NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Incorporating PFAS as Contaminants of Concern at Waste Sites in New Hampshire

PFAS Stakeholder Meeting

April 11, 2017

Agenda

- Introduction – Michael Wimsatt, Director, WMD
- NHDES Update – Lea Anne Atwell, HWRB
- Sampling Considerations – Peter Sandin, HWRB

Break

- Database Protocols – Melanie Cofrin, Water Division
- Response Actions – Kate Emma Schlosser, HWRB
- Q&A

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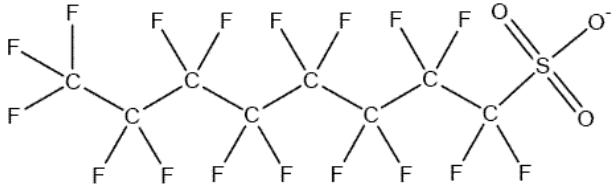
Update on NHDES Investigations and Program Approach

Lea Anne Atwell, Project Manager
NHDES Hazardous Waste Remediation Bureau

Per- and Polyfluoroakyl Substances (PFAS) / Perfluorinated Chemicals (PFCs)

- Perfluorooctanoic acid (PFOA or C8)

- Perfluorooctane sulfonate (PFOS)



- NEWMOA Webinars: www.newmoa.org/cleanup/workshop.cfm

- NEWMOA Workshops: May 8, 9, &10

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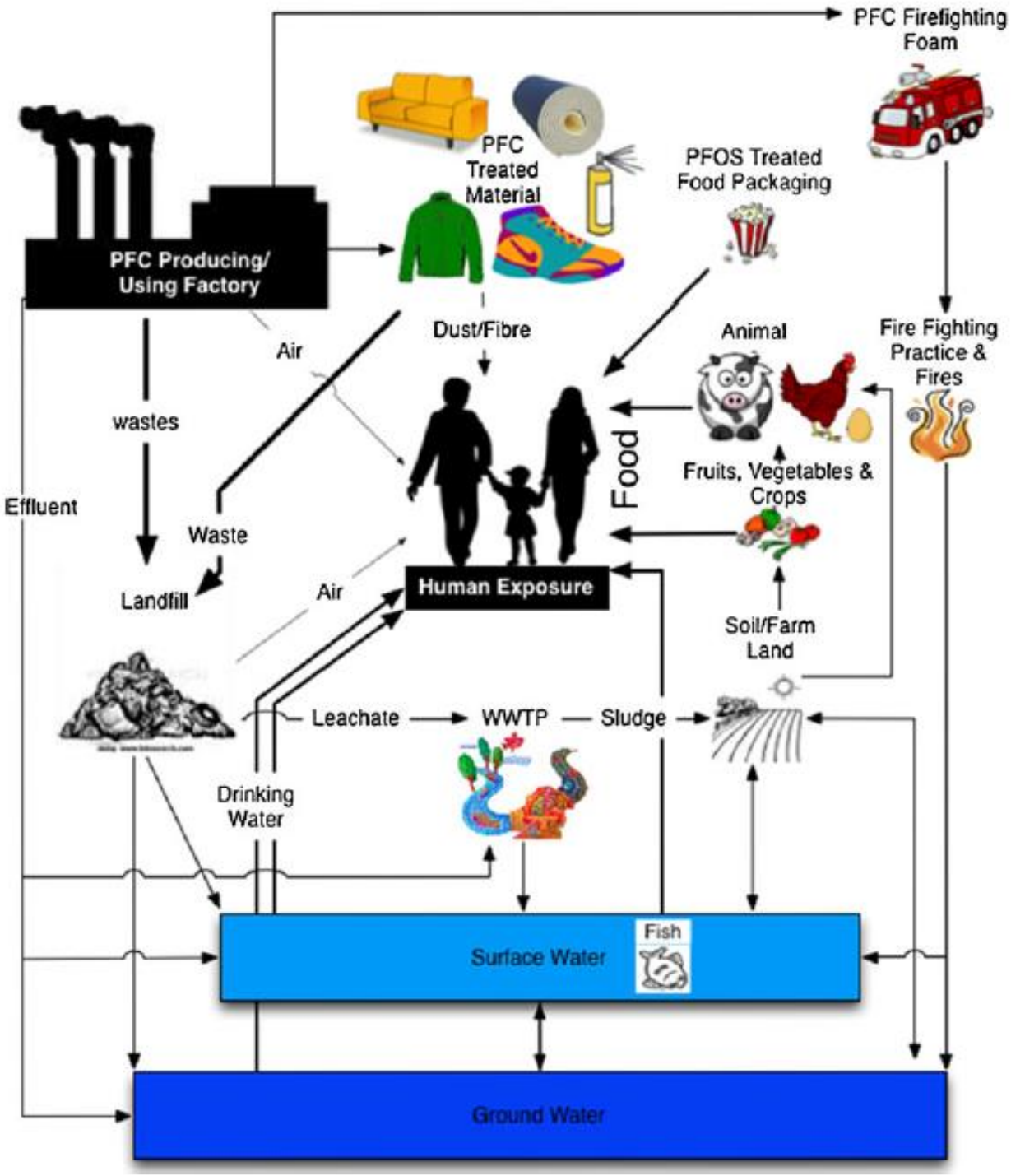
Metal plating
Semiconductor coatings
Hydraulic fluids
Medical devices
Rubber and plastics



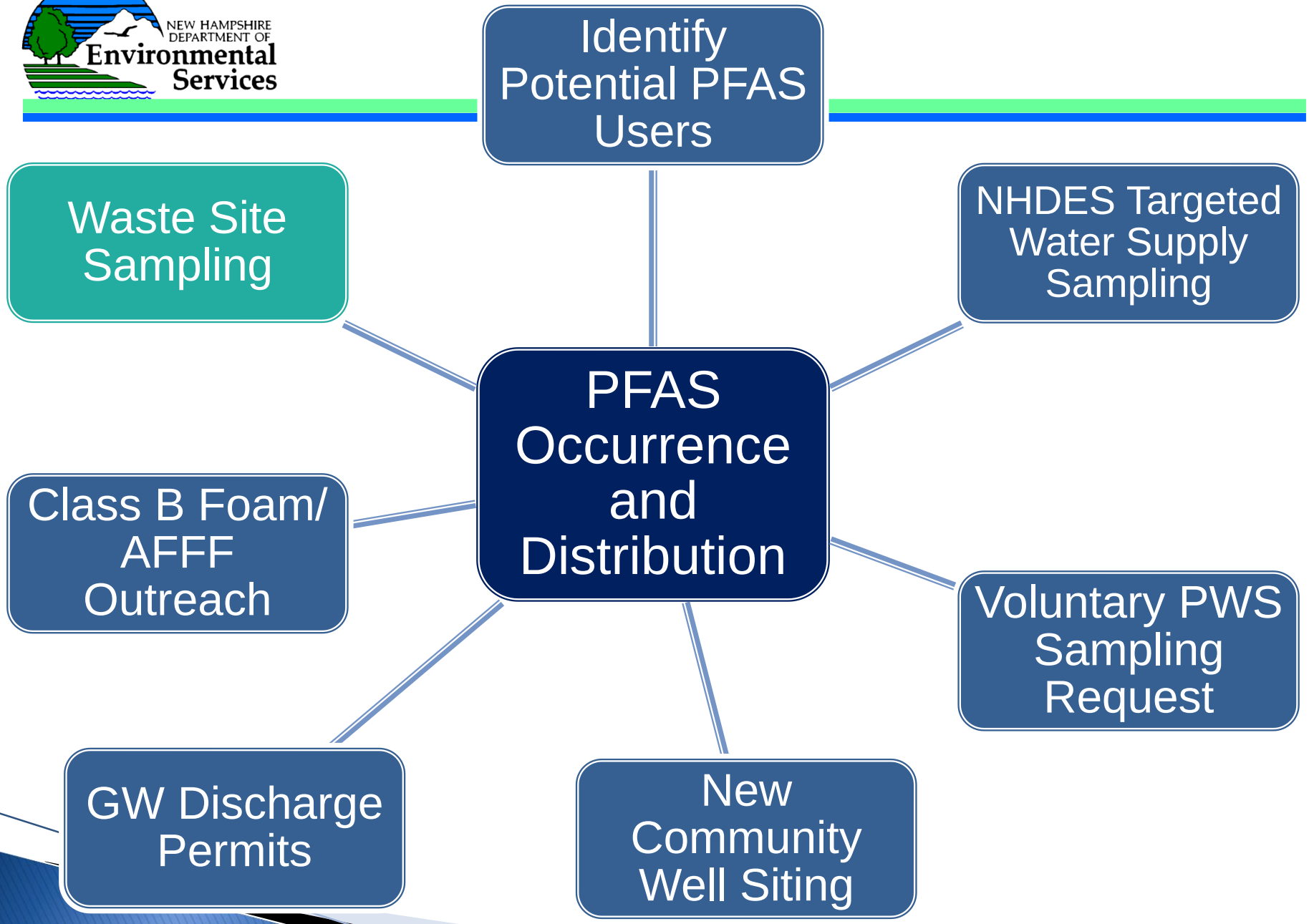
From Oliaei 2013, Environmental Science Pollution Research

NH Regulatory Framework

- AGQS - Ambient Groundwater Quality Standards (Env-Or 600)
  - PFOA, total of all isomers – 70 ng/L or ppt
  - PFOS, total of all isomers – 70 ng/L or ppt
  - Combined total PFOA + PFOS – 70 ng/L or ppt

- Soil guidance - direct contact
  - PFOA – 0.5 mg/kg (500 ppb)
  - PFOS – 0.5 mg/kg (500 ppb)
  - No leaching based standard

- No surface water standard

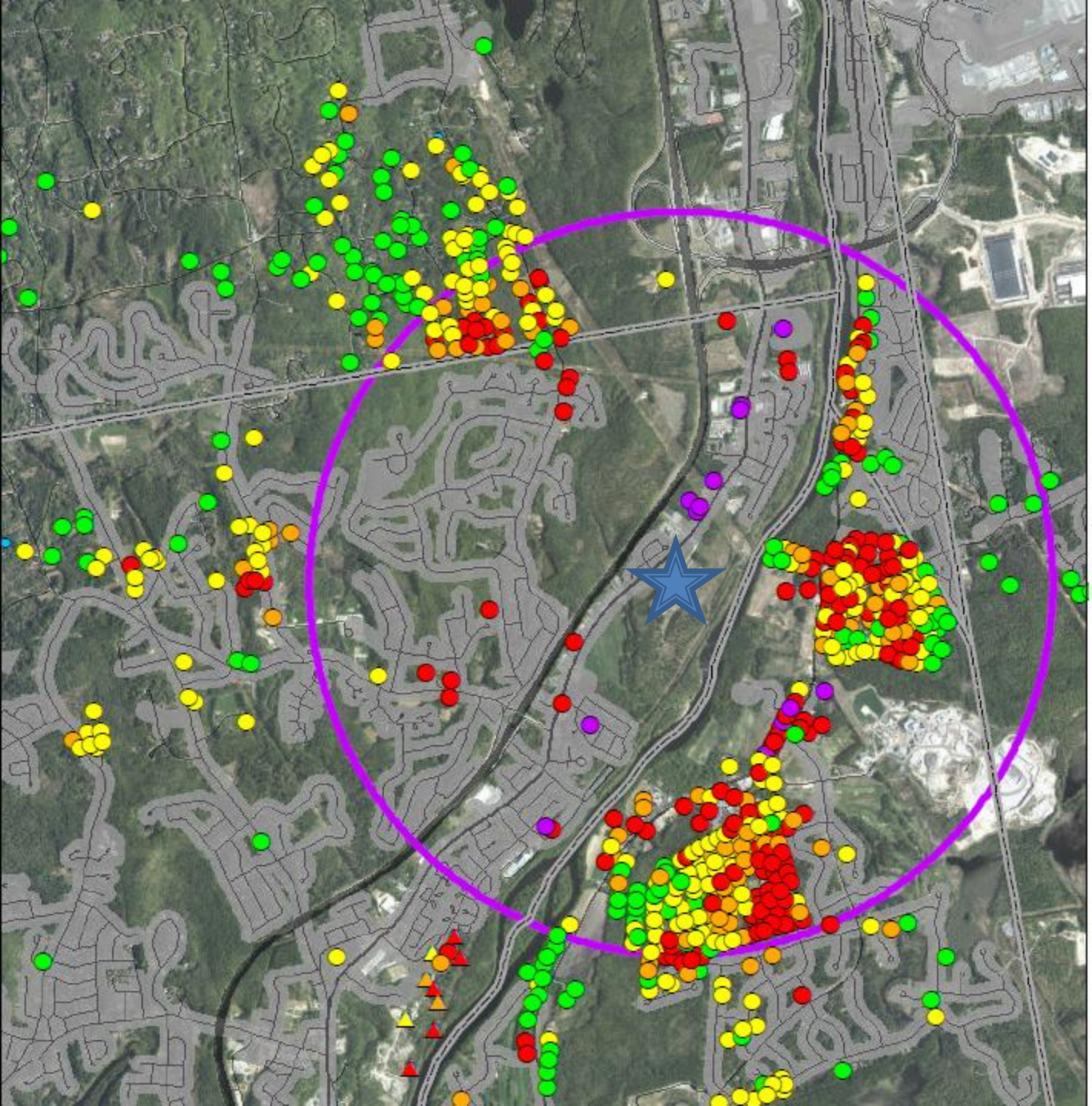

Identify Potential PFAS Users
Waste Site Sampling
NHDES Targeted Water Supply Sampling
PFAS Occurrence and Distribution
Class B Foam/ AFFF Outreach
Voluntary PWS Sampling Request
GW Discharge Permits
New Community Well Siting

NHDES Sampling – MtBE Team

Site	Sample Locations	Results	PFOA + PFOS (ppt)			
			<10	10 - <45	40 - <70	≥ 70
TOTAL	**1,743**	**1,712**	**831**	**530**	**115**	**236**
SGPP	926	901	289	336	87	189
TCI Amherst	247	246	129	78	16	23
Lydall	16	16	7	4		5*
Landfills (5)	302	301	233	58	3	7*
Fire Training / Fire Departments (7)	103	100	67	23	3	7*
General Investigation	74	74	66	7	1	
Unknown Source (5)	75	74	40	24	5	5

Interactive map

Results as of March 14, 2017



SOUTHERN NH PFC INVESTIGATION
November 30, 2016

1.5 Mile Radius

PFOA + PFOS (PPT)

Public/Private Well	Monitoring Well	Surface Water	
●	▲	■	≥400
●	▲	■	70 - <400
●	▲	■	45 - <70
●	▲	■	10 - <45
●	▲	■	< 10
●			Sampled - Result Pending

Transportation

US/ NH Route

Road

Driveway

Political Boundary

Water Distribution

1:36,000

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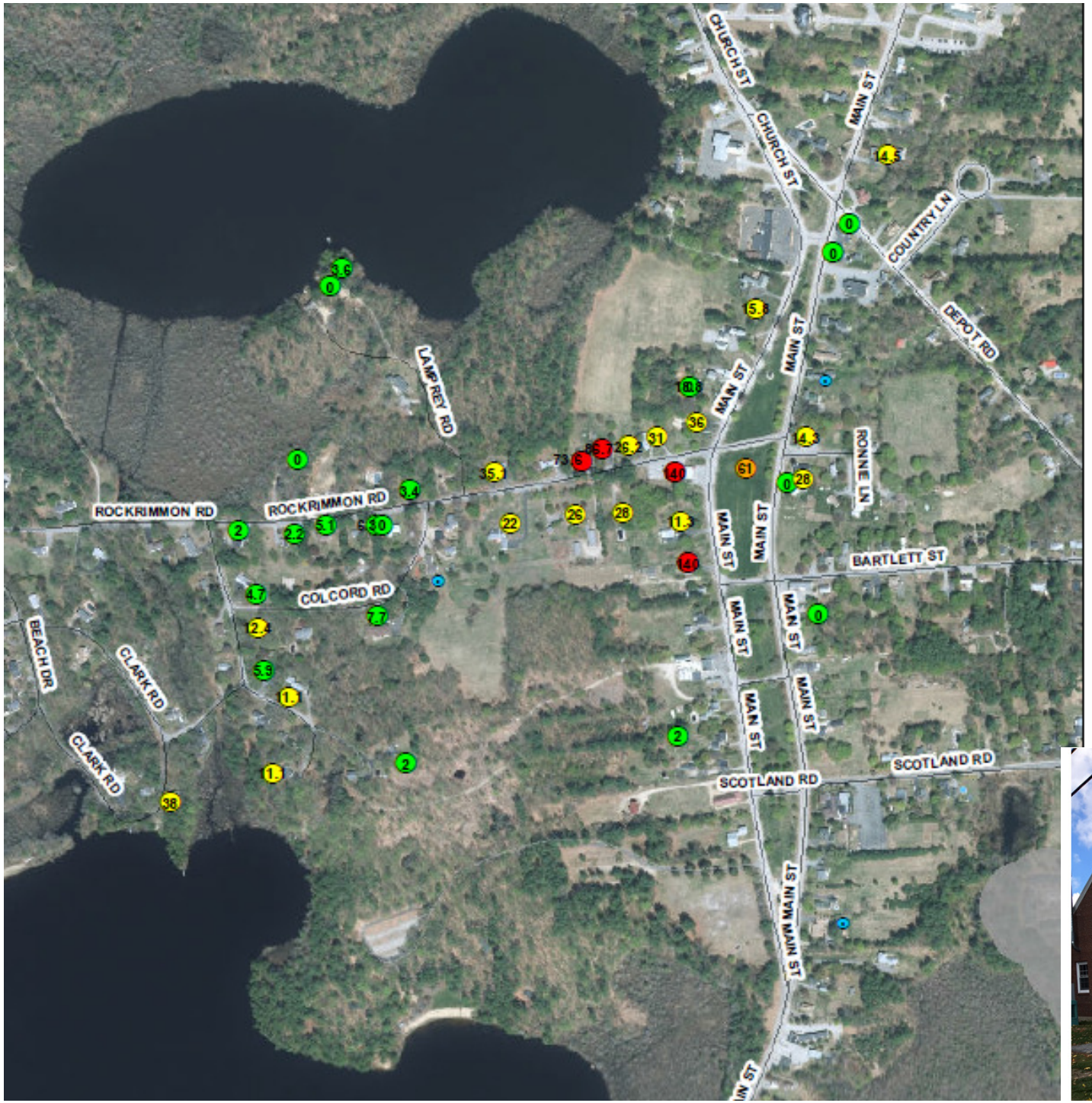
Fire Department

PFC INVESTIGATION
FEBRUARY 8, 2017



PFOA + PFOS (PPT)

Supply Well	Monitoring Well	Surface Water	Other Sample	
●	▲	■	⬟	≥400
●	▲	■	⬟	70 - <400
●	▲	■	⬟	45 - <70
●	▲	■	⬟	10 - <45
●	▲	■	⬟	< 10
⊙				Analytical ResultPending

Public Water Supplies

Water Distribution

Political Boundary

PFAS Occurrence

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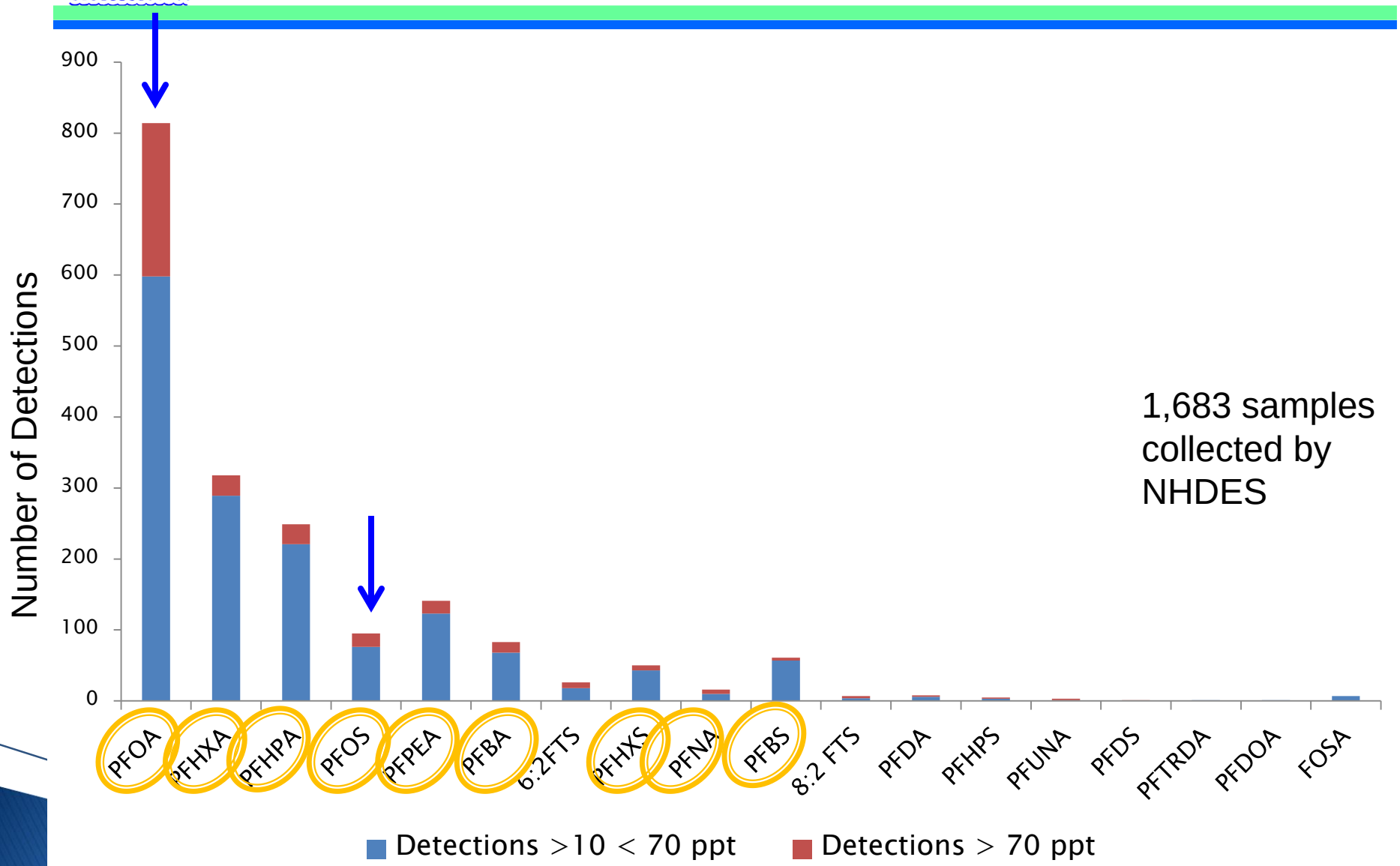


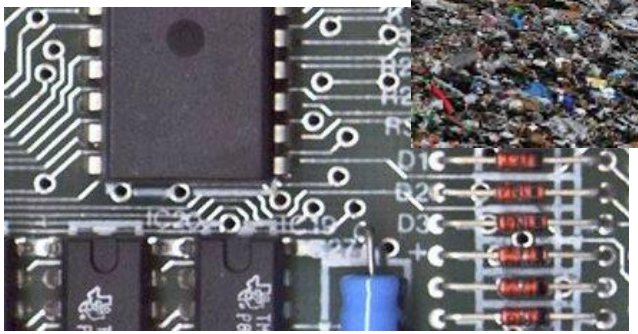
Expansive Use of PFAS

Industrial Uses	Commercial Products
Photo Imaging	Cookware (Teflon®, Nonstick)
Metal Plating	Fast Food Containers
Semiconductor Coatings	Candy Wrappers
Aviation Hydraulic Fluids	Microwave Popcorn Bags
Medical Devices	Personal Care Products (Shampoo, Dental Floss)
Firefighting Aqueous Film-Forming Foam	Cosmetics (Nail Polish, Eye Makeup)
Insect Baits	Paints and Varnishes
Printer and Copy Machine Parts	Stain Resistant Carpet
Chemically Driven Oil Production	Stain Resistant Chemicals (Scotchgard®)
Textiles, Upholstery, Apparel and Carpets	Water Resistant Apparel (Gore-Tex®)
Paper and Packaging	Cleaning Products
Rubber and Plastics	Electronics
	Ski Wax

Program Approach

- Initial letter – November 22, 2016
- Letters directly to Site owners by end of April
- Active landfills – sample in July 2017
- Other sites – 2017 or 2018

Project Type	# of Sites
HAZWASTE	340
SITEEVALHW	154
LAND/UNLINED	189
LWW/LAGOON	23
LAND/LN	7
Total	713



Written Guidance

- Updated lab list
- PFAS SOP in Master QAPP
- EMD Guidance – Coming Soon
- FAQs – Coming Soon

SAMPLING FOR PER- & POLY-FLUORINATED ALKYL SUBSTANCES

PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide guidance for collecting samples for per- and poly-fluorinated alkyl substances (PFAS) analysis. *Please note that PFAS are emerging contaminants; therefore, this SOP will be modified as new information becomes available.*

Because of the potential presence of PFAS in common consumer products and in equipment typically used to collect groundwater samples and the low detection limits associated with laboratory PFAS analysis, special handling and care must be taken when collecting samples for PFAS analysis.

This SOP outlines general practices for collecting PFAS samples and provides a summary of non-acceptable field and sampling materials (likely to contain PFAS) and acceptable alternatives.

Any modifications to this SOP shall be approved in advance by the New Hampshire Department of Environmental Services (NHDES) Project Manager, documented in the field logbook and presented in the final report.

Resources

- NHDES General

  http://des.nh.gov/organization/commissioner/pfoa.htm
- HWRB Technical (Hot Topics)

  http://www.des.nh.gov/organization/divisions/waste/hwrb/index.htm
- DHHS

  http://www.dhhs.nh.gov/dphs/pfcs/index.htm
- Contact Information

  Lea Anne S. Atwell, NHDES, (603)271-6572, leaanne.atwell@des.nh.gov

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Sampling Protocols and Lab Analyses

Peter Sandin

NHDES Hazardous Waste Remediation Bureau

PFAS Stakeholder Meeting

April 11, 2017

Topics

- Developing a Sampling Plan
  - Site Prioritization
  - Existing Conceptual Site Model
  - Historical knowledge not previously considered for CSM
  - Provide sound justification for approach
- Sampling Protocols
  - Field Equipment Selection
  - Personal Considerations
  - QA/QC
- Laboratory Analyses and Considerations

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Sampling Plan Design

Site Prioritization

- Should be Risk Driven
- Target sites with Water Supply Wells currently within, or in close proximity to, a GMZ
- Existing POETs
- Target Sites with historical documentation of potential sources

Conceptual Site Model

- Bare Minimum = Source> Plume > GMZ > Receptors
- Identify source area monitoring wells
- Characterize mid-plume and GMZ boundary
- Are there current receptors under the GMP
- What about upgradient?

Historical Information

- Is there information in the SI or from knowledgeable party that supports another approach?
- Class B Foam/AFFF History
- Other industrial processes
- Other considerations

Sample Program Justification

- When reporting the results, provide supporting information for the sampling plan

- Some sites require sampling plan be submitted beforehand for NHDES review and approval
  - Lined landfills (summer 2017)
  - Federal facilities: Superfund and DoD sites (confirm with PM)

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Sampling Protocols

Sampling Considerations

- NHDES Sample Collection Guidance Document

  http://www.des.nh.gov/organization/divisions/waste/hwrb/documents/pfc-stakeholder-notification-20161122.pdf

- NEWMOA Webinar

  http://www.newmoa.org/events/event.cfm?m=228

- NHDES QAPP

Category	Prohibited Items	Allowable Items
Pumps and Tubing	Teflon® and other fluoropolymer containing materials	High-density polyethylene (HDPE), low density polyethylene (LDPE) , or silicone tubing, peristaltic pump or stainless steel submersible pump
Decontamination	Decon 90	Alconox® or Liquinox®, potable water followed by deionized rinse.
Sample Storage and Preservation	LDPE or glass bottles, PTFE-or Teflon®-lined caps, chemical ice packs	Laboratory-provided sample container -*preferred*; or, HDPE or polypropylene bottles, regular ice
Field Documentation	Waterproof/treated paper or field books, plastic clipboards, non-Sharpie® markers, Post-It® and other adhesive paper products	Plain Paper, metal clipboard, Sharpies®, pens
Clothing	Clothing or boots made of or with Gore-Tex™ or other synthetic water resistant and/or stain resistant materials, Tyvek® material	Synthetic or cotton material, previously laundered clothing (preferably previously washed greater than six times) without the use of fabric softeners
Personal Care Products (for day of sample collection)	Cosmetics, moisturizers, hand cream and other related products	Suncreens: Alba Organics Natural Yes to Cucumbers Aubrey Organics Jason Natural Sun Block Kiss My Face Baby-safe sunscreens ('free' or 'natural') Insect Repellents: Jason Natural Quit Bugging Me Repel Lemon Eucalyptus Herbal Armor California Baby Natural Bug Spray BabyGanics Sunscreen and Insect Repellents: Avon Skin So Soft Bug Guard-SPF 30
Food and Beverage	Pre-packaged food, fast food wrappers or containers	Bottled water or hydration drinks

QA/QC

Initial Screening Effort

- Field Blank
  - PFC free lab water taken to field and poured from one container to another.
- Equipment Blank: only if non-dedicated equipment to be used
  - Also equipment blanks of decon water (at Pease 1 per day per field crew)
- Field Duplicates: only if >10 samples

Full-Scale Investigations

- Follow NHDES QAPP and/or coordinate with PM

Hypothetical Site 1

Former Landfill

- LTM of low-level CVOC and metals plume at east end
- Highest CVOC at tow of slope
- CVOC plume extends 400’ beyond landfill, down primary hydraulic gradient direction
- GMZ boundary 500’ to east

Hypothetical Site 1 con't.

Other Considerations

- Burning and fire training with AFFF in 1970s at west end
- Groundwater divide with some westward flow component
- GMZ boundary only 200' to west (1 MW)
- Off-site WSW with former low-level CVOCs but dropped from GMP

Hypothetical Site 2

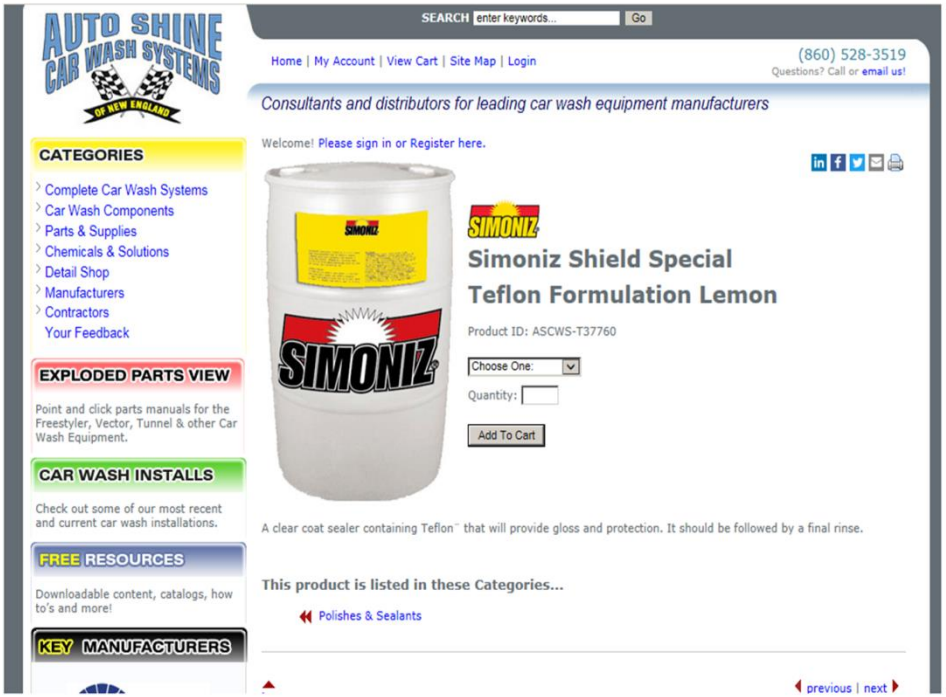
Active Gas Station with co-mingled CVOCs (HWRB)

- Highest VOCs in former UST bed and service area dry well
- Well defined diving plume extends west 400’
- Driven well points with former low-level VOCs 450’ SW & NE
- One well has active POE 300’ west

Hypothetical Site 2 con't.

Other Considerations

- Car Wash upgradient of active GMZ well network
- Off-site WSW with former low-level CVOCs but dropped from GMP



Hypothetical Site 3

Small Airport with co-mingled fuel and CVOC plumes

- Very transmissive sand and gravel aquifer
- Long linear shallow VOC Plume
- Off-site impacted WSW with POET

Hypothetical Site 3 con't.

Other Considerations

- Second Off-site dug WSW formerly monitored, low-level VOCs only after hard pumping event to fill swimming pool
- Photo in office of prophylactic deployment of AFFF at Air Show fuel spill

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Laboratory Analyses

Laboratories

- Limited number of labs perform analysis
- http://des.nh.gov/organization/commissioner/documents/pfoa-testing-labs.pdf

Nelson Analytical Lab
490 East Industrial Park Dr.
Manchester NH 03109
(603) 622-0200
http://www.nelsonanalytical.com/

Seacoast Analytical Laboratory
P.O. Box 555, Barrington NH 03825
(603) 868-1457
www.seacoastanalytical.com

Maxxam Analytics
6740 Campobello Road
Mississauga, Ontario L5N 2L8
+1 (905) 817-5700
maxxam.ca

AXYS Analytical Services Ltd.
2045 Mills Road West
Sidney, BC V8L 5X2
+1 (888) 373-0881
www.axysanalytical.com

Eurofins Eaton Analytical, Inc
750 Royal Oaks Drive, Suite 100
Monrovia, CA 91016
(626) 386-1117
www.EurofinsUS.com/Eaton

Absolute Resource Associates
124 Heritage Avenue #16
Portsmouth, NH 03801
(603)436-2001
www.absoluteresourceassociates.com

Eastern Analytical, Inc.
25 Chenell Drive
Concord, NH 03301
(800) 287-0525
www.easternanalytical.com

Test America
Vista

Granite State Analytical
22 Manchester Rd
Derry, NH 03038
(603) 432-3044
www.granitestateanalytical.com

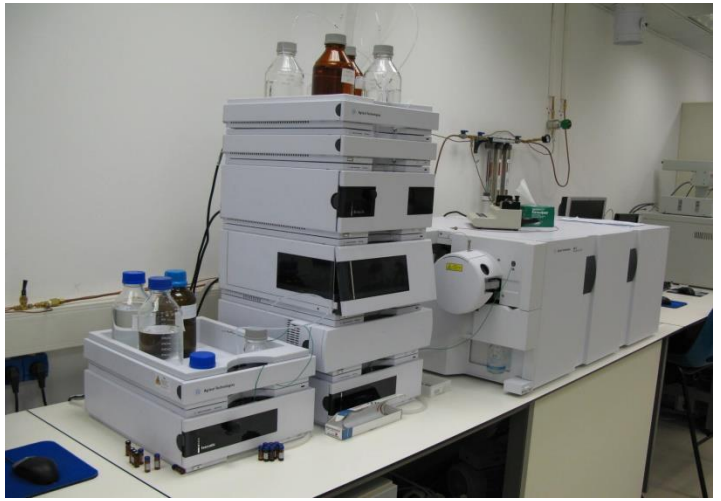
ALS
1317 South 13th Ave
Kelso, WA 98626 USA
(360) 577-7222
www.alsglobal.com

South Central Regional Water Authority
90 Sargent Drive
New Haven, CT 06511
(203) 401-2700
www.rwater.com

March 22, 2016

Analytical Methods

- USEPA Method 537 Rev 1.1
  - Solid Phase Extraction and Liquid Chromatography/ Tandem Mass Spectrometry (LC/MS/MS)
- Drinking water method
- Potential matrix interference effects for groundwater samples



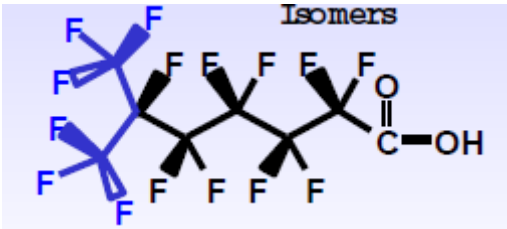
LC/MS/MS

SPE Setup

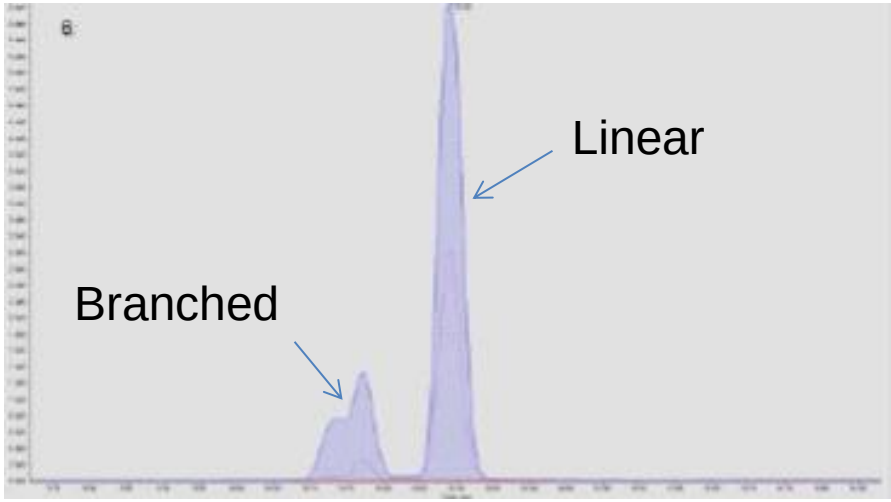
Analytical Methods cont.

- *Strongly recommend modified USEPA Method 537 with isotope dilution*
  - Uses stable isotopes to account for analyte loss
  - No standardized method
  - USEPA developing a standardized isotope dilution method

Isomers



- Linear and branched
- Different manufacturing processes
  - 3M (30% branched / 70% linear)
  - Dupont (linear only)
- Previously, labs calculated PFOA concentrations differently
  - Some reported linear only
  - Some reported both
  - 20-40% difference
  - Sept 2016 - USEPA issued clarification



Recommended Analyte List

Perfluoroalkyl Carboxylic Acids	# of Carbons
Perfluorobutanoic acid (PFBA)	4
Perfluoropentanoic acid (PFPeA)	5
Perfluorohexanoic acid (PFHxA)	6
Perfluoroheptanoic acid (PFHpA)	7
Perfluorooctanoic acid (PFOA)	8
Perfluorononanoic acid (PFNA)	9

Perfluoroalkane Sulfonic Acids / Sulfonates	# of Carbons
Perfluorobutanesulfonic acid (PFBS)	4
Perfluorohexanesulfonic acid (PFHxS)	6
Perfluorooctanesulfonic acid (PFOS)	8

RLs <5 ppt

Laboratory Certification

- *Strongly recommended certification:*
  - *DOD and/or*
  - *NELAP*
- NH accreditation status

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Questions and Discussion

Peter Sandin, P.G.
NHDES – Pease Office
603-559-0022
peter.sandin@des.nh.gov

OneStop Data Providers for PFAS Sampling:

Uploading Data to the Environmental Monitoring Database (EMD)

Melanie Cofrin
NHDES Water Division

Summary of Data Upload

Register for an account or edit current account.

Upload monitoring locations.

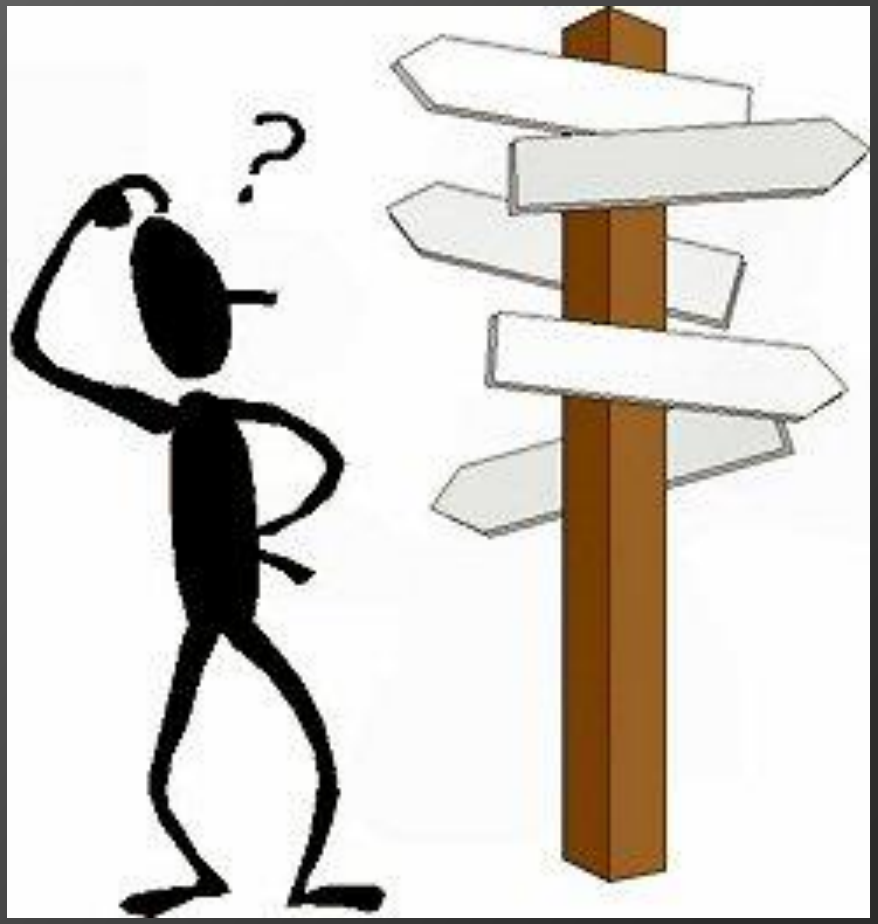
Go Sampling!

Upload sampling data.

Data in the EMD has Many Crucial Benefits

- It can be mapped
- We can create reports – for the NHDES, consultants, and the public
- It can be tracked efficiently
- It's easier to see where detections occur

We're Here to Help!



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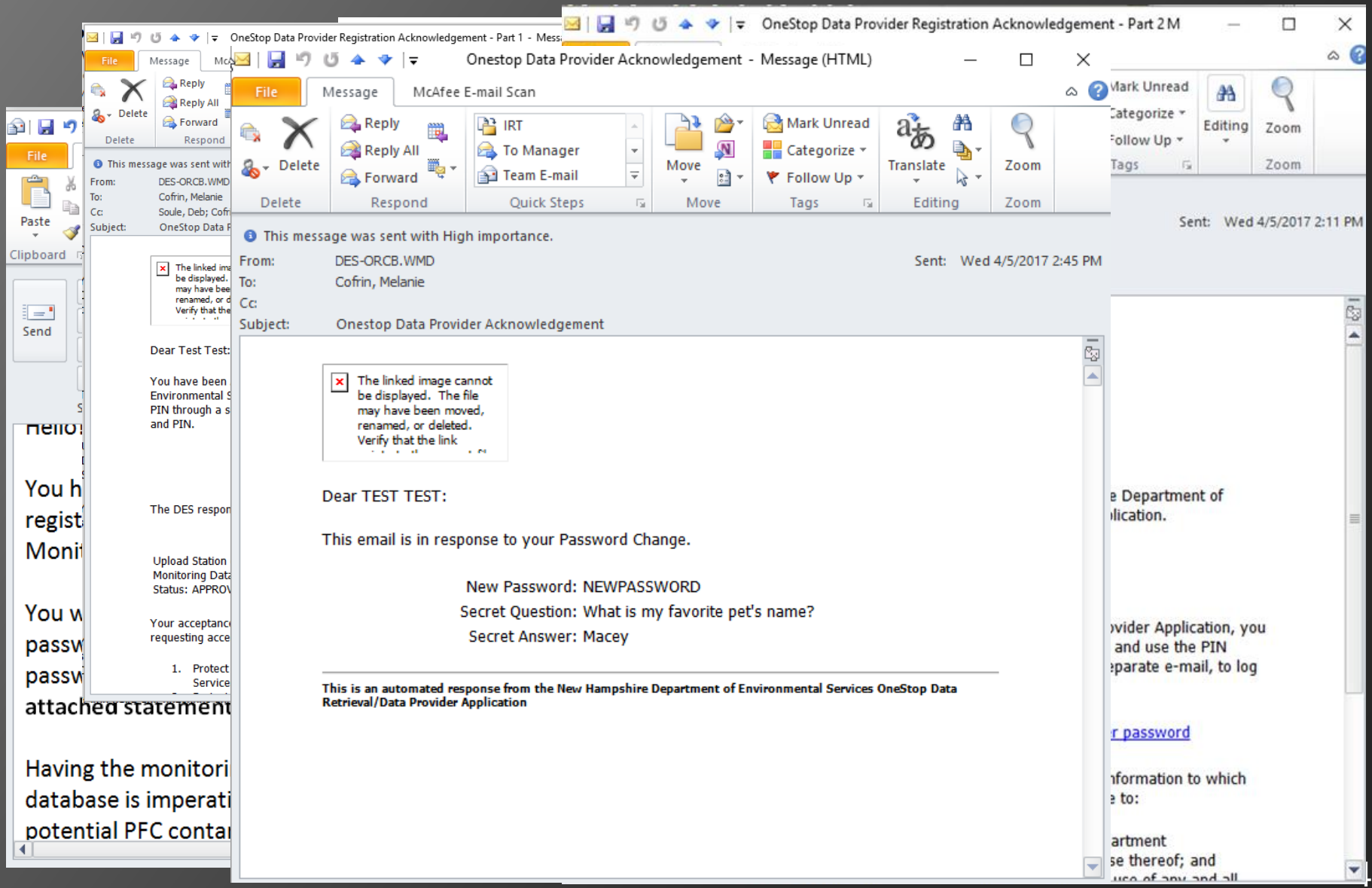
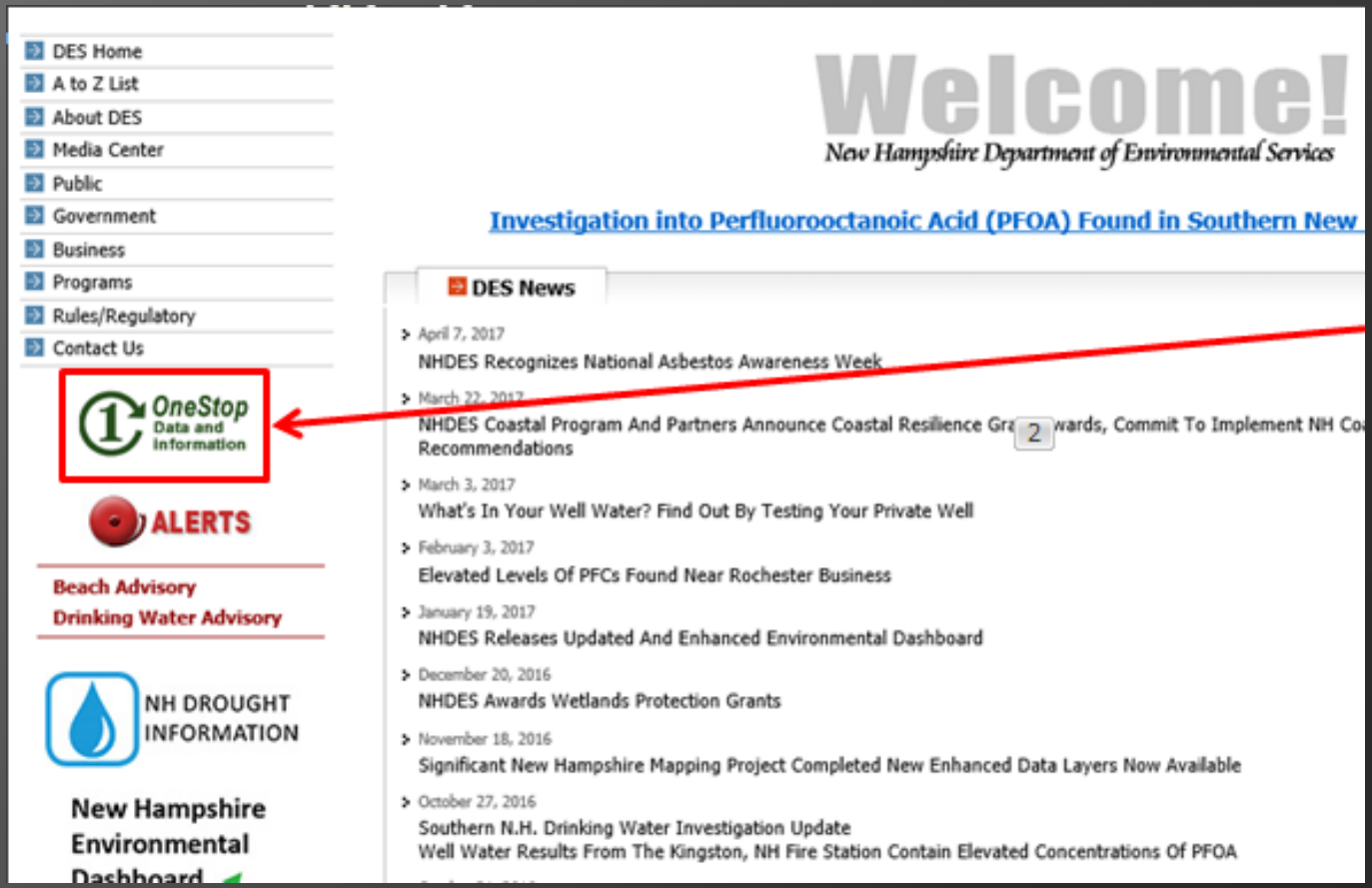


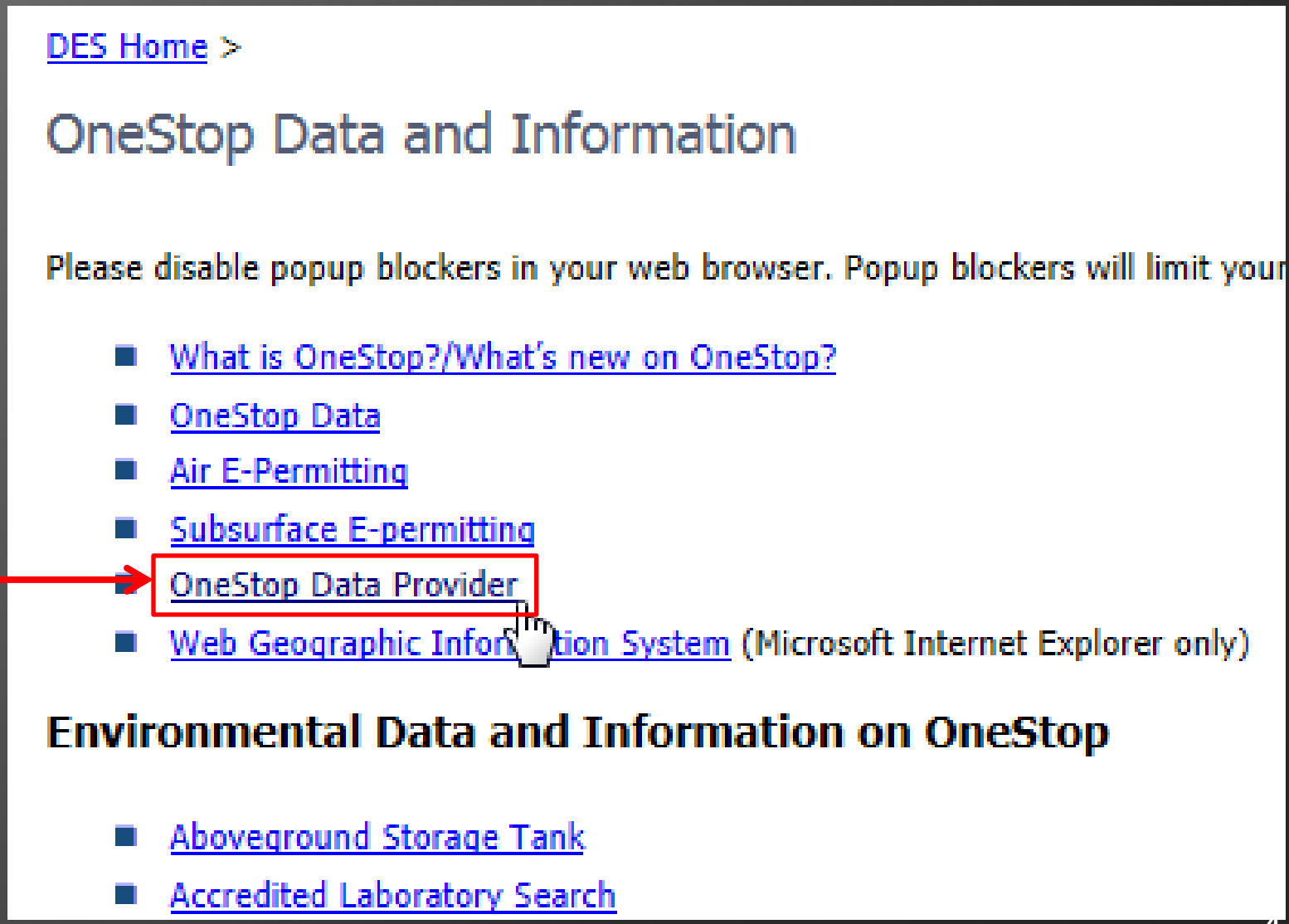
Logging In as a Data Provider

Save this link to your favorites!

https://www2.des.state.nh.us/OnestopDataProviders/DESLogin.aspx

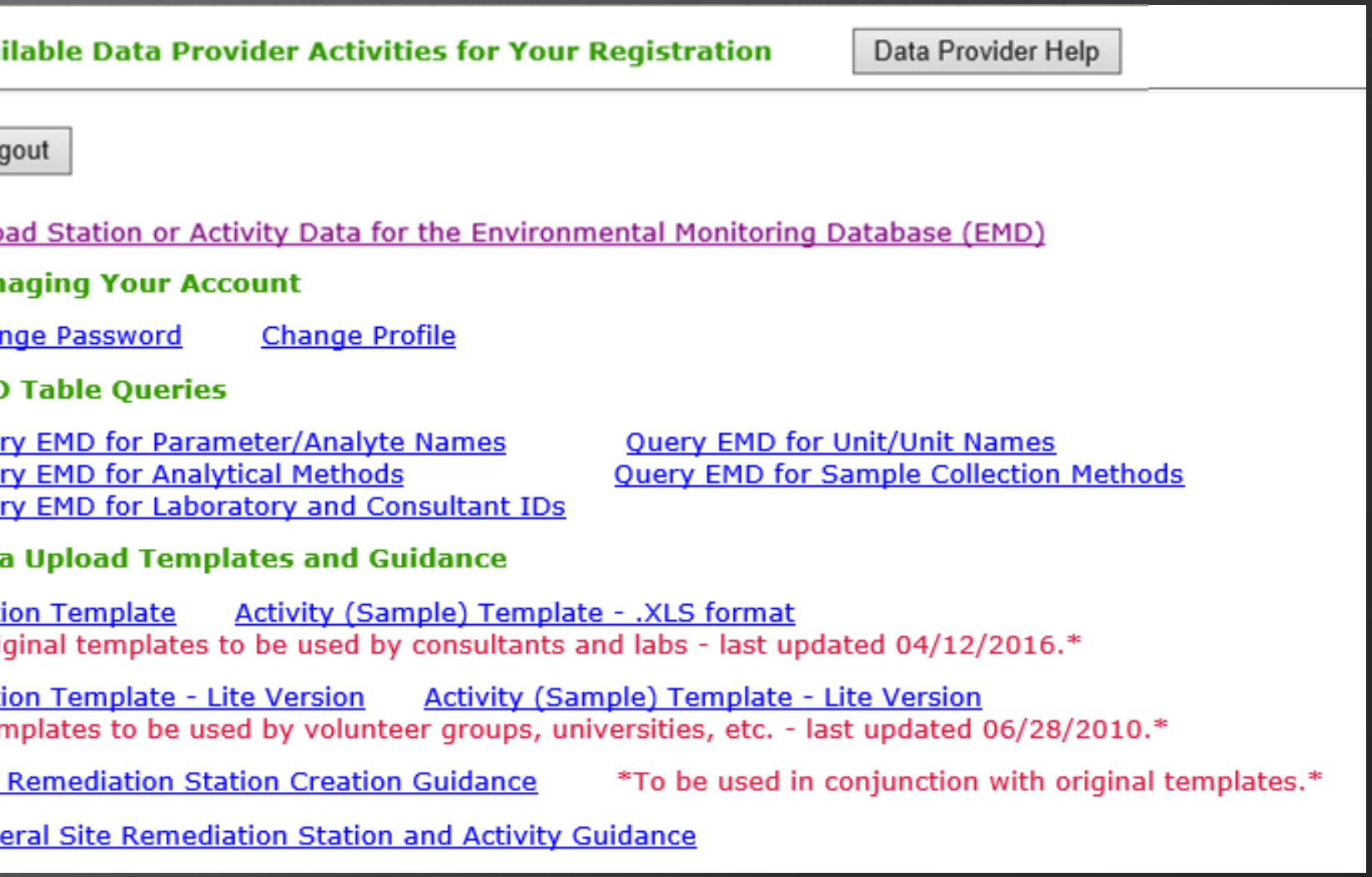


Logging In as a Data Provider



Click here!

Data Provider Home Screen



Have Questions? Getting Errors? Completely lost?

Don’t be discouraged!

It can be difficult to get it the first time

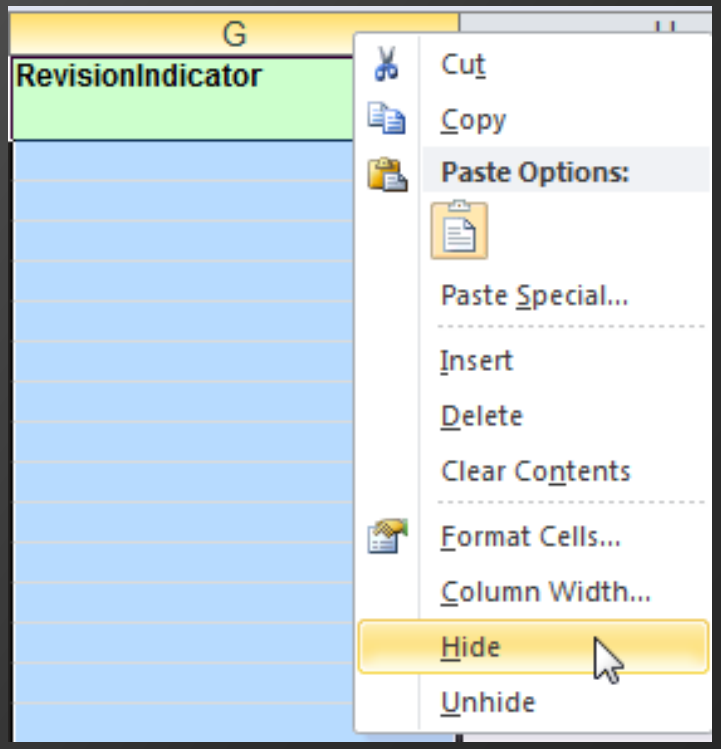
but it gets easier!

For all your data upload needs – email

Melanie.Cofrin@des.nh.gov

Using the Templates

- You <u>can</u> hide columns
- You <u>can</u> add tabs/worksheets
- Do not reorder the columns
- Do not change the column title/name
- Do not change the title/name of the tabs
- Do not save the template as a newer version of Excel



Station Template

- Submit your stations about a week before sampling please!
- Submitting stations **first** gives NHDES staff time to process the submittal.
- Include these unique station identifiers on your sampling chain of custody.
  - This will help when you go to submit activity (sampling) data!

Station Template

I can send you the station template with an example!

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	ProjID	SiteNumber	StationID	AliasID	StatName	Address	Town	County	State	TaxMap	TaxLot	StatType	DateEst	StatDescr
2	HWRB	Example Row	199904001MW01	MW-01	Brief Descri	1 Foster	Laconia	Belknap	NH	35	001-018	Well	1/10/2017	Monitoring w

Schema Column Name Used in Template	Column Description	Format Considerations (Columns dependent on pick lists are highlighted in orange. See "EMD Pick Lists" worksheet for pick list values.)	Example	Size/Type	Required?
ProjID	Project ID the station is associated to/related. In the Sample-Activity Template, this column is called "ProjectIdentifier".	Pick list. Must be valid ID. Contact project manager for correct ID to use.	HWR/ORCB	Ch (15)	Yes
SiteNumber	Site/facility/system number the station is associated to/related. In the Sample-Activity Template, this column is called "FacilitySiteIdentifier".		2003040123	Ch (20)	Conditionally required if ProjID = "HWR/ORCB", then a valid site number must be entered.
StationID	ID for the location where samples/measurements are taken. In the Sample-Activity template, this column is called "MonitoringLocationIdentifier".	Must be a unique station ID. If it already exists in the database, you will be prompted to create a different value or see if station has already been submitted.	2003040123MW1	Ch (15)	Yes
AliasID	Alias (alternate) ID for the station. In the Sample-Activity Template, this column is called "MonitoringLocationAlternateName".		GZA-1	Ch (25)	No
StatName	Brief, geographically descriptive name for the station.		Monitoring well 1 at NW corner of tank	Ch (100)	Yes
Address	Address for the station.		12 Maple Street	Ch (50)	No
Town	Town the station is in. Proper town names only - no village	Pick list.	Hopkinton	Ch (40)	Yes
County	County the station is in.	Pick list.	Merrimack	Ch (20)	Yes
State	State the station is in.	Pick list.	NH	Ch (2)	Yes
TaxMap	Tax map for the station.		125	Ch (20)	No, except required for Waste Management Division (WMD) submittals.
TaxLot	Tax lot for the station.		U-3	Ch (20)	No, except required for WMD submittals.
StatType	Station type.	Pick list.	Well	Ch (45)	Yes
DateEst	Date the station was established or drilled.	MM/DD/YYYY	04/01/2003	Date	No
StatDescr	Description of the station.		4" driven well on the NW edge of the tank excavation area. Well is flush with pavement and topped with bronze cap.	Ch (4000)	No
StatDir	Directions to the station.		Station is at SE corner of the property where UST tank was formerly located.	Ch (1999)	No

Activity Template

- Use the “Lite” template!
  - It’s simpler
  - It’s the one we reference in the help guides
- Submit activity (aka sample) data as soon as you can – within 45 days of sampling
- Either the consultant or the lab can submit activity templates
  - (just needs to be someone with a login)

Activity vs. Result Information

- Activity/Sample data is entered in columns A-U

Sample 1	Mfg-Textile	Sample - routine	PFAS	04/11/2017	7:30:00
Sample 1	Mfg-Textile	Sample - routine	PFAS	04/11/2017	7:30:00
Sample 1	Mfg-Textile	Sample - routine	PFAS	04/11/2017	7:30:00
Sample 1	Mfg-Textile	Sample - routine	PFAS	04/11/2017	7:30:00
Sample 1	Mfg-Textile	Sample - routine	PFAS	04/11/2017	7:30:00

- Result data is entered in columns V-AN

537 Mod	USEPA	water	45298-90-6	CAS	- PFOS		20	ug/L
537 Mod	USEPA	water	335-67-1	CAS	- PFOA	<	5	ug/L
537 Mod	USEPA	water	2058-94-8	CAS	PFUNA		12	ug/L
537 Mod	USEPA	water	375-95-1	CAS	- PFNA		6	ug/L

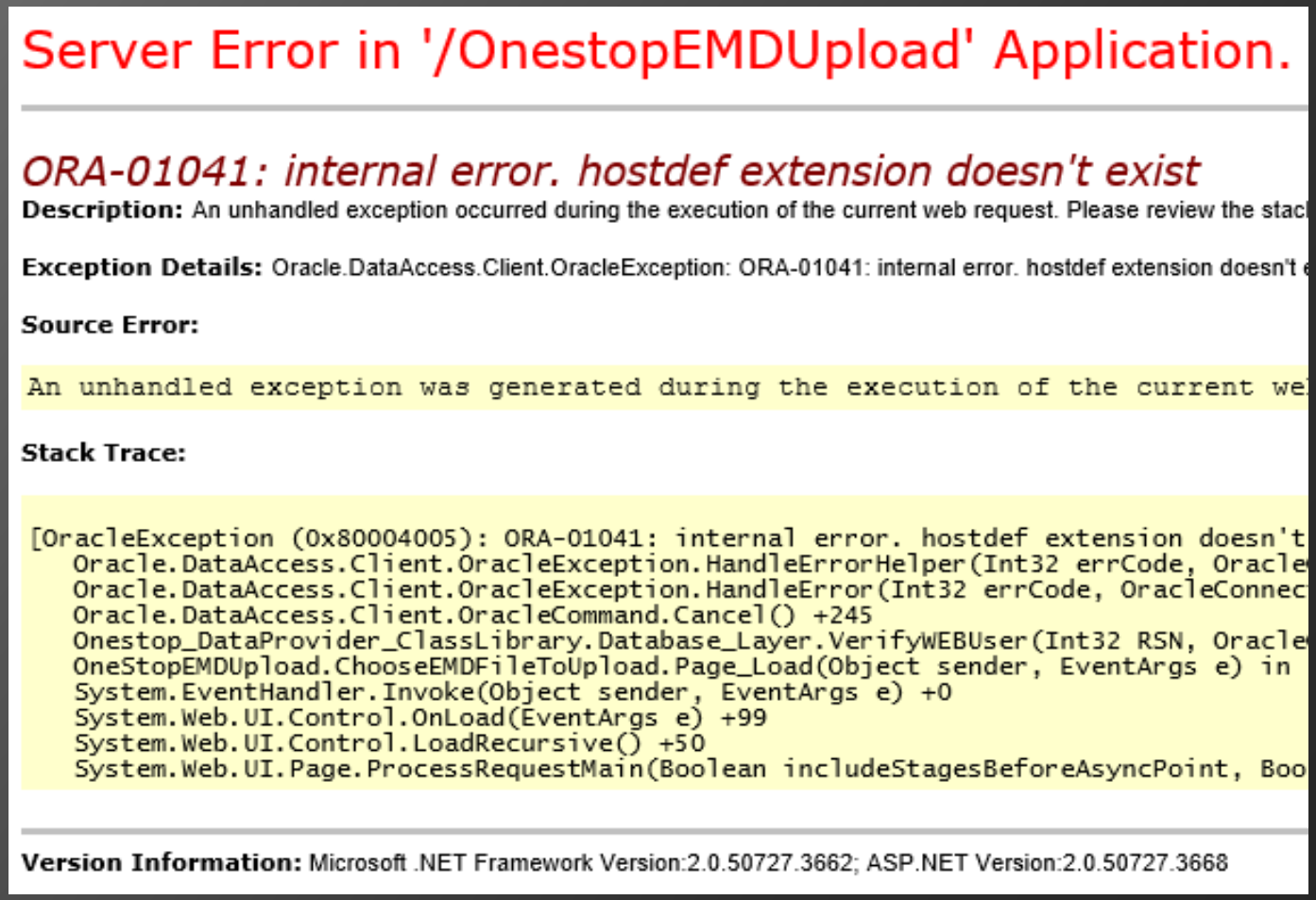
Data Provider Home Screen

Submitting Data

1. Click on “Upload Station or Activity Data for the Environmental Monitoring Database (EMD)”
2. Select what you are uploading
3. Browse to your file
4. Click “Validate Only” to check the file
5. If valid, repeat steps 1-3
6. Click “Submit” to submit the data

Common Errors

If you get an error screen – try refreshing

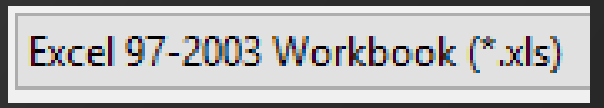


Common Errors

If the program doesn't recognize the template ('No records found')

Start Time: 2/24/2017 1:07:26 PM
No 'Activity' records were found in 'UnknownActNo.xlsx' or the wrong template was used based on your file upload type.
End Time: 2/24/2017 1:07:26 PM

1. Make sure you selected the correct type of file to be uploaded.
2. Make sure it's saved as '.xls'
3. Try downloading a new template and copying your data into it.



Contact Information

If you get stuck or just can't find how to do something, please contact us for help!

- Contact your NHDES project manager for specific project questions.
- For technical help on the template or upload issues contact: Melanie Cofrin at Melanie.Cofrin@des.nh.gov

  If you can – include a screenshot of the problem and/or the template you're trying to upload!

Thank You!

Any Questions?

Response Actions

Kate Emma Schlosser, Project Manager
NHDES Hazardous Waste Remediation Bureau

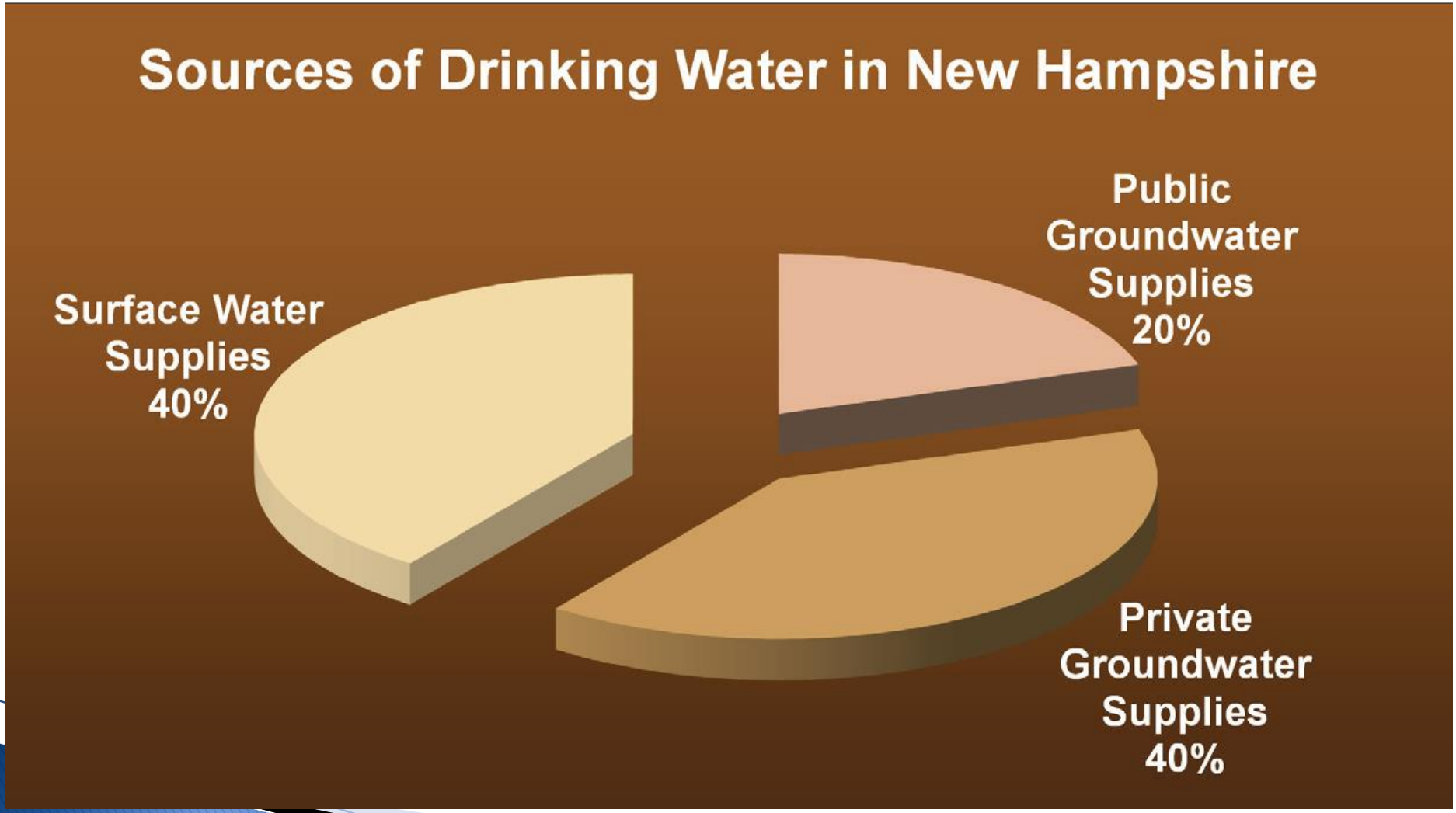
Now What?

Routine Reporting

- 45 day data transmittal
- Periodic summary report

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Drinking Water Exposure



Drinking Water Exposure

Sampling Date	PFOA (ppt)	PFOS (ppt)	Total PFOA + PFOS (ppt)
April 2016 (Lab 1)	60	9.3	69.3
November 2016 (Lab 1)	55	5.3	60.3
November 2016 (Lab 2)	42	<4	42
February 2017 (Lab 3)	40	<2	40

Water Supply Well [PFOA+PFOS] ≥ 90% AGQS (≥ 63 ppt)

- **Immediate verbal notification**
  - Provide to property owner and NHDES HWRB Project Manager upon knowledge of result.
    - If site is unassigned, notify HWRB Administrator (Karlee Kenison).
    - If verbal notification not possible, provide email notification.

- **Provide potable water** ***Action pursuant to Env-Or 607.06(b) and permits.***
  - Short term – bottled water.
  - Long term – coordinate with HWRB Project Manager.

Requirements: Notification (Env-Or 604)
- *Written notification due within 30 days for exceedance at or beyond GMZ boundary (Env-Or 607.07)*
- *Written notification due within 60 days unless otherwise allowed by GMP (Env-Or 604)*

In addition, NHDES strongly recommends immediate verbal notification, as described above.
Action will be required with detections greater than AGQS. Although not required, based on NHDES' experience, we strongly recommend also taking action when concentrations detected in a water supply well are ≥ 90% of AGQS (≥63 ppt).

Water Supply Well
Compliance Monitoring Well
[PFOA+PFOS] ≥ 90% AGQS (≥ 63 ppt)

Assess potential impacts to drinking water supplies

Initial response actions required per Env-Or 605.04, as applicable, for exceedances of AGQS. Requested actions likely to include receptor survey and impacted drinking water supply assessment.

Develop sampling plan Min. 500 ft, consider 1,000 ft radius (typ.) Expand if > 210 ppt [PRP/PM]	Resample impacted well Sample other supply wells (Contact in 14 days, sample within next 14 days) [PRP]	If ≥ 90% AGQS, immediate notification to property owner and NHDES Send results to property owners, upload data to EMD, upload documents to OneStop [PRP]

In addition, NHDES strongly recommends implementation of these actions where concentrations detected are ≥ 90% AGQS.

Monitoring Guidance
Water Supply Wells and Monitoring Wells

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

≥ 50% AGQS

Monitoring frequency and duration based on site-specific conditions

If trend is increasing, evaluate site characterization, remedy, and future monitoring frequency

If steady or decreasing, monitor until trend established

(2 to 4 rounds [typ.]) or until <50% AGQS (35 ppt)

Provided for planning purposes. Actual requirements to be evaluated on a site-specific basis.

Monitoring Guidance
Water Supply Wells

Water Supply Well	Water Supply Well
≥ 70% AGQS (49 to 63 ppt)	≥ 50% to < 70% AGQS (35 to 49 ppt)
Sample monthly	Sample in 3 to 6 months

Provided for planning purposes. Actual requirements to be evaluated on a site-specific basis.

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

DES's Mission Statement

To help sustain a high quality of life for all citizens by protecting and restoring the environment and public health in New Hampshire.

We consider quality of life, public health and safety, economic vitality, and the concerns of our citizens while pursuing our responsibilities under the law.

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Questions and Discussion

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Extra Slides

Groundwater at a Car Wash

Analyte Name	Result	MRL
HFPO-DA	ND U	4.6
Perfluorobutanoic Acid	640	93
Perfluoropentanoic Acid	3400	46
Perfluorobutane Sulfonate	5.3	4.6
Perfluorohexanoic Acid	3500	46
Perfluoroheptanoic Acid	1200	46
Perfluorohexane Sulfonate	4.9	4.6
Perfluorooctanoic Acid	33	1.9
Perfluorononanoic Acid	ND U	4.6
Perfluorooctane Sulfonate	19	4.6
Perfluorodecanoic Acid	350	4.6
Perfluoroundecanoic Acid	ND U	4.6
Perfluorodecane Sulfonate	ND U	4.6
Perfluorododecanoic Acid	ND U	4.6
Perfluorooctylsulfonamide	ND U	4.6
Perfluoro-n-tridecanoic acid	ND U	4.6
Perfluoro-n-tetradecanoic acid	ND U	4.6
Perfluoroheptane sulfonate	ND U	4.6
N-ethylperfluoro-1-octanesulfonamide	ND U	4.6
N-methylperfluoro-1-octanesulfonamide	ND U	4.6
2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol	ND U	4.6
2-(N-methylperfluoro-1-octanesulfonamido)	ND U	4.6

ng/L (ppt)

>9,000 ppt PFAS