SOCIETY FOR RISK ANALYSIS ANNUAL MEETING 2006

W2-C.4 2:30 PM Exposure assessment approaches for unmonitored releases from the world's first plutonium component production facility: Los Alamos, NM (1944-1945). *Widner TE, Knutsen JS, Flack SM*; ChemRisk, Inc.* sflack@chemrisk.com

Abstract: Constructed in 1943, D Building in Los Alamos was the first facility in the world to process gram and then kilogram quantities of plutonium to manufacture atomic bomb parts. As increasing quantities of the new and largely unknown plutonium were received from Oak Ridge and Hanford, purification, conversion to metal, and component fabrication were scaled up to ultimately produce the Trinity device and the Fat Man bomb. A state-of-the-art air conditioning system, provided to keep dust away from the rare plutonium, was not as well suited to contain airborne contamination in the heavily contaminated building. Effluents via numerous roof-top vents were unmonitored and largely unfiltered. Official compilations of Los Alamos effluents have reflected no contribution from D Building. CDC's Los Alamos Historical Document Retrieval and Assessment project team has studied D Building to support bounding of plutonium releases from the facility and allow assessment of exposures to Los Alamos residents, who lived as close as 200 m away. Documents, photographs, and drawings were reviewed, and workers with D-Building experience were interviewed to fill in information gaps. The equipment and processes that were used in D Building were characterized, as were the quantities of plutonium processed and indoor and environmental concentrations. Plutonium processing was subdivided into a series of operations, including solution chemistry (e.g., decanting, filtering, and boiling), dry chemistry (e.g., weighing, filling, and metallothermic reductions), and metallurgical work (e.g., alloying, machining, and pressing). To support prioritization of potential public exposures from wartime activities in D Building, potential releases from each operation were estimated by applying relevant heuristics from US NRC and DOE-sponsored experimental programs concerning release fractions and respirable fractions for nonreactor nuclear facilities.