



# Toxics Information Series

## CFC's, Ozone, and Health

Chlorofluorocarbons, commonly called CFC's are chemicals used as refrigerants in air conditioners, home refrigerators, and freezers; as industrial solvents; and in the manufacturing of plastic foam products. Until 1978, CFC's were also used as propellants in aerosol spray products-- deodorants, hair sprays, pesticides, furniture polish, paints, etc. -- but most of those uses were banned in the United States and some other nations after it was learned the CFC's could endanger human health and the environment. This information bulletin discusses the dangers of CFC's and the government's actions to safeguard public health and the environment from those dangers.

### What are CFC's?

CFC's are organic chemicals, part of the family of chemical compounds known as halogenated hydrocarbons. They are non-flammable, chemically inert gases with qualities that make them nearly ideal for use as refrigerants and other industrial processes. Approximately 750 million pounds of CFC's were produced in the U.S. in 1979. Worldwide production of the two major types of CFC's was 2 billion pounds in 1978.

### Why are CFC's a Problem?

CFC's are a global problem because they are suspected of breaking down the ozone layer, the protective shield in the stratosphere (upper atmosphere) 15-20 miles above the earth. The ozone layer reduces the amount of the sun's damaging ultraviolet radiation that reaches the earth. Here's how CFC's attack the ozone layer:

After CFC's are released into the air on earth -- by spraying from a can, leaks from air conditioners or refrigerators or industrial emissions -- they slowly migrate into the stratosphere. When they reach the ozone layer, ultraviolet rays split the CFC molecules apart to form chlorine and various chemical compounds. The chlorine serves as a catalyst which increases the rate at which reactions destroying ozone molecules occur. Each chlorine molecule may be involved in thousands of such reactions.

Results: The amount of ozone protecting the earth from damaging ultraviolet radiation is being diminished. If global emissions of CFC's continue at the present rate, scientists predict the additional ultraviolet rays reaching the earth will cause thousands of additional cases of potentially fatal skin cancer and hundreds of thousands of additional cases of non-fatal skin cancer. Scientists also believe that added

ultraviolet radiation may lower production of wheat, corn, soybeans, rice, and other crops and plants, as well as yields of anchovy, mackerel, shrimp, crab, and other marine species. Scientists also fear the releases of CFC's into the air may eventually affect our climate. They could contribute to potentially dangerous warming of the earth's atmosphere. That, in turn, could cause partial melting of the polar icecaps, flooding of coastal cities, changes in precipitation patterns, and reduced crop yields in the world's most productive agricultural areas.

In sum, the useful chemicals called CFC's are also potentially hazardous chemicals.

## A Warning

"In the United States, significant ozone depletion would eventually mean a likely probability of thousands of new cases a year of melanoma skin cancer, which is frequently fatal, and a certainty of very many thousands of additional cases every year of nonfatal (nonmelanoma) skin cancer in addition to even larger increases in both kinds of skin cancer associated with changing habits of exposure to the sun."

-- From a 1979 report from a National Academy of Sciences committee studying the impact of CFC's on the ozone layer.

## What's the Government Doing about CFC's?

The Federal government has already taken these actions to reduce emissions of CFC's:

- Effective October 15, 1978, the U.S. Environmental Protection Agency (EPA) banned the manufacturing of CFC's for use as aerosol propellants.
- Effective December 15, 1978, EPA banned the processing of CFC's into aerosol products as propellants, and banned the distribution of such products in interstate commerce.
- Effective December 15, 1978, the U.S. Food and Drug Administration (FDA) banned the manufacturing or packaging of food, drug, or cosmetic products containing CFC's as propellants.
- Effective April 15, 1979, FDA banned the marketing of food, drug, or cosmetic products containing CFC's as propellants.

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<p>Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont</p> <p>EPA Mr. Robert Dangel Toxic Substances Coordinator John F. Kennedy Federal Building Boston, MA 02203 (617) 223-0585</p> <p>FDA Mr. A. J. Beebe Regional Director 585 Commercial Street Boston, MA 02109 (617) 223-1278</p>	<p>New Jersey, New York, Virgin Islands, Puerto Rico</p> <p>EPA Mr. Ralph Larsen PCB Coordinator 26 Federal Plaza New York, NY 10007 (212) 264-1925</p> <p>FDA Mr. Caesar A. Roy Regional Director 830 3rd Avenue Brooklyn, NY 11232 (212) 965-5416</p>	<p>Delaware, Maryland, Pennsylvania, Virginia, West Virginia, District of Columbia</p> <p>EPA Mr. Charles Sapp Toxic Substances Coordinator Curtis Building (3AH20) 6th &amp; Walnut Street Philadelphia, PA 19106 (215) 597-4058</p> <p>FDA Mr. R. J. Davis Regional Director 2nd and Chestnut Street Room 900 Philadelphia, PA 19106 (215) 597-4390</p>	<p>Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee</p> <p>EPA Mr. Ralph Jennings Toxic Substances Coordinator 345 Courtland Street, NE Atlanta, GA 30308 (404) 881-3864</p> <p>FDA Mr. M. D. Kinslow Regional Director 880 W. Peachtree Street Atlanta, GA 30309 (404) 881-4266</p>	<p>Indiana, Illinois, Michigan, Minnesota, Ohio, Wisconsin</p> <p>EPA Mr. Karl Bremer Toxic Substances Coordinator 230 South Dearborn Street Room 1165 Chicago, IL 60604 (312) 353-2291</p> <p>FDA Mr. L. R. Claborn Regional Director 175 W. Jackson Boulevard Room A-945 Chicago, IL 60604 (312) 353-1047</p>

EPA's actions were taken under the Toxic Substances Control Act, which requires EPA to regulate, and ban if necessary, chemicals that present an unreasonable risk of injury to health or the environment. FDA's actions were taken under the Federal Food, Drug, and Cosmetic Act, which requires FDA to make sure that food, drug, and cosmetic products are safe.

The coordinated actions by EPA and FDA virtually eliminated the use of CFC's as propellants in aerosol spray products in the U.S. (Some propellant uses are still allowed -- for medical purposes, for example -- but they represent only a minute fraction (2-5%) of the amount of CFC's previously used in spray products.)

Other nations have also acted on the global problem of CFC's: Sweden, Norway, and Canada have banned the use of CFC's as propellants in spray products. The European Economic Community has called for a 30 percent reduction from 1976 levels in the use of CFC in aerosols by each of its nine member nations. This is to take place by December 1981. The EEC also has curtailed new investments in CFC production facilities.

Even if all releases of CFC's were to cease immediately, worldwide, enough material is already in the atmosphere, and "banked" in various products, to continue the ozone's depletion for at least another decade, after which the ozone level would gradually recover.

Despite the elimination of CFC's from most aerosol products in the U.S. and a few other nations, worldwide use of CFC's for other purposes has risen, so that much of the savings from decreased aerosol use has been eliminated. Estimates of future growth suggest that non-aerosol CFC use will continue to expand, particularly in certain product areas such as insulating foams. That poses a significant threat to health and the environment.

The National Academy of Sciences has estimated that continued global emissions of the two major types of CFC's even if held to the 1977 level, will most likely result in a 16 percent reduction in the ozone layer in the stratosphere. That, in turn, would cause a 44 percent increase in the amount of harmful ultraviolet radiation reaching the earth at mid-latitudes -- and potentially hundreds of thousands of new cases of skin cancer.

To help reduce the continuing assault on the ozone layer, EPA is initiating regulatory development on a program to limit total U.S. production of CFC's -- for all uses -- to present levels.

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What's Next?

Additional restrictions of the production and use of CFC's by all CFC-producing nations may well be necessary to safeguard health and the environment worldwide. Scientists in the U.S. and abroad continue to study the problem. As new information becomes available and as substitutes for the remaining uses of CFC's are developed EPA will consider other actions to reduce the use of CFC's and will urge other nations to take similar action.

Want More Information?

Additional information on EPA's regulation of CFC's is available from EPA headquarters in Washington, D.C. or from the EPA regional office listed inside. The toll-free number is (800) 424-9065; in Washington D.C. call 554-1404.

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