

Environmental Sciences Division

An assessment of radiological impacts of uranium mill tailings on aquatic biota

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An assessment of radiological impacts of uranium mill tailings on aquatic biota. Eddlemon, G. K., Oak Ridge National Laboratory, Oak Ridge, TN. As part of an environmental impact statement prepared under the National Environmental Policy Act (NEPA), the aquatic impacts of a large uranium mill tailings pile adjacent to the Colorado River near Moab Utah were assessed for (1) existing pile conditions and (2) expected conditions under a proposal to stabilize the pile in place. Because most NEPA assessments involving radionuclides understandably emphasize human health effects, radiological effects on aquatic life generally receive little if any consideration, and yet public and federal/state agency perceptions of potential radiological effects on fish and wildlife continue to grow. In this study, the potential radiological and chemical effects of radionuclides from the pile on endangered fish and other aquatic biota were evaluated using several lines of evidence including results of hydrological and chemical studies of the tailings pile and underlying groundwater; and limited monitoring of surface water quality and fish body burdens. The assessment found that both water quality data and measured radionuclide concentrations in fish indicated substantial enrichment in certain radionuclides originating in the tailings pile (e.g., Po-210, Th-230, and U-238). Calculated whole-body dose rates for aquatic organisms residing along the shoreline adjacent to and immediately downstream of the tailings pile were considerably higher than for background conditions. Po-210 was estimated to contribute nearly 80 % of the total dose from all radionuclides in the U-238 decay series. Nevertheless, total radiological dose rates to fish near the pile were estimated at less than 0.001 rad/day under both current conditions and those predicted to occur under the proposed stabilization. In contrast to public perception, these estimates are well below levels generally considered harmful to fish and invertebrate populations.