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ABSTRACT

NATURE AND EXTENT OF INTERNAL RADIOACTIVE CONTAMINATION OF HUMAN BEINGS EXPOSED TO FALLOUT MATERIAL IN OPERATION CASTLE

S. H. Cohn, J. S. Robertson*, W. H. Chapman
Naval Medical Research Institute and U. S. Naval Radiological Defense Laboratory

The first instance of exposure of human beings to significant internal contamination with fission products, occurred as a result of the ingestion and inhalation of fallout material from a nuclear detonation in the Spring of 1954. An evaluation of the nature and extent of this internal radioactive contamination was made by a comparison of the radioelements excreted by the exposed human beings with data obtained from radiochemical analysis of the tissues and excreta of animals contaminated in the same event. The body burden of the group of human beings with the greatest internal contamination was near but did not exceed the maximum permissible levels for the individual radionuclides. Radioiodine was probably the most hazardous internal radioemitter at early times after exposure. Of the longer lived fission products, Sr^{89} was the most abundant and presented the greatest potential internal hazard. The contribution of the internal radiation to the acute radiation syndrome observed appears to be small on the basis of the estimated body burden of the principal radioelements. In view of the short half-life of the most abundant fission products in this situation, the possibility that chronic irradiation effects will occur is quite small.

* Now at Brookhaven National Laboratory.