

# Rachel's Environment & Health News

## #508 - How to Eliminate Dioxin

August 21, 1996

A two-year study of dioxin in the Great Lakes has concluded that 86% of dioxin sources could be eliminated without economic sacrifice, and possibly with economic gains.[1,2] The study was conducted by a team of researchers at Queens College in New York, led by Dr. Barry Commoner.

Dioxin has emerged in the past 15 years as one of the two or three most dangerous chemicals ever tested. Intensive study of dioxin has confirmed that dioxin acts as a powerful "growth dysregulator," an "environmental hormone" that interferes with normal growth and development in fish, birds, reptiles, amphibians, and mammals, including humans. (See REHW #279, #414.) Dioxin disrupts the central nervous system, the immune system, the hormone (endocrine) system, and the reproductive system, preventing normal growth and development of the young and causing a variety of cancers. Furthermore, this intensive study revealed that Americans now carry enough dioxin in their bodies to create a cancer hazard hundreds of times as large as the "acceptable" cancer hazard defined by EPA [U.S. Environmental Protection Agency]. Furthermore, existing "body burdens" of dioxin in Americans could be expected to cause other health effects in sensitive members of the population, such as immune system damage. Dioxin is thus a serious public health problem. (See REHW #390, #391.)

Dioxin is never intentionally manufactured (except for laboratory purposes), but it occurs as an unwanted byproduct of many industrial processes. A recent estimate of annual world-wide dioxin production (which amounts to 3000 kilograms [kg], or 6614 pounds [lb] per year) indicates that major sources of dioxin include:[3]

\*\* municipal solid waste incinerators (1130 kg [2491 pounds], or 37.6% of world total);

\*\* cement kilns burning hazardous waste (680 kg [1499 lb], or 23%). Only cement kilns in the U.S. burn hazardous waste, and these incinerators produce 13 times as much dioxin, per pound of cement manufactured, compared to cement kilns that do not burn hazardous waste.

\*\* steel smelters (350 kg [772 lb], or 12% of total);

\*\* cement kilns not burning hazardous waste (320 kg (706 lb), or 11%);

\*\* biomass combustion (350 kg [772 lb], or 12%). This is from forest fires and from commercial and residential wood burning. Trees do not naturally produce dioxin. But forests may be treated with chlorinated pesticides, such as Silvex, which then produce dioxins when burned. Alternatively, airborne dioxins may settle onto trees and be absorbed into the leaves and wood; when these later burn, the dioxin may be released into the atmosphere again. The researchers who developed these global estimates don't know which explanation is correct.

\*\* medical waste incinerators (84 kg [185 lb], or 2.8%);

\*\* secondary copper smelting (78 kg (172 lb), or 2.6%);

\*\* automobiles burning leaded gasoline (11 kg [24 lb], or 0.4%); cars burning leaded gasoline emit 9 times as much dioxin per gallon of fuel, compared to burning unleaded gasoline.

\*\* automobiles burning unleaded gasoline (1 kg [2.2 lb], or 0.03%).

These estimates are subject to large uncertainties because almost nothing is known about dioxin sources in the former Soviet Union, China, and India, which together hold about 43% of world population. Furthermore, estimates of total dioxin falling onto the Earth's surface worldwide (13,100 kg, or 28,880 lb) are about 4 times as large as total estimated worldwide emissions (3000 kg, or 6614 lb). Thus no one is quite sure where all the world's dioxin is coming from. One thing IS certain: dioxin is not coming from

natural sources. Study of the sediments of lakes has shown that there was very little dioxin in the environment prior to 1940.[4]

Despite these major uncertainties, dioxin emissions into the Great Lakes have been studied carefully by Commoner and associates, who identified 1329 individual sources of dioxin. Of these 1329 sources, 106 account for 86% of the dioxin entering the Lakes:

\*\* 48% of the dioxin entering the Great Lakes originates in 609 hospital waste incinerators and 14 commercial medical waste incinerators.

\*\* 22% of Great lakes dioxin originates in 52 municipal solid waste incinerators burning 11.7 million tons of trash per year.

\*\* 8% originates in iron ore sintering plants. (To sinter means to form into a solid mass using heat but without melting.)

\*\* 8% from cement kilns burning hazardous wastes.

\*\* 4% from secondary copper smelting.

\*\* 3% from combustion of coal.

\*\* 2% from wood combustion.

\*\* 2% from cement kilns not burning hazardous wastes.

\*\* 1% from heavy duty diesel vehicles.

\*\* 0.8% from hazardous waste incinerators.

\*\* 0.7% from sewage sludge incineration.

\*\* 2.2% from other sources (secondary copper refining; hexachlorobenzene waste incineration; combustion of leaded and unleaded gasoline).

The bulk of Commoner's report is an economic analysis of the feasibility of eliminating the sources of dioxin from medical waste incinerators, municipal solid waste incinerators, iron ore sintering plants, paper mills, and cement kilns burning hazardous wastes.

Commoner takes a modern "pollution prevention" approach to dioxin: he looks for ways to change production processes to avoid the creation of dioxin. Throughout the study, Commoner discusses the alternative approach --pollution control --and shows that it cannot reduce dioxin emissions to zero. Only pollution prevention --eliminating the creation of dioxin by changing production technologies --can achieve zero discharge of dioxins.

Interestingly, despite prominent use of the term "pollution prevention" inside EPA (where they've even turned it into the catchy buzzword, "P2"), Commoner shows time after time that EPA and certain of the "big 10" environmental groups who are talking about reducing dioxin emissions under the Clean Air Act of 1990 are all stuck in old-style "pollution control" debates. Sierra Club, Natural Resources Defense Council (NRDC) and EPA are spending their scarce resources jousting in court over the meaning of "maximum available CONTROL technology" --not even discussing real pollution prevention, which requires NOT MAKING POLLUTION TO BEGIN WITH. (The Clinton Administration and some of its acolytes in the Washington environmental community revealed their contempt for real pollution prevention last month when they helped Congress repeal the Delaney clause. Since 1958, the Delaney clause had prohibited the addition of known carcinogens to processed foods--the only U.S. environmental law truly based on PREVENTION. Now the Delaney prohibition has been repealed, replaced by a risk assessment process which allows "safe" amounts of cancer-causing chemicals to be added to our food. In the unprincipled world of D.C. environmental politics-and-money, this is being touted as progress. The catch is, no one

promoting the new "risk assessment" approach actually believes that "safe" amounts of carcinogens can be established, certainly not when several carcinogens and other poisons are added simultaneously to the food of tens of millions of people. So EPA and other cynical Washington operatives are promoting public health policies founded on risk assessments which have no basis in science, which are not in any sense prevention-based, and which certainly cannot "guarantee protection for children," as one environmental group announced they would.[5] Presumably, such cynical posturing is the price one pays to remain an "inside player"--a sad display of political opportunism and ethical collapse by our friends.) At present, in Washington, P2 is just so much eye wash.

Commoner on the other hand applies the principle of pollution prevention aggressively, and in novel ways:

\*\* Medical wastes are incinerated, basically, to kill germs and reduce volume. Commoner shows that medical waste incinerators around the Great Lakes could all be shut down affordably and replaced by autoclaving (essentially a large pressure cooker that sterilizes) followed by landfilling. Autoclaving and landfilling are an affordable, dioxin-free alternative to medical waste incinerators.

\*\* Commoner shows that all municipal solid waste incinerators could be closed and retired (their outstanding bonded debt paid off by public funds) and replaced by dioxin-free intensive recycling programs --all at a net SAVING of \$536 million each year for Great Lakes communities. \*\* Commoner shows that --despite anti-P2 regulations imposed by EPA -- pulp and paper mills could readily shift to totally-chlorine-free technologies, thus COMPLETELY ELIMINATING THE SOURCES OF DIOXIN IN PAPER MILLS. Real pollution PREVENTION is affordable.

\*\* Commoner shows that chlorinated solvents and oils could be eliminated from iron sintering plants, thus ELIMINATING the sources of dioxin from these facilities.

\*\* Commoner shows that 75% of all cement is manufactured without using hazardous waste as a fuel, and that therefore it would be relatively easy for government to outlaw use of hazardous waste as a fuel in cement kilns, to protect public health and safety.

Commoner's clear, quantitative analysis and low-key advocacy offer real hope that dioxin could be brought under control nation-wide. Unfortunately, Commoner starts his thinking from a place quite different from the place where EPA and the big environmental lobbying groups start their thinking. Commoner boldly examines the production processes that are creating dioxin --production processes that are traditionally considered the exclusive domain of the so-called "private sector" --and suggests how they could be modified to prevent pollution. (It seems odd that this sector retains the label "private" even though its decisions have polluted every square foot of the planet with powerful poisons.) Until the environmental community adopts an approach as bold as Commoner's, trendy talk of P2 will remain nothing more than a cynical cover for business as usual.

--Peter Montague (National Writers Union, UAW Local 1981/AFL-CIO)

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[1] Barry Commoner and others, DIOXIN FALLOUT IN THE GREAT LAKES. WHERE IT COMES FROM; HOW TO PREVENT IT; AT WHAT COST. (Flushing, N.Y.: Queens College, Center for the Biology of Natural Systems, June, 1996). Telephone (718) 670-4182.

[2] Barry Commoner and others, ZEROING OUT DIOXIN IN THE

GREAT LAKES: WITHIN OUR REACH (Flushing, N.Y.: Queens College, Center for the Biology of Natural Systems, June, 1996). Telephone (718) 670-4182.

[3] Louis B. Brzuzy and Ronald A. Hites, "Global Mass Balance for Polychlorinated Dibenzo-P-dioxins and Dibenzofurans," ENVIRONMENTAL SCIENCE & TECHNOLOGY Vol. 30, No. 6 (1996), pgs. 1797-1804. A recent "mass balance" study of U.S. (not global) dioxin emissions is Valerie M. Thomas and Thomas G. Spiro, AN ESTIMATION OF DIOXIN EMISSIONS IN THE UNITED STATES [PU/CEES Report No. 285] (Princeton, N.J.: Princeton University, Center for Energy and Environmental Studies, December, 1994).

[4] Jean M. Czuczwa and others, "Polychlorinated dibenzo-p-dioxins and dibenzofurans in sediments from Siskiwit Lake, Isle Royale," SCIENCE Vol. 226 (1984), pgs. 568-569. And see Jean M. Czuczwa, and Ron A. Hites. "Airborne Dioxins and Dibenzofurans: Sources and Fates." ENVIRONMENTAL SCIENCE AND TECHNOLOGY Vol. 20 (1986), pg. 195 and following pages.

[5] Richard Wiles and Mark B. Childress, "Pesticide Bill Guarantees Protection for Children and a Citizen's Right to Know," press release dated July 17, 1996 from Environmental Working Group, 1718 Connecticut Avenue, N.W., Suite 600, Washington, DC 20009; telephone: (202) 667- 6982. The Environmental Working Group (EWG) knows as well as we do that risk assessments cannot "guarantee protection for children." President Clinton evidently liked EWG's disinformation so well that he later repeated it himself; see Associated Press, "Clinton Praises Bill Regulating Pesticides," NEW YORK TIMES, August 4, 1996, p. 17. And see John H. Cushman, Jr., "Pesticide Measure Advances In House, Without Rancor," NEW YORK TIMES, July 18, 1996, pg. 20.

Descriptor terms: dioxin; great lakes; paper mills; chlorine; msw; incineration; medical waste incinerators; steel industry; steel smelters; pollution prevention; cement kilns; hazardous waste; dioxin sources; biomass combustion; copper smelting; automobiles; gasoline; lead; iron sintering;