



# UNEP Chemicals

**July 1999**

## Information on Dioxins

### Dioxins, Furans Pose Concerns for Health and Environment World-wide

Dioxins and furans are persistent organic pollutants, or POPs, that pose health and environmental concerns for countries world-wide.

They are unintended by-products of combustion and many industrial processes. Once emitted, they can travel long distances far from the source and last for a long time. In the process, they accumulate in fatty tissue and increase in concentration as they

move higher in the food chain. Today, trace amounts of dioxins and furans are present in virtually all global ecosystems.



"Trace amounts of dioxins and furans are present in virtually all global ecosystems." Shown here is a pulp mill on Lake Baikal in Russia.  
*(Photo/Dr. Heidi Fiedler)*

This information sheet highlights key aspects of these contaminants and activities being undertaken by the United Nations Environment Programme (UNEP) to deal with them.

### Background on Chemical Composition, Major and Minor Emission Sources

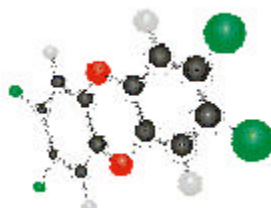
- Dioxins (polychlorinated dibenzo-*p*-dioxins, or PCDD), and furans (polychlorinated dibenzofurans, or PCDF), are environmental contaminants detectable in trace amounts in air, water, and soil in virtually all parts of the global ecosystem.

- Typically, dioxins and furans are found as mixtures of 210 compounds. Seventeen are highly toxic. One of these, known as Seveso dioxin, referring to the release of high levels of dioxin during an industrial accident in Seveso, Italy in 1976, is considered the most toxic man-made compound.

- They are not intentionally pro-

duced and do not serve any useful purpose.

- In the past, environmental contamination due to dioxins and furans came primarily from production and use of chloroorganic chemicals.



Chlorinated Dioxin

These included polychlorinated biphenyls, pentachlorophenol, and other chlorinated aromatic chemicals.

The pulp and paper industry was a main source to the aquatic environment, and still is in many developing countries.

- Today's major sources -- at least in

industrialised countries -- are combustion processes of any type. Examples are: incineration of municipal, hazardous, and clinical wastes; the iron and non-ferrous metal industry; and smaller sources, such as automobiles (especially when run on leaded gasoline), home heating, open garbage burning, and landfill fires.



Chlorinated Furan  
*(Images/Wellington Laboratories, Guelph, Ont., Canada)*

**Visit our new POPs home page:  
[WWW.CHEM.UNEP.CH/POPS](http://WWW.CHEM.UNEP.CH/POPS)**



Jet d'eau, Geneva, Switzerland  
(Photo/Linda C. Durkee)

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*UNEP promotes the environmentally sound management of chemicals and so helps protect public health and the environment. It advances sustainable development by catalysing vital global actions and building national capacity for the sound management of chemicals through information exchange, training and capacity building*

*For a complete list of publications, databases, and websites, please contact UNEP Chemicals.*

## Key Points on Health Effects, Dietary Exposure

- Potential health effects from dioxins and furans are numerous. Dioxin exposures to humans are associated with increased risk of severe skin lesions (chloracne and hyperpigmentation), altered liver function and lipid metabolism, general weakness due to drastic weight loss, depression of the immune system, and endocrine and nervous system abnormalities.

- Dioxins and furans build up in fatty tissue of living species, accumulating as they move higher through the food chain and with time. They are transferred in breast milk.

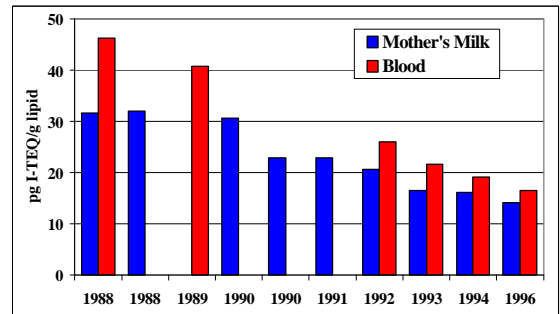
- Although levels in breast milk are decreasing in certain cases due to control measures, they are still high enough to be cause for concern.

- The World Health Organization, while urging greater effort to identify and control sources of dioxins and related compounds, promotes and supports breastfeeding because of its beneficial effects.

- More than 90 percent of the intake of dioxins and furans by humans is through food consumption. Dairy products, meat, fish, and eggs are the

primary sources of exposure. Ingestion of contaminated soil, inhalation of air, and dermal absorption are minor sources.

- Contamination of food products with dioxins and furans continues to be an issue, even in developed countries, as evidenced by the recent contamination of foodstuffs with dioxins and furans in Belgium. The contamination resulted in a ban on marketing such items as poultry, eggs, meat, and dairy products.



Concentrations of dioxins and furans in mother's milk and human blood are decreasing in Germany as a result of control measures. This trend line, developed by Dr. Heidi Fiedler based on German data, covers 1988 to 1996, and expresses concentrations in picograms International Toxic Equivalents per gram of lipid.

## UNEP Undertakes Activities To Deal with Dioxins, Furans

The United Nations Environment Programme (UNEP) is supporting global negotiations to reach a legally binding international instrument to deal with dioxins and furans as well as 10 other specified persistent organic pollutants, or POPs.

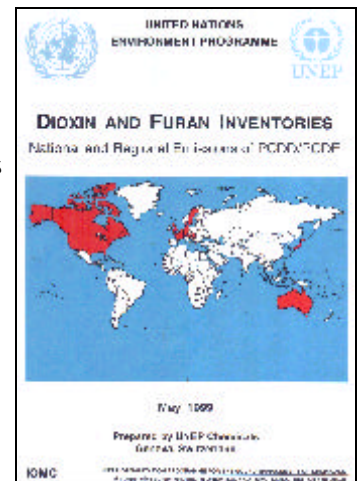
The negotiations by the Intergovernmental Negotiating Committee come in response to the mandate from the UNEP Governing Council to reach a global agreement on the initial list of 12 POPs by the year 2000.

In advance of the treaty, UNEP has initiated and contributed to other activities to identify dioxins and furans and to take measures against them to protect public health and the environment.

In June 1999, UNEP Chemicals released a report summarising the available information on releases of dioxins and furans to the environment. The report covers 15 national inventories, mostly from Western

Europe and North America, and three additional ones from UNEP Focal Points. UNEP plans to update this report as soon as new information becomes available.

UNEP Chemicals will also develop training modules and tool kits to help countries identify sources and take measures to reduce releases.



Report available from UNEP Chemicals