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Biles promised to send him a copy of what we send to Holifield from Ramey

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

OCT 20 1969

Joseph J. DiNunno, Special Assistant to the General Manager
for Environmental Affairs

REPLY TO QUESTIONS RAISED BY DR. ISBIN

This is in reply to your memorandum of October 16, 1969, requesting answers to three questions raised at the University of Minnesota Symposium on October 11, 1969.

The response to question 2 is contained in a memorandum from Gordon M. Dunning to Howard Brown, copy to you, dated October 14, 1969.

The information referred to in question 3 is contained in the AEC's Semiannual Report to Congress dated January 1953, covering the time period July-December 1952. The pertinent quotation is found on page 122 of that report:

> "Cattle absorb 25 to 30 percent of the ingested strontium, with about 25 percent reaching the bone. A few days after entrance of radiostrontium into the body, about 99 percent of the remaining amount will be in the bones. The only potential hazard to human beings would be the ingestion of bone splinters which might be intermingled with muscle tissue during butchering and cutting of the meat. An insignificant amount would enter the human body in this fashion."

Up until the end of 1952 the most pertinent data were on strontium-90 in fetal bones developed by Dr. W. F. Libby. The values were so low that there was no particular reason to hasten to inaugurate an extensive monitoring of the environment. Even in late 1953 and early 1954 when measurements of strontium in milk were initiated, the concentrations of strontium-90 were indeed quite low. For example, in early 1954 the highest values of strontium-90 in milk were only about 1/2 picocurie per liter of milk. It is correct that as time went on it was appreciated more fully the role that milk might play in the uptake of strontium-90 by man and the analyses effort was expanded accordingly.

In regard to your first question, it is not clear what data are being referred to. On pages 11 and 12 of Dr. Commoner's speech he states,

> "One can calculate that if the environment is sufficiently contaminated with radioiodine to deposit a constant level of 1 picocurie per gram in cattle thyroids, then human beings will be exposed, in a lifetime, to about .2 rads of radiation--about 1/50th of the present FRC guide level. . ."

Since 1 picocurie of iodine-131 per gram of thyroid tissue will produce about 0.011 millirads per day, it would take about 50 years to accumulate 0.2 rads. However, Dr. Commoner's statement is in reference to cattle thyroids and it has been shown that human thyroids contain very much less radioiodine than cattle, on a gram per gram basis. Dr. Commoner's reference to 1/50th of the FRC guide level suggests that he believes that 10 rads are the appropriate FRC guide. In fact, the FRC guide for normal peacetime operations is 1.5 rads per year for an individual in the general population. There is another subtle, but real point not always appreciated. If one is talking about a more or less continuous contamination of the environment (which was Dr. Commoner's thesis) and the dose to the thyroid of an individual infant in the population kept at 1.5 rem per year, then a man who is conceived, born and lives his full life span in such an environment would receive about 15 rem, not 105 rem (1.5 rem per year x 70 years) to his thyroid. This is due to the fact that one's thyroid increases in size from infancy to adulthood, yet the assumed daily radioiodine intake remains constant. It is also noted on page 13 of Dr. Commoner's paper he speaks of

> " . . . will pay that price with their lives."

Disorders or even malignancies of the thyroid are not fatal. If other actions cannot alleviate the symptoms, then surgery may be indicated and such action has been proven successful in the Marshallese who received large radiation doses to the thyroid.

On page 9 Dr. Commoner makes reference to some iodine levels in the 1959-61 period. We are obtaining a copy of the report from which Dr. Commoner drew his data and will give you our comments later.

Martin B. Biles, Director
Division of Operational Safety

cc: R. J. Catlin, ADHP, OS