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# EPA'S DIOXIN REASSESSMENT--PART 1: NEW PICTURE OF DIOXIN'S TOXICITY EMERGES

U.S. Environmental Protection Agency [EPA] is pressing ahead with its "reassessment" of the toxicity of dioxin, aiming to produce a draft report by June. It has been widely rumored in newspapers that EPA's reassessment will downgrade the dangers of dioxin. But in fact it now appears that EPA may conclude in June that dioxin is at least as toxic as the agency now assumes it to be--and it's even possible the agency will declare dioxin more toxic, not less.

EPA officials announced in April 1991 that "new scientific evidence" showed dioxin may be less dangerous than the agency had said back in 1985 when it first set stringent standards for dioxin exposure to humans. Based on the "new evidence" it was time to reassess the dangers of dioxin, agency chief William Reilly announced in April. Then, as the year-long reassessment got under way, Mr. Reilly jumped the gun and told the NEW YORK TIMES August 15 (pg. 1) what the conclusions of his agency's study would be: "We are now seeing new information on dioxin that suggests a lower risk assessment for dioxin should be applied." The TIMES ran the story on page one.

We have since learned that the whole idea of reassessing the toxicity of dioxin originated with executives of four major paper companies who visited Mr. Reilly's office January 23rd, 1991, and that Mr. Reilly's August statement to the NEW YORK TIMES reflected the paper industry's agenda, not the views of EPA scientists. At an EPA public hearing on dioxin in Washington November 15, Greenpeace and Alder-Hill Associates of Tidewater, Oregon [(503) 528-7151], released leaked documents including a January 25th, 1991, letter from the four paper company chief executive officers (John A. Georges, International Paper; T. Marshall Hahn, Jr., Georgia-Pacific Corp.; Furman C. Moseley, Simpson Paper; and Andrew C. Sigler, Champion International) thanking Mr. Reilly for his receptiveness to their ideas January 23: "We were also encouraged by what we perceived as your willingness to move expeditiously to re-examine the potency of dioxin and chloroform in light of the important new information that has

been submitted with respect to those chemicals."

In their discussions with Mr. Reilly Jan. 23, these executives browbeat EPA for "failure to act on the emerging health science." They claimed there is now a "prevailing view that low-level dioxin exposures do not pose a serious health threat." "Despite this new reality," they said in their January 25 letter, "EPA has taken no tangible or timely steps to revisit its health criteria for dioxin, and has even failed to temper the Agency's zeal in acting on the worst risk estimates...." As a direct result of these EPA failures, the executives told Mr. Reilly, the paper industry is beleaguered by "public fears about risk associated with dioxin which bears no relationship to scientific evidence. A consequence of this atmosphere is that our companies are now the subject of groundless class action toxic tort suits seeking billions of dollars in damages."

In other words, it's entirely EPA's fault that the paper industry has now begun to resemble the asbestos industry--overwhelmed by lawsuits by citizens claiming harm from exposure. In no uncertain terms, these paper company executives told Mr. Reilly how important it was that his agency play down the toxicity of dioxin in public statements: "Reasoned public statements can help calm the needless public alarm that has, in turn, stimulated the proliferation of unjustified legal action against so many companies in our industry," the paper company officials said.

In August Mr. Reilly met the paper industry's need for "reasoned public statements" and the NEW YORK TIMES put it on page one: "U.S Officials Say Dangers of Dioxin Were Exaggerated." At least 26 other major American newspapers picked up this story, and it is now "common knowledge" that dioxin is not as dangerous as officials used to think. William Reilly himself says so.

Meanwhile EPA's scientific staff was pursuing a very different line of reasoning. They had concluded that dioxin not only causes cancer in humans, but also that it interferes with human health in a broad range of ways. EPA scientists are now referring to dioxin as an "environmental hormone."

Based on concern about dioxin's potency as a carcinogen, EPA in 1985 established a very stringent allowable intake of dioxin for humans: 0.006 picograms (or 0.000000006 micrograms) per kilogram of body weight per day. Since the "average" person is assumed to weigh 70 kilograms (154 pounds), this "average" person is allowed to eat no more than 0.006 x 70 = 0.42 picograms of dioxin each day. One microgram is one-millionth of one gram; a picogram (pg) is a millionth of a microgram, or a trillionth of a gram. There are 28 grams in an ounce.

Unfortunately, because of widespread dioxin contamination of the food chain by the paper industry and other sources, the average American eats dioxin in daily quantities ranging from 3 to 50 picograms, thus exceeding the EPA's "safe" dose of 0.42 picograms by anywhere from seven-fold to 120-fold, depending on whose data you accept regarding dioxin contamination of our food supply. [1, pgs. 94- 95.].

Here is the basic problem: if the EPA's stringent 1985 standard is warranted, then the dioxin in our food supply represents a major failure of public health protection. Naturally, therefore, it is in the interests of

EPA itself--which does not want to look like a failure--AND of the dioxin dumpers in the paper industry (and others)--who do not want to look like thoughtless poisoners--to find "new" evidence making dioxin appear less potent. Unfortunately, all the new evidence seems to be pointing in the other direction.

Dioxin is never produced intentionally; dioxin serves no useful purpose and, so far as anyone knows, there are no benefits from dioxin in your body, only risks. Nevertheless, dioxin is created in major quantities as a byproduct: from chlorine bleaching of pulp and paper, from manufacture of certain herbicides (e.g., 2,4,5-T), from manufacture of many plastics (e.g., PVC), from manufacture of many chlorinated hydrocarbon chemicals, and from incineration of municipal solid wastes.

At the heart of the dioxin problem is chlorine. Chlorine is a highly reactive chemical (it tries to hook onto anything it touches, to form a new chlorinated molecule). Because it is so reactive, chlorine almost never occurs in a free state in nature; it is all bound up in the very stable molecule known as sodium chloride, or table salt.

Starting at the turn of this century Dow Chemical, and later other firms, began producing free chlorine as they split salt to get sodium, which they sold commercially as sodium hydroxide (caus-tic soda). Then they began to invent uses (to create markets) for all the waste chlorine, and thus the chemistry of "chlorinated hydrocarbons" was developed. Unfortunately, chlorinated hydrocarbons--solvents, pesticides, plastics, and a host of other chemicals--have turned out to be uniquely persistent, uniquely able to accumulate in food chains, and uniquely toxic in fish, birds and mammals, like humans.

Now, with EPA's dioxin reassessment chugging along, a new body of knowledge about the toxicity of dioxin is developing rapidly. A review article in SCIENCE NEWS (Vol. 141, January 11, 1992, pgs. 24-27) summarizes current understanding of dioxin's toxicity--and there is nothing in the new picture that would be comforting to the paper industry or to its fellow dioxin polluters in chemicals, plastics, pesticides or solid waste incineration.

Dioxin has always baffled toxicologists because it produces different effects in different species, and different effects within the same species at various doses. But the new science of dioxin is beginning to explain these mysteries by viewing dioxin as a hormone. Hormones are chemical messengers that travel throughout the body turning on and off various chemical switches. Hormones need only be present in tiny quantities to set off a cascade of major changes in bodily systems, changes not limited to cancer.

Linda Birnbaum--a key member of EPA's team reassessing dioxin--told SCIENCE NEWS, "If you think of TCDD as a hormone, it makes it easier to understand these very big differences [in dioxin's behavior]."

[Continued next week.]

--Peter Montague, Ph.D. ========== [1] Agency for Toxic Substances and Disease Registry, TOXICOLOGICAL PROFILE FOR 2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN [ATSDR/TP-88/23] (Springfield, VA: National Technical Information Service [NTIS], 1989); available from NTIS

[phone (703) 487-4650] as publication number PB89-214522.

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