United States Environmental Protection Agency

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Dioxin Facts

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EPA'S On-Going Regulatory Program

Since the 1970's, when dioxin contamination first came to light, EPA has established extensive and active control measures for dioxins and furans in each of its major programs.

Clean Air Program

On September 1, 1994, Administrator Browner announced proposed air standards for new and existing municipal waste incinerators, which are estimated to be the second largest source (behind medical waste incinerators) of the known annual national air emissions of dioxin. The proposal specifies technology-based performance standards, which would reduce dioxin and other organic chemical emissions by 95 to 99 percent from 180 existing municipal waste incinerators; dioxin emissions from new plants would be reduced by more than 99 percent. When the proposal becomes a final rule in September 1995, existing plants will have one to three years to comply with the rule, while new plants must comply immediately on start-up of operations. In the meantime, EPA is working with municipal incinerator operators to ensure that they employ good operating procedures to minimize their emissions.

EPA will propose similar regulations for medical waste incinerators no later than February 1, 1995, and issue the final standards by April 15, 1996. There are over 5000 medical waste incinerators in the United States and collectively they are estimated to be the largest overall contributor of known annual national air emissions of dioxin; individually, however, emissions from medical waste incinerators are thought to be relatively small. Once these regulations are fully implemented, municipal and medical waste incinerators will represent only a small percentage of the currently known annual national air emissions of dioxin.

EPA is currently also implementing the new air toxics provisions of the Clean Air Act Amendments of 1990 that will result in new technology-based air toxics standards for 170 industrial categories. Where dioxins and furans are significant pollutants for those categories, these standards will result in further controls on their emissions.

Hazardous Waste Program

The incineration of hazardous wastes may result in dioxin emissions from burning dioxin-contaminated wastes, or as a result of the incomplete combustion of other hazardous wastes. EPA regulates the incineration of hazardous wastes, including any resulting air emissions, under its hazardous waste program. In May 1993, Administrator Browner announced a program to upgrade emission standards for hazardous waste combustors, which include incinerators, boilers and industrial furnaces that burn hazardous wastes. The proposed standards are expected to require stringent, state-of-the-art controls on emissions, which could reduce current dioxin emissions from existing hazardous waste combustors by 94 to 97 percent. EPA plans to propose the new standards in September 1995 and issue the final standards in December 1996.

In the interim, any facility that applies for a new permit or to renew an existing permit to burn hazardous wastes will have to conduct a comprehensive risk assessment to evaluate potential population exposures to hazardous contaminants at the facility. EPA will use its existing permitting authority to impose additional restrictions, including dioxin limits, in such facility permits, if a risk assessment shows that additional restrictions are necessary to protect human health and the environment.

The existing regulations require that hazardous waste combustors demonstrate that they effectively destroy the wastes being burned and that they minimize emissions resulting from the incomplete combustion of hazardous wastes. Accordingly, hazardous waste combustors must conduct a rigorous trial burn to demonstrate that they can achieve a destruction and removal efficiency of 99.99% for each principal organic hazardous constituent designated in their operating permits. Hazardous waste combustors that burn dioxin-contaminated wastes must demonstrate a destruction and removal efficiency of 99.9999% on those principal organic hazardous constituents that are harder to burn than dioxins and furans. Hazardous waste combustors must also meet strict limits on carbon monoxide or hydrocarbon emissions, which are signs of poor combustion, to minimize the production of dioxin emissions and other undesirable products of incomplete combustion. Finally, hazardous waste combustors must monitor their emissions frequently to ensure that they are meeting their emission limits.

Clean Water Program

EPA has had an active program to limit dioxin contamination of U.S. waters by developing technology-based effluent limitation guidelines for pulp and paper mills, which are incorporated into operating permits for these facilities, developing ambient water quality criteria guidance for use by the states in setting water quality standards for specific water uses, and prohibiting the discharge of dredged material that is contaminated with dioxin in violation of state water quality standards.

On October 31, 1993, Administrator Browner proposed effluent limitations guidelines for pulp and paper mills, which create dioxin primarily as a result of the bleaching of wood pulp used to make paper. The proposed effluent guidelines would require the use of best available technology and would result in major process changes in the pulping and bleaching technologies used at four categories of pulp and paper mills. Process changes in the pulping technology would reduce the amount of lignin, a precursor to dioxin formation, in pulp prior to bleaching. Bleaching process changes would substitute chlorine dioxide for elemental chlorine for kraft mills, to reduce dioxin formation, and totally chlorine-free bleaching for sulfite mills.

In 1984, EPA recommended ambient water quality criteria for 2,3,7,8-TCDD, the most toxic form of dioxin, to be used by the states in setting enforceable water quality standards for specific water uses. The recommended ambient water criteria are based on a cancer risk level of a one in one million (0.013 parts per quadrillion of dioxin in water). Enforceable water quality standards for dioxin have now been either adopted in all 57 states, territories and Indian tribes that administer the water quality standards program, or imposed by EPA by regulation.

The Agency is also in the process of establishing water quality criteria for toxic pollutants in the Great Lakes. In April 1993, Administrator Browner proposed the Great Lakes Water Quality Guidance, which would establish water quality criteria for 2,3,7,8-TCDD to protect both human health and wildlife. The proposed criteria for dioxin take into consideration the bioaccumulation of dioxin and the risks to humans and wildlife through the food chain. EPA plans to issue the final Great Lakes Water Quality Guidance in March 1995.

The presence of dioxin in river sediments may be a significant issue in the dredging of harbor entrances of rivers. EPA and the U.S. Army Corps of Engineers jointly administer a permit program, which regulates the discharge of dredged and fill material into waters of the United States, including wetlands. If testing of the dredged sediments indicates that dioxin is present, then the sediments must meet the applicable state water quality standards for dioxin before they can be discharged into the waters of the United States.

Safe Drinking Water Program

On July 17, 1992, EPA established drinking water standards for 2,3,7,8-TCDD in public drinking water supplies: an enforceable maximum contaminant level (MCL) of 3×10^{-8} milligrams per liter. This level represents the lowest detection level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. Finally, EPA identified granular activated carbon treatment as the best available technology to be used by public water supply systems to meet this dioxin level.

Superfund Program

EPA has identified dioxin as a key contaminant of concern at approximately two dozen waste disposal sites on the National Priorities List (NPL), which are scheduled for long-term cleanup under Superfund remedial authority. EPA has also identified dioxin as an important contaminant in approximately 50 removal

actions, which are generally smaller, more immediate cleanups than those involved at NPL sites.

Actions under Superfund have included the cleanup of pesticide and Agent Orange manufacturing plants; industrial facilities that once produced trichlorophenol; creek sediments and drainage sewers near Love Canal; contaminated soil from the Times Beach sites in Missouri; dioxin wastes improperly disposed of on farmland in the Midwest; and dioxin contaminated streets near a pesticides manufacturing plant in Newark.

Incineration of hazardous substances at Superfund sites, whether of dioxins or other chlorinated contaminants, can produce dioxin emissions due to incomplete combustion. Superfund incineration remedies comply fully with the existing regulations for hazardous waste combustors that are discussed above, including a rigorous trial burn and frequent monitoring during operation.

Pesticide and Toxic Chemicals Program

Dioxin first came to the Federal Government's attention as a contaminant of the herbicides 2,4,5-T and Silvex. During the 1970's and early 1980's these two herbicides were removed from the market for all uses.

Subsequently, EPA began a review of all existing pesticides to determine whether dioxin/furans were created during their manufacturing process. In 1987, EPA initiated two data call-ins that requested specific information regarding the manufacture of 161 pesticide active ingredients.

At this time, EPA has ruled out any concerns for 140 of those active pesticide ingredients because either no dioxin/furan impurities were found or those active ingredients are no longer produced.

Of the remaining 21 active pesticide ingredients, two were found to have manufacturing processes which produced detectable levels of dioxin/furans, but these levels were below the level requiring action. The manufacturing processes of two other active ingredients are also known to produce dioxin/furans above detectable levels, but their toxicological significance is still under review. EPA is currently reviewing the data submitted for the last 17 active ingredients and anticipates that it will complete its review by 1996.

For all new pesticide registrations, EPA currently evaluates product chemistry data to ensure that new active ingredients are screened for dioxin/furan contamination.

EPA has also been concerned that certain commercial chemicals might be contaminated with dioxins just as certain pesticides have been and has taken actions to deal with this problem. In 1987, EPA issued the Dioxin/Furan Test Rule pursuant

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to the Toxic Substances Control Act requiring the submission of data on over sixty chemicals and chemical precursors already in use that potentially had dioxin contamination. Of the chemicals tested, four were determined to have dioxin contamination: chloranil and three brominated flame retardants. The manufacturers and importers of chloranil have agreed to reduce the level of dioxin in their product and EPA is reviewing the data on the brominated flame retardants to determine the seriousness of the risk they may pose.

Since 1989, EPA has reviewed new chemical submissions for the potential for dioxin contamination under its New Chemicals Program. To date, three chemicals have been tested (none of these have subsequently been commercialized), ten chemicals have been withdrawn (in part because of EPA's requirement for testing), and testing is underway on several additional chemicals.