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Phasing Out a Problem: Perfluorooctyl Sulfonate (PFOS)

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What is PFOS?

- Perfluorooctyl sulfonates; *acids, salts, halides, etc.*
- Man-made: do not occur in nature
- Produced since 1950's for use in surface treatment, paper protection, and performance chemical (surfactant and insecticide) products
- Also produced by breakdown/degradation of other sulfonyl-based fluorochemicals
- Made mostly by 3M Company

What is PFOS used for?

- Soil and stain resistant coatings on textiles, carpets, leather (2.3 million lbs/year)
- Oil, grease, and water resistance on paper products, including paperboard and food contact papers (2.6 million lbs/year)
- Performance chemicals: fire fighting foams, industrial surfactants, acid mist suppression, etc. (1.5 million lbs/year)

Why is PFOS a problem?

- PFOS is a PBT chemical:

Persistent

Bioaccumulative

Toxic

- PFOS has been found in the blood of the general US population, in wildlife, and in people overseas

Why is PFOS a problem?

- Persistent:
 - PFOS is a very stable chemical that does not break down or degrade in the environment;
once it's there, it stays
- Bioaccumulative:
 - PFOS can build up over time; *its half-life in human blood is about 4 years*
 - Higher-ups in the food chain are exposed to the full dose of what has built up in their food

Why is PFOS a problem?

- Toxicity:
 - PFOS is only moderately toxic via acute oral exposure; *rat LD₅₀ of 251 mg/kg*
 - In repeat oral dose subchronic and reproductive toxicity studies, however, serious effects seen
 - *Post-natal deaths in rats at 3.2 and 1.6 mg/kg/day*
 - *In repeat-dose treated Rhesus monkeys, death within 3 weeks at 10 mg/kg/day; within 7 weeks at 4.5 mg/kg/day. Adverse effects in cynomolgus monkeys at 0.75 mg/kg/day*

Why is PFOS a problem?

- Detected in blood not only in workers handling the chemical, but in the general US population and in wildlife
 - *High as 12.83 ppm in manufacturing workers*
 - *In pooled serum from general population, 30-40 ppb; small sample of children, mean 54 ppb*
 - *In eagles, wild birds, and fish, in ppb range*

How did PFOS get in people?

- We don't know the precise exposure route, but studies are underway
- Possibilities include:
 - Dietary intake from food wrapped in papers treated with PFOS derivatives
 - Inhalation from aerosol applications
 - Inhalation, dietary, or dermal exposures during manufacturing, use, or disposal of chemicals and treated products

Why haven't PFOS problems been addressed before?

- PFOS was always known to be persistent, but much information on bioaccumulation and toxicity is recent
 - Improved detection technologies find PFOS at much lower levels in humans, wildlife
 - PFOS doesn't fit normal bioaccumulation model; *partitions to blood, not fat*
 - Newest toxicity tests raise greatest concerns

How big a risk is PFOS?

- EPA does not believe that the current situation presents an imminent health risk to the general US population; *blood levels low, concentration in surface-treated products (carpets/textiles) low*
- However, serious concern for potential future risk to humans and wildlife if PFOS continues to be produced, released, built up in the environment
- Studies underway to determine relationship of current blood levels to potential for adverse effects
- Questions/concerns on occupational exposures

What is being done about PFOS?

- 3M conducted studies, shared results with EPA, and discussed concerns
- On 5/16/2000, 3M publicly announced voluntary phase-out of perfluorooctanyl chemistries, most by end of 2000
- 3M submitted phase-out plan to EPA on 6/16/2000, amended on 7/7/2000
- 3M continues aggressive research program

What does the 3M PFOS phaseout plan involve?

- 3M will stop manufacture of PFOS for surface treatment products by 12/31/2000; *includes fabric/carpet/leather soil and stain resistance and paper coating products, including food contact*
- 3M will phase out manufacture of PFOS for performance products by 12/31/2002
- *Caveat:* May request permission for extended production for specific performance uses for which adequate substitutes do not exist or can't be qualified in time; *risk/risk tradeoffs, national security, technical performance issues*

What does EPA think of 3M's PFOS phaseout plan?

- EPA agrees that continued manufacture and use of PFOS represents an unacceptable technology that should be eliminated to protect human health and the environment from long term consequences
- 3M's voluntary phaseout will accomplish this goal more quickly than regulation could
- EPA may use regulation to "close the door" on PFOS after 3M's exit; *concerned parties will be able to comment and to dialogue with EPA*

What does this mean for fire fighters using PFOS foams?

- Fire fighting foams are in the performance category of products; continue through 2002
- 3M and EPA will be assessing health, safety and environmental implications of possible substitutes; *will welcome dialogue!*
- If qualified substitutes not available by end of 2002, 3M may request continued PFOS production for specific uses

What about using chemicals other than PFOS?

- Initial actions and phaseout apply to PFOS chemicals only
- EPA will be expanding review to assess other perfluorinated chemicals and related chemistries; *PFOA, telomers*
- Assessment activities will be international
- Industry group already proposing voluntary two-year research effort on some major telomers to begin 9/2000
- Too early to anticipate outcomes

How will EPA make decisions on PFOS issues?

- Toxic Substances Control Act (TSCA)
- Risk/benefit balancing requirements allow flexibility; *TSCA lets EPA take risk/risk tradeoffs, economic issues into account*
- Possible actions include:
 - Bans
 - Restrictions on uses
 - Production volume limits
 - Data collection and new testing requirements
 - Labeling, hazard communication

Where can I find information on PFOS and EPA actions?

- All documents on PFOS in public EPA Administrative Record, File AR-226
 - Includes all health studies submitted on PFOS
 - Available in hard copy or on CD-ROM
 - 401 M St, SW, Room NE B-607, Wash., DC, noon to 4 PM Eastern, Monday-Friday; telephone 202-260-7099
- Working on website; *not up yet, stay tuned*
- Interim EPA “Voice of PFOS:” Mary Dominiak, phone 202-260-7768; *dominiak.mary@epa.gov*