

MERCURY: HIGH LEVELS OF MERCURY IN FISH THROUGHOUT THE STATE OF FLORIDA IS LINKED TO COAL-FIRED POWER PLANTS AND TRASH INCINERATORS. "Down upon the Suwannee River, and in many of Florida's other streams and lakes, the bass are so laden with deadly mercury they are unfit for the frying pan. Surprising levels of the toxic metal are showing up all over the state, leaving health officials worried that mercury might be only the tip of a contamination iceberg. Researchers suspect one major source of the heavy metal -which when ingested can cause nerve damage, birth defects and death in both animals and people- may be rain contaminated by the emissions of coal-fired power plants and garbage incinerators...Florida does have 239 electric generating units scattered around the state that burn coal, oil or natural gas. The state is also home to 14 garbage incineration units, capable of burning about 9,400 tons of solid waste a day. The four plants in Hillsborough and Pinellas counties account for 55% of that total. Five others with a combined capacity of 7,850 tons are under construction, including one rated for 900 tons a day in Pasco County. Pinellas County is also considering expanding its total capacity to 4,500 tons a day. **Coal generally contains about 0.1 to 0.3 parts per million of mercury. Oil and natural gas contain much less. Solid municipal waste contains up to 10 times as much - 0.5 to 3 parts per million. Mounting evidence suggests that fossil fuels and garbage give up almost all of their mercury to the atmosphere when burned.** Research from the Great Lakes and Sweden -both with well established histories of mercury problems- has shown that mercury vapor spewing from smokestacks can spread contamination far from the source...High mercury levels in fish have been detected across the state, from the Everglades to the tip of the Panhandle, in separate watersheds that have little in common except that they all catch rain... Evidence from other contaminated areas suggests that high mercury levels in wildlife may persist more than 100 years after the source has been removed...A 1978 report by the National Academy of Sciences had included Florida among the states with no mercury problem...Scientists use game fish to study mercury for two main reasons: Eating them poses an obvious human health hazard, and, because of the way mercury acts in the environment, fish generally contain the highest levels...Historically, mercury has not been regarded even as an important constituent of industrial air pollution. In a 1984 compendium of air toxins, the EPA does not even include mercury. But data from Pinellas County's garbage incineration units suggest that **incineration in the state could send as much as 13.7 tons of mercury aloft every year. Fossil-fuel-burning power plants might add another 16 tons to that total,** said the Department of Environmental Regulation (DER) Hamilton Owen...**Mercury in the water:** "The metal may come via rain or from natural sources -leaching from rocks or peat moss or leaking from the Earth's interior in volcanic gases. In tainted rain, concentrations are not especially high -in the range of one or two parts per billion. But once in a lake or stream, it follows the same basic chemical course, regardless of its source, Watkins said. The relatively benign mercury is quickly transformed into toxic organic compounds by bacteria, explained Curtiss Watkins, the DER's expert on atmospheric deposition into water. These substances, called methylmercuries, are biologically active and are quickly ingested and absorbed by tiny water creatures and plants like algae, leaving the water itself nearly mercury free. The multitude of tiny organisms that absorb the methylmercury directly from the water are eaten by larger creatures, which in turn, end up in the stomachs of still larger animals, and so up the line, finally reaching aquatic birds, mammals and man. None of these creatures is capable of excreting the mercury after ingesting it. Instead, it accumulates -each animal retains all the mercury from everything it ever ate. That's called '**bioaccumulation.**' Another important effect is '**biomagnification.**' For example, during the life of an average bass, the fish consumes many times their weight in still smaller creatures, and so on. The end result is that one fish consumes a huge amount of food containing low levels of mercury, retaining and

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concentrating all of it in the few pounds of its body weight. These two effects lead to concentration of the mercury poisoning in animals at the top of the food chain. As a result, a small increase in the mercury content of the water can lead to dramatic and deadly effects up the line. Evidence also suggests that acid rain aggravates the problem, because acidic water makes the mercury more chemically active and thus more likely to be converted to the poisonous state, Watkins said. So toxic rain containing both acid and mercury makes a dynamic, poisonous soup. **Mercury from the air:** "...Many people now mistakenly believe that if it isn't raining, nothing bad is coming down. That's just not true," Watkins said. There actually are several ways by which airborne materials make it to the ground - settling as dry particles and gases among them, Watkins said. But **rain, snow and fog seem to be the favored modes of transportation for mercury**, said (EPA's Gary Glass), who has spent nearly a decade studying the phenomenon in Minnesota. Mercury has the property, unusual for a metal, of being liquid under normal conditions. It also evaporates readily, much like water, and boils to a gas well below the operating temperatures of most coal-fired plants and garbage incinerators. So when anything containing mercury is burned, the metal vaporizes and goes up the chimney as a gas. **Conventional scrubber systems, designed to clean ash and other chemicals out of smokestack emission, apparently catch very little of the gas.** 'I'd say more than 90% of the mercury present escapes the stack,' Glass said. Once released, the mercury vapor spreads out. Swedish research suggests that it remains suspended at least two months before falling, giving it plenty of time to spread out evenly over the countryside. During their atmospheric travels, the mercury molecules combine with ozone - another air pollutant - to form compounds that will dissolve in water. These are absorbed by the water vapor that forms clouds and produces rain, Glass said..." The Tampa Tribune, July 3, 1989. For a copy of the full Tampa Tribune report please send \$1 to **Waste Not**.

TWO IMPORTANT PAPERS AVAILABLE ON BAGHOUSE TECHNOLOGY AND MERCURY EMISSIONS IN FLORIDA.

Craig Volland has authored "**A Critical Review of EPA's Dry Scrubber Standard**" and an "**Addendum on Mercury Emissions in Florida.**" The implications of these papers are greater than the issue of just incineration. EPA has justified the technology of dry scrubbers just as they justified the technology of incineration by setting standards that the technology can meet instead of pushing for technologies that will better protect the environment. What Craig has shown is that the EPA has discounted the dangers related to mercury emissions and ignored the physics of mercury under conditions that would be seen in an incinerator. These papers are available from Craig Volland, **Spectrum Technologists**, 616 E. 63rd Street, Kansas City, MO 64110. Tel: 816-523-2525. The papers are \$3 each or \$5 for the two.

ACTIVATED CHARCOAL FILTERS. According to Bernd Franke of the **Institute for Energy & Environmental Research** in West Germany, pilot tests at incinerators in Wurtzburg and

Nuremburg have demonstrated that mercury can be effectively removed using activated charcoal filters. According to Bernd, the charcoal filters are also effectively capturing the dioxins and other heavy metals. If this is the case, it can now be said that not one trash incinerator in the U.S.A. is fitted with Best Available Control Technology. Bernd estimates the extra cost of fitting an activated charcoal filter to an incinerator would be \$15-\$20 per ton.

STANISLAUS COUNTY, CA: Meanwhile, Jeffrey Hahn, Vice-President of **Ogden Martin Systems**, confirmed (at the 9th Int'l Symposium on Dioxin, Toronto, Sept 18-22, 1989) that **Ogden's** latest trash incinerator in Stanislaus County, CA, fitted with a dry lime scrubber and a baghouse, is capturing little, if any, mercury from its air emissions (see **Waste Not # 68**).

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