

obtain informed consent was included in the report titled *American Nuclear Guinea Pigs* (U.S. House of Representatives 1986).

The study of the retention and distribution of plutonium in human subjects attracted a good deal of attention, and it still provides the only long-term data on the subject at these relatively high levels. The CHR staff published several papers on these measurements, including the following: Larsen et al. (1976), Rowland and Durbin (1976), Rundo et al. (1976), Rundo and Holtzman (1976), and Schlenker et al. (1976). Examination of this small group of patients gave no indication that they had experienced any detrimental effects from the plutonium injections.

The study of thorium workers, mentioned in Polednak's revision of the epidemiologic plan for the CHR, was of particular interest to the U.S. Nuclear Regulatory Commission, which subsequently aided in funding the study. The Lindsay Chemical Company, later known as the American Potash Chemical Company and finally as a division of Kerr-McGee Corporation, was formed in Chicago in 1902. It originally used thorium nitrate in the manufacture of incandescent mantles. The company moved to West Chicago in the late 1930s, where it remained until it closed in 1973. By 1952 mantle production was limited, and the production of rare earths and thorium chemicals constituted the major activities.

Copies of all employment records were obtained, covering the period from the mid 1920s until 1973. A potential study group of 4,478 workers at the West Chicago plant contained 3,538 males and 940 females. Exposure data were provided by an unpublished industrial hygiene survey made in 1952 (Kelvin and Fresco 1953) and by AEC inspections in 1956-1973. Radiation levels reported in the 1952 survey were 0.5-5 mR/hr at locations where thorium chemicals were processed or stored. Airborne thorium levels for workers directly involved in the thorium extraction process were somewhat higher than the present limits.

Three published reports examined mortality rates for a cohort of 3,039 men (Polednak et al. 1978; Rundo et al. 1979; Stehney et al. 1980). An excess of deaths had occurred (511 versus 486.8 expected), but only two causes were statistically significant at the 95% level: diseases of the circulatory system, with 205 deaths versus 249.5 expected (significantly less than expected), and motor vehicle accidents, with 38 deaths versus 23.2 expected. The authors concluded, after further examining mortality results based on year of first employment, duration of employment, and job classification, that the results were not consistent with a strong relationship between employment at this plant and subsequent mortality from respiratory diseases (as might have been expected from the inhalation of airborne