Attachment 1

Agency for Toxic Substances and Disease Registry

Public Health Activities At The DOE Oak Ridge Reservation

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Presentation Overview

- Introduction to the Agency for Toxic Substances and Disease Registry (ATSDR)
- Brief Review of ATSDR's Public Health Activities and Findings from 1991–2012
- ATSDR Public Health Assessment on the Evaluation of Y-12 Mercury Releases

Introduction to ATSDR

Introduction to ATSDR

- Federal public health agency of the U.S. Department of Health and Human Services
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980
- Superfund Amendments and Reauthorization Act (SARA) of 1986

Congressional Mandate

ATSDR performs specific public health functions:

- Public health assessments
- Health consultations
- Health surveillance and registries
- Response to emergency releases of hazardous substances
- Applied research in support of public health assessments
- Education and training concerning hazardous substances

ATSDR Uses The Public Health Assessment Process To:

- Identify communities where people might be exposed to hazardous substances in the environment.
- Determine how hazardous a site is and recommends action needed safeguard the health of community members.
- Work with communities, environmental groups, and local, state, and other federal agencies to protect the public health.

ATSDR Will, As Appropriate, Do The Following:

- Involve communities when investigating a hazardous waste site;
- Review and assess environmental health data and community information;
- Provide an independent, objective public health decision based on the best currently available science;
- Collect additional data through exposure investigations, limited/targeted environmental sampling, and health studies to assess health effects;

ATSDR Will (continued)

- Provide and explain the results of our evaluations, consultations, and investigations, including environmental health education for health care providers and communities;
- Refer persons to specialists in environmental medicine for health care followup;
- Incorporate into finalized documents any relevant and appropriate public comments and peer review comments;
- Refer non-ATSDR public health issues or problems to other federal, state, or local government entities.

ATSDR Will Not:

- Conduct large-scale, site- or release-related environmental sampling;
- Enforce regulations;
- Provide medical treatment and health care services.

Review of ATSDR's Public Health Activities and Findings at the DOE Oak Ridge Reservation

ATSDR Public Health Activities (1991-1999)

Responded to Ongoing Superfund Activities

- East Fork Poplar Creek (EFPC)
  - Y-12 Releases to East Fork Poplar Creek
  - Proposed Mercury cleanup for EFPC floodplain soil
  - Science Panel Meeting on bioavailability of inorganic mercury in soil
  - Four scientific journal articles on bioavailability of inorganic mercury

- Watts Bar Reservoir
  - Chemical and radiologic contaminants in lower Watts Bar Reservoir
  - Community and physician education programs on PCBs in fish
  - Watts Bar Fish advisory brochure
  - Exposure investigation to measure actual PCBs and mercury levels in people consuming moderate to large amounts of fish

ATSDR Public Health Activities (2000–2012)

- **Oak Ridge Reservation Health Effects Subcommittee**
  - 25 subcommittee meetings and 125 workgroup meetings
  - Evaluated need for medical monitoring/health clinic
  - Provided recommendations to ATSDR
- **ATSDR Oak Ridge Field Office**
- **Community and Physician Education**
  - Epidemiology Workshops
  - PCBs in fish
  - Thyroid disorders
  - Congenital malformations and cancer
  - Cyanide intoxication
- **Assessment of Cancer Incidence In Adjacent Counties**

Nine Public Health Assessments (2001–2012)

- **Y-12 (Y-12 National Security Complex)**
  - Uranium Releases
  - Mercury Releases
- **X-10 (Oak Ridge National Laboratory)**
  - Radionuclide releases from White Oak Creek
  - Iodine -131 releases
- **K-25 (East Tennessee Technology Park)**
  - Uranium and fluoride releases
  - TSCA incinerator
- **Overall Oak Ridge Reservation**
  - PCB Releases
  - Offsite Groundwater
  - Current chemical exposure

Findings of Eight Public Health Assessments

- Current and past off-site exposures to released contaminants were below levels that cause health effects.
- Additional epidemiological studies or medical monitoring are neither warranted nor scientifically appropriate.
- Responded to more than 500 specific community health concerns.

Data Limitations of Eight Public Health Assessments

- **Insufficient environmental monitoring data to determine potential exposures for the following past releases:**
  - From 1944 to 1956, persons who were under the age of 18 when exposed to I-131 released from X-10. Potential for health effects on the thyroid.
  - In the 1940s and 1950s, short-term (acute) exposure to fluoride and hydrogen fluoride in Sugar Grove and Union/Lawnville communities from the large, sudden uranium hexafluoride (UF6) releases during accidents and equipment maintenance at the K-25/S-50 site. Potential for temporary respiratory irritation in sensitive persons.
  - Exposure to dioxins in fish.

Public Health Assessment on Y-12 Mercury Releases

Public Health Assessment on Y-12 Mercury Releases

Scope of Evaluation

- Past and current offsite exposures from 1950 to 2009
- Three forms of mercury
  - Elemental mercury
  - Inorganic mercury
  - Organic mercury
- Environmental data and exposure pathways
  - Air, soil, surface water, sediment, fish, crayfish, turtles, and produce
- Populations Living and Recreating in Seven Communities
  - City of Oak Ridge, Scarboro neighborhood, Wolf Valley, EFPC floodplain, Poplar Creek, Clinch River, Watts Bar Reservoir

ATSDR Conclusions Regarding Past Exposure to Y-12 Mercury Releases

- **At different times in the past, children or pregnant women could have been exposed to amounts of mercury that were potentially harmful to health.**
  - Children who swallowed water while playing in East Fork Poplar Creek during specific weeks from 1956–1958 might have been exposed to levels of inorganic mercury that might have affected their kidney (renal) health.
  - Children who played in the two areas along East Fork Poplar Creek floodplain and accidently swallowed mercury-contaminated soil before its removal in 1997 may have been exposed to inorganic mercury at levels that might have affected their kidney (renal) health.

ATSDR Conclusions Regarding Past Exposure to Y-12 Mercury Releases

- Children born to, or who were nursing from, women who ate certain species of fish from Poplar Creek during the 1970s–1990s may have an increased risk of subtle neurodevelopmental health effects. But for these effects to have occurred, mothers would have had to frequently eat certain species of fish just before and during pregnancy or while nursing.

- From 1950 to 1963, elemental mercury could have been carried from the Y-12 plant by workers into their homes and potentially exposed their families to elemental mercury vapors and caused harm, especially to young children.

Data Limitations Regarding Past Exposure to Y-12 Mercury Releases

- **For a few potential past exposures in the 50s and early 60s, insufficient environmental monitoring data are available to determine exposure levels and potential for health effects.**
  - Breathing elemental mercury from 1950 through 1963 in Oak Ridge, Scarboro, and EFPC floodplain
  - Swallowing East Fork Poplar Creek water with inorganic mercury from 1953 to 1955
  - Eating fish with organic mercury from EFPC, Poplar Creek, Clinch River, and Watts Bar Reservoir during the 1950s and 1960s

ATSDR Conclusions Regarding Current Exposure to Y-12 Mercury Releases

- **Current air, soil, and sediment do not pose a public health hazard**
  - Air Exposure Pathway
    - Ambient elemental mercury air data in EFPC floodplain are orders of magnitude lower than ATSDR's comparison value.
  - Soil and Sediment Exposure Pathway
    - In 1996, ATSDR evaluated the proposed 400 ppm inorganic mercury cleanup level for EFPC floodplain soil. ATSDR concluded that the 400 ppm mercury cleanup level was protective of public health and posed no health threat to children or adults.
    - In 1996 and 1997, DOE excavated and removed EFPC floodplain soil and sediment containing more than 400 ppm of mercury.

ATSDR Conclusions Regarding Current Exposure to Y-12 Mercury Releases

- **Current vegetable and surface water are not a public health hazard.**
  - Vegetable Exposure Pathway
    - Estimated inorganic mercury dose well below health effects levels
  - Surface Water Exposure Pathway
    - Since 1992, none of the EFPC water samples have exceeded the U.S. EPA comparison value.
    - Exposure scenario – Children ignoring the bacterial advisory and playing in EFPC 18 times a year
      - Average mercury concentration of 0.047ppb
      - Estimated inorganic mercury dose (1.2×10^{-5} mg/kg/day) is below the U.S. EPA reference dose (RfD) (3.0×10^{-4} mg/kg/day)

ATSDR Conclusions Regarding Current Exposure to Y-12 Mercury Releases

- **Current fish are not a public health hazard.**
  - East Fork Poplar Creek (EFPC)
    - EFPC exposure scenario – one fish meal per month
    - Estimated organic mercury doses for adults are at or below ATSDR and U.S. EPA health guidelines
    - Estimated organic mercury dose for children are slightly above U.S. EPA health guidelines, but not close to the National Academy of Sciences (NAS) health effect level
  - Watts Bar Reservoir
    - Estimated organic mercury doses for adults and children eating one fish meal per month are below ATSDR and U.S. EPA health guidelines
    - Estimated organic mercury doses for adults and children eating one or two fish meals per week are slightly above ATSDR and U.S. EPA health guidelines, but not close to the NAS health effect level

ATSDR Conclusions Regarding Current Exposure to Y-12 Mercury Releases

- **ATSDR Exposure Investigation (1997)**
  - Purpose
    - Determine whether people consuming moderate to large amounts of Watts Bar Reservoir fish are exposed to elevated levels of polychlorinated biphenyls (PCBs) or mercury.
  - Results
    - 89 participants had nondetectable mercury levels
    - Median value of mercury in blood was below the detection limit
    - Arithmetic mean of mercury detection in blood was 5.2 ppb
    - Only one participant had a blood mercury level higher than 10 ppb
  - Conclusion
    - The distribution of blood mercury level in participants is similar to the distribution of levels found in the general U.S. population.

Health Outcome Data Evaluation

- **Criteria for Conducting Health Outcome Data Evaluation**
  - Is there at least one potential or completed exposure pathway?
  - Can the period of exposure be determined?
  - Can the population that was or is being exposed be quantified?
  - Are estimated doses and the duration of exposure sufficient for plausible, reasonable expectations of health effects?
  - Are health outcome data available at a geographic level or with enough specificity to be correlated to the exposed population?
  - Do the validated data sources or databases have information on the specific health outcome(s) or disease(s) of interest?

- **ATSDR Conclusion Regarding Y-12 Mercury Releases**
  - Followup health outcome data evaluation is neither warranted nor scientifically appropriate.

ATSDR Recommendation Regarding Y-12 Mercury Releases

- DOE should maintain long-term oversight of the elevated mercury-contaminated soil in the undeveloped area of DOE property along EFPC east of the Horizon Center. If the property is transferred to another party, consider remediation or deed restriction.

- To prevent unnecessary exposure to workers and the public, ATSDR cautions that the Watts Bar Reservoir deep-channel sediment not be disturbed, removed, or disposed of without careful review by the interagency working group.

- People, particularly children, pregnant women, and nursing mothers should heed the fish consumption advisories for the waterways near the Oak Ridge Reservation.

For additional information on ATSDR's public health activities at the DOE Oak Ridge Reservation, please visit

http://www.atsdr.cdc.gov/sites/oakridge/

Or contact Agency for Toxic Substances and Disease Registry

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