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UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.

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Dear Senator Anderson:

We would like to inform the Committee of plans of the Atomic Energy Commission to conduct a marine radiobiological survey in the Pacific. Data have come to our attention which indicate that radioactive debris trapped originally in the North Equatorial Current during Operation CASTLE is moving westward toward the Kuroshio Current and the islands of Japan and Formosa, a possibility which appears to have international as well as scientific significance. In order that these data may be fully assessed, detailed monitoring of the Western Pacific must be undertaken as soon as possible.

The Atomic Energy Commission has entered into an agreement with the U. S. Coast Guard whereby the Coast Guard will furnish a suitable vessel for the survey. Arrangements with the Coast Guard have been coordinated with the Chief, Naval Operations, and Commander, Joint Task Force-7.

It is expected that the Coast Guard vessel, with a technical staff of six scientists from the AEC, Office of Naval Research, Scripps Oceanographic Institute, and University of Washington at Seattle, will depart on or about February 25, 1955. The mission will require approximately six to eight weeks and will cover a track of about 14,000 miles from San Francisco to Tokyo and return. The actual survey will be conducted along the North Equatorial Current and thence via the Kuroshio Current to the vicinity of Formosa, and thence to Japan, covering a track of about 5,000 miles. Surface and deep water samples and marine organisms will be taken from the North Equatorial Current, the Kuroshio Current and other designated locations in the Pacific and measurements made aboard the vessel for gross radioactivity.

It has been determined by the AEC that the survey itself does not involve "Restricted Data." The radio-chemical separation analysis of samples will be undertaken at the Commission's Health and Safety Laboratory, New York Operations Office and the results of these analyses will involve "Restricted Data" since such data could reveal weapons information. The classification "Secret" Defense Information has been assigned to the survey in order to avoid, if possible, an unwarranted recrudescence of fears in Japan of radioactive contamination of fish; and because knowledge by unfriendly interests of bomb-originated radioactive debris in the vicinity of Formosa might



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be used effectively to embarrass the United States. The fact of an oceanographic survey in the Pacific, however, is regarded as unclassified so long as purpose, content, and results are not revealed.

Enclosed is a report prepared by the Division of Biology and Medicine which presents in somewhat greater detail the source and significance of the data and the scope and content of the study plan.

Sincerely yours,

W. F. Libby

acting Chairman

Enclosure
Marine Radiobiological Survey

The Honorable Clinton P. Anderson
Chairman
Joint Committee on Atomic Energy
Congress of the United States

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A REPORT BY THE

Director, Division of Biology and Medicine
Atomic Energy Commission

on

A MARINE RADIOBIOLOGICAL SURVEY IN THE CENTRAL AND WESTERN PACIFIC

1. One of the important findings during CASTLE was that a large fraction of the radioactive debris from a thermonuclear device detonated close to the surface is deposited within 100 miles of the site of detonation. On the basis of studies we performed after detonations from both land and barges, it appears probable that more than half of the radioactive debris produced by the CASTLE series of detonations may have fallen into the Pacific in the immediate vicinity of the Marshall Islands.

2. The AEC delegates to a Japanese-American Radiobiological Conference held in Tokyo last November returned to this country with data obtained by the Japanese scientists during the voyage of the SHUNKOTSU MARU, a research survey vessel which collected ocean samples in the mid-Pacific during the month of May and June. The course of the SHUNKOTSU MARU is attached in Exhibit A which shows that the vessel traversed the north equatorial current at three distances west of Bikini. In the course of these traverses, the Japanese scientists obtained water samples at various depths and from their data have constructed the profiles showing contamination with depth at each of their traverses. These profiles are attached as Exhibit B. In addition they collected plankton and fish.

3. The Japanese data are consistent with our data obtained during CASTLE which indicate that diffusion occurs rapidly between the surface and the thermocline but that exchange with water below the thermocline takes place very slowly. Moreover, tritium measurements of ocean water by Dr. Williard F. Libby, while at the University of Chicago, suggest that material distributed between the surface and thermocline are diffused with a halflife of about 18 years. This exceedingly slow rate is explained by the surprisingly small coefficient of exchange across the thermocline.

4. The Japanese data also suggest that lateral diffusion from the equatorial current is likewise proceeding at a slower rate than would have been expected on the basis of previously available knowledge.

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5. The Japanese data have been reviewed by oceanographers from the Woods Hole and Scripps Institute of Oceanography and the AEC technical staff. In their opinion a large part of the radioactivity observed in the North Equatorial current will eventually flow into the Kuroshio current in the manner illustrated in Exhibit C which projects the course of this activity for the next few months. The dimunution in activity between the end of June when the Japanese made their last survey and 1 March 1955 would be in the order of 90% due to radiological decay and oceanographic factors. This presents us with the possibility that large masses of the equatorial and Kuroshio currents may continue to be radioactive in amounts which do not necessarily constitute a health hazard but which are certainly high enough to attract the attention of Japanese scientists.

6. The Division of Biology and Medicine has just learned that the Government of Japan proposes to conduct another oceanographic survey of the Central, Western and North Pacific. Their expedition will begin in July and last two months. Reliance on Japanese findingsis considered undesirable.

7. The tract of the AEC survey should approximate that shown in Exhibit C, but operational flexibility has been provided in the ship's orders so that the actual course of the vessel will be determined by the daily research findings of the expedition's scientific staff.

8. To determine the geographical extent and degree of radioactivity in the water and marine organisms the following tests will be conducted aboard ship.

   (a) Continual gross monitoring of surface seawater.

   (b) Gross monitoring of individual seawater samples taken from the surface to depths of 500 meters.

   (c) Gross monitoring of wet and dry samples of plankton and fish.

9. A quantitative and qualitative radio-chemical separation analysis will be made of item 8 (b) and (c) at the New York Health and Safety Laboratory. This phase of the project is classified "Secret Restricted Data."

10. Salinity analysis, temperature and current velocities will also be taken.

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