

May 10, 1974

SECY-S-74-78

# COMMISSIONER ACTION

Chairman Ray  
 Commissioner Larson  
 Commissioner Doub  
 Commissioner Kriegsman  
 Commissioner Anders

## DRAFT RESPONSE TO QUERY

The attached response to query has been prepared to enable the Director of Information Services to answer questions should the need arise. It has been reviewed by the General Counsel and Information Services.

If you have comments regarding the text of the draft response please direct them to Information Services (Mr. Newlin, Ext. 3281).



Paul C. Bender  
 Secretary of the Commission

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5/8/74

RESPONSE TO QUERY ON PLUTONIUM INJECTION STUDY-MANHATTAN DISTRICT

The Atomic Energy Commission is conducting a staff inquiry into a biological experiment undertaken by the Manhattan Engineer District near the end of World War II to determine how plutonium, a man-made radioactive material, is deposited and excreted in the human body.

At that time, thousands of workers in the defense industry were involved in handling plutonium and it was essential to establish realistic criteria for protecting their health. For this purpose, accurate information was needed about the retention of this material in the human body and about its rate of excretion. A great deal had already been learned from experiments in animals, but it was recognized that reliable information pertaining to man could be obtained only from persons who had received injections of known amounts of plutonium.

Between 1945 and 1947, 18 hospital patients in hospitals located in New York, Tennessee, Illinois and California, were injected with soluble plutonium. No health effects that could be attributed to the injections were observed at any time. The amounts of plutonium ranged from about two body burdens up to one injection of about 145 body burdens; most were about seven body burdens. A body burden is a term for the allowable amount of deposition in the body resulting from occupational exposure. All but one of the injections were given before the AEC was established in August 1946. The subjects selected for the study generally were over 45 years old and suffered from chronic or malignant diseases that made survival for ten years highly unlikely. Nevertheless, four of these patients are still alive.

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The other patients died of the illnesses diagnosed at the time of the injections or of other illnesses not related to the injections.

Scientific studies were conducted for varying periods up to five years on the patients after the injections. Much of what is known today about the retention of plutonium in man is based on these experiments. The scientific community has been aware of the existence of these studies for a number of years. In 1972, Dr. Patricia W. Durbin of Lawrence Berkeley Laboratory, contributed a chapter to the book "Radiobiology of Plutonium," in which she reviewed the essential clinical information about the patients and presented a complete analysis of the data from this study.

Early in 1973, the Director of the Center for Human Radiobiology at Argonne National Laboratory, arranged for clinical examinations and follow-up studies on three of the surviving patients. In addition, he obtained permission later in 1973 for the exhumation of the body of one patient in order to determine the distribution of plutonium. Two papers describing the results of these recent studies will be presented at the International Congress for Radiation Research to be held in Seattle, Washington, in July 1974.

The inquiry now being conducted by AEC staff seeks to establish the circumstances under which the original study was done, including whether any of the 18 patients or their next of kin were informed about the nature and purpose of the injections. Because of the strict secrecy surrounding plutonium at that time, it is uncertain what the patients may have been told. Furthermore, policy guidelines for the conduct of medical experimentation on humans and the concept of informed consent were then not yet clearly formulated.

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It has been established, as a result of the present inquiry, that the last patient injected was informed and consented to receive the injection. This was the one patient injected after the AEC was established and a directive was issued requiring that witnesses be present when the patient is informed. Available evidence has not resolved the issue of whether the other surviving patients were informed. It is the intent of the AEC to insure that these patients will be informed through their personal physicians.

Of the 18 patients who participated in this study, 13 were male and 5 female; 15 were white and 3 black; 13 were 45 years old or older at the time of injection; 2 were between 35 and 45; 2 were between 18 and 35, and 1 was 4 years old. Four patients are alive today; the fate of two is unknown; all the others died of their diagnosed illnesses or conditions not related to the injections, ten within three years after injection, one each within fifteen and twenty-one years.

The findings of the AEC staff inquiry will be made available to the public.

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