

External Technical Review Summary

United States Department of Energy Office of Environmental Management (DOE-EM)

External Technical Review of the Mitigation and Remediation of Mercury Contamination at the Y-12 Plant, Oak Ridge, TN

Why DOE-EM Did This Review



From 1953 to 1983, ~240,000 pounds of mercury (Hg) were released to the East Fork Popular Creek during the operation of the Y-12 Plant. In 1963, direct systematic releases of mercury stopped; however, mercury continues to be released into the creek from various sources of contamination in the Y-12 complex. Remediation completed up to 1992 resulted in an overall reduction of Hg loading from 150 g/day in 1983 to 15 g/day in 1992, with a current goal of 5g/day or less. *The objective was to review the current ground and surface water Hg remediation strategy for adequacy in reducing Hg levels in the fish and to identify opportunities to achieve cost and technical improvements and/or to address technical uncertainties.*

What the ETR Team Recommended

1. The team recommended that a plan that logically integrates the prioritized list of recommendations into a coordinated technical approach be developed with the participation of affected Oak Ridge organizations, state and federal regulators and stakeholders.
2. "Quick Wins" were recommended for near term improvements as follows:
Outfall 200- (a) use of stannous chloride in the NS Pipe to volatilize Hg, (b) addition of Hg sequestrants, and (c) use of sodium thiosulfate for dechlorination.

2. (cont'd) "Quick Wins"

Creeks and Streams- (a) selective physical modification at areas of methylation and (b) addition of trace Se to reduce methylation and/or uptake current and projected reality should be added.

What the ETR Team Found

The review/workshop focused on mercury contamination in the East Fork Popular Creek and how to reduce mercury levels in the fish. The metrics for achieving cleanup vary according to the agency of interest; however, national data suggest a clear trend toward the use of fish tissue concentration as the ultimate basis for setting standards. A significant technical observation was that the level of Hg found in the fish in the creek at Y-12 resulted from an intricate series of chemical transformations that began with the initial release of Hg followed by a series of changes as the Hg was transported through the shallow soil, to the surface and/or shallow ground water, and then through the reach of the stream drainage. The concentration of Hg in the fish, a potential remedial action endpoint, is better correlated with the concentration of methyl mercury in the stream. The biogeochemical and microbial processes that form methyl mercury from inorganic mercury are in the basic science regime and are being actively studied. Therefore, actions that reduce the fraction of Hg converted to methyl mercury within stream water and/or sediment or actions that alter the food chain dynamics are potentially important to addressing the impact of mercury at Oak Ridge. Recommendations were made by evaluation of four action zones: buildings and rubble, source zone soil, Outfall 200 area, and upper and lower reaches of the creek. The first two zones appeared to have less direct importance than Outfall 200 and the upper and lower reaches of the creek in affecting the environmental impact of mercury contamination at the Y-12 Facility.

To view the full ETR reports, please visit this web site:
<http://www.em.doe.gov/Pages/ExternalTechReviews.aspx>

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The purpose of an External Technical Review (ETR) is to reduce technical risk and uncertainty. ETRs provide pertinent information for DOE-EM to assess technical risk associated with projects and develop strategies for reducing the technical risk and to provide technical information needed to support critical project decisions. Technical risk reduction increases the probability of successful implementation of technical scope. In general, ETRs assesses technical bases, technology development, and technical risk identification and handling strategies.



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