TAM-D.7

INTERNAL DOSE RECONSTRUCTION UNDER THE ENERGY EMPLOYEES OCCUPATIONAL ILLNESS COMPENSATION PROGRAM.* E.M. Brackett,[1] D.K. Allen,[2] R.W. Kenning,[1] V.A. King,[1] and B.M. Olsen[1] ([1]MJW Corporation Inc., 338 Harris Hill Road, Williamsville, NY 14221; [2]National Institute for Occupational Safety and Health)

To provide for a fair and compassionate approach to the processing of claims, it is essential that dose reconstructions be performed as expeditiously as possible. This approach differs from traditional occupational internal dosimetry in that worst case assumptions may be applied to determine that the energy employee was not likely to have incurred a compensable level of radiation dose or, conversely, a reconstruction can be truncated at the point where it becomes evident that the claimant likely qualifies for compensation. In addition, the yearly dose, from the start of exposure until the date of cancer diagnosis, to the organ relevant to the specified cancer is required for determining the probability of compensation. The probability is based on radiation type, and in some cases, is further broken down by energy range, rather than radionuclide. These departures from traditional occupational internal dose assessment have created a need for the development of new approaches as well as new software to accomplish the goal. Claims where it is apparent that a large dose was delivered to the relevant organ can be expedited by performing a partial dose assessment. It was initially thought that claims appearing to be clearly non-compensable would be relatively quick and simple, but they have turned out to be the most challenging. Examples of several dose reconstructions are provided.
*(Work supported by the National Institute for Occupational Safety and Health under contract no. 200-2002-00593.)

TAM-D.8

EXTERNAL DOSE RECONSTRUCTION UNDER THE ENERGY EMPLOYEES OCCUPATIONAL ILLNESS COMPENSATION PROGRAM.* S.E. Merwin,[1] T.D. Taulbee,[2] M.H. Smith,[1] and D.N. Stewart[1] ([1]Dade Moeller & Associates, 1845 Terminal Drive, Richland, WA 99352; [2]National Institute for Occupational Safety & Health)

42 CFR Part 82 prescribes methods for radiation dose reconstruction under the Energy Employees Occupational Illness Compensation Program Act of 2000. A key element of the dose reconstruction process is the determination of external doses. Such doses may have been received from external exposure to photons, neutrons, or electrons; radiation sources that must be considered include sources within the facilities at which the energy employee worked, onsite ambient radiation, and occupational medical x-ray procedures. Information on radiation doses is obtained from personal monitoring device data, if available, or from other sources such as survey instrument data, co-worker data, or dose rate calculations based on source term data. Organ-specific doses are calculated depending on cancer type, with appropriate corrections applied to account for the type and capability of the monitoring devices, the energy of the radiation, and the exposure geometry. Potential missed doses and uncertainties are two key factors that impact the reconstructed dose and the calculated probability of causation.
*(Work supported by the National Institute for Occupational Safety and Health under contract no. 200-2002-00593.)

TAM-D.9

A MONTE CARLO APPROACH TO ESTIMATE ORGAN DOSE UNCERTAINTY. T.D. Taulbee and J.W. Neton (NIOSH, 4676 Columbia Parkway, MS-R45, Cincinnati, OH 45226)

To estimate the probability of causation (PC) under the Energy Employees Occupational Illness Compensation Program Act (EEOICPA), it is necessary to reconstruct the dose for the tissue or organ that was diagnosed with a primary cancer. Since EEOICPA provides compensation if the PC is 50% or greater at the 99% confidence interval, uncertainty in the organ dose is an important parameter that must be considered. This paper discusses a Monte Carlo approach used to estimate the organ dose uncertainty from three sources: 1) random error in the measured dose from multiple dosimeters; 2) uncertainty in missed dose due to limits of detection or reporting thresholds; and 3) uncertainty in the organ dose conversion factor (DCF). The uncertainty in the dose conversion factors are due to incomplete knowledge of the photon energy and exposure geometry. The Interactive RadioEpidemiology Program (IREP) uses three photon energy intervals to calculate the PC. Since the true photon energy spectrum is almost never known, especially with early dosimetry, and the organ dose conversion factors vary significantly across the photon energy intervals, there is considerable degree of uncertainty in these dose conversion factors. In addition, the exposure geometry for an individual worker is also almost never known with certainty. Through a qualitative evaluation of the workplace and the job, the most probable exposure geometry is estimated. The possible distribution of dose conversion factors is bounded using the photon energy interval and exposure geometry combination that results in the lowest organ dose

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On the cover: A panda at the San Diego Zoo. Photo courtesy of the San Diego Convention and Visitors Bureau.

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