

IDENTIFICATION AND SCREENING EVALUATION OF KEY HISTORICAL MATERIALS AND EMISSION SOURCES AT THE OAK RIDGE RESERVATION

Thomas E. Widner,* Stephen R. Ripple,* and John E. Buddenbaum†

Abstract—In 1991, the State of Tennessee initiated a Health Studies Agreement with the U.S. Department of Energy. It included independent studies of possible adverse health effects in people living near the Oak Ridge Reservation resulting from releases of chemicals and radionuclides since 1942. A Dose Reconstruction Feasibility, the first of a planned sequence of initiatives to evaluate the potential for health effects, included application of screening methods to focus subsequent dose reconstruction and epidemiologic efforts on the materials and emission sources that have historically been most important. The feasibility study produced a history of operations that likely generated off-site releases from the X-10, K-25, Y-12, and S-50 plants, based on reviews of classified and unclassified records and interviews of active and retired workers. The availability of environmental monitoring and research data that would support dose reconstruction was also characterized. Quantitative emission and environmental contamination data were used to identify those materials and plant activities that should receive the highest priority in further health studies. Plausible exposure pathways were identified, and screening methods were used to identify the most important pathways and past activities that appear to be associated with the greatest health hazards. The materials and activities shown to have the highest potential for public health hazards are as follows: 1) The release of radioiodine [likely over 3.7 PBq (100,000 Ci)] to the air from radioactive lanthanum ("RaLa") processing at X-10 (now Oak Ridge National Laboratory) from 1944 through 1956; 2) The release of ^{137}Cs and other radionuclides in liquid wastes from chemical separation activities at X-10; 3) The release of mercury to the air, soil, and surface waters from Y-12 lithium enrichment operations between 1950 and 1963. About 11,000,000 kg of mercury were handled at Y-12, and 910,000 kg were reported lost or unaccounted for; and 4) The release of polychlorinated biphenyls (PCBs) from machining oils, electrical equipment, and other sources in the Oak Ridge area. Based on the findings of the study, the Oak Ridge Health Agreement Steering Panel called for a dose reconstruction for radioiodine, mercury, PCBs, and radionuclides released from White Oak Creek and research into opportunities for analytic epidemiologic studies to identify adverse health effects in exposed populations.