

Overview of Perfluorinated Chemicals (PFCs) and Related International Initiatives

www.oecd.org/ehs/pfc

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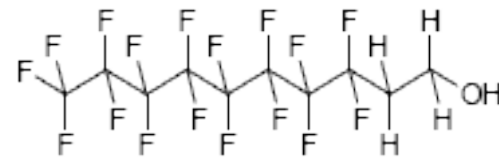
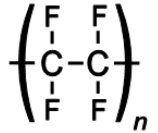
Outline

- **Long-chain perfluorinated chemicals (LCPFCs)**
 - Chemical categories
- **Concerns with LCPFCs**
- **Uses**
- **Alternatives to LCPFCs**
- **International settings**
 - Stockholm Convention (on PFOS)
 - Strategic Approach to Chemicals Management (SAICM)
 - OECD PFC Steering Group
 - UNEP/OECD Global Steering Group

Examples of highly fluorinated compounds

- **Fluoropolymers (e.g. PTFE)**

- Uses include non-stick cookware coatings; architectural coatings; chemical and fire-resistant cable; waterproof, breathable fabrics; etc.
- PFOA (as APFO) is used as polymerization aid in manufacture of fluoropolymers, which are used in many industries and consumer products
- PFOA not expected to be found in most final fluoropolymer products except in trace amounts



Fluorotelomer alcohol, 8:2 FTOH

- **Fluorotelomers (e.g. FTOH)**

- Uses include stain and water repellent surface coatings on carpets, textiles, paper; surfactant in cleaners, performance products, etc.
- PFOA may also be formed by degradation of telomers (small fluorinated polymers) not made with PFOA
- Residual monomers in telomers can degrade to LCPFCs

- Widely used in industrial and consumer products

Long-Chain Perfluorinated Chemicals (LCPFCs)

- **Perfluoroalkyl sulfonates (PFAS)**
 - Perfluorohexane sulfonate (PFHxS)
 - Perfluorooctane sulfonate (PFOS)
 - Higher homologues
 - Salts
 - Precursors
- **Perfluorocarboxylic acids (PFCA)**
 - Perfluorooctanoic acid (PFOA)
 - Higher homologues
 - Salts
 - Precursors

Concerns with LCPFCs

- Found world-wide in the environment, wildlife, and humans
- Persistent
- Bioaccumulative in wildlife (↑ bioaccumulation with ↑ carbon chain length)
- Long half-life in humans
- Toxic to laboratory animals, producing reproductive, developmental, and systemic effects in laboratory tests
- Multiple sources of emissions and patterns of exposure

International Efforts

- Stockholm Convention on Persistent Organic Pollutants (POPs)
 - In May 2009, PFOS, its salts, and perfluorooctane sulfonyl fluoride (PFOSF) were added to Annex B, subjecting them to restrictions on production and use
 - Note: Webinars on POPs-free products and POPs in products on 15 September and 3 November 2011
- Strategic Approach to International Chemicals Management (SAICM)
 - In May 2009, during the International Conference on Chemicals Management (ICCM2), delegates agreed to consider the development of stewardship programs and regulatory approaches to reduce emissions and content of PFAC and PFAS chemicals in products and to work toward their elimination, where feasible
 - Global PFC Group formed to promote and coordinate activities on PFCs
 - Representatives from SAICM regions, industry, NGOs and IGOs
- Organisation for Economic Co-operation and Development's (OECD)
 - *2010 Survey of Product Content and Environmental Release Information on PFCs*
 - *A range of other activities to support information gathering and exchange*

Stockholm Convention: PFOS Uses

- Textile impregnation and surface protection
- Impregnation of packaging (paper/cardboard)
- Cleaning agents, waxes and polishes for cars and floors
- Surface coating, paint and varnish
- Oil production and mining
- Photographic industry
- Electrical and electronic parts
- Semiconductor industry
- Aviation hydraulic fluids
- Pesticides
- Medical devices
- Metal plating
- Fire-fighting foams

Alternatives to LCPFCs

- **Stockholm Convention**
 - Draft guidance document on alternatives to perfluorooctane sulfonate and its derivatives
 - Intersessional working group on substitution and alternatives
- **Alternatives:**
 - Shorter-chain perfluoroalkyl sulfonates
 - Shorter-chain perfluoroalkyl ketones and ethers
 - Polyfluorodialkyl ether sulfonates
 - Fluorotelomers and fluorophosphates
 - Fluorinated co-polymers
 - Fluorinated polyethers
 - Siloxanes and silicone polymers
 - Sulfosuccinates
 - Stearamidomethyl pyridine chloride
 - Polypropylene glycol ether, amines, and sulfates

ICCM2 and PFCs

SAICM ICCM2 Resolution II/5 invited relevant stakeholders to promote PFC stewardship programmes and to contribute to:

- **Information-gathering activities**, such as the recently developed OECD survey of product content and environmental release information on PFOS, PFOA, their related substances and products and mixtures containing these substances;
- **Information exchange on alternatives currently in use**, including short-chain-length fluorocarbons, **and potentially safer alternative substances or technologies** for their use; on criteria for alternatives; on the necessity and possibility of technology transfer; on progress in and examples of regulatory actions and voluntary programmes; on monitoring; on emissions; on exposure; on environmental fate and transport; and on the potential effects of perfluorinated chemicals and alternatives on human health and the environment;

OECD PFC Steering Group

- Concern about persistence, toxicity, and bioaccumulative potential of LCPFCs
- Prompted OECD to undertake action in early 2000, aiming to collect more reliable data on the production and use of PFCs
- Establishment of PFC Steering Group in 2004 to support these activities
- In 2009 ICCM2 adopted resolution II/5 for management of PFCs: to « consider development of ... approaches to reduce emissions and the content ... in products ... and work towards global elimination where ... feasible »
- OECD PFC work contributes to this mandate
- Main tools: information gathering and exchange
- Establishment of Global PFC Group jointly with UNEP

Scope of Work of OECD PFC Steering Group

- Distinction between long-chain perfluorinated compounds (LC PFCs) and short-chain perfluorinated compounds (SC PFCs), based on the toxicity and bioaccumulation differences between LC PFCs and SC PFCs.
- "Long-chain perfluorinated compounds" refers to:
 - Perfluorocarboxylic acids (PFCA) carbon chain lengths C8 and higher, including perfluorooctanoic acid (PFOA);
 - Perfluoroalkyl sulfonates (PFAS) with carbon chain lengths C6 and higher, including perfluorohexane sulfonic acid (PFHxS) and perfluorooctane sulfonate (PFOS); and
 - Precursors of these substances that may be produced or present in products.
- OECD PFC Steering Group looks at a broad range of PFCs, including PFOS, and including alternatives to PFOS

Key activities

- PFC Web Portal: www.oecd.org/ehs/pfc
- Webinars and side-events on specific themes
 - Oct. 2010 « Recent PFC related activities »
 - 2, 8/9 March 2011 « 2009 PFC Survey »
 - Side-events at POPs COP (lunch time 28 April) and OEWG (November 2011)
- PFC Surveys on production and use of PFCs and their releases to the environment (2004, 2006, 2009)

Global PFC Group

- Need to establish a global group, given importance of countries outside OECD region in production and use of PFCs
- UNEP and OECD to serve as secretariat to « Global PFC Group »
- Open and informal group that operates through conference calls
- Developing countries are invited to join the Group
- SAICM Regional Focal points have been requested to coordinate government nominations

Additional Resources

- OECD Portal on Perfluorinated Chemicals
 - http://www.oecd.org/site/0,3407,en_21571361_44787844_1_1_1_1_1,00.html
- Stockholm Convention
 - <http://chm.pops.int/Implementation/NewPOPs/The9newPOPs/tabid/672/language/en-US/Default.aspx>

Thank you!

OECD Portal on Perfluorinated Chemicals

www.oecd.org/ehs/pfc

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