Rachel's Environment & Health News
#234 - Chemical Regulation -- Part 1: Push Comes To Shove
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Two researchers from Oak Ridge National Laboratory (ORNL), Curtis Travis and Sheri Hester, have just published a new study of chemical contamination of planet Earth and have confirmed what many people already knew: the entire surface is polluted. What separates Travis and Hester from other U.S. government researchers before them is their stated belief that all this pollution is taking its toll on human health: "We maintain that ambient [normal, everyday] levels of pollution have risen to the point where human health is being affected on a global scale." Furthermore, they conclude that planet-wide contamination seems certain to increase because U.S. Environmental Protection Agency (EPA) does not even try to prevent the spread of low levels of chemicals through air, water, and soil. EPA's regulatory programs have other goals.

EPA's regulatory programs are aimed at protecting the most-exposed individual near any given facility. Whether it's mercury released from a municipal solid waste incinerator or radioactivity released into water from a low-level radioactive waste dump, EPA's regulations say, "Our goal is to protect the individual who may be getting the biggest exposure." EPA therefore picks a spot where they believe the greatest exposure will occur, then EPA establishes the concentration (in parts per million) that they believe the individual can "safely" receive during a lifetime of exposure. They define "safe" as "an exposure that will kill no more than one in every million individuals so exposed." EPA then figures out, as best they can, how much dilution will occur from the point of release to the place where the most-exposed individual resides. Based on these goals (and assumptions about dilution), EPA then issues a permit for a particular polluter to release a certain amount of mercury (or radioactivity, or other toxin) into air or water continuously. Since the allowable release is set to protect the maximally-exposed individual, EPA assumes all is well, never considering the combined consequences of many "safe" releases.

One could raise doubts about many aspects of this approach to pollution control, but the ORNL researchers highlighted only one key problem: continuous releases of mercury (or radioactivity, or other toxin), although they may protect the most-exposed individual, do nevertheless allow toxic materials to enter the environment continuously. Toxics released from thousands, or perhaps millions, of different sources add up. Additional "adding up" occurs in the food chain. A low concentration of mercury in water turns into a slightly higher concentration in plants living in that water, an even higher concentration in animals eating those plants, and so on up the food chain. You may start off with a small dose in air or water, but large predators at the top of the food chain (big fish, big birds, wolves, humans, bears, etc.) get a large dose.

Once they are released into the environment, chemicals seek out the environmental medium (air, water, soil, or living things) in which they are most soluble. Trichloroethylene (TCE) and benzene are most soluble in air, so they tend to be found in air. DDT and PCBs are most soluble in the fatty tissues of living things, so they tend to move into the food chain and concentrate in living things.

Transport through the atmosphere is the main way chemicals spread around the globe; even fat-soluble chemicals initially move via the atmosphere, then they enter food chains and concentrate in animals (including humans). So most pollutants travel via the atmosphere, but food is the main source of pollutants for humans.

Travis and Hester focus on PCBs, dioxins, benzene, mercury, and lead, showing how "ambient" (normal, everyday background) levels of these contaminants are high enough to make people sick. They make the point-- worth emphasizing--that they chose these chemicals only because data exist for these chemicals. For the vast majority of the 65,000 chemicals we dump into our air and water routinely via incinerators, landfills, and intentional releases from factory pipes and stacks, no data exist on how much is dumped, where it goes, or what effects it may be having. EPA has spent 20 years not gathering the necessary data.

PCBs. Although Congress banned PCBs in 1976 and EPA banned them in 1977, an estimated 900 tons of PCBs cycle through the U.S. atmosphere each year. Somewhere between 60% and 90% of the PCBs entering the Great Lakes come from the atmosphere, according to Travis and Hester. The average PCB concentration in breast milk in the U.S. is 89 micrograms per kilogram. They calculate that the background level of PCBs in the U.S. food supply creates a cancer risk of 110 per million (using EPA's method for calculating cancer risks). That is to say, among every group of one-million U.S. citizens [and there are 245 such groups in our population of 245 million people], 110 individuals can be expected to get cancer from normal, background PCB exposures.

Dioxins. Background dioxin levels in the American people are lower than PCB levels, but dioxins are more potent carcinogens than PCBs. The "background" cancer risk from dioxins, according to Travis and Hester using EPA's methods, is 210 per million.

Benzene. The background cancer risk from routine exposure to benzene in the U.S. is 100 per million (or one in 10,000).

Mercury. Travis and Hester do not calculate a cancer risk for mercury. However, they make the important point that mercury released by coal combustion, by the chlor-alkali industry (which produces chlorine and caustic soda), and by municipal waste incinerators has introduced mercury into enormous areas far distant from the places where the mercury was released. In remote lakes in Michigan, 15% of the fish contain mercury concentrations in excess of that state's health advisory of 0.5 parts per million (ppm). Approximately 30% of Wisconsin's lakes and 50% of Florida's lakes contain fish with mercury levels that exceed state health standards. Mercury seems to be becoming a global problem, not limited to areas near point-sources.

Lead. Travis and Hester report that lead is affecting between 3 and 4 million U.S. children adversely (chiefly impaired cognitive development--stunted mental growth) because of "our mismanagement and heavy use of this toxic material." An additional 400,000 fetuses in the U.S. are probably harmed by lead each year before they are born, Travis and Hester report.

Travis and Hester calculated the total background cancer risk from 11 chemicals, using data from the U.S. Department of Agriculture (which samples the U.S. food supply for chemicals occasionally), using EPA's method for calculating cancer risks. They conclude that these 11 chemicals create a background cancer risk of 1000 in a million, or one in a thousand. And of course this does not consider consequences besides cancer. It omits consideration of respiratory problems, reproductive and developmental illnesses, nervous system disorders, damage to the immune system, the increasing occurrence of multiple chemical sensitivity (see RHWN #165, #220) and much more.

Travis and Hester's cancer analysis is based on a tiny part of the full picture. They say, "The true extent of human exposure to environmental pollution has never been quantified. For example, the [EPA's] human adipose [fatty] tissue survey has identified only a very small fraction of the chemical mass found in human adipose tissue." In other words, no data exist for the vast majority of chemical exposures that occur routinely. EPA has studiously avoided gathering the data.

As for solving this problem, don't look to EPA. Travis and Hester say, "The only way to diminish global cycling of contaminants is to decrease production of pollutants or to destroy pollutants before they are released into the environment.... At present, the most commonly used method to destroy pollutants is incineration. However, emissions from incinerator stacks tend to release pollutants directly into the atmosphere." EPA has placed all its eggs in the incineration basket and is aggressively trying to force all states to site incinerators (see RHWN #142)--a strategy guaranteed to make the problem of global contamination worse. As for the

suggestion to "decrease production of pollutants," this would require governmental intrusion into the manufacturing place, compelling factory owners to avoid certain chemicals, or to use less of them. Travis and Hester argue this is the only way to prevent global contamination, with its attendant human health damage. Thus it seems to come down to this: the health of humans in general vs. the right of American manufacturers to call the shots inside their own factories. Push really has come to shove. Fireworks ahead.

--Peter Montague

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Get: Curtis C. Travis and Sheri T. Hester, "Global Chemical Pollution," ENVIRONMENTAL SCIENCE & TECHNOLOGY Vol. 25, No. 5 (May, 1991), pgs. 814-819.

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