

SUGGESTED REPLY TO LETTER DATED MARCH 27, 1954 FROM DR. WALTER K. FRANKEL,
DOVER, N. J.

"Your letter of March 27, 1954, in which you discuss hazards which may be associated with the use of nuclear weapons, with particular reference to the activation of atmospheric iodine, was referred to the Division of Biology and Medicine, U. S. Atomic Energy Commission, and they have commented as follows.

'The atmospheric content of iodine in the atmosphere is reported by Kalvero Bankana and Th. G. Sahama (Geochemistry, U. of Chicago Press, 1950) to vary from 0.0001 to 0.001 ng/m³ depending upon location relative to the sea and upon other conditions.

'From any particular nuclear explosion, a definite number of neutrons is available to produce approximately the same number of radioactive atoms from the various chemical elements in the vicinity of the explosion. The iodine occurring naturally in the atmosphere must compete with the atoms of other elements for capture of these neutrons and, because of the relatively small numbers of iodine present, will capture very few of them. For example, each cubic meter of air contains about one billion times as many nitrogen atoms as iodine atoms. Since the two species of atoms have comparable attractions for the neutrons produced by the explosion, the number of C¹⁴ atoms produced will be of the order of a billion times the number of I¹²⁵ atoms produced. Further, the iodine produced by this process has a half-life of only 25 minutes, so that in 4 hours time the amount produced will have decayed to 1/1000 of its original activity, and in 12 hours to 1/1,000,000,000 of its original amount.

'It is well known that measurable quantities of radioactive iodine are produced by the fission of U²³⁵ or of Pu²³⁹. This, however, is a different radioisotope of iodine, I¹³¹, and its production is unrelated to the natural occurrence of iodine in the atmosphere.'

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