

# Perfluorochemicals & Fire Fighting Training Sites in Minnesota



February 2009

# What Are PFCs?

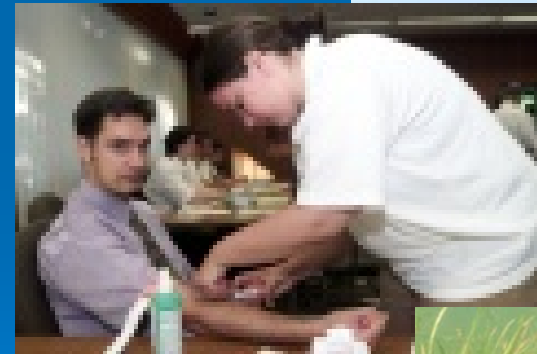
- Perfluorochemicals (PFCs) –
  - large group of man-made compounds.
  - made by adding fluorine atoms to common organic chemicals.
- PFCs form coatings
  - repel water, stains, and oil and grease
  - Also called “surfactants” or “surface active agents”
- PFCs are used in a wide range of consumer products, industrial materials, and manufacturing applications, including:
  - Paper, fabric, and cookware coatings
    - (ex: Gor-Tex ©, Scotchguard© & Teflon©)
  - Photographic film coatings
  - Semi-conductors
  - Aviation fuels
  - Some Class B fire fighting foams

# PFCs Behave in Unique Ways

- Do not break down in the environment
  - C-F bond is one of the strongest known
- Do not stick to rock or soil particles
  - Move quickly into the groundwater
  - Move nearly as fast as the groundwater
  - Travel long distances
- Chemical structure similar to fatty acids
  - Move into blood of living organisms
  - Stay in the body for a long time

# Unique Properties Result in Global PFC Distribution

- PFCs have been found in the blood of people and wildlife around the world
- Environmental sampling has detected small amounts of PFCs in lakes and rivers, shallow groundwater, and soils in Minnesota, the US, and other countries.



# Health Effects of PFOA & PFOS

- Small changes in the liver and thyroid in animals.
- Delays in growth and maturation in rats and mice whose mothers were exposed.
- Possible effects on hormone levels & liver enzymes in workers at manufacturing facilities. No clear link to a "disease."
- Health study of 70,000 people exposed through drinking water in Ohio & West Virginia – results not yet available.

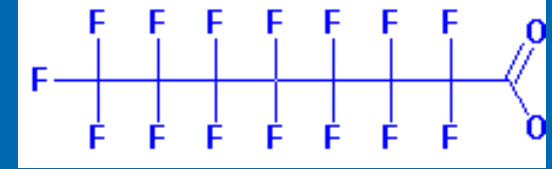
# Why Is MN Looking At Fire Fighting Foams?

- The Minnesota Department of Health (MDH) and Minnesota Pollution Control Agency (MPCA) have been investigating PFCs in the environment.
- Some types of Class B (for chemical and petroleum fires) fire fighting foams contain PFCs.
- Studies at large fire training sites (airports, military bases, etc.) have detected PFCs environment (soil, water, groundwater, fish, etc.).
- An MPCA survey of Minnesota fire departments and fire training academies found some are using foams that contain a small amount of PFCs. Repeated use at the same location may impact the environment.

# PFCs Associated With Aqueous Film Forming Foams (AFFF)

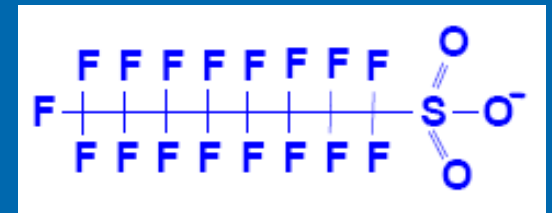
## ➤ PFOA

- HRL (proposed) = 0.3 ppb, half-life: ~4 yrs.



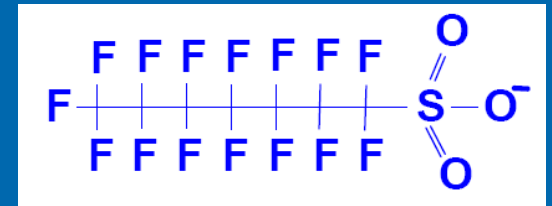
## ➤ PFOS

- HRL = 0.3 ppb; half-life: ~5 yrs.



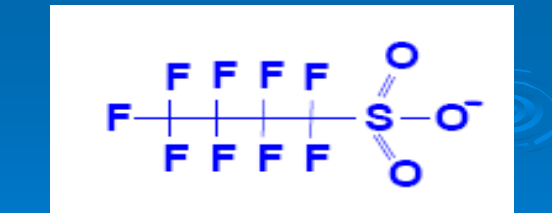
## ➤ PFHxS

- No HRL or HBV, half-life: 9 years



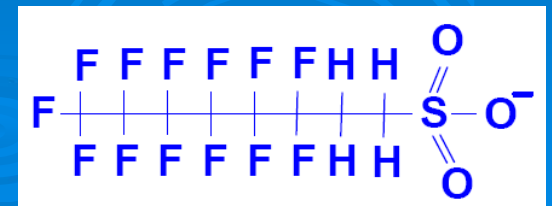
## ➤ PFBS

- No HRL or HBV, likely has a short half-life



## ➤ 6:2 FtS

- Fluorotelomer sulfonate
- No HRL or HBV



# Use of Class B Foams in MN

- 227 fire departments use Class B foams (43%)
  - 106 train with Class B foams
- All major airports use or used Class B foams
- 3 Community Colleges use or used Class B foams
  - Lake Superior (Duluth)
  - South Central (N. Mankato)
  - Northland (E. Grand Forks)
- Refineries
  - Marathon (St. Paul Pk.) and Flint Hills (Pine Bend)
  - Wrenshall – no information available

# MDH Evaluation of the Survey Results

- MDH staff ranked the training sites
  - How close is the training area to drinking water wells?
  - What is the direction of flow of groundwater?
  - How far down is the groundwater?
  - How deep are the wells?
  - Is the groundwater partly protected from surface contamination?
  - How often is fire training done?
  - How much foam is used at each training?
  - How is the foam disposed of after each training?
- MDH identified:
  - 14 highest priority sites
  - 6 high priority sites
  - 21 medium priority sites
  - 24 low priority sites.

# MDH & MPCA Sampling Plans

- MDH will begin sampling the “highest priority” city wells in March 2009
  - Non-community public wells (such as schools, daycares, churches, businesses, etc.) will be sampled, if needed.
- MPCA will begin environmental investigations at 20 high priority sites in March 2009
  - All of MDH’s highest priority sites are on the MPCA list, plus several others where public wells are not at risk
  - MPCA will also identify and sample private wells if groundwater contamination is detected at any sites.
- All sample results will be reported to the affected cities and well owners.
- MDH and MPCA will work with city officials to keep residents informed.