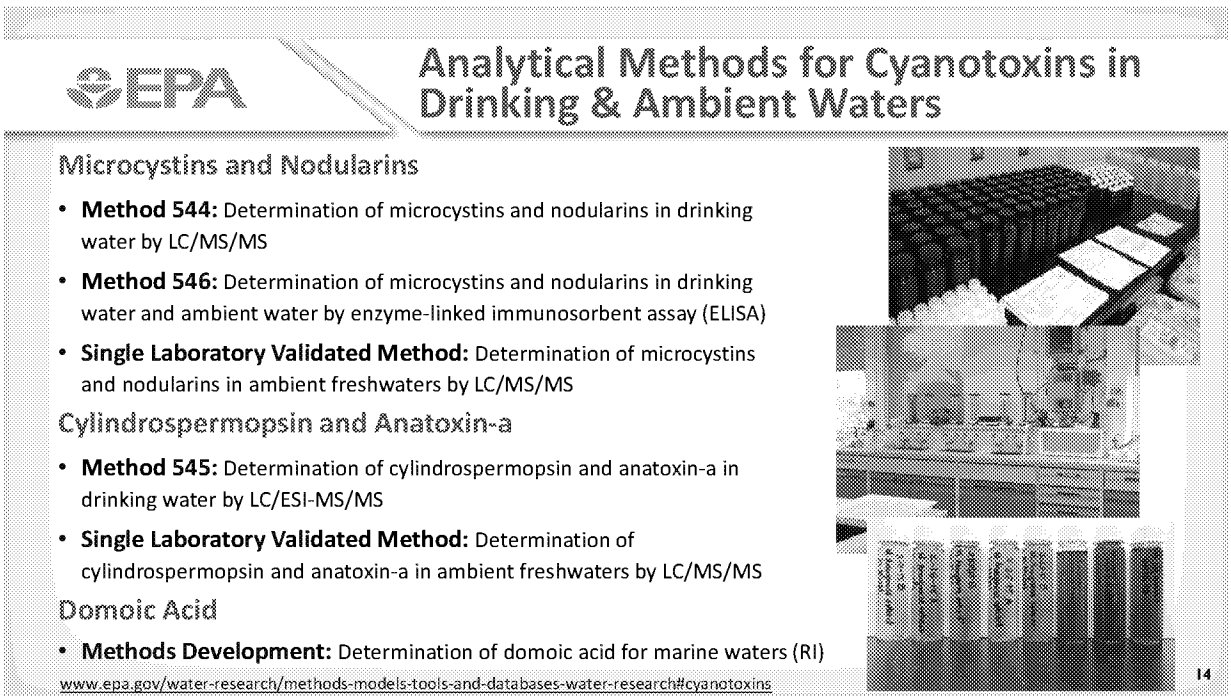
- Changing nutrient loads, in combination with other moderating factors, will affect eelgrass recovery in Narragansett Bay, RI
- ORD developed predictive seagrass presence/absence model accounting for spatial autocorrelation
- The Narragansett Bay Seagrass Model produced robust predictions of eelgrass extent
- Model provides ability to discriminate factors, predict recovery & potential factors limiting recovery (e.g., tidal currents) at specific sites in the Bay



Predicting Occurrences of Harmful Algal Blooms

- Harmful algal blooms of cyanobacteria are occurring more frequently, and are more severe, in New England lakes and reservoirs, with potential ecological, human health & economic consequences
- ORD is developing data-intensive statistical models to predict the likelihoods of bloom events and of microcystin in individual water bodies
- Modeled relations developed between landscape characteristics & lake trophic state, and between tropic state & presence of microcystin
- Modeled results can inform management of conditions (e.g., nutrient loads) influencing bloom occurrence, and can direct routine monitoring for harmful algal blooms





EPA Method 544: Determination of Microcystins and Nodularin in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)This method is used to determine six microcystins (including MC-LR) and nodularin in drinking water using solid phase extraction and liquid chromatography tandem mass spectrometry (SPE-LC/MS/MS). The advantage of this SPE-LC/MS/MS is its sensitivity and ability to speciate the microcystins. This method development task establishes sample preservation techniques, sample concentration and analytical procedures, aqueous and extract holding time criteria and quality control procedures.

EPA Method 545: Determination of Cylindrospermopsin and Anatoxin-a in Drinking Water by Liquid Chromatography Electrospray Ionization Tandem Mass Spectrometry (LC/ESI-MS/MS)This method is used for the determination of the algal toxins, cylindrospermopsin and anatoxin-a, in finished drinking water. Method 545 requires the use of MS/MS in Multiple Reaction Monitoring (MRM) mode to enhance selectivity. It is intended for use by analysts skilled in the operation of LC/ESI-MS/MS instrumentation and the interpretation of the associated data.

EPA Method 546: Determination of Total Microcystins and Nodularins in Drinking Water and Ambient Water by Adda Enzyme-Linked Immunosorbent Assay (ELISA)This method is used for the determination of total microcystins and nodularins in finished drinking water and in ambient water using ELISA. It measures the total concentration based on detection of a characteristic feature common to microcystin and nodularin congeners (structural variants).

Single Laboratory Validated Method for Determination of Cylindrospermopsin and Anatoxin-a in Ambient Freshwaters by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)This standardized, single laboratory validated liquid chromatography/tandem mass spectrometry (LC/MS/MS) method is used for the detection of

cyanotoxins—cylindrospermopsin and anatoxin-a (combined intracellular and extracellular)—in ambient freshwaters. It requires the use of very small volumes of organic solvent and very small quantities of pure analytes, thereby minimizing potential hazards to both the analyst and the environment as compared to the use of large volumes of organic solvents in conventional liquid-liquid extractions.

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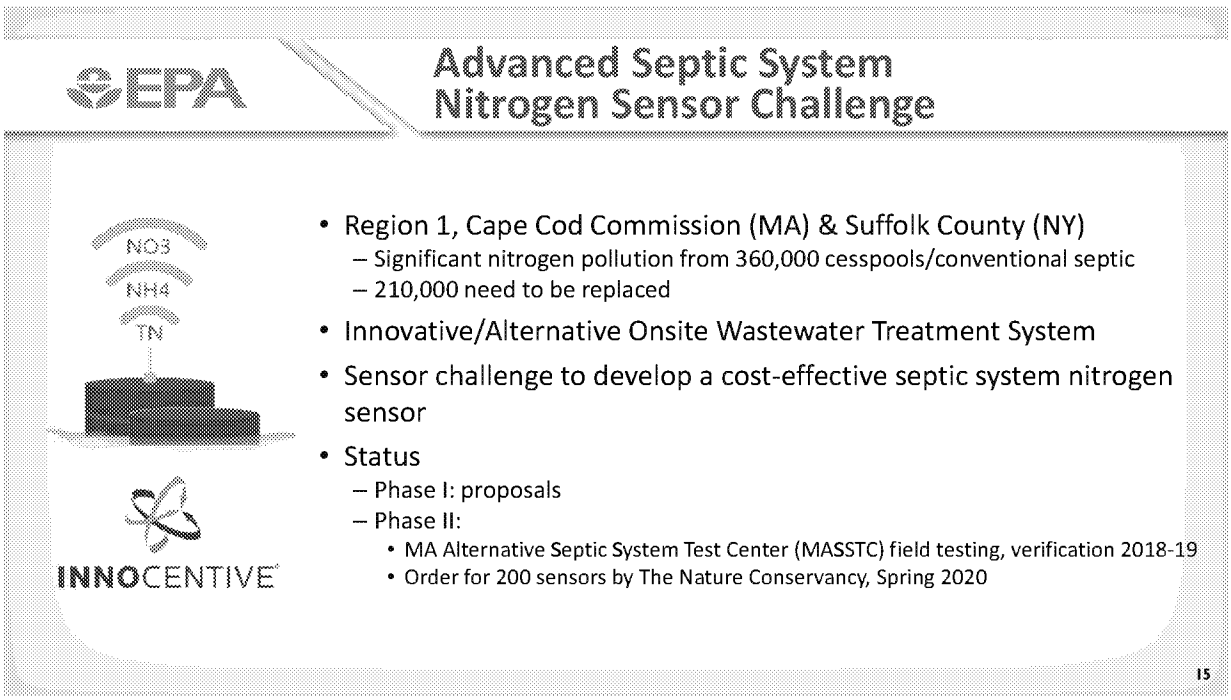


innovative/alternative onsite wastewater treatment system (I/A OWTS)

The current cost of monitoring one I/A OWTS during the four and half years of the MA permitting process is $4,500. It costs $300 to sample 1 system and run the lab tests. For an I/A OWTS manufacturer to monitor the required 50 systems in MA over 4.5 years, it costs $155,250 for the sampling.

Sensor challenge to develop a cost-effective septic system nitrogen sensor
Assures long-term system functionality & evidence for recommendation
Lower data collection costs
Performance and maintenance
Verification and reduce field testing costs; improve performance
Aid in streamlining permitting process over time

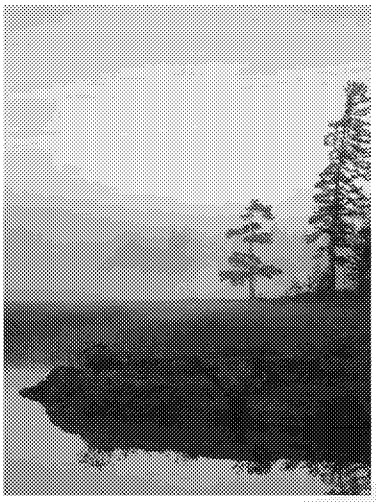
Workshop/webinar: 7/12/2018
1st no risk one month test: 10/1/2018
2nd no risk one month test: 1/7/2019
By invitation only, 6 month field verification test: 5/13-11/15/2019
Awards: ISO ETV 14034 verification reports, 2/21/2020
Proposed TNC order for 200 sensors: Spring 2020

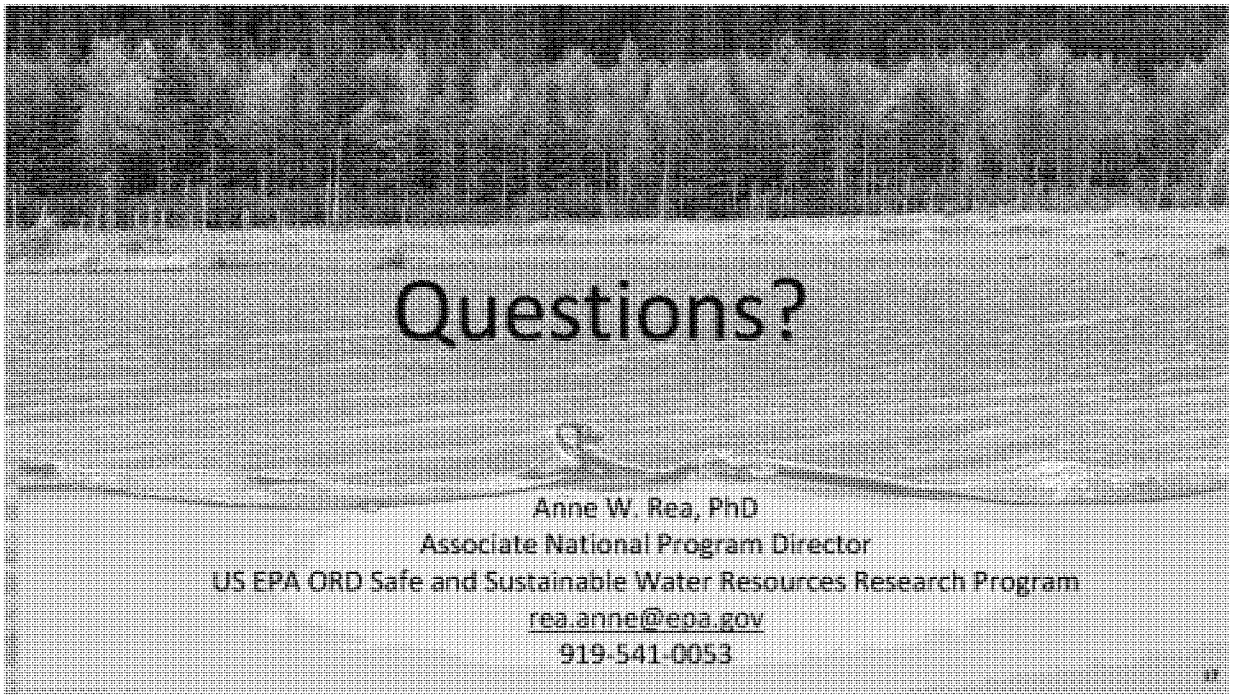
All the sensor testing will be conducted at the MA Alternative Septic System Test Center (MASSTC) on Cape Cod. Our Technical Panel for the prototype testing includes the following people from the R1 area: George Loomis (URI professor, advanced septic system expert & advisor to RI), George Heufelder (Head of MASSTC) and Brian Dudley (MA DEP).

Tel Labs is also developing a very low cost nitrate and ammonium sensor for the Advanced Septic System Nitrogen Sensor Challenge. Mark Bowkett, CEO of Tel Labs, will be speaking next Monday at the showcase meeting in Woods Hole.

Assisting New England with Nutrient Issues

- Informing development of nutrient and related criteria & standards
- Evaluating approaches to nutrient management & mapping
- Evaluating the effects of excess nutrients on aquatic resources
- Using data-intensive models to predict occurances of harmful algal blooms, and developing methods for quantification of cyanotoxins in drinking water
- Encouraging development of nutrient sensors




Questions?
Anne W. Rea, PhD
Associate National Program Director
US EPA ORD Safe and Sustainable Water Resources Research Program
rea.anne@epa.gov
919-541-0053

Managing Nutrients: Upper Taunton Watershed, MA

- Taunton River watershed is one of the fastest developing watersheds in MA, with eutrophication-related 303d listings for lakes & streams, and a need to control nitrogen loading to Narragansett Bay, RI
- ORD worked with consortium of NGOs & planning groups to apply the Watershed Management Optimization Support Tool (WMOST*) to determine most cost-effective management actions to meet multiple loading targets

- Results demonstrated that green infrastructure best management practices & riparian buffer restorations could be most cost effective solutions in reducing non-point source phosphorus loads to lakes & nitrogen loads to Narragansett Bay
- Consortium requesting additional funds to apply WMOST to future growth/climate scenarios in watershed & to inform municipal managers

*https://www.epa.gov/ceam/wmost

303d listings driven by phosphorus

Nutrient Sensor Challenges

EPA-led interagency collaboration on prize challenges to address nutrients www.challenge.gov

CHALLENGE	GOAL	RESULT/STATUS
Nutrient Sensor Challenge	Affordable nitrogen and phosphorous sensors to market	3x price reduction sensors on the market
Visualize Nutrients	Effective communication/visualization of nutrient data	Award winning video
Smart Septic Sensor Challenge	Nitrogen sensors to monitor septic system integrity	Breakthrough technology for low-cost nitrogen sensors (U. Connecticut)
Nutrient Reduction Challenge	Recover nitrogen/phosphorous from pork and dairy manure	Prototypes in development
Nutrient Sensor Action Challenge	Demonstrated use of nitrogen/phosphorous sensor data for use in decision making	Stage 1 - 11 teams participated Stage 2 - launch February 2018

19

In 2013 a coalition of agencies agreed to work together on issues pertaining to nutrient pollution.
EPA, USGS, NOAA, NIST and USDA; The Agencies convened a Visioneering with experts from different sectors and disciplines to identify barriers; from those barriers a set of challenges grew that the agencies worked on together.

This list is some of the activities by the coalition;

Nutrient Sensor Challenge – low cost sensors for N and P; there is now a sensor on the market and other companies have reduced their prices

Vizualize Nutrients Challenge – challenge to create effective examples of visualizing data from nutrient sensors; help turn data into information

Smart Septic Challenge – with Masschusetts, Suffolk County NY -serious issues with N from failing septic systems; needed a small and affordable sensors; breakthrough technology identified from U Conn.

Nutrient Reduction Challenge – Office of Water challenge with extensive public/private partnership to find cost effective solutions for N and P recovery from pork and dairy

Nutrient Sensor Action Challenge – Proof of concept challenges for communities/organizations to demonstrate added value and opportunity for N/P sensor data to be used in decisions

Here are the two companies from the sensor challenge that now have low cost sensors on the market. I know Systea has sensors collecting data in New England and in Ohio – I don't know exactly who are the partners but am trying to find out .

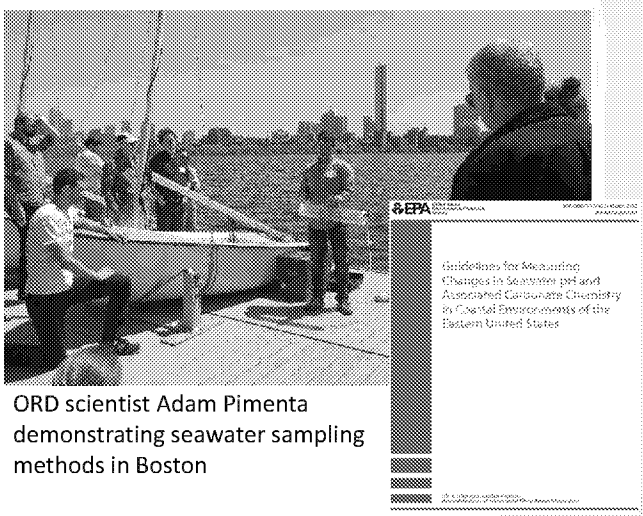
Systea – WIZ probe
http://www.systea.it/index.php?option=com_k2&view=item&layout=item&id=223&Itemid=175&lang=en

Tel Labs – Lowcost sensor for nitrate, nitrite, ammonium and phosphate for open waters: http://www.aquamonitrix.com/

Also there is a 4th sensor for nitrate, nitrite, ammonium and phosphate for open waters: http://www.aquamonitrix.com/ It was developed by Tel Labs. They were involved in the Nutrient Challenge, but the Aquamonitrix was not commercial ready until recently, and I think it costs $5-6K.

Near-Coastal Acidification & Hypoxia – CT, MA & ME

- Nutrient-enhanced near-coastal acidification has the potential to adversely affect shellfish
- Changes in pH in near-coastal waters currently are difficult to measure
- ORD developed monitoring guidelines & demonstrated their application during citizen science workshops with a range of stakeholders
- Organizations now coordinating monitoring efforts, equipment & data



ORD scientist Adam Pimenta demonstrating seawater sampling methods in Boston

https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100UDMR.txt 20

Coastal communities are concerned about coastal acidification, which has been difficult to monitor with traditional open water sensors because it is influenced by dynamic eutrophication processes and pulses of freshwater after storm events.

EPA recently published coastal acidification monitoring guidelines, which are written for a wide variety of audiences concerned about impacts. The guidelines can be found here: https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100UDMR.txt.

Science partners held citizen science workshops in Connecticut, Maine, and Massachusetts focusing on the guidelines and on strengthening regional connections among researchers, citizen scientists, and other stakeholders. EPA staff served as 'science advisors' during the workshops.

Workshop participants included shellfish growers, educators, and representatives of municipal shellfish commissions, watershed associations, state agencies, regional organizations (e.g., NEIWPCC, Save the Bay, Harbor Watch, etc), land trusts, and research organizations. These organizations resolved to coordinate their efforts, share data, equipment and lessons learned, and have begun to discuss quarterly sampling "blitzes" and shared calibration exercises.

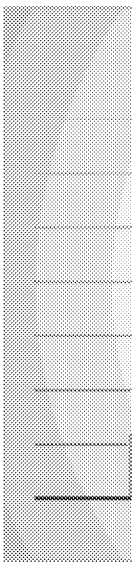
****

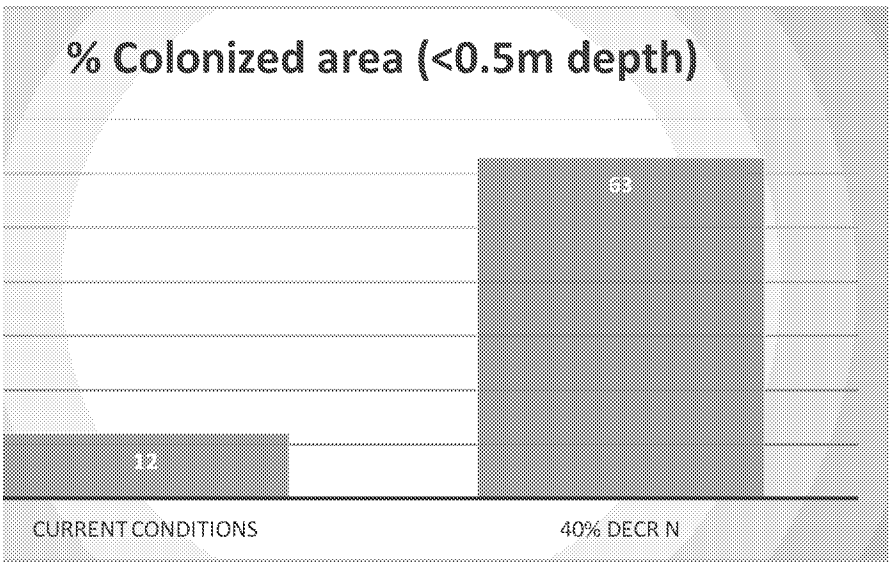
EPA's recently released coastal acidification monitoring guidelines lay out the relationships with nutrient enrichment and may be of interest (https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100UDMR.txt). The document also contains a bunch of info on methods. There has been a ton of interest; Adam and I served as 'science experts' during three citizen science workshops funded by NOAA and held in May in Connecticut, Maine, and Massachusetts. The guidelines served

as the ‘jumping off’ point for the workshops, where we gave an overview and demonstrated some of the methods and equipment. You are welcome to use any of the slides in the ‘grear’ file you attached, but my guess is that they would take too much explanation to be of value for state the commissioners meeting, perhaps with the exception of the ones with pictures of shellfish experiments.

Note that Maine and Rhode Island both have legislative commissions on ocean acidification. Not sure about MA and CT and NH.

	% Colonized area (<0.5m depth)
Current Conditions	12
40% Decr N	63




% Colonized area (<0.5m depth)
63
12
CURRENT CONDITIONS
40% DECR N

US EPA's Office of Research and Development (ORD) Science and Technical Capabilities

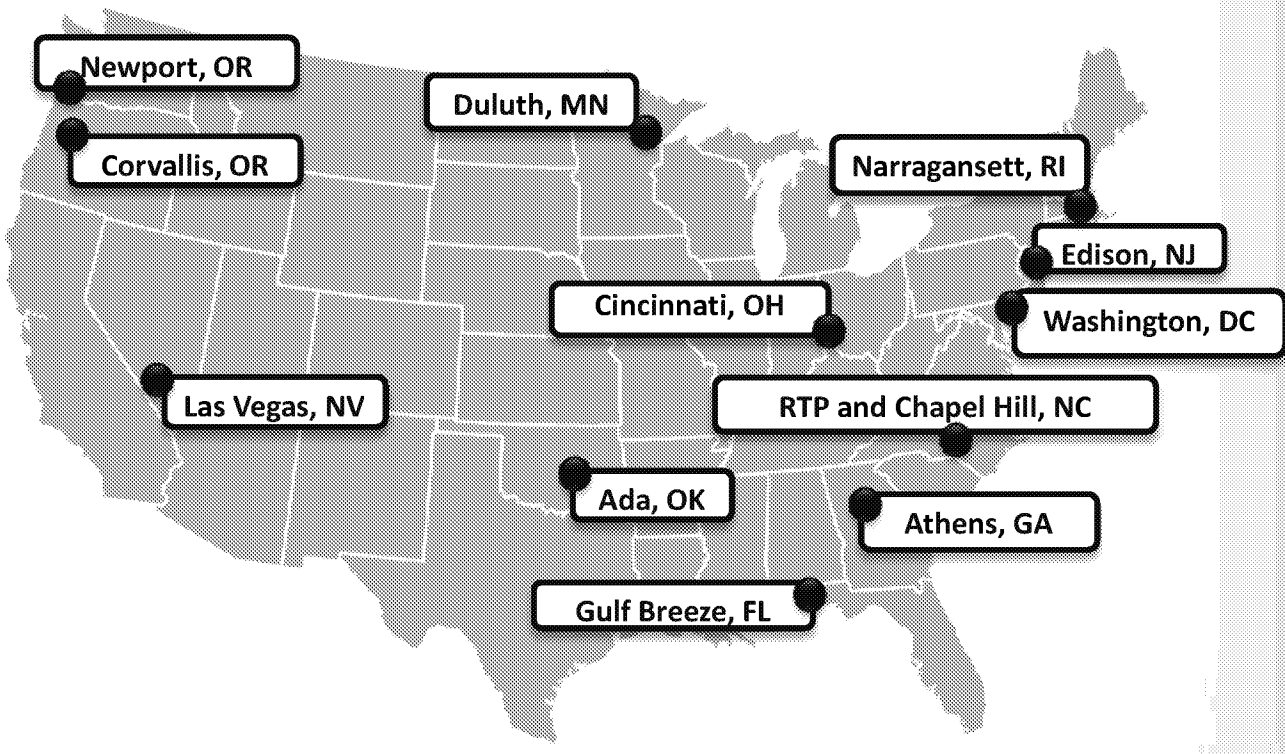
Jennifer Orme-Zavaleta
Principal Deputy Assistant Administrator for Science

June 19, 2018

ORD At A Glance

Our Mission

Provide the science, technical support, technology and tools to inform US EPA's mission to protect public health and the environment.



1,513.9 full time equivalents
(proposed OP plan)
$492 million budget
12 locations

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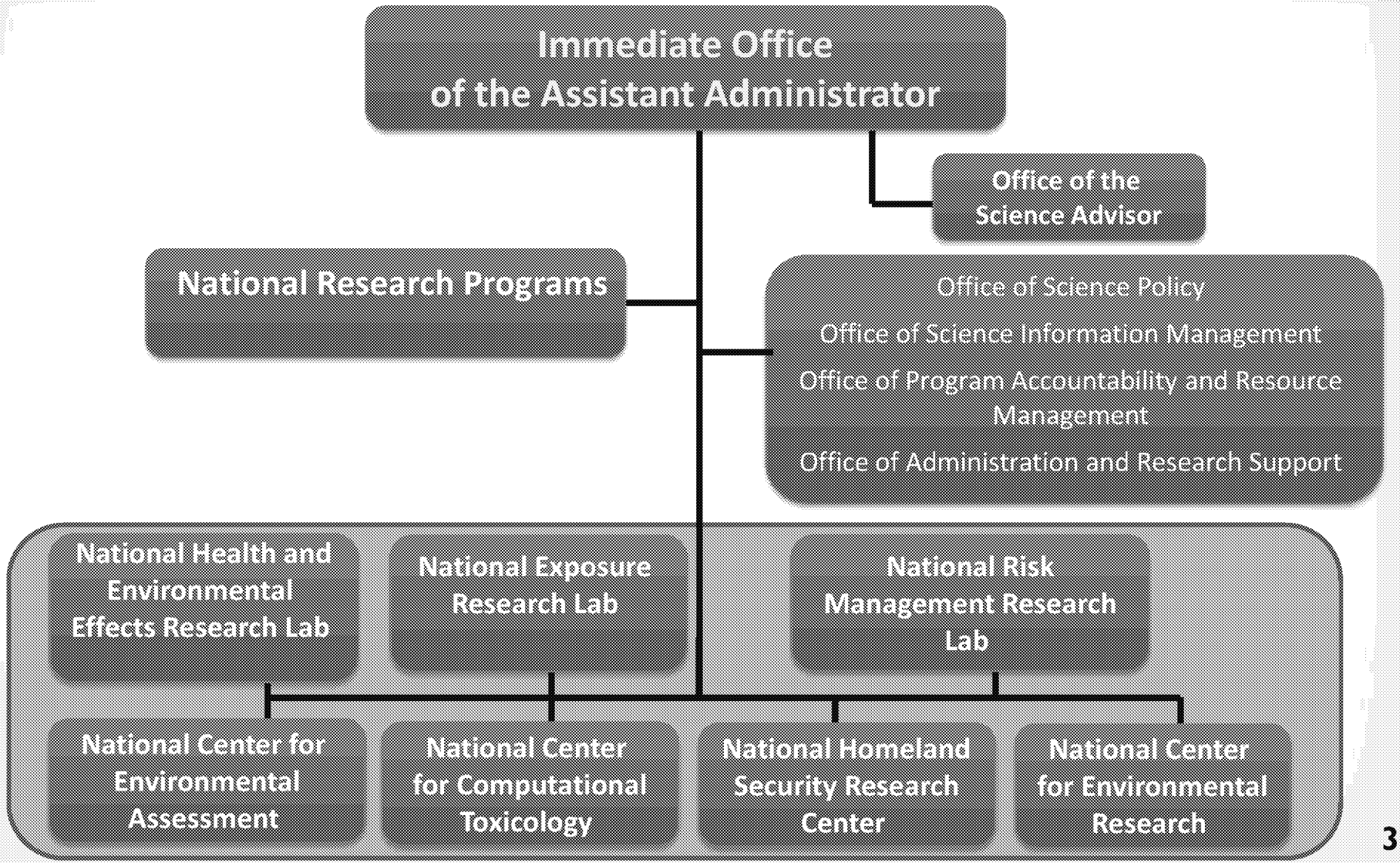
ORD Organizational Chart



Research Authorization

US EPA's research provides science that is authorized by nearly 50 environmental laws including:

- **Toxic Substances Control Act:** "conduct such research, development, and monitoring as is necessary to carry out the purposes of this Act. The Administrator may enter into contracts and may make grants for research, development, and monitoring under this subsection."
- **Safe Drinking Water Act**: "conduct research, studies, and demonstrations relating to the causes, diagnosis, treatment, control, and prevention of physical and mental diseases and other impairments of man resulting directly or indirectly from contaminants in water, or to the provision of a dependably safe supply of drinking water."
- **Comprehensive Environmental Response, Compensation, and Liability Act:** "shall assure the initiation of a program of research designed to determine the health effects (and techniques for development of methods to determine such health effects) of such substance…and in combination with other substances with which it is commonly found."
- **Clean Air Act:** "shall establish a national research and development program for the prevention and control of air pollution."

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ORD Research

ORD provides the scientific foundation for US EPA to execute its mandate to protect human health and the environment.

1. **Longer Term Research**: Conducts ***innovative and anticipatory*** research applied to a range of US EPA program and regional needs to solve longer term environmental challenges and provide the basis of future environmental protection.
2. **Research on Statutory Requirements and Specific Environmental Challenges**: Experts provide research support to US EPA program and regional offices, as well as states, tribes and communities, to help them respond to contemporary environmental challenges.
3. **Technical and Emergency Support**: Because of our expertise, local, state and national officials come to us for technical support to respond to environmental crises and needs, large and small.

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National Research Programs

Air and Energy

- *Air pollution*
- *Air quality monitoring*
- *Decision support tools*

Sustainable & Healthy Communities

- *Ecosystem services*
- *Human health*
- *Sustainable materials management*
- *Superfund*

Safe & Sustainable Water Resources

- *Watersheds/recreational waters*
- *Nutrients and harmful algal blooms (HABs)*
- *Water treatment and infrastructure*

Chemical Safety for Sustainability

- *Computational toxicology and exposure*
- *Evaluation of risk across life cycle of manufactured chemicals, materials and products*

Human Health Risk Assessment

- *Risk assessments for specific chemicals*
- *Risk assessment methods*

Homeland Security

- *Water system security*
- *Resilience and remediating wide areas*

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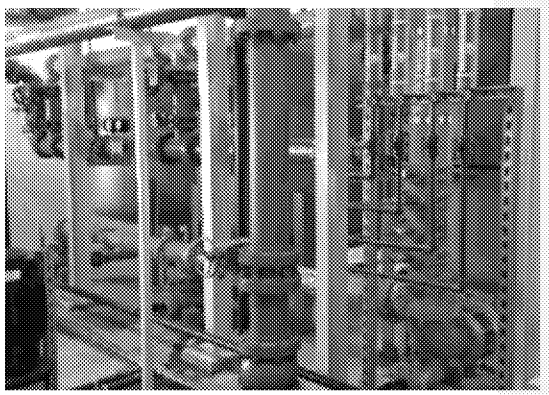
State Engagement

ORD regularly engages with state agencies to ensure states' environmental science needs are being met and to provide science-based tools, approaches and methods, technical support and training.

- **State Research Needs**
  - ECOS/ERIS surveys
- ***ECOS and ORD: Partners for Meeting State Research Needs*, Sept 2017**
  - This most recent summary compiles 78 stories of how ORD's work during the past 5 years has supported states
- **Memorandum of Agreement (MOA) with ECOS and ASTHO**
  - Current project gathered information on how states communicate the risks of per- and poly-fluorinated alkyl substances (PFAS) and harmful algal blooms (HABs)
- **Webinars on Research Products and Tools**
  - *EPA Tools & Resources* monthly series
- **Outreach and Collaboration**
  - Lab visits to share ORD science & technical capabilities and discuss science-related topics of interest to states



"Ammonia residual in the distribution system can cause nitrification and other operational 'nightmares.' This EPA ORD supported pilot project in Palo is successful and the use of biologically active filters is an innovative, emerging drinking water technology that can be a viable option for certain other systems." — Bill Ehm, Director, Environmental Services Division, Iowa Dept of Natural Resources

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EPA Research Supports States

Some Recent Examples

10

AK – PFAS
ID – Modeling for agriculture, energy, water and air systems interactions
OR – Water nitrate contamination; Tools to help communities identify environmental issues; Ocean acidification research; Reducing methyl mercury levels; Advanced monitoring technologies
WA – Managing nutrients in riparian ecosystems; Habitat suitability models

9

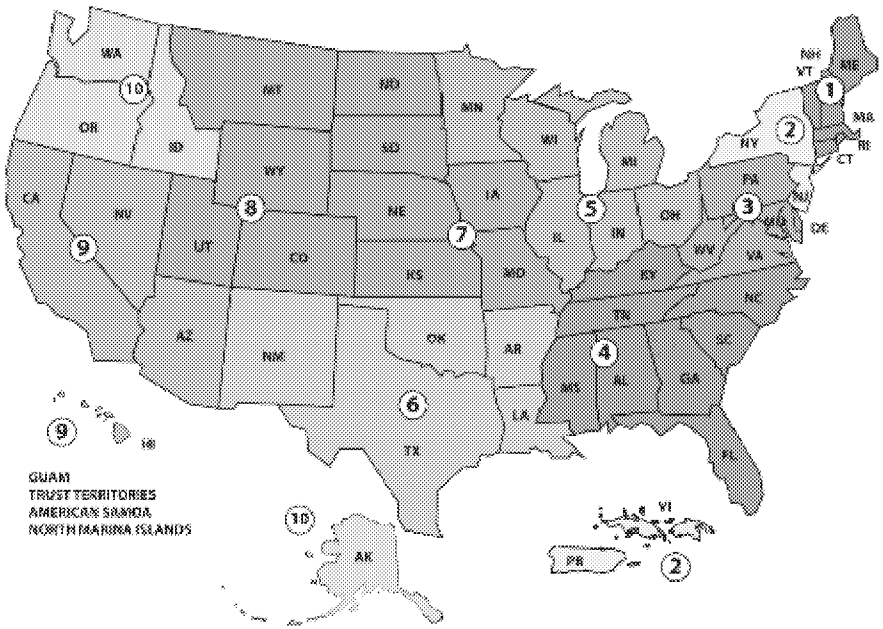
CA – Evaluating chemicals; Population and land use projections; Synthetic turf field safety; Decontaminating subway railcars; Decision support tools to advance communities' priority projects; Risk assessment training; Advanced monitoring technologies
NV – Groundwater characterization and remediation

8

CO – Simulating conditions in drinking water utilities; Advanced monitoring technologies
MT – IRIS assessment for Libby Amphibole Asbestos; Asbestos exposure following forest fires
UT – Fine particle air pollution; Emissions measurement methods

7

IA – High ammonia levels in drinking water
KS – Prairie rangeland burning; Community air quality monitoring
MO – Models and tools to reduce sewer overflows



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LA – Cancer risk assessments
OK and **TX** – Community air quality monitoring
OK – Chemical composition analysis; Evaluating water interactions at Superfund site
TX – Chemical contamination risks

5

MI – Lead contamination technical support; Simulating conditions in drinking water utilities
MN – Sulfate standard development support; Modeling bioaccumulation of PCBs and mercury in fish
OH – Harmful algal blooms limiting drinking water; Managing algal toxins; Small drinking water systems; Simulating conditions in drinking water utilities
WI – Predicting water quality at beaches

1

CT – Community air quality monitoring;
CT, MA, ME , NH, RI and **VT** – Stream monitoring network; Planning for energy and air emissions
CT and **NH** – Advanced monitoring technologies
ME – Tribal risk assessment (sediment and water quality)
VT – Impervious cover data for watersheds

2

NJ and **NY** – Stream monitoring network; Planning for energy and air emissions
NJ – PFAS
NY – Management of bio-hazardous wastes; Planning for biological incident; Simulating conditions in drinking water utilities

3

DE, MD, PA, VA and **WV** – Stream monitoring network
MD – Managing stormwater treatment systems; Advanced monitoring technologies; Reducing harmful air pollutants; Management of bio-hazardous wastes
MD, PA and VA – Stormwater management planning support
PA – CADDIS causal assessment; Community air quality monitoring

4

AL, GA, KY, NC, SC, TN – Stream monitoring network
FL, GA, KY, NC, SC, TN – Characterizing urban background levels for contaminated site cleanup levels
FL, KY – Simulating conditions in drinking water utilities
GA – Green infrastructure in Atlanta's Proctor Creek
KY – Advanced monitoring technologies
MS – Fecal bacterial and viral indicators
NC – Community air quality monitoring; STEM education; Wright Chemical Superfund Site
SC – Food waste reduction

https://www.epa.gov/research/us-epa-office-research-and-development-and-environmental-council-states-partners-meeting

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Technical Assistance on PFAS to New Hampshire

- Extensive work characterizing "legacy" PFAS previously conducted by NH using contract laboratories
- Ongoing technical challenges including limitations in fluorochemistry and related fate and transport expertise, with handling more complex sample matrices, and with the unknown nature of compounds
- NH Department of Environmental Services requested ORD's assistance which resulted in a strong collaborative effort with NH collecting valuable samples and ORD applying novel methods of sampling (air) and analysis (non-targeted high-resolution mass spectrometry)
- Status:
  - Sampling and analysis is ongoing
  - First report (targeted analysis) delivered 4/4/2018
  - Non-targeted analysis is identifying novel PFAS
- Impact:
  - This work will help NH determine the needs for and proper design of air pollution control equipment to prevent PFAS emissions

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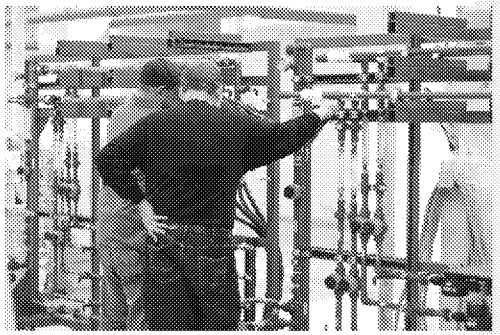
Technical and Emergency Support: Lead

Supporting States & Regions:

- Researching methods to improve the ability to identify lead service lines in a non-destructive way (e.g., Flint, MI; Galesburg, IL)
- Assessing composition of pipe scales and treatment progress (e.g., Fall River, MA; Providence, RI; Flint, MI)
- Assisting with review of corrosion control plans and studies (e.g., Sebring, OH; Denver, CO; Providence, RI)



Supporting the Lead & Copper Rule:

- Regulatory option selection
- Multimedia exposure modeling to inform a health-based benchmark for lead in drinking water
- Corrosion control treatment options for various water systems
- Sampling methods for monitoring lead
- Cost and benefits analysis

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Other Emergency Response

- **ReAChback for Emergency Response**
  - Quick-response scientific support capability to ensure coordinated, timely response to large-scale disasters
- **Corpus Christi, TX Drinking Water Contamination**
  - Identified decontamination approaches to purge the drinking water systems of the contaminant
- **Ebola Response**
  - Responded to Ebola patients in U.S. by identifying decontamination methods for vehicles, facilities, and Personal Protective Equipment for health care workers, technical support for waste management, and the fate of the virus in wastewater
- **Gold King Mine**
  - Provided toxicity information and developed modeling for long-term monitoring
- **Elevating Critical Public Health Issues Policy**
  - Developed a process to allow staff to expedite the elevation of important issues

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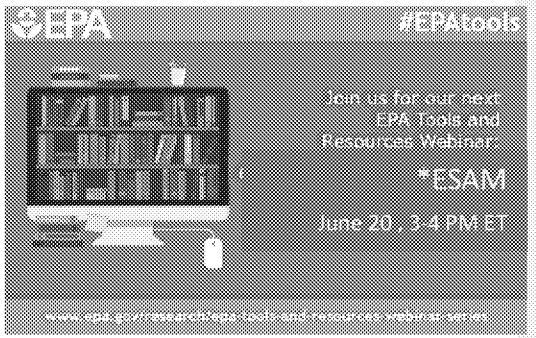
Research Products and Tools



To help ensure that the tools and resources EPA develops are accessible and useful to needs on the ground, ORD hosts a public monthly *EPA Tools and Resources* webinar series to share our research, demonstrate tools and seek input from our partners.

Webinar Topics:

- ✓ Publically available, easily understandable, and not overly technical
- ✓ Relevant to identified state science needs, including case studies
- ✓ Highlighting work at the nexus of public health and the environment

When?

Generally the **3rd Wednesday of every month**, 3-4 PM ET.

Past webinars and upcoming registration at:
https://www.epa.gov/research/epa-tools-and-resources-webinar-series

*(ESAM) Environmental Sampling and Analytical Methods

Communicating the Risks of PFAS and HABs: State Case Studies and Toolkits

- In early 2018, ASTHO and ECOS interviewed health and environmental agency staff from 13 states about their risk communication strategies and lessons learned for either PFAS contamination or HABs. This project was funded by ORD under the MOA.

- Results were compiled into brief case studies that outline the states' overall efforts, risk communication efforts, relevant resources, key messages for the public, and challenges in the states' programs or communications.
  - ECOS states for PFAS state case studies (**PA, MI** and **NH**); ASTHO states (**CO, MN** and **NY**)
  - ECOS states for HABs state case studies (**MO, NC, OH** and **UT**); ASTHO states (**IN, OR** and **VT**)

- Public webinars in June 2018 provided key findings from the case studies and offered potential considerations to others seeking to implement or improve their risk communication practices.

ECOS-EPA Bimonthly PFAS Calls

Coordinate calls with ECOS/states to share information on PFAS human health/toxicity, analytical methods, site characterization/exposure and remediation/treatment work. (Next call is scheduled June 20, 4-5 pm ET)

For More Information

- **EPA Research web page**
  www.epa.gov/research

  - **States and ORD: Partners to Meet State Research Needs**
    https://www.epa.gov/research/states-and-ord-partners-meet-state-research-needs

  - **EPA Tools and Resources webinar series**
    https://www.epa.gov/research/epa-tools-and-resources-webinar-series

  - **EPA ORD Strategic Research Action Plans**
    http://www.epa.gov/research/strategic-research-action-plans

  - **EPA Methods, Models, Tools and Databases**
    https://www.epa.gov/research/methods-models-tools-and-databases

- **EPA Science Matters newsletter**
  https://www.epa.gov/sciencematters

- **It All Starts with Science blog**
  http://blog.epa.gov/science/

- **Join more than 100,000 followers on Twitter (@EPAresearch)**
  https://twitter.com/EPAresearch

ED_002545_00008724-00014

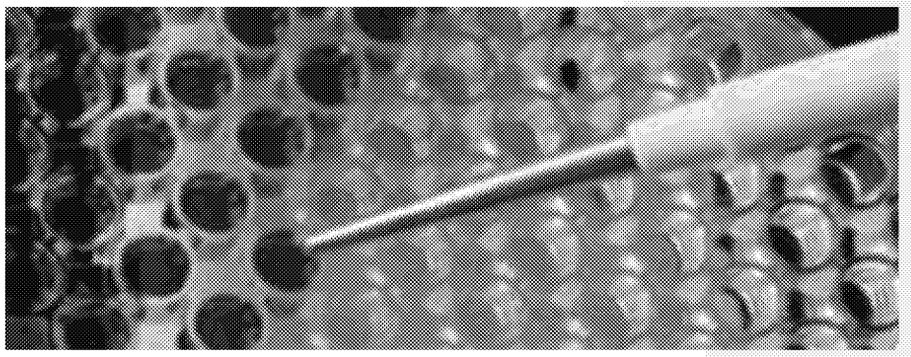
Per- and Polyfluoroalkyl Substances (PFAS) Research & Development Activities

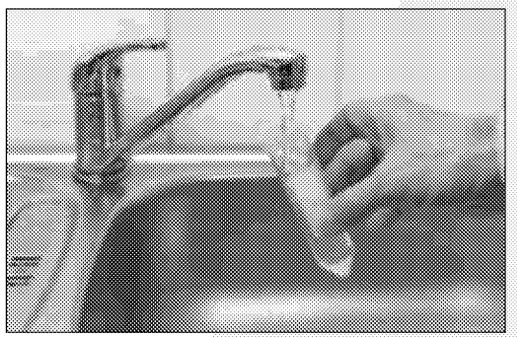
Andrew Gillespie
US EPA Office of Research and Development

New England State Commissioners' Visit to AED
June 19, 2018

Current PFAS Research Activities

- Human Health/Toxicity
- Analytical Methods
- Exposure
- Treatment/Remediation
- Technical Assistance





ED_002545_00008725-00002

Research: Human Health/Toxicity

Problem: Lack of toxicity values for many PFAS compounds

Action:

- Literature review of published toxicity data for 31 PFAS of interest
- Conduct additional assessments and work to address knowledge gaps through computational toxicology and rapid/high-throughput screening

Results:

- Literature review complete, ~21 PFAS with some in vivo data to support assessment
- Toxicity assessment underway for GenX, PFBS, + five additional PFAS
- Computational assays underway for 75 PFAS representative of PFAS chemical space

Impact: States will have PFAS toxicity values to support risk management decisions and risk communication

Tools: **EPA Chemistry Dashboard**
Health and Environmental Research Online (HERO)

ED_002545_00008725-00003

Research: Analytical Methods

Problem: Lack of standardized/validated analytical methods for many PFAS analytes (especially short chain), and in media other than drinking water

Action: Perform multi-laboratory validations for analytical methods for (1) non-drinking water samples and solids (SW-846 Methods for facility or site investigation and remediation), (2) additional PFAS analytes for drinking water samples, and (3) methods for sampling air stack emissions

Results:

- Draft SW-846 Direct Injection analytical method external validation study underway
- Draft SW-846 Isotope Dilution method in review
- Method development for short-chained PFECAs (GenX, ADONA) in drinking water, for PFAS in estuarine waters, and for PFAS precursors in aqueous and solid matrices underway
- Pilot test of air emission sampling and analysis methods underway in NH and NC

Impact: Stakeholders will have standard analytical methods for PFAS analytes in different environmental media

Tools: **EPA Method 537** (drinking water)
SW-846 Compendium (non drinking water and solids)

ED_002545_00008725-00004

Research: Exposure

Problem: Lack of knowledge on sources, site-specific concentrations and exposure

Action: Develop and test methods to characterize PFAS sources and exposures

Results:

- Published non-targeted analysis (NTA) methods for qualitatively/semi-quantitatively assessing novel PFAS (including PFAS precursors) in environmental samples
- Developing exposure models for identifying PFAS exposure pathways and relative source contribution
- Developing and evaluating sampling and site characterization approaches to identify sources and extent of contamination

Impact: Stakeholders will be able to assess potential PFAS sources and exposures, and identify key exposure pathways for risk management

Tools: Published methods and models

ED_002545_00008725-00005

Research: Drinking Water Treatment Performance

Problem: Utilities lack drinking water treatment technology performance data for PFAS removal

Action:

- Review PFAS performance data from available sources (industry, DoD, academia, international)
- Test commercially available granular activated carbons (GACs) and ion exchange (IE) resins for effectiveness over a range of PFAS under different water quality conditions
- Evaluate a range of system sizes – large full-scale utility options to home treatment systems

Results:

- Update EPA's **Drinking Water Treatability Database**, a public database for treatment performance data for regulated and unregulated contaminants
- Use state-of-the-science models to extrapolate existing treatment studies to other conditions

Impact: Utilities will be able to identify effective treatment strategies for removing PFAS from drinking water

Tool: **EPA Drinking Water Treatability Database**

ED_002545_00008725-00006

Research: Drinking Water Treatment Cost

Problem: Utilities lack treatment technology cost data for PFAS removal

Action:

- Gather performance and cost data from available sources (DOD, WRF, industry, etc.)
- Compare costs and cost models across different entities
- Update EPA's **Unit Cost Models** to address PFAS
- Connect EPA's **Drinking Water Treatability Database** to EPA's cost models for ease of operation
- Evaluate tradeoffs between cost and removal of a range of PFASs and mixtures of PFASs

Results: Tools and data to support selection of optimal treatment choice

Impact: Utilities will be able to make informed decisions about cost-effective treatment strategies for removing PFAS from drinking water

Tools: E**PA Drinking Water Treatment Technology Unit Cost Models**

ED_002545_00008725-00007

Research: Contaminated Site Remediation

Problem: PFAS-contaminated sites require remediation and clean up to protect human health and the environment

Action:

- Characterize sources of PFAS such as fire training and emergency response sites, manufacturing facilities, production facilities, disposal sites
- Evaluate treatment technologies for remediating PFAS-impacted soils, waters, and sediments
- Develop treatment trains to address complex matrices with co-mingled wastes that may occur with PFAS contamination
- Generate performance and cost data with collaborators (DOD, WRF, industry, etc.) to develop models and provide tools to determine optimal treatment choices

Results: Tools, data and guidance regarding cost, efficacy, and implementation for remedy selection and performance monitoring

Impact: Responsible officials will know how to reduce risk of PFAS exposure and effects at contaminated sites, and to repurpose sites for beneficial use

ED_002545_00008725-00008

Research: Wastewater Treatment

Problem: Consumer and industrial use of PFAS-containing products often results in disposal to wastewater, becoming a source of PFAS in the environment

Action:

- Characterize various waste streams (e.g. municipal, industrial, manufacturing, landfill leachate) contributing to wastewater as sources of PFAS
- Evaluate efficacy of current and innovative wastewater treatment technologies (e.g. conventional, advanced, centralized, decentralized, pretreatment, water reuse, biosolids) to manage PFAS contamination
- Evaluate performance and cost data with other entities (WRF, industry, consultants, etc.)

Results: Provide data, tools and guidance to operators on management of PFAS in wastewater, biosolids, wastewater reuse, and pretreatment

Impact: Responsible officials will be able to manage effectively PFAS in wastewater

ED_002545_00008725-00009

Research: Materials Management

Problem: Lack of knowledge regarding end-of-life management (e.g. landfills, incineration) of PFAS-containing consumer and industrial products

Action:

- Characterize various end-of-life disposal streams (e.g. municipal, industrial, manufacturing, landfills, incinerators, recycled waste streams) contributing PFAS to the environment
- Evaluate efficacy of current and advanced waste management technologies (e.g. landfilling, thermal treatment, composting, stabilization) to manage PFAS at end-of-life disposal
- Evaluate performance and cost data with other entities (DOD, industry, academia, etc.) to manage these materials and manage PFAS releases to the environment

Results: Provide technologies, data and tools to manage these end of use streams

Impact: Responsible officials will be able to manage effectively end-of-life disposal of PFAS-containing products

ED_002545_00008725-00010

Technical Assistance for States, Tribes and Communities

Problem: State, tribes and communities sometimes lack full capabilities for managing PFAS risk

Action:

- Make ORD technical staff available to consult on PFAS issues
- Utilize applied research at impacted sites to develop new research solutions while also providing technical support to site managers
- Summarize reoccurring or common support requests to share lessons learned from technical support activities in ORD
- Collaborate with ECOS and ASTHO to develop state case studies for effective risk communication of waterborne contaminants (PFAS and HABs)

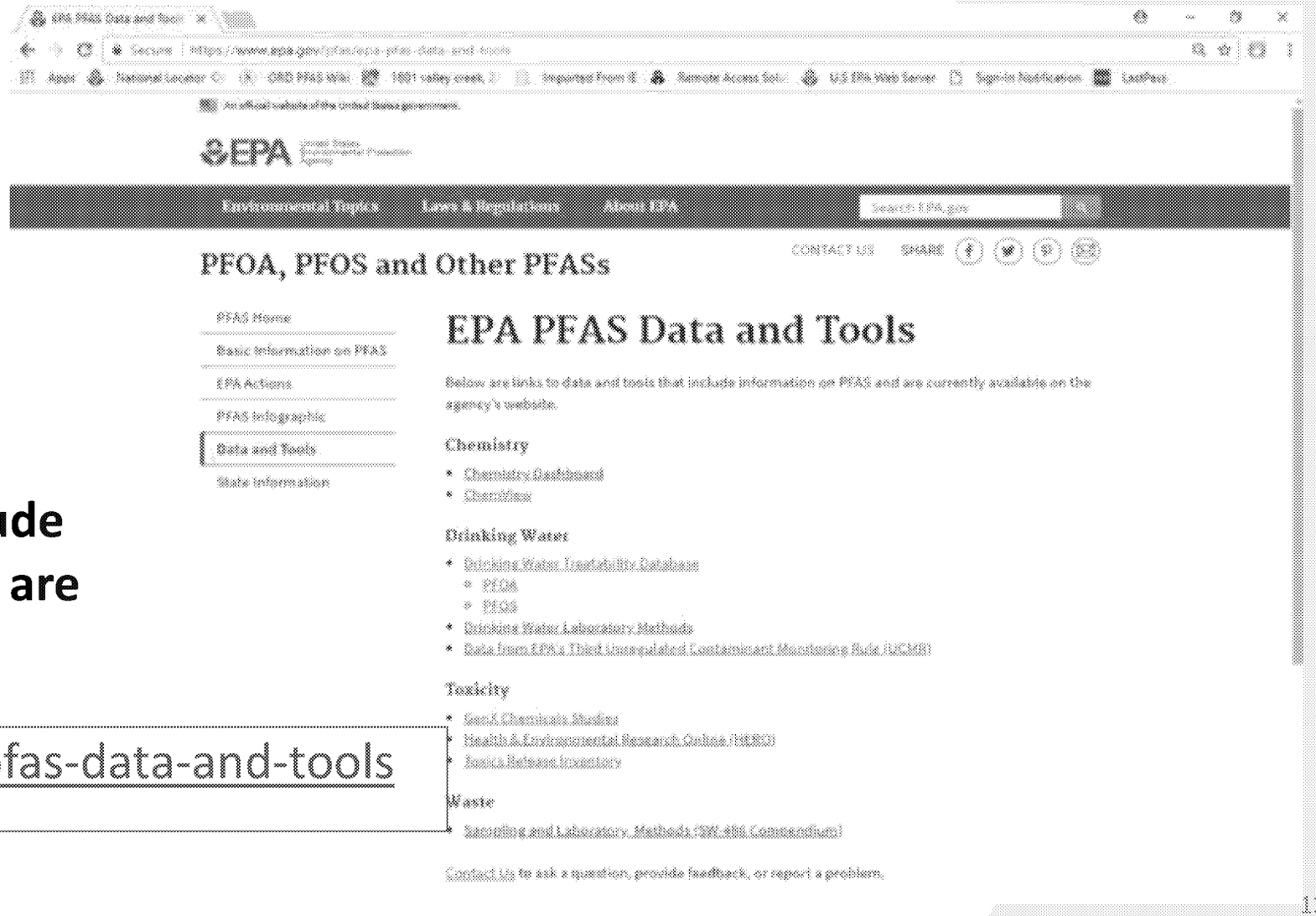
Results: Many examples of past and ongoing technical assistance

- **Cape Fear River, NC** – Significant reductions in PFAS in source and finished drinking water
- **Manchester, NH** – Collaboration on air and water sampling
- **Wyoming, OH** – Rapid analysis of PFAS cross contamination in water distribution system

Impact: Enable states, tribes and communities to 'take action on PFAS'

ED_002545_00008725-00011

EPA PFAS Data and Tools



Links to data and tools that include information related to PFAS and are available on EPA's website:

https://www.epa.gov/pfas/epa-pfas-data-and-tools

For More Information

Andrew Gillespie, PhD
Associate Director, National Exposure Research Laboratory
ORD Executive Lead for PFAS R&D
US EPA Office of Research and Development
919-541-3655
gillespie.andrew@epa.gov

ED_002545_00008725-00013

Message

From: Dunn, Alexandra [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=426D0177EAAB4001A5C85F051565997E-DUNN, ALEXA]
Sent: 6/8/2018 12:56:21 PM
To: Scott, Robert [Robert.Scott@des.nh.gov]
CC: Wimsatt, Mike [Michael.Wimsatt@des.nh.gov]; Gutro, Doug [Gutro.Doug@epa.gov]
Subject: Re: PFAS workshop

There are no capacity limitations. Online registration will be released by HQ next week. One speaker per group on 25th. We have a skeletal agenda for the 26th. I'll call you now Bob.

Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***

On Jun 8, 2018, at 8:18 AM, Scott, Robert <Robert.Scott@des.nh.gov> wrote:

> Anything you can provide to help us answer these type of inquiries?
>
> *Robert R Scott*
> Commissioner
> New Hampshire Department of Environmental Services
> 29 Hazen Drive, PO Box 95
> Concord, NH 03302-0095
> W:
> C: Ex. 6
> Robert.Scott@des.nh.gov
>
> **From:** Alex Koutroubas [mailto:alex@dennehybouley.com]
> **Sent:** Thursday, June 7, 2018 10:21 PM
> **To:** Fitzgerald, Mike
> **Subject:** PFAS workshop
>
> Hi Mike,
>
> Do you know how folks can register for this meeting below?
>
> I can't seem to find anything.
>
> Thanks,
>
> Alex
>
> **EPA New England will host the first regional PFAS workshop at the NHDES Seacoast office at Pease Intl Tradeport on June 25 from 5-9 and June 26 from 8-3.**

Message

From: Dunn, Alexandra [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=426D0177EAAB4001A5C85F051565997E-DUNN, ALEXA]
Sent: 6/6/2018 7:39:09 PM
To: Paul Mercer [paul.mercer@maine.gov]; melanie.loyzim@maine.gov
CC: Gutro, Doug [Gutro.Doug@epa.gov]; Szaro, Deb [Szaro.Deb@epa.gov]; Melanson, Kate [Melanson.Kate@epa.gov]
Subject: Re: PFAS regional summit on June 25 and June 26

Exeter HS is in the Portsmouth NH area.

Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***

On Jun 6, 2018, at 3:36 PM, Dunn, Alexandra <dunn.alexandra@epa.gov> wrote:

> Dear Commissioner Mercer and Deputy Commissioner Loyzim, I wanted to let you know that we will be having the PFAS New England summit on June 25 and June 26. We are in the process of securing Exeter HS which has a capacity of 1000. The event will be fully open to the media and all who desire to attend.
>
> We are waiting for further details from headquarters on an announcement that will come on June 11, but please consider this your official invitation to the event so that you can make any necessary travel.
>
> > Sent from my iPhone
> > Alexandra Dapolito Dunn, J.D. , Regional Administrator
> > Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***

Message

From: Dunn, Alexandra [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=426D0177EAAB4001A5C85F051565997E-DUNN, ALEXA]
Sent: 5/31/2018 8:06:10 PM
To: Brian F. Goetz [bfgoetz@cityofportsmouth.com]; Cassidy, Meghan [Cassidy.Meghan@epa.gov]; Scott, Robert [Robert.Scott@des.nh.gov]
CC: Kernen, Brandon [Brandon.Kernen@des.nh.gov]; Pillsbury, Sarah [Sarah.Pillsbury@des.nh.gov]; Clark Freise [clark.freise@des.nh.gov]
Subject: RE: PFAS National Leadership Summit and Engagement

Brian,

Thanks for your patience. We are obtaining information working with EPA HQ about how the New England and other regional meetings will be structured. Once we have more information on what type of opportunities there will be to share case studies, we'll let you know.

Alexandra Dapolito Dunn, J.D.
Regional Administrator

Region 1 New England
5 Post Office Sq. Suite 100
Mail Code: ORA01-4
Boston, MA 02109-3912

Desk: (617) 918-1012
Mobile: Ex. 6
Fax: (617) 918-0012
dunn.alexandra@epa.gov

From: Brian F. Goetz [mailto:bfgoetz@cityofportsmouth.com]
Sent: Thursday, May 31, 2018 12:24 PM
To: Cassidy, Meghan <Cassidy.Meghan@epa.gov>; Dunn, Alexandra <dunn.alexandra@epa.gov>; Scott, Robert <Robert.Scott@des.nh.gov>
Cc: Kernen, Brandon <Brandon.Kernen@des.nh.gov>; Pillsbury, Sarah <Sarah.Pillsbury@des.nh.gov>; Clark Freise <clark.freise@des.nh.gov>
Subject: RE: PFAS National Leadership Summit and Engagement

All – I understand that the meeting dates are set for the Region 1 Meeting here somewhere in or near Portsmouth. I have blocked off time and am looking forward to presenting the Portsmouth/Pease Tradeport case study either of the days. Also, I let Meghan know that if we can be of any assistance here locally just let us know.

Thanks – Brian

Brian F. Goetz
Deputy Director of Public Works
City of Portsmouth
680 Peverly Hill Road
Portsmouth, NH 03801
Ph: (
Cell: Ex. 6

bfgoetz@cityofportsmouth.com

From: Brian F. Goetz
Sent: Thursday, May 24, 2018 9:36 AM
To: 'Cassidy, Meghan' <Cassidy.Meghan@epa.gov>; Dunn, Alexandra <dunn.alexandra@epa.gov>; Scott, Robert <Robert.Scott@des.nh.gov>
Cc: Kernen, Brandon <Brandon.Kernen@des.nh.gov>; Pillsbury, Sarah <Sarah.Pillsbury@des.nh.gov>; Clark Freise <clark.freise@des.nh.gov>
Subject: RE: PFAS National Leadership Summit and Engagement

Meghan –

Thank you. I will look forward to participating.

– Brian

Brian F. Goetz
Deputy Director of Public Works
City of Portsmouth
680 Peverly Hill Road
Portsmouth, NH 03801
Ph: Ex. 6
Cell:
bfgoetz@cityofportsmouth.com

From: Cassidy, Meghan [mailto:Cassidy.Meghan@epa.gov]
Sent: Thursday, May 24, 2018 7:51 AM
To: Brian F. Goetz <bfgoetz@cityofportsmouth.com>; Dunn, Alexandra <dunn.alexandra@epa.gov>; Scott, Robert <Robert.Scott@des.nh.gov>
Cc: Kernen, Brandon <Brandon.Kernen@des.nh.gov>; Pillsbury, Sarah <Sarah.Pillsbury@des.nh.gov>; Clark Freise <clark.freise@des.nh.gov>
Subject: RE: PFAS National Leadership Summit and Engagement

Brian,

I just wanted to let you know that we will be reaching out to you in the next week or so to further discuss your interest and potential involvement.

Thanks.

Meghan F. Cassidy, Chief
Superfund Technical & Enforcement Support Section
Ex. 6
cassidy.meghan@epa.gov

From: Brian F. Goetz [mailto:bfgoetz@cityofportsmouth.com]
Sent: Wednesday, May 23, 2018 10:23 AM

To: Dunn, Alexandra <dunn.alexandra@epa.gov>; Scott, Robert <Robert.Scott@des.nh.gov>; Cassidy, Meghan <Cassidy.Meghan@epa.gov>
Cc: Kernen, Brandon <Brandon.Kernen@des.nh.gov>; Pillsbury, Sarah <Sarah.Pillsbury@des.nh.gov>; Clark Freise <clark.freise@des.nh.gov>
Subject: RE: PFAS National Leadership Summit and Engagement

Dear Ms. Dunn and Mr. Scott –

Thank you both for responding to this. As you know, one of the wells serving the Pease Tradeport Water System here in Portsmouth was impacted by PFAS above the Health Advisory over four years ago. Since that time we have been actively working with the Air Force, the Pease Development Authority, the regulatory agencies and our community in response to all aspects of this contamination. We have worked with a large technical team to monitor and assess the extent of the contamination, explored treatment options, installed an activated carbon treatment system on two of the three wells at Pease impacted by PFAS, run pilots on alternative treatment medias, and researched other PFAS impacted public water systems to find out what their response to the contamination has been. We would certainly like to participate in the upcoming PFAS summit here in New Hampshire and are also willing to present our case study in how we have responded to the issue and lessons learned.

Please feel free to contact me directly if you would like to discuss further.

Thank you for your consideration.

Brian F. Goetz
Deputy Director of Public Works
City of Portsmouth
680 Peverly Hill Road
Portsmouth, NH 03801
Ph: 6 Ex. 6
Cell:
bfgoetz@cityofportsmouth.com

From: Dunn, Alexandra [mailto:dunn.alexandra@epa.gov]
Sent: Wednesday, May 23, 2018 8:19 AM
To: Scott, Robert <Robert.Scott@des.nh.gov>; Cassidy, Meghan <Cassidy.Meghan@epa.gov>
Cc: Kernen, Brandon <Brandon.Kernen@des.nh.gov>; Brian F. Goetz <bfgoetz@cityofportsmouth.com>; Pillsbury, Sarah <Sarah.Pillsbury@des.nh.gov>; Clark Freise <clark.freise@des.nh.gov>
Subject: Re: PFAS National Leadership Summit and Engagement

And I'm copying our lead at R1.

Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***

On May 23, 2018, at 7:12 AM, Scott, Robert <Robert.Scott@des.nh.gov> wrote:

> Brian,
>
> We are still working out details with EPA but the intent is to be as inclusive as space allows. We'll add you to the list of those wishing to attend and will let you know when we have

more details.

Bob Scott

Sent with BlackBerry Work
(www.blackberry.com)

From: Kernen, Brandon <Brandon.Kernen@des.nh.gov<mailto:Brandon.Kernen@des.nh.gov>>
Date: Wednesday, May 23, 2018, 5:47 AM
To: Brian F. Goetz <bfgoetz@cityofportsmouth.com<mailto:bfgoetz@cityofportsmouth.com>>
Cc: Pillsbury, Sarah <Sarah.Pillsbury@des.nh.gov<mailto:Sarah.Pillsbury@des.nh.gov>>, Scott, Robert <Robert.Scott@des.nh.gov<mailto:Robert.Scott@des.nh.gov>>, Freise, Clark <Clark.Freise@des.nh.gov<mailto:Clark.Freise@des.nh.gov>>
Subject: Re: PFAS National Leadership Summit and Engagement

Thank you Brian.

I am not sure who is organizing the agenda at this point.

I am copying Clark Freise and Bob Scott to let them know about your interest in being involved in the regional summit. It does make sense as Pease was one of the first DoD sites where PFAS was addressed and it impacted three major water supply sources. Portsmouth's experience and assessment of the needs and challenges associated with PFAS should be part of the agenda.

Regards

Brandon

From: Brian F. Goetz <bfgoetz@cityofportsmouth.com>
Sent: Tuesday, May 22, 2018 6:24 PM
To: Kernen, Brandon
Subject: Re: PFAS National Leadership Summit and Engagement

Brandon - I tried to watch the live stream of the summit today. They only had the first hour of talks up on YouTube so I didn't get to see anything from the afternoon. I did see you and Andrea Amico in the photo of the audience that they had online. I guess they'll be having a local summit in NH June 25th and 26th. I'd like to be involved as I tried to get into the Washington one and was told it wasn't an open invitation.

Thanks - Brian
cell: Ex. 6

.pptx>

Message

From: Dunn, Alexandra [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=426D0177EAAB4001A5C85F051565997E-DUNN, ALEXA]
Sent: 5/29/2018 12:36:37 PM
To: Scott, Robert [Robert.Scott@des.nh.gov]
CC: Wimsatt, Mike [Michael.Wimsatt@des.nh.gov]; Cassidy, Meghan [Cassidy.Meghan@epa.gov]
Subject: Re: Region 1 / NHDES PFAS EVENT JUNE 25-26

Excellent!

Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***

On May 29, 2018, at 8:03 AM, Scott, Robert <Robert.Scott@des.nh.gov> wrote:

> Mike Wimsatt will be on the call tomorrow.
>
> *Robert R Scott*
> Commissioner
> New Hampshire Department of Environmental Services
> 29 Hazen Drive, PO Box 95
> Concord, NH 03302-0095
> W:
> C: Ex. 6
> Robert.Scott@des.nh.gov
>
> ---
>
> **From:** Dunn, Alexandra [mailto:dunn.alexandra@epa.gov]
> **Sent:** Tuesday, May 22, 2018 4:07 PM
> **To:** Scott, Robert
> **Subject:** Re: Region 1 / NHDES PFAS EVENT JUNE 25-26
>
> See below. We have 2 calls set so far. Who should run point for DES?
>
> Sent from my iPhone
> Alexandra Dapolito Dunn, J.D. , Regional Administrator
> Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***
>
> On May 22, 2018, at 4:04 PM, Lindsay, Jane <lindsay.jane@epa.gov> wrote:
>
>> Alex,
>>
>> Confirming two meetings already on the books as follows:
>>
>> Wednesday, May 30th at 11:00
>> Wednesday, June 13th at 1:30
>>
>> Will ensure above group gets calendar invites for both meetings –
>>
>> Tks,

J

From: Dunn, Alexandra
Sent: Tuesday, May 22, 2018 3:40 PM
To: Szaro, Deb <Szaro.Deb@epa.gov>; Olson, Bryan <Olson.Bryan@epa.gov>; Cassidy, Meghan <Cassidy.Meghan@epa.gov>; Dixon, Sean <dixon.sean@epa.gov>; Gutro, Doug <Gutro.Doug@epa.gov>; Moraff, Kenneth <Moraff.Ken@epa.gov>; Downing, Jane <Downing.Jane@epa.gov>; Murphy, Jim <Murphy.Jim@epa.gov>; Lindsay, Jane <lindsay.jane@epa.gov>
Subject: Region 1 / NHDES PFAS EVENT JUNE 25-26

We need to have a meeting ASAP to discuss how to move ahead on this workshop. I'll get some info from Peter and team on support resources.

I'd like to discuss prelim issues like location structure capacity content logistics registration etc.

I'm hoping Jim & Megan can take the lead in close coordination w others.

Jane pls schedule.

Sent from my iPhone
Alexandra Dapolito Dunn, J.D. , Regional Administrator
Region 1 New England. ***This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act***

Message

From: Dunn, Alexandra [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=426D0177EAAB4001A5C85F051565997E-DUNN, ALEXA]
Sent: 3/21/2018 8:58:36 PM
To: Kaliszewski, Bob [Robert.Kaliszewski@ct.gov]
Subject: RE: PFAS DC Event Follow Up

Just in from HQ:

PARTNER INFORMATION

- EPA invited each territory/tribe/state governor to send 1-2 representatives to attend. EPA requests that each territory/tribe/state coordinate internally to identify their attendees and send their names to: safewater@epa.gov
- EPA also invited federal partners to send 1-2 representative from their organizations. EPA requests that each organization coordinate internally to identify their attendees and send their names to: safewater@epa.gov *the list of invited federal partners is provided below.
- At this time, EPA does not intend to fund travel.

Alexandra Dapolito Dunn, J.D.
Regional Administrator

Region 1 New England
5 Post Office Sq. Suite 100
Mail Code: ORA01-4
Boston, MA 02109-3912

Desk: (617) 918-1012
Mobile: Ex. 6
Fax: (617) 918-0012
dunn.alexandra@epa.gov

From: Kaliszewski, Bob [mailto:Robert.Kaliszewski@ct.gov]
Sent: Wednesday, March 21, 2018 4:55 PM
To: Dunn, Alexandra <dunn.alexandra@epa.gov>
Subject: RE: PFAS DC Event Follow Up

Alex, thanks for the follow up. We really appreciate the PFAS help. As for the meeting we will probably send a person and offer the other seat to our Public Health Dept. We will keep you posted. Also we did have staff on the LIS call so we are on top of the communication there.

Regards, Bob

From: Dunn, Alexandra [mailto:dunn.alexandra@epa.gov]
Sent: Wednesday, March 21, 2018 4:12 PM
To: Kaliszewski, Bob
Subject: PFAS DC Event Follow Up

Bob,

Thanks for the call with CTDEEP yesterday. I wanted to let your team know that today you should have received a copy of a letter to your Governor from Administrator Pruitt regarding the PFAS DC meeting. Details are still emerging – we understand attendance will be limited to 2 per state. Part of the meeting will be limited to EPA/states. There is no indication of EPA covering state travel at this point.

Also, I am set to be briefed on Stratford Army Engine Plant before coming to Raymark.

Finally, please know we stand ready to help with the PFAS sampling and further activities at Westchester airport.

Alexandra Dapolito Dunn, J.D.
Regional Administrator

Region 1 New England
5 Post Office Sq. Suite 100
Mail Code: ORA01-4
Boston, MA 02109-3912

Desk: (617) 918-1012
Mobile: Ex. 6
Fax: (617) 918-0012
dunn.alexandra@epa.gov

-----Original Appointment-----
From: Bryan-Powell, Juliet [mailto:Juliet.Bryan-Powell@ct.gov] **On Behalf Of** Kaliszewski, Bob
Sent: Friday, January 26, 2018 12:52 PM
To: Dunn, Alexandra
Subject: Accepted: FW: Commissioner Klee
When: Friday, January 26, 2018 5:00 PM-5:15 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Commissioner will call Alex at Ex. 6 - Rob's Office

Message

From: Dunn, Alexandra [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=426D0177EAAB4001A5C85F051565997E-DUNN, ALEXA]
Sent: 3/21/2018 12:35:53 PM
To: Loyzim, Melanie [Melanie.Loyzim@maine.gov]
Subject: RE: Region 1 Memo RE: PFAS

Hi Melanie,
Sorry for the delay. I did send some ideas to the Administrator, but I think that the most relevant activity is what occurred this week on PFAS. I think the concentrated EPA focus that is outlined in the Governor letters and with the forthcoming summit in DC will be excellent. We then are going to hold a follow up event in region 1.
Hope you're at ECOS. I am supposed to do the oil spill drill tomorrow with Maine and NH weather permitting.

Alexandra Dapolito Dunn, J.D.
Regional Administrator

Region 1 New England
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dunn.alexandra@epa.gov

From: Loyzim, Melanie [mailto:Melanie.Loyzim@maine.gov]
Sent: Thursday, March 15, 2018 5:18 PM
To: Dunn, Alexandra <dunn.alexandra@epa.gov>
Subject: FW: Region 1 Memo RE: PFAS

Alex,
Do you have anything you can share in regards to the email below?
Thanks,
Melanie

From: Malinowski, Kerri
Sent: Thursday, March 15, 2018 4:04 PM
To: Loyzim, Melanie <Melanie.Loyzim@maine.gov>
Cc: Hodgeman, Christina S <Christina.S.Hodgeman@maine.gov>
Subject: Region 1 Memo RE: PFAS

Hi Melanie,
During a brief conversation I recently had with our new Region 1 Administrator, Alex mentioned a memo she recently sent to Administrator Pruitt which outlined five PFAS related challenges facing state agencies. As I understand it, there was a response from the federal office that gave Region 1 staff reason to believe that the PFAS issue may soon be handled in a more coordinated manner.
Have you seen this memo or have information about the five items discussed? It sounds like its contents could help inform our agency's efforts.
Thanks,

Kerri

Kerri Malinowski
Maine Department of Environmental Protection
Office of the Commissioner
Main Office: Ex. 6
Direct: Ex. 6

http://www.maine.gov/dep/

Message

From: Dunn, Alexandra [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=426D0177EAAB4001A5C85F051565997E-DUNN, ALEXA]
Sent: 10/26/2018 2:25:43 PM
To: Moore, Julie [Julie.Moore@vermont.gov]
Subject: Re: Joint Petition for Rulemaking to Establish a Drinking Water Standard for PFAS

Thank you for the heads up on this significant development. Clearly EPA is not moving fast enough for the organizations in New England. I wonder if they're seeking the same standard from each state? I'll have to look into that.

Sent from my iPhone

Alexandra Dapolito Dunn, J.D.
Regional Administrator
Region 1 New England
(617) 918-1012

This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act

On Oct 26, 2018, at 9:07 AM, Moore, Julie <Julie.Moore@vermont.gov> wrote:

> Good morning, Alex.
>
> Nice to see you earlier this week in Portsmouth. I wanted to give you a heads up on the petition we just received, attached and below. I understand that MA and CT have received similar petitions, and expect that other NE states will also in short order.
>
> We will keep EPA apprised as we chart a path forward.
>
> Best,
> Julie
>
> ---
>
> **From:** Elena Mihaly <emmihaly@clf.org>
> **Sent:** Thursday, October 25, 2018 2:40 PM
> **To:** Moore, Julie <Julie.Moore@vermont.gov>
> **Cc:** Levine, Mark <Mark.Levine@vermont.gov>; Vose, Sarah <Sarah.Vose@vermont.gov>; Boedecker, Emily <Emily.Boedecker@vermont.gov>; Redmond, Bryan <Bryan.Redmond@vermont.gov>; Schwer, Chuck <Chuck.Schwer@vermont.gov>; Chapman, Matt <Matt.Chapman@vermont.gov>; Englander, David <David.Englander@vermont.gov>; Donovan, Thomas <Thomas.Donovan@vermont.gov>; McDougall, Robert <robert.mcdougall@vermont.gov>; Jen Duggan <jduggan@clf.org>; Zak Griefen <zgriefen@clf.org>; Jon Groveman <jgroveman@vnrc.org>; Johanna de Graffenreid <johanna@radvt.org>; paul@vpirg.org; Shaina Kasper <shaina@toxicsaction.org>
> **Subject:** Joint Petition for Rulemaking to Establish a Drinking Water Standard for PFAS
>
> Dear Secretary Moore:
>
> Attached please find a joint petition for rulemaking from Conservation Law Foundation, Vermont Natural Resources Council, Rights and Democracy, Vermont Public Research Interest Group, and Toxics Action Center requesting the Vermont Agency of Natural Resources to establish a drinking water standard for Per- and Polyfluoroalkyl Substances (PFAS) that is protective of public health.

CLF is mailing you a hard copy of this petition for rulemaking, along with a thumb drive containing the PDF sources to which we cite in the petition. If the cc'd parties wish to also receive a hard copy of the petition in the mail and/or a thumb drive containing cited PDF documents, please contact me directly with such a request.

Sincerely,

Elena

Elena M. Mihaly
Staff Attorney
Conservation Law Foundation

15 East State Street, Suite 4
Montpelier, VT 05602

P: Ex. 6
E: emihaly@clf.org

For a thriving New England
<image001.png>
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CONFIDENTIALITY NOTICE
This e-mail message from Conservation Law Foundation is intended only for the individual to which it is addressed. This e-mail may contain information that is privileged, confidential and exempt from disclosure under applicable law. If you are not the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you received this e-mail by accident, please notify the sender immediately and destroy this e-mail and all copies of it.

<2018.10.25_Joint Petition to ANR for Rulemaking to Establish PFAS Drinking Water Standard.pdf>

Message

From: Dunn, Alexandra [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=426D0177EAAB4001A5C85F051565997E-DUNN, ALEXA]
Sent: 6/11/2018 7:53:05 PM
To: Klee, Robert [Robert.Klee@ct.gov]
CC: Szaro, Deb [Szaro.Deb@epa.gov]; Cassidy, Meghan [Cassidy.Meghan@epa.gov]; robert.kaliszewski@ct.gov; Colon, Carmen [Carmen.Colon@ct.gov]; Bryan-Powell, Juliet [Juliet.Bryan-Powell@ct.gov]
Subject: RE: Regional PFAS Engagement Session

Excellent, and I do believe we have also invited Commissioner Pinto.

Alexandra Dapolito Dunn, J.D.
Regional Administrator

Region 1 New England
5 Post Office Sq. Suite 100
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Boston, MA 02109-3912

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dunn.alexandra@epa.gov

From: Klee, Robert [mailto:Robert.Klee@ct.gov]
Sent: Monday, June 11, 2018 3:35 PM
To: Dunn, Alexandra <dunn.alexandra@epa.gov>
Cc: Szaro, Deb <Szaro.Deb@epa.gov>; Cassidy, Meghan <Cassidy.Meghan@epa.gov>; robert.kaliszewski@ct.gov; Colon, Carmen <Carmen.Colon@ct.gov>; Bryan-Powell, Juliet <Juliet.Bryan-Powell@ct.gov>
Subject: RE: Regional PFAS Engagement Session

Hi Alex,

Adding my Deputy, Bob Kaliszewski, who will be attending for CT, and will be able to coordinate with our public health folks.

Cheers,

Rob

Robert J. Klee
Commissioner
Connecticut Department of Energy and Environmental Protection
79 Elm Street, Hartford, CT 06106-5127
P: Ex. 6 | F: 860.424.4051 | E: robert.klee@ct.gov

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

www.ct.gov/deep

Conserving, improving and protecting our natural resources and environment;
Ensuring a clean, affordable, reliable, and sustainable energy supply.

From: Dunn, Alexandra [mailto:dunn.alexandra@epa.gov]
Sent: Monday, June 11, 2018 1:11 PM
To: Klee, Robert
Cc: Szaro, Deb; Cassidy, Meghan
Subject: Regional PFAS Engagement Session

Good afternoon, Commissioner Klee.

As part of our Regional PFAS Engagement Session, our Tuesday June 26th agenda includes a Moderated State Panel. The goal of this panel is to provide a brief overview of how each of our state partners is addressing PFAS, and to hear state thoughts for consideration in the development of EPA's PFAS Management Plan.

Each state will be provided with 10 minutes to provide information related to the following areas of interest:

1. Overview of state approach/strategy related to PFAS.
2. Presentation of state-specific PFAS benchmarks.
3. Challenges state faces in identifying, addressing and communicating about PFAS.

Given the limited timeframe for each state to speak, we request that the environmental commissioners/directors for CT, RI and ME coordinate with your drinking water public health counterparts to include any information pertinent to their programs.

I hope that you or a member of your staff will participate on this panel. My Point of Contact for this panel is Meghan Cassidy. Please confirm your participation and identify the state speaker via email to cassidy.meghan@epa.gov by COB Friday, June 15th.

Alexandra Dapolito Dunn, J.D.
Regional Administrator

Region 1 New England
5 Post Office Sq. Suite 100
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Boston, MA 02109-3912

Desk: (617) 918-1012
Mobile: Ex. 6
Fax: (617) 918-0012

dunn.alexandra@epa.gov

Message

From: Dunn, Alexandra [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=426D0177EAAB4001A5C85F051565997E-DUNN, ALEXA]
Sent: 6/22/2018 11:21:58 AM
To: Matthews, Lisa [Matthews.Lisa@epa.gov]
CC: Clark Freise [clark.freise@des.nh.gov]; Good, Alicia (DEM) [alicia.good@dem.ri.gov]; terry.gray@dem.ri.gov; angelo.liberti@dem.ri.gov; slongsworth@ecos.org; melanie.loyzim@maine.gov; Nicole Lugli [Nicole.Lugli@ct.gov]; paul.mercer@maine.gov; julie.moore@vermont.gov; Moran, Gary (DEP) [gary.moran@state.ma.us]; Elizabeth Scott [elizabeth.scott@dem.ri.gov]; Szaro, Deb [Szaro.Deb@epa.gov]; Dixon, Sean [dixon.sean@epa.gov]; Wagner, Kenneth [wagner.kenneth@epa.gov]; Chancellor, Erin [chancellor.erin@epa.gov]; Smith, Bernicel [Smith.Bernicel@epa.gov]; Orme-Zavaleta, Jennifer [Orme-Zavaleta.Jennifer@epa.gov]; Robbins, Chris [Robbins.Chris@epa.gov]; Yamada, Richard (Yujiro) [yamada.richard@epa.gov]; Cheatham-Strickland, Latonia [Cheatham-Strickland.Latonia@epa.gov]; Kuhn, Kevin [Kuhn.Kevin@epa.gov]; LaVay, Maggie [LaVay.Maggie@epa.gov]; Munns, Wayne [Munns.Wayne@epa.gov]; Gillespie, Andrew [Gillespie.Andrew@epa.gov]; Rea, Anne [Rea.Anne@epa.gov]; Sams, Reeder [Sams.Reeder@epa.gov]; Keith, Darryl [Keith.Darryl@epa.gov]; Wigand, Cathleen [Wigand.Cathleen@epa.gov]; Scheuer, Amy [Scheuer.Amy@epa.gov]
Subject: Re: Thank you! Visit to EPA ORD's Atlantic Ecology Division

Jennifer, Chris and Lisa -

You all did a fabulous job with the meeting. Much of the information informed conversation at meetings later in the week for me - especially our nutrients and resilience work. The PFAS update will help tremendously for next week's New England workshop.

Thank you!!!!

Sent from my iPhone

Alexandra Dapolito Dunn, J.D.
Regional Administrator
Region 1 New England
Ex. 6

This email is for official EPA business only and may be subject to disclosure under the Freedom of information Act

On Jun 21, 2018, at 4:47 PM, Matthews, Lisa <Matthews.Lisa@epa.gov> wrote:

> Sent on behalf of Chris Robbins
>
> Dear New England States and EPA Region 1,
>
> It was great seeing everyone this past week in Narragansett! On behalf of US EPA's Office of Research and Development (ORD), thank you for taking the time out of your busy schedules to visit ORD's Atlantic Ecology Division. We were so glad that you were able to learn about EPA's research, meet our scientists and see first-hand some of the innovative work being done by EPA ORD researchers. We appreciated having the opportunity to share and collaborate with all of you.

It is very helpful for us to hear more about the environmental issues the New England states are confronting and receive feedback on how ORD's research, tools and methods can more effectively support states' efforts to protect the environment. We hope you found the research presented this week useful and relevant. We look forward to continuing our dialogue and sharing more of our applied science tools with you to help inform environmental decision making.

Attached are the presentations from Tuesday. We are compiling notes from the meeting and will share action items with you soon. We look forward to continued discussions with you and your staff. Please feel free to contact Lisa Matthews, ORD's State Liaison (matthews.lisa@epa.gov<mailto:matthews.lisa@epa.gov> or Ex. 6 with any questions or follow-up.

Sincerely,

Chris Robbins

Christopher S. Robbins

Deputy Assistant Administrator for Management (Acting)

US EPA Office of Research and Development

Ex. 6

Attached presentations:

* ORD Overview
* AED Overview
* PFAS
* Chemistry Dashboard
* HABs
* Coastal Resilience
* Nutrients

<ORD Overview (AED).pdf>

<AED Overview_Munns (final).pdf>

<PFAS_Gillespie (final).pdf>

<Chemistry Dashboard_Sams (final).pdf>

<HABs_Keith (final).pdf>

<Coastal Resilience_Wigand (final).pdf>

<Nutrients_Rea (final).pptx>

Message

From: Stuart Wilson-Patton [stuart.wilson-patton@ag.tn.gov]
Sent: 10/3/2018 12:03:32 PM
To: Wheeler, Andrew [wheeler.andrew@epa.gov]
Subject: Set stronger PFAS standards and clean-up plan

Andrew Wheeler,

Dear Acting Administrator Wheeler,

I am writing to call on the Environmental Protection Agency (EPA) to set an enforceable standard for PFAS (per- and polyfluoroalkyl substances) contamination in drinking water, and to coordinate with the Department of Defense to develop a robust plan for cleaning up contaminated sites.

I am aware of the Health and Human Services report that shows that health effects from PFAS water contamination can arise at exposure to levels 7 to 10 times lower than EPA's current drinking water health advisory suggests. I am also aware that the Department of Defense has publicly acknowledged a need to expand its clean-up efforts and would benefit from stronger standards to help guide where to focus.

Stuart Wilson-Patton
stuart.wilson-patton@ag.tn.gov

Ex. 6

Message

From: Alvin Anderson [andersona4@michigan.gov]
Sent: 10/1/2018 2:58:04 PM
To: Wheeler, Andrew [wheeler.andrew@epa.gov]
Subject: Set stronger PFAS standards and clean-up plan

Andrew Wheeler,

Dear Acting Administrator Wheeler,

I am writing to call on the Environmental Protection Agency (EPA) to set an enforceable standard for PFAS (per- and polyfluoroalkyl substances) contamination in drinking water, and to coordinate with the Department of Defense to develop a robust plan for cleaning up contaminated sites.

I am aware of the Health and Human Services report that shows that health effects from PFAS water contamination can arise at exposure to levels 7 to 10 times lower than EPA's current drinking water health advisory suggests. I am also aware that the Department of Defense has publicly acknowledged a need to expand its clean-up efforts and would benefit from stronger standards to help guide where to focus.

Alvin Anderson
andersona4@michigan.gov

Ex. 6

Message

From: Douglas Long [dolong@pa.gov]
Sent: 10/1/2018 2:09:55 PM
To: Wheeler, Andrew [wheeler.andrew@epa.gov]
Subject: Set stronger PFAS standards and clean-up plan

Andrew Wheeler,

Dear Acting Administrator Wheeler,

I am writing to call on the Environmental Protection Agency (EPA) to set an enforceable standard for PFAS (per- and polyfluoroalkyl substances) contamination in drinking water, and to coordinate with the Department of Defense to develop a robust plan for cleaning up contaminated sites.

I am aware of the Health and Human Services report that shows that health effects from PFAS water contamination can arise at exposure to levels 7 to 10 times lower than EPA's current drinking water health advisory suggests. I am also aware that the Department of Defense has publicly acknowledged a need to expand its clean-up efforts and would benefit from stronger standards to help guide where to focus.

Douglas Long
dolong@pa.gov

Ex. 6

Message

From: Lynn Van Gilder [lynn.vangilder@maryland.gov]
Sent: 9/28/2018 12:43:17 AM
To: Wheeler, Andrew [wheeler.andrew@epa.gov]
Subject: Set stronger PFAS standards and clean-up plan

Andrew Wheeler,

Dear Acting Administrator Wheeler,

I am writing to call on the Environmental Protection Agency (EPA) to set an enforceable standard for PFAS (per- and polyfluoroalkyl substances) contamination in drinking water, and to coordinate with the Department of Defense to develop a robust plan for cleaning up contaminated sites.

I am aware of the Health and Human Services report that shows that health effects from PFAS water contamination can arise at exposure to levels 7 to 10 times lower than EPA's current drinking water health advisory suggests. I am also aware that the Department of Defense has publicly acknowledged a need to expand its clean-up efforts and would benefit from stronger standards to help guide where to focus.

Lynn Van Gilder
lynn.vangilder@maryland.gov

Ex. 6