

***Historic mercury discharge revelation made 30 years ago***  
**(As published in *The Oak Ridger's Historically Speaking* column on May 20, 2013)**

Carolyn Krause provides insight into repercussions of the 1983 revelation that there had been mercury from Y-12 that had gotten into East Fork Poplar Creek. This information resulted in several levels of investigations and reports. Carolyn gives examples of the events and reports as well as the people involved in the historic mercury investigations.

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On May 17, 1983, 30 years ago this past Friday, the Department of Energy made an historical announcement about its releases of mercury from the Oak Ridge Y-12 Plant to the environment. It was a watershed in the history of U.S. efforts to protect human health and the natural environment.

The massive political, governmental, media, managerial, scientific and engineering responses to this announcement set into motion the ongoing nationwide remediation of government sites contaminated with radioactive materials, heavy metals and chemicals.

Environment, safety and health became a high priority when John Herrington became Secretary of Energy in February 1985 under President Ronald Reagan. Since then, major priorities at DOE facilities have been health and safety, waste management, and environmental restoration.

In 1969-70 Swedish and Canadian scientists determined that inorganic mercury released to streams could be converted to methylmercury, which is taken up by edible fish. Methylmercury in fish and other mercury compounds can cause brain and nervous system damage in humans.

In 1982, as a result of a study by Oak Ridge National Laboratory, the state of Tennessee and later DOE posted warnings against eating fish from Poplar Creek and East Fork Poplar Creek in Oak Ridge. The ORNL work showed that bluegill fish in EFPC had higher-than-permitted levels of mercury and that the Y-12 Plant was a continuous source of mercury to the creek.

In response to a newspaper reporter's 1982 inquiry under the Freedom of Information Act, DOE disclosed on May 17, 1983, its large historic losses of mercury (18,000 gallons out of 200,000 gallons used) to the environment. The accidental discharges came from secret lithium-separations work in support of hydrogen bomb development. President Truman had announced plans to develop the H-bomb in 1950, and Y-12 Plant workers separated lithium isotopes using mercury from 1955 to 1963.

On July 11, 1983, a congressional hearing on the government's role in mercury contamination of Oak Ridge was held in the city. U.S. Representatives Al Gore and Marilyn Lloyd, both of Tennessee, were present at the hearing.

In 1985 DOE's Inspector General published "Alleged Cover-up of Mercury Contamination," a report on the DOE Oak Ridge Operations' handling of mercury contamination. In the same year DOE started an ongoing project at Y-12 to reduce mercury in plant effluents into EFPC. As a result, biologists have been finding more fish of various species in the creek, once called an "aquatic desert."

Over the next 10 years, ORNL researchers measured the relative concentrations of different forms of mercury in Lake Reality (a spill-control impoundment built at Y-12 in 1988), in EFPC and its sediments, in floodplain soil and groundwater and in air.

They also found that the deepest sediments of Lower Watts Bar Reservoir are contaminated with mercury as well as arsenic, chromium and radioactive cesium-137. Because mercury was trapped in deep sediments, scientists later determined that the contaminant of most concern for fish eaters is PCBs from industrial sources.

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Researchers with SAIC and Oak Ridge Associated Universities also made a variety of mercury measurements. ORAU tested the garden soil and vegetables of residents, finding no threats to health.

In 1989 the Environmental Protection Agency made DOE's Oak Ridge Reservation a Superfund site, requiring it to be cleaned up to comply with the Comprehensive Environmental Response, Compensation and Liability Act. The Clinch River Environmental Restoration Program was established at ORNL to provide a scientific basis for the government's remedial plans.

In 1990 news media reports that sediments in Lower Watts Bar Reservoir are contaminated with mercury and other pollutants caused resort owners to be concerned about possible declines in the tourist trade, so they filed a successful lawsuit in 1991 against the DOE contractors. DOE agreed in September 1995 to implement institutional controls such as posting of advisories against eating the reservoir's fish, evaluating sediments for high levels of contaminants and continued environmental monitoring.

In 1993 remediation goals for mercury in EFPC floodplain soils were determined. One concern was that children could get mercury poisoning from eating floodplain soil; it was assumed that a child might drop a lollipop on the soil, pick it up and lick it.

The original cleanup goal for the EFPC floodplain was 50 parts (of mercury) per million (parts of soil). In other words, soils with a mercury concentration greater than 50 ppm had to be removed at an estimated cost of \$370 million. This cleanup goal was based on an EPA assumption that the soil mercury was mostly mercuric chloride, a toxin easily taken up by the body's organs.

Oak Ridge researchers confirmed earlier evidence that the dominant mercury compound in the floodplain soil is mercuric sulfide, which the organs do not absorb and which readily leaves the body. Because this compound is nontoxic, DOE recommended a cleanup goal of 180 ppm.

At a January 1995 public hearing, Oak Ridge citizens argued that DOE's cleanup goal of 180 ppm for mercury in EFPC floodplain soil was too conservative in light of local scientific findings. In its Record of Decision for the EFPC floodplain, issued in November 1995, DOE changed its cleanup level from 180 to 400 ppm, reducing the remediation cost by hundreds of millions of dollars.

In 1996-97 DOE's Oak Ridge Environmental Management Program supervised the removal and replacement of mercury-contaminated soil on 13 acres at two floodplain sites along Lower EFPC. The total cost: \$8 million.

A report issued in 1997 by the state of Tennessee's Oak Ridge Health Project concluded that this significant Cold War pollution event posed no threat to public health. The highest risk from methylmercury was to the unborn children of pregnant women who ate large amounts of fish from the Clinch River and Poplar Creek in the 1950s and 1960s. That's when Y-12 mercury releases were the highest and when mercury was not thought to be a health hazard in waterways.

In the past 16 years, Y-12 has continued to reduce mercury discharges to EFPC. In early May, Sen. Lamar Alexander announced that a water treatment plant will be built at the head of EFPC to prevent future releases of mercury to the creek. East Fork Poplar Creek is currently a test bed for ORNL studies of mercury, fish and the roles of different bacteria in increasing or decreasing methylmercury concentrations in water.

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Thank you Carolyn for your review of the mercury issue and the details surrounding the investigation and reporting of the issues related to mercury in East Fork Poplar Creek.

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The Department of Energy posted warning signs along East Fork Poplar Creek



Oak Ridge National Laboratory researchers sampled East Fork Poplar Creek for fish to assess the health of the creek

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Ralph Turner of the Oak Ridge National Laboratory invented a device that reduced the cost of determining where soil mercury concentrations were too high and whether cleanup operations worked