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PROGRAM AND EXTENDED ABSTRACTS

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A RETROSPECTIVE STUDY OF THE 1945-1946 OCCUPATIONAL PLUTONIUM EXCRETION DATA*

by

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ABSTRACT

The bioassay records and quality control data for all plutonium workers, employed at Los Alamos on the Manhattan Project during and after World War II (1945-1946), have been closely examined for their significance. The purpose of this study was to determine the distribution of the recorded activity assigned to the samples and controls, to compare the sample and control data distribution, and to establish the validity of the sample results considered greater than the upper limits of the analytical background distribution.

Details of the modes of exposure of the Los Alamos workers to plutonium have been reported in the literature (He73). Voelz et. al. (Vo79) reported extensive bioassay data on 26 Los Alamos male employees who were judged to have the highest plutonium exposures in 1944-1945. This presentation will compare the bioassay records of all the plutonium workers against the records of the 26 selected workers. During this time period the average chemical recovery was 83 per cent and the background was 0.7 counts per minute.

Examination of the laboratory notebooks showed that the routine occupational bioassay samples and the samples obtained from the plutonium injection cases reported by Langham (La80) were analyzed during the same time period, by the same personnel, using the same analytical procedure. Original notebook records indicate that routine bioassay samples were not corrected for chemical blank (background) or chemical recovery, nor were all samples found to be 24-hour collections.

All analytical results with minor exceptions were found to be valid and supportive of the level of plutonium being excreted by the exposed workers that have been sampled at regular intervals up to the present time. This continuous long-term plutonium bioassay record and the now available autopsy tissue data are unique and have become a significant source of information on the behavior of plutonium in humans.

These data will be discussed and compared with the recently reviewed plutonium injection data also being presented at this conference.

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He73 Hempelmann L. H., Langham W. H., Richmond C. R., and Voelz G. L., 1973, "Manhattan Project Plutonium Workers: A Twenty-seven Year Follow-up Study of Selected Cases," Health Phys. 25, 461-479.

Vo79 Voelz G. L., Hempelmann L. H., Lawrence J. N. P., and Moss W. D., 1979, "A 32-year Medical Folow-up of Manhattan Project Plutonium Workers", Health Phys. 37, 445-485.

La80 Langham W. H., Bassett S. H., Harris P. S., and Carter R. E., 1980, "Distribution and Excretion of Plutonium Administered Intravenously to Man," Health Phys. 38, 1031-1060.

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