

Rachel's Environment & Health News

#43 - Indoor Air Is More Contaminated Than Outdoor Air; Homes At Risk

September 20, 1987

Why is it important to reduce the use of hazardous materials (as distinct from reducing hazardous wastes)? Here's one compelling reason: Indoor air pollution is a greater source of exposure to hazardous chemicals than is outdoor exposure, even if you live near major "point sources" of pollution, according to a careful study by the federal Environmental Protection Agency (EPA).

From 1979 to 1985, EPA researchers studied the outdoor air, the indoor air, and chemicals carried on the breath of 355 individuals living in the [heavily industrialized] Jersey City-Bayonne part of New Jersey, in [not so industrialized] Greensboro, North Carolina, and in [not industrialized] Devils Lake, North Dakota.

The EPA looked for 20 chemicals in all these locations and they found 11 of them at all locations. This is known as the TEAM [Total Exposure Assessment Method] Study and it was carefully done; about 5000 samples were taken in all, 1500 of them taken to provide quality control checks on the data.

Participants in the study wore a small, battery-operated pump pinned to a vest; the pump drew in air close to the subject's face, providing a good measure of the quality of the air a person was breathing. At night the pump was placed on the bedside table (providing a measure of indoor air). Other pumps were placed in peoples' back yards or side yards, providing measures of outdoor air. At the end of each day, each person's breath was sampled. Thus the study provided data on (a) personal air; (b) indoor air; (c) outdoor air; and (d) breath.

In New Jersey, 11 hazardous chemicals could be measured consistently in breath and air samples. The chemicals are 1,1,1-trichloroethane, p- xylene, ethylbenzene, tetrachloroethylene, o-xylene, p-dichlorobenzene, chloroform, trichloroethylene, and carbon tetrachloride. Averages (medians) for personal air exceeded outdoor averages for every chemical in every season, usually by a factor of 2 to 5. This means that, in a typical day at work and at home (com-bined), people breathed in 2 to 5 times as much hazardous chemical as they would have if they had sat in their back yards for 24 hours. This was true even if the people lived within a mile of a source of industrial air pollution.

In NJ, the night-time readings (indoor air) exceeded outdoor air concentrations in 28 out of 30 cases.

In North Carolina and North Dakota the results are even stronger (because in NC and ND the outdoor air is cleaner): in 17 out of 18 cases, personal air exceeded the levels found in outdoor air, usually by a factor of 5 to 10.

The chemicals on peoples' breath were closely correlated with their activities of the previous 12 hours. People had chloroform (a carcinogen) on their breath if they were exposed to chlorinated water (through drinking, showering, bathing, washing clothes and dishes).

Other factors causing increased exposure to chemicals:

Occupation: Employment in plastics, wood processing, service stations/garages, painting, textiles, metals, scientific laboratories, dye plants and even hospitals were associated with significantly increased exposure to 9 of the 11 chemicals.

Home characteristics: living with a smoker or a chemical plant worker increased the risk of everyone in the home.

Common daily activities: pumping gasoline (filling one's gas tank) or visiting a service station; visiting a dry cleaner; keeping moth crystals or room deodorizers in the home; furniture refinishing; painting; scale model building; using pesticides; smoking; traveling in a car--were all associated with increased exposures to one or more of the 11 chemicals.

Specific exposures are as follows: smokers (and those living with smokers) have elevated levels of benzene, styrene, ethylbenzene and p- xylene on their breath. The sidestream of a cigarette provides much more benzene than does the smoke inhaled by the smoker (240 micrograms per cigarette in the sidestream vs. 35 micrograms in the mainstream). About 60% of U.S. children live in homes with smokers and are thus exposed to benzene, a cause of leukemia. Children with one parent smoking have a doubled risk of leukemia; with both parents smoking the risk of leukemia is increased five-fold (compared to children of non- smoking parents).

Chlorinated water causes indoor air in New Jersey to have four times as much chloroform as outdoor air.

A person visiting a dry cleaner for five minutes has twice as much tetrachloroethylene (PCE) on his or her breath, compared to a person avoiding such a visit. PCE levels in dry cleaning shops are very high.

Moth crystals and room deodorizers are intended to maintain high levels of p-dichlorobenzene in homes, so no one should be surprised that they succeed. Recently p-dichlorobenzene was determined to be a carcinogen. In homes using moth crystals or air deodorizers, p-dichlorobenzene levels are 25 times higher than in outside air (in NJ).

What can be done to reduce exposures to chemicals in the home and at work? Consumers can purchase less of the offending products (moth balls, for example); citizen pressure can force manufacturers to reduce their use of hazardous chemicals; citizen pressure can force government agencies to adopt standards for building materials (for example, particle board is today loaded with formaldehyde, a carcinogen); and ventilate the place better. Programs to force waste reduction will help little, if at all.

The TEAM study results appeared in the scientific journal ENVIRONMENTAL RESEARCH, Vol. 43 (1987), pgs. 290-307.

--Peter Montague

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GAO FINDS FEDERAL AGENCIES SLOW TO PLAN CLEANUP OF THEIR TOXIC DUMPS

The federal General Accounting Office (GAO) has issued a 36 page report, SUPERFUND: CIVILIAN FEDERAL AGENCIES SLOW TO CLEAN UP HAZARDOUS WASTES [GAO/RCED-87-153], which says federal agencies have so far found 1,882 hazardous waste sites on their property but have evaluated only half of them. Most agencies are still looking. The report is available free from GAO, DHISF, P.O. Box 6015, Gaithersburg, MD 20877; phone (202) 275-6241.

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Descriptor terms: superfund; remedial action; hazardous waste disposal technologies; epa; hazardous chemicals; indoor air pollution; nj; nc; nd; trichloroethane; trichloroethylene; chloroform; carbon tetrachloride; tetrachloroethylene; dichlorobenzene; plastics; heavy metals; carcinogens; drinking water; chlorination; testing; tobacco; leukemia; formaldehyde; pesticides; benzene; styrene;