




Perfluorochemicals (PFCs)

- Used for many years in products that resist heat, stains, water, oil and grease
- Many other specialized industrial and commercial uses
- Surfactants with unique chemical properties



Primary PFCs of Interest in MN

- PFOS: $C_8F_{17}SO_3^-$ 
Perfluorooctane sulfonate and its salts
- PFOA: $C_8F_{15}O_2^-$ 
Perfluorooctanoic acid and its salts
- PFBA: $C_4F_7O_2^-$ 
Perfluorobutanoic acid and its salts

PFCs and Human Health

- 3M Worker Studies
 - Possible effects on hormone levels, liver enzymes
 - Half life in the body of ~ 3-5 years (PFOA/PFOS)
- There are no specific levels of PFCs in human blood that have been associated with adverse health effects
- Others PFCs not studied as extensively as PFOS/PFOA; thought to be less toxic and generally do not accumulate in the body

PFBA: Available Data

- Historical literature summary
 - Indicates the liver is a primary endpoint of toxicity, but suggest toxicity is less than PFOA.
- Toxicokinetic study (3M) – preliminary results
 - Shorter half-life in test animals.
- 28-day study (3M) – draft report
 - Liver weight and decreased cholesterol
- Developmental study (EPA) – ongoing (results ~ 2-3 months away)
- 90-day study (3M) – planning underway (results ~ 6 months away)

MDH Guidelines

- 2002 Health Based Values for Groundwater
 - PFOS – 1 ppb
 - PFOA – 7 ppb
- Long-term / lifetime exposure
- Based on slight liver and thyroid effects

Current MDH Guidelines

- More is now known about PFOS and PFOA than in 2002
 - Older studies have been re-evaluated
 - New studies have been published that reinforce previous data
- The HBVs for PFOS and PFOA are currently being reviewed in light of this information

Current MDH Guidelines

- As a cautious public health approach, MDH has applied the following guidelines for PFCs:
 - PFOS, PFHxS, PFBS: 0.6 ppb
 - PFOA, PFHxA, PFPeA, PFBA: 1.0 ppb
 - Also, look at all PFCs together
- These values are not a “bright line”
- Based on information for PFOS/PFOA
- Values for other chemicals are protective until information is available

Summary

- PFOS/PFOA have not been detected through several rounds of samples.
- PFBA has been found at low levels.
- MDH is evaluating the available information on PFBA to determine the most appropriate advice.
- In the interim the risks from exposure are low, and can be further reduced.

What are the Options for Further Reducing Risk?

- Public water supplies will be monitored and managed to minimize PFBA levels.
- A properly maintained granular activated carbon (GAC) filter can reduce PFBA levels in drinking water.
- Bottled water can also be used for individual drinking or cooking needs.