

Evaluation of Annual External Radiation Doses at Values Near Minimum Detection Levels of Dosimeters at the Hanford Nuclear Facility

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ABSTRACT

In epidemiological studies of workers exposed to ionizing radiation, recognition of the limitations of available radiation dosimetry data is important to interpretation of a study's findings. This paper provides an investigation of external radiation dosimetry data for workers at the Hanford nuclear facility, focusing on changes over time in practices for recording dosimetry measurements that were between zero and the minimum detectable level of a radiation dosimeter. Reported annual external radiation doses for the years 1944-1989 were examined for 33,459 workers; these records are the sum of periodic dosimetry measurements within a calendar year. For each year, the proportion of annual external doses with values in the range of minimum detectable level was examined. Contrary to previous researchers, we concluded that there is evidence that dosimetry measurements with values between zero and the minimum detectable level may have been recorded as zero in some historical periods. This conclusion is supported by evidence drawn from historical documentation about radiation dosimetry practices at the Hanford facility. Although workers at the Hanford facility have relatively complete and detailed external radiation dosimetry data compared to some other nuclear facilities that began operation in the 1940s, these data may suffer limitations related to dosimetry recording practices at the facility.

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