Public Health Emergency Response to PFAS as an Emerging Threat

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Presentation adapted from House Natural Resources and Outdoor Recreation Committee,
House Natural Resources and Environmental Quality Subcommittee on Appropriations,
and MDHHS PFAS Toxicology and Health Effects
Objectives

- What are PFAS
- Creation of MPART
- PFAS Emergency: Parchment, MI
- Preparedness Planning for PFAS Response
- Laboratory Capacity to Support PH

Michigan Department of Health & Human Services
Per- and polyfluoroalkyl substances (PFAS)

- Strong carbon-fluorine bonds
- Surfactants
- Hydrophobic (repels water) and oleophobic (repels oil, fat, grease)
- Began developing in 1940’s
- 5,000+ compounds today
Common PFAS Abbreviations

- Perfluorooctanoic acid (PFOA)
- Perfluorooctane sulfonate (PFOS)
- Perfluorobutane sulfonic acid (PFBS)
- Perfluorohexane sulfonic acid (PFHxS)
- Perfluorononanoic acid (PFNA)
- GenX
- ...
Sources of PFAS

- Drinking water, typically localized and associated with a specific facility (e.g., manufacturer, landfill, wastewater treatment plant, firefighter training facility).

- Food packaged in PFAS-containing materials, processed with equipment that used PFAS, or grown in PFAS-contaminated soil or water.

- Commercial household products, including stain- and water-repellent fabrics, nonstick products (e.g., Teflon), polishes, waxes, paints, cleaning products, and fire-fighting foams (a major source of groundwater contamination at airports and military bases where firefighting training occurs).

- Workplace, including production facilities or industries (e.g., chrome plating, electronics manufacturing or oil recovery) that use PFAS.

- Living organisms, including fish, animals and humans, where PFAS have the ability to build up and persist over time.
PFAS Uses

- Aerospace
- Apparel
- Building and Construction
- Chemicals and Pharmaceuticals
- Electronics
- Oil & Gas
- Energy
- Healthcare and Hospitals
- Aqueous Film Forming Foam
- Semiconductors
Why the concern?

- Pervasive
- Persistent
- Bioaccumulative
- Associated with adverse health effects (human epidemiology)
- Scarcity of information in scientific literature
- Incomplete regulatory structure
Health Outcomes (PFOA & PFOS)

In People:
- Alter cholesterol
- Thyroid disease (PFOA)
- Ulcerative colitis (PFOA)
- Testicular and kidney cancer (PFOA)
- Alter immune system function
- Lower chance of pregnancy

In Laboratory Animals:
- Developmental effects
  - Reduce ossification of the proximal phalanges
  - Decrease pup birth weight
  - Accelerated puberty in male pups
- Immune system dysfunction
- Alter liver and kidney weight
PFAS Cycle

- PFAS producing/using industries
- Wastewater to WWTP
- Wastewater direct discharge to stream
- Wastewater to WWTP
- Leachate to WWTP
- Biosolids
- Landfill
- Infiltrate into groundwater
- Plant uptake
- Some food products
- Drinking water
- Residential homes
- Soil/farmland
- Firefighting foam
- River
- MDHHS
- Michigan Department of Health & Human Services
Human Exposure

• Ingestion is main pathway
  o Drinking contaminated water
  o Ingesting food contaminated with PFAS, such as certain types of fish and shellfish
  o Eating food packaged in materials containing PFAS (e.g., popcorn bags, fast food containers, etc.)
    - Until recently- PFAS now largely phased out of food packaging
• Hand-to-mouth transfer from surfaces treated with PFAS-containing chemicals
Blood Levels of the Most Common PFAS in People in the United States from 2000-2014

* Average = geometric mean

PFAS Emerge in Michigan

- 2012 Wurtsmith “Do Not Eat” fish advisory
- 2012-2015 GLRI-funded surface water and fish sampling
- 2017 Camp Grayling groundwater sample data
- 2017 North Kent residential well and groundwater sample data
- 2018 Parchment municipal water system sample data
MI Standards

Drinking water

✓ 70 ppt PFOA/PFOS lifetime health advisory
✓ MCL(s) under development

Surface water quality

✓ 11/12 ppt PFOS
✓ 420/12,000 ppt PFOA

Groundwater cleanup

✓ 70 ppt PFOA/PFOS
✓ GSI per surface water quality standards
Values for chemicals in drinking water range from parts per million, to parts per billion, to parts per trillion, and to parts per quadrillion depending on chemical-specific information.
Sampling and Analytical

- Sampling guidance
- Analytical methods
- Analyte list varies (currently looking at 24)
- State lab capabilities
Michigan PFAS Action Response Team (MPART)

- Executive Order 2019-3
- Unique multi-agency approach
- Leads coordination and cooperation among all levels of government
- Directs implementation of state’s action strategy
Sites being investigated

- Map represents sources of groundwater contamination over 70 ppt PFOS+PFOA
- Once a source is identified, it becomes an official site
- Multiple other investigations with no known source yet

Current site list is available at www.michigan.gov/pfasresponse.
MPART

- Statewide testing of public water supplies
- Began in April 2018
- Phase I – Public Water Supplies, Childcares, and Tribal Systems
- Phase II – 750 Type II noncommunity water supplies
Statewide Public Water Supply Results

Statewide Public Water Supply Testing Initiative Results*

- Non-Detect Total PFAS
- < 10 ppt Total PFAS (Not ND)
- 10 – 70 ppt PFOS+PFOA (>10 ppt Total PFAS)
- > 70 ppt PFOS+PFOA

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage %</th>
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<tr>
<td>Community Water Supplies</td>
<td>89.2%</td>
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<tr>
<td>Schools on Wells</td>
<td>91.1%</td>
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<tr>
<td>Child Care / Head Start</td>
<td>88.2%</td>
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<tr>
<td>Tribes</td>
<td>100.0%</td>
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*As of February 5, 2019*
Kalamazoo will extend water system to Parchment in wake of PFAS contamination

By BRYCE HUFFMAN • JUNE 6, 2018
City of Parchment

• “The Paper City”
• Est. 1939
• Pop. 1,817
• Originally home to Kalamazoo Vegetable Parchment Co. (1909)
Incident Action Planning

Incident Action Plan (IAP) Objectives:

• Fulfill unmet needs/Coordinate resources
• Obtain and maintain situational awareness
• Coordination between local, state and federal agencies and appropriate subject matter experts
• Coordinate Public Information with local public information officers
• Support local health departments and healthcare facilities
• Monitor Points of Distribution (POD) operations for the distribution of bottled water to individuals and households
• Ensure expedited testing of impacted water systems
Resource Coordination

- Outreach representatives to assist with public inquiries
- 500 Informational door hangers
- Bottled water for distribution at PODs
- NSF PFAS filters for home use and replacement filters
- 50 American Red Cross Volunteers
- Badging for responders
Public Information and Outreach

Kalamazoo will extend water system to Parchment in wake of PFAS contamination

By BRYCE HUFFMAN  •  AUG 6, 2018

Kalamazoo, MI — The Kalamazoo County Health & Community Services Department will provide a news release each day at 3:00 p.m. for the community with the latest information, and report on the daily activities surrounding the Parchment Water Response.

PFAS Filters for Residential Water Wells
All private residential water wells located east of the Kalamazoo River that the Michigan Department of Environmental Quality (MDEQ) tested will be provided a point of use filter as part of the MDEQ investigation. Kalamazoo County Health & Community Services Department (HCS) in partnership with the Kalamazoo County Plumbers, Pipefitters & HVAC Local 357 will install all PFAS certified filters at no cost to residents.

This week, HCS Staff contacted all residents to set up appointments for Local 357 to install the units starting next Monday, August 27. Installation appointments will continue through the week, ending on Friday, August 31. The Plumbers Union is working closely with HCS staff to ensure all residents have their water filters installed properly.

The Local 357 personnel are authorized to install filters. They can be identified by a specific badge (pictured right) provided by the Kalamazoo County Health & Community Services Department. Anyone representing themselves from The Plumbers Union should have the badge visible at all times, and residents should ask to see it. The plumber will have the filter with them, and there will be no cost or payment required from the resident.

After the filter is installed, the homeowner that is serviced by their own water well can resume drinking the water. Please be mindful that The Do Not Drink order is still in place for residents connected to Parchment's municipal


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HEALTH AND COMMUNITY SERVICES DEPARTMENT
Parchment Water Hotline: 269.373.5346
www.facebook.com/KalamazooCountyHCS | www.kalcounty.com/hcs

Michigan Department of Health & Human Services
SEOC Activation Summary

• Activated for July 26th - August 27th
• Governor’s Declaration of Disaster for the City of Parchment and Cooper Township within Kalamazoo County for drinking water contamination.
• Delivered over 20,000 cases of bottled water through a community POD.
• Purchased and distributed water filters and replacement cartridges to residents on private wells.
• The City of Parchment water was connected to the Kalamazoo system in order to flush the system of PFAS.
• 5 rounds of testing were conducted on City of Parchment water system and testing of 120 private wells
• Coordinated 26 News releases working with local Public Information Officers
Lessons Learned – Emergency Management

Increasing events

Complex multi-disciplinary Events

Identify processes in place and know your infrastructure

Integrate into emergency management processes

Public information and outreach

Public Trust
Michigan PFAS Readiness Plan

Multi-Agency Plan
• Collaborated with various state agencies’ Emergency Management Coordinators and SMEs

Introduction Section
• Purpose
• Scope
• Background
• Planning Assumptions
• Roles and Responsibilities

Concept of Operations – Phased Approach
• Monitoring
• Detection
• Investigation
• Intervention
• Recovery

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Laboratory Testing

For this response, samples were shipped to a contractor:

- Shipping time
- Sample prioritization
- Increased cost to expedite samples

Current Capacity of MDHHS BOL:

- Testing in fish tissue (2012)
- Testing in deer tissue and organs (2018)
- Testing in water and serum (2018)
Value of PH Laboratory Testing

- Faster
- More control
- Prioritization
- Communication
- **Expertise**

Photo Credit: Dr. Sandip Shah
PFAS in Fish

- PFOS is the chemical that shows up the most in fish. Testing for PFAS since 2012. As of 9/2018, nearly 1,300 fish samples from 55 water bodies have been analyzed.
- Some places, PCBs, dioxins, and mercury are higher than PFOS.
- Species include bluegill, sunfish, largemouth bass, smallmouth bass, suckers, crappie.
- Range from Do Not Eat to limited portions of meals.
Fish Consumption Advisories

- Over 600 fish filets have been analyzed at the Michigan Department of Health and Human Services Analytical Chemistry Lab
- PFOS fish consumption screening levels range from 9 ppb (ng/g) to >300 ppb (“Do Not Eat”)
- 5 water bodies with “Do Not Eat” for PFOS (this includes the Huron River)
  - Approximately 60 fish consumption guidelines issued due to PFOS fish filet levels
North Kent County Exposure Assessment

Launch November 27, 2018

Recruitment letters begin week November 26, 2018

Assess exposures from PFAS to clients exposed to ≥70 ppt (n=400) and those < 70 ppt (n= 400)

Study to assess population exposed and magnitude of exposure

Health Study May be conducted if Exposure Assessment identifies elevated exposure in study population due to environmental source.
Surface Water Investigation

- Ambient monitoring
- Publicly owned treatment works (POTW)
  - Industrial Pretreatment Program (IPP)
  - Biosolids
- Industrial direct dischangers
- Fish
- Surface water foam
Deer Consumption Advisory

- 128 deer
  - 80 deer from four targeted areas
  - 48 samples from hunter-harvested deer (submitted for disease testing)
- 1 deer with elevated PFOS in muscle
  - “Do Not Eat” advisory issued within 5 mile radius of Clarks Marsh
- Additional testing planned
www.Michigan.gov/PFASresponse