

A Response to Emerging Concerns:

PHL Roles in PFC Monitoring in Minnesota

Presented by Paul Moyer

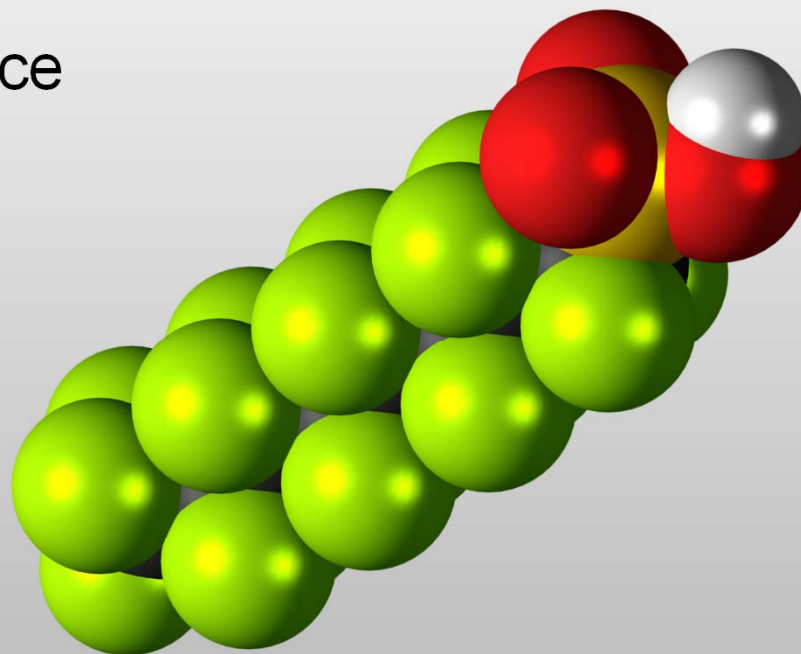
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APHL Speaker Disclosure

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Today's Presentation

- History of PFC in Minnesota
- Water Monitoring Activities
- Human Health-Based Guidance
- Surface Water Quality Guidance
- Interventions & Clean Up
- Biomonitoring Studies
- Home & Garden Study
- Summary
- Questions



History of PFCs in Minnesota

- 1950s
 - Chemical production
 - Legal disposal
- 1990s
 - Concerns begin
- 2000
 - Voluntary elimination announced
- 2002/2003
 - Production stopped
 - EPA preliminary assessment

History of PFCs in Minnesota

- 2004/2005
 - State groundwater monitoring begins
- 2006/2007
 - State human health-based guidance derived
 - Ambient surface water standards
 - Fish advisories
- 2008/2010
 - Community biomonitoring projects
- 2013
 - Home and garden study
 - Round three of biomonitoring funded

Water Monitoring Activities

- Landfill monitoring wells
 - Closed Landfill Program
 - Area around suspected waste sites
- Community systems
 - 11 Communities / 8 municipal systems
 - Most with levels below guidance values
- Private wells
 - State agency collection
 - More granular data
- Storm water impacts
- Expanded monitoring
 - Other landfills
 - Fire fighting foams (AFFFs)

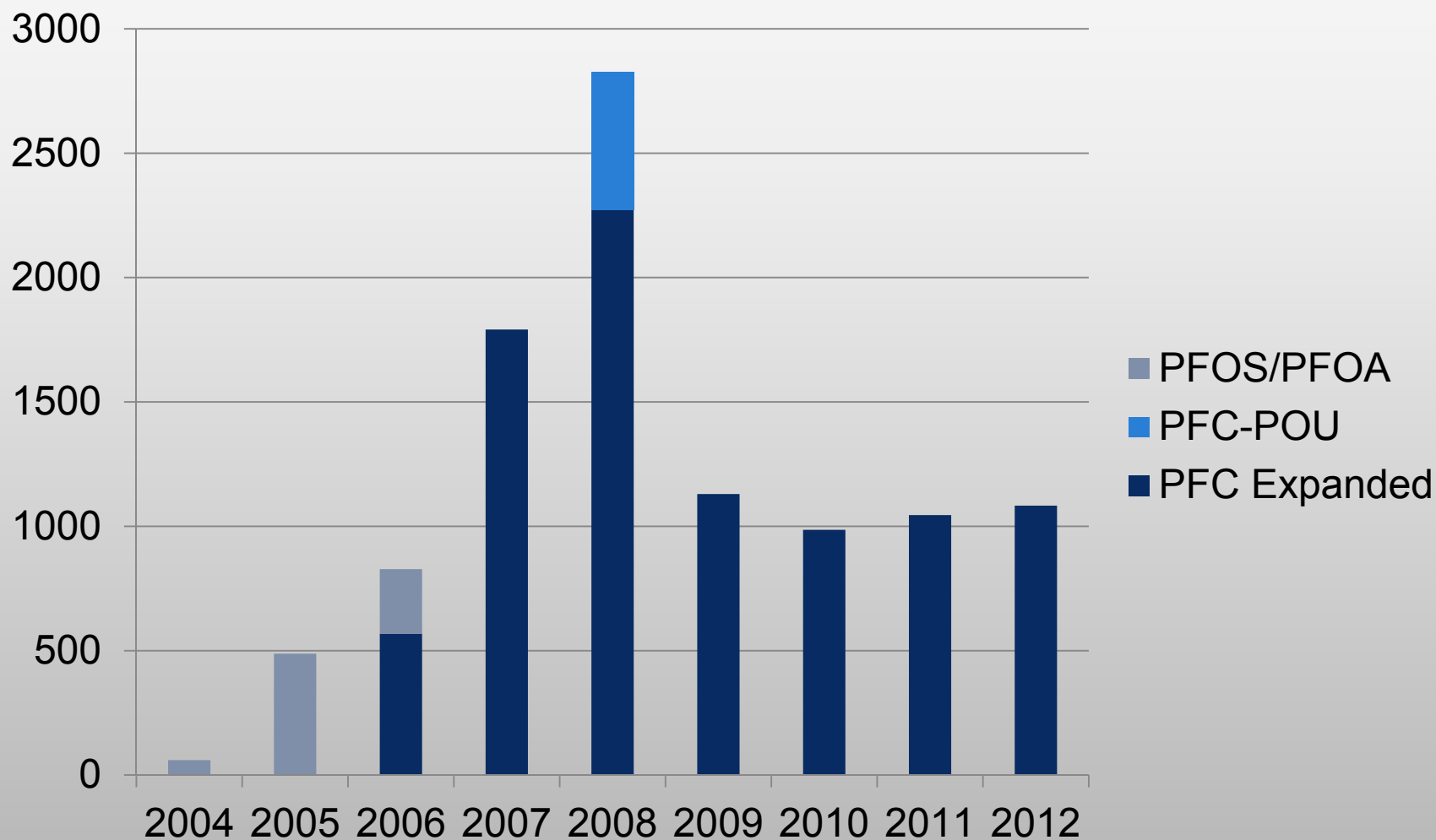


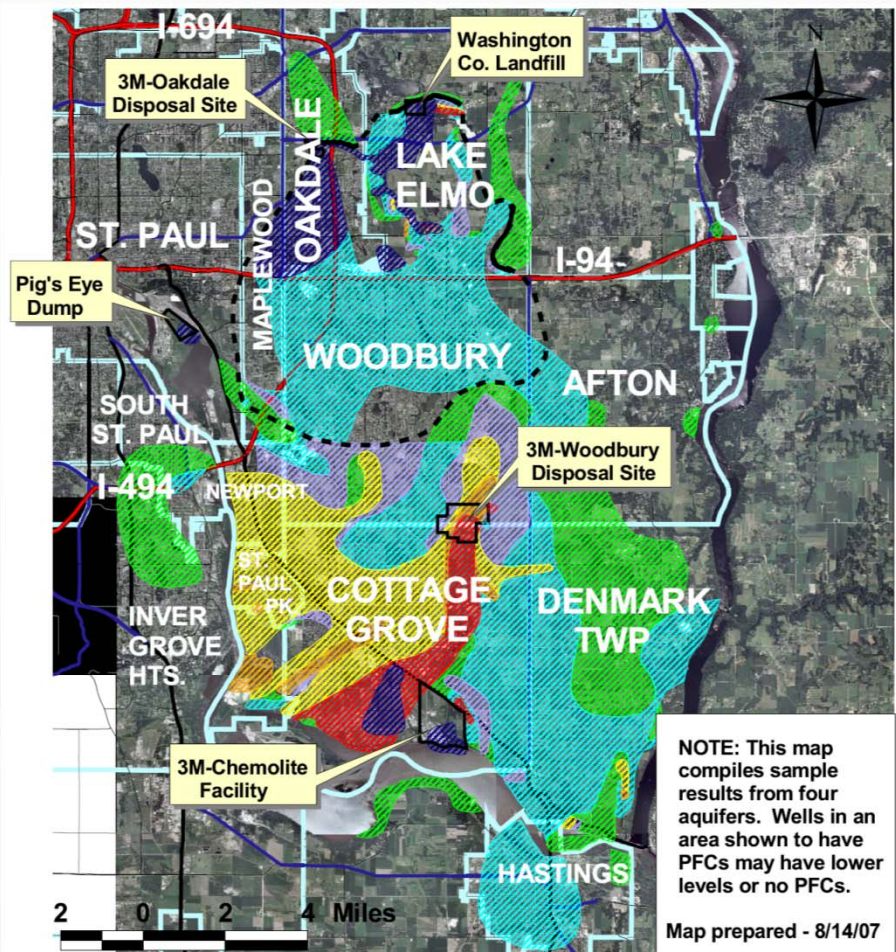
Water Monitoring Activities

- Analytes of interest:
 - Eight carbon:
 - PFOS (perfluorooctane sulfonate)
 - PFOA (perfluorooctanoic acid)
 - Six carbon:
 - PFHxS (perfluorohexane sulfonate)
 - PFHxA (perfluorohexanoic acid)
 - Five carbon:
 - PFPeA (perfluoropentanoic acid)
 - Four carbon:
 - PFBS (perfluorobutane sulfonate)
 - PFBA (perfluorobutanoic acid)

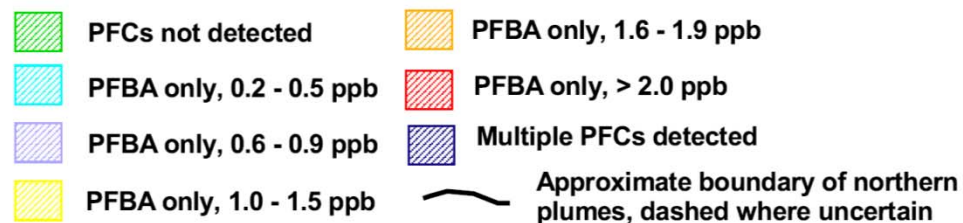


PFC Water Sample Analysis





PFCs in the Southeast Metro Area



Human Health-Based Guidance

CAS Number	Chemical	Value Type	Exposure Duration	Value (µg/L)	Health Endpoint(s)
335-67-1; 335-66-0; 3825-26-1; 2395-00-8; 335-93-3; 335-95-5	Perfluorooctanoic Acid (PFOA) and Salts (PDF: 109KB/11 pages)	HRL ₀₈	Acute	ND	--
			Short-term	ND	--
			Subchronic	ND	--
			Chronic	0.3	Development effects; Liver system; Immune system
			Cancer	NA	--
375-22-4	Perfluorobutyrate (PFBA) (PDF: 143KB/7 pages)	HRL ₁₁	Acute	ND	--
			Short-term	7	Liver system; Thyroid (E)
			Subchronic	7*	Liver system; Thyroid (E)
			Chronic	7*	Liver system; Thyroid (E)
			Cancer	NA	--

Surface Water Quality Guidance

Chemical	CAS#	Date Proposed / Promulgated	Aquatic Tox. & Human Health
Perfluorooctanesufonic acid (PFOS)	1763231	Developed Aug. 3, 2007	
		Revised Oct. 30, 2009	

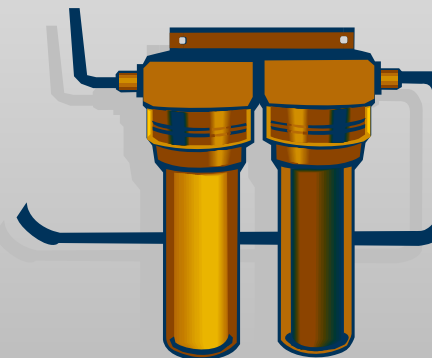
B. Minnesota Water Quality Standards

Water Class	Use	CS	MS	FAV	CS Basis
1, 2A	DW, Salmonid	7 ng/L	85 ug/L	170 ug/L	PCA Hs
1, 2Bd	DW, NonSalmonid	7 ng/L	85 ug/L	170 ug/L	PCA Hs
2B, 2C, 2D	NonSalmonid	7 ng/L	85 ug/L	170 ug/L	PCA Hs
	Other				

CS: Chronic Standard, DW: Drinking Water, FAV: Final Acute Value, MS: Maximum Standard

Water Clean Up Activities

- Landfills
 - On-site treatment
 - Re-line site
 - Screen other sites
- Community Systems
 - GAC
 - Breakthrough monitoring
 - PFC interactions
- Private Wells
 - Point-of-Use Filtration report
 - GAC
 - RO

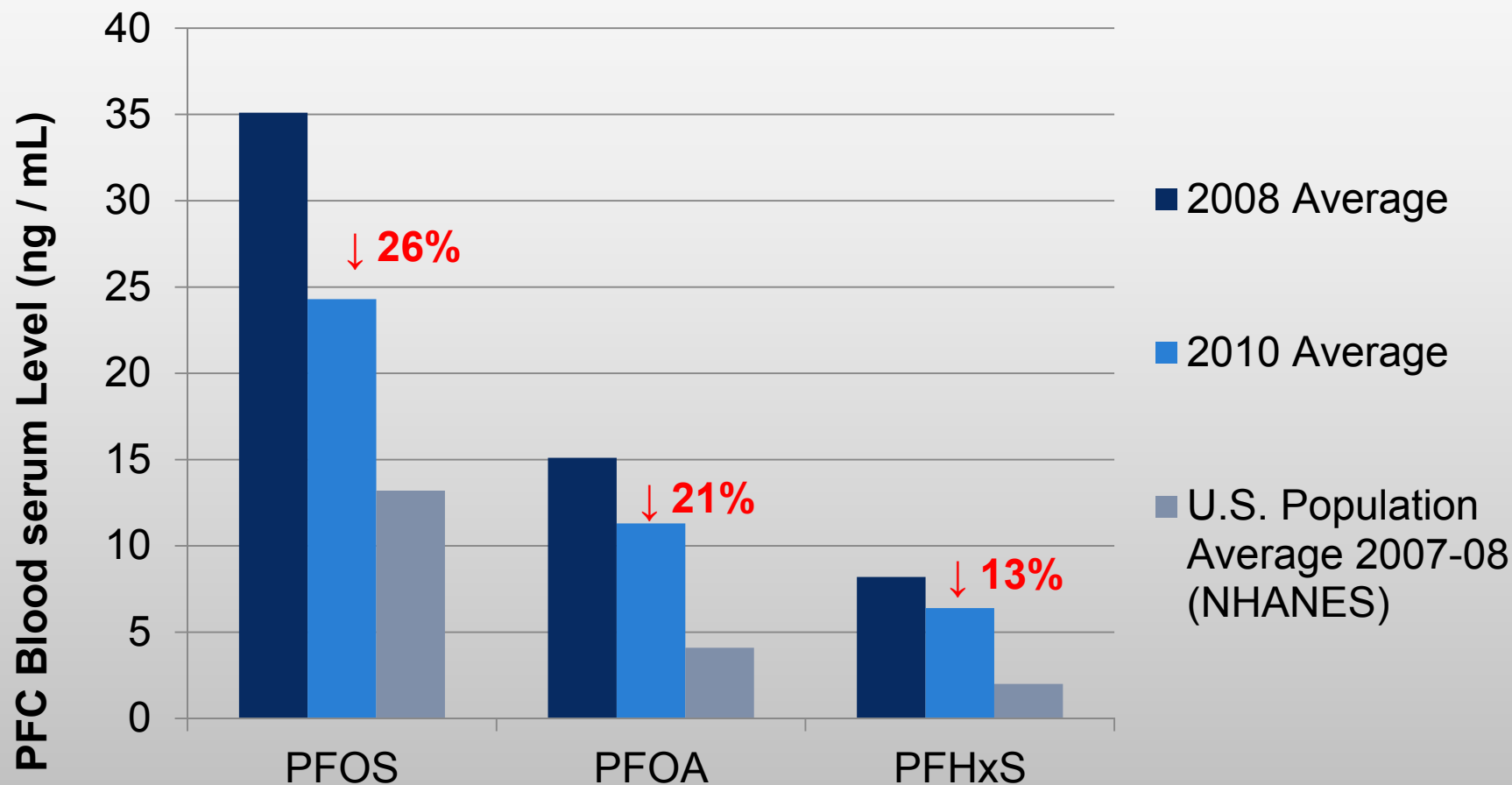


Biomonitoring Studies

- 2008 Study (n=196)
- 2010 Study (n=164)
- 2013 Funding for 3rd study
- Analytes:
 - PFOS (perfluorooctane sulfonate)
 - PFOA (perfluorooctanoic acid)
 - PFHxS (perfluorohexane sulfonate)
 - PFBA (perfluorobutanoic acid)
 - PFBS (perfluorobutane sulfonate)
 - PFHxA (perfluorohexanoic acid)
 - PFPeA (perfluoropentanoic acid)



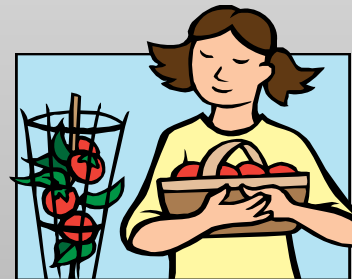
Biomonitoring Studies



Note on PFBA Detects: 2008 = 25%; 2010 - 21%

PFCs in Homes & Garden Study (PIHGS)

- Ongoing
- East Metro Area affected by groundwater contamination
- Alternate sources of exposure:
 - Soil
 - Homegrown produce
 - House dust



Minnesota Fish Consumption Advisory

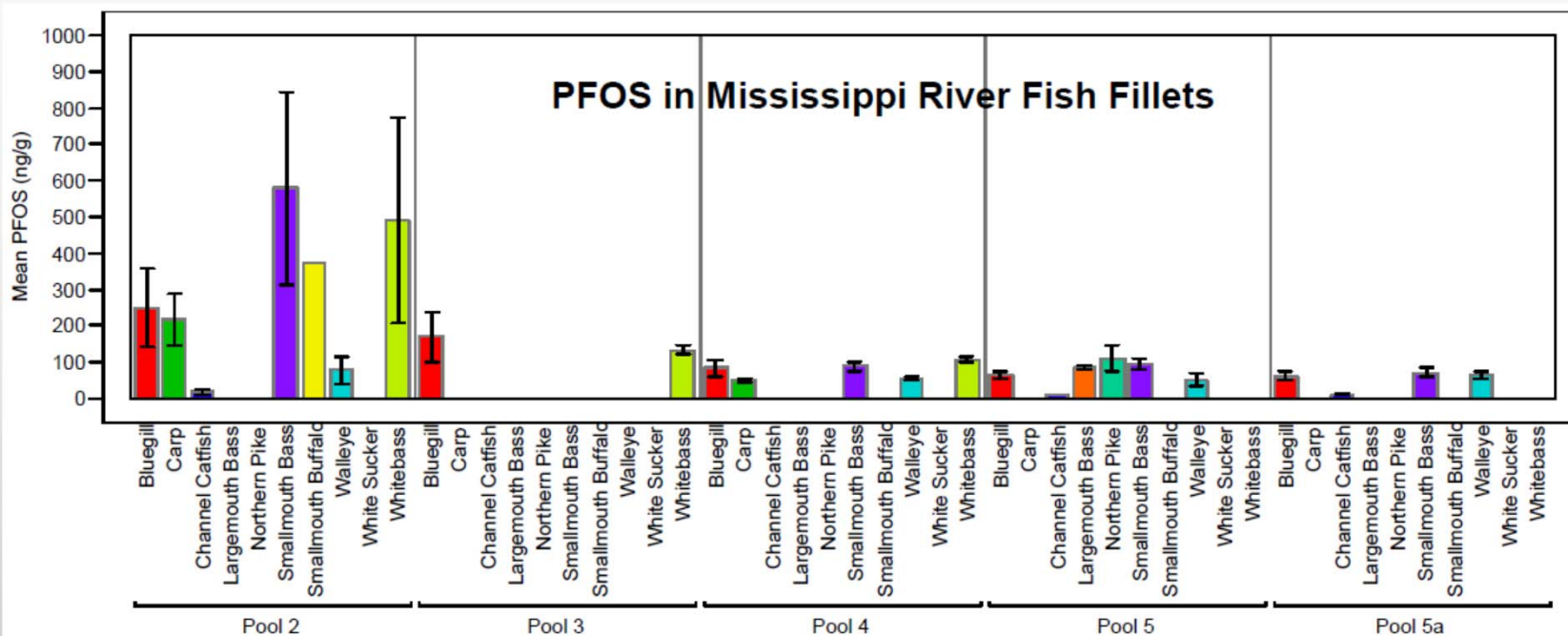


Table 3: Meal Advice Category vs. Fish PFOS Concentration

Meal Advice	PFOS Concentration (ng/g)
No restrictions	< 38
1 meal / week	> 38 - 160
1 meal / month	> 160 - 700
Do not eat	> 700

Summary

- State / Local need
- State Laboratory supports State programs
 - Method development
 - Water monitoring
 - Intervention evaluations
 - Biomonitoring
 - Alternate exposure investigations



Acknowledgments

- Minnesota Department of Health
 - Drinking Water Protection
 - Well Management
 - Environmental Laboratory
 - Environmental Public Health Tracking & Biomonitoring
 - <http://www.health.state.mn.us/divs/eh/hazardous/topics/pfcs/index.html>
- Minnesota Pollution Control Agency
 - Environmental Analysis and Outcomes Division
 - Remediation Division (Closed Landfill Program)
 - <http://www.pca.state.mn.us/index.php/waste/waste-and-cleanup/cleanup/superfund/perfluorochemicals-pfc/perfluorochemicals-pfcs.html#connection>

Questions

Paul Moyer

Minnesota Department of Health

Public Health Laboratory Division

Environmental Laboratory Section

paul.moyer@state.mn.us

651-201-5669

