HEADQUARTERS FIELD COMMAND
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REFER TO FILE NO. 729 54-722-0

10 JUN 1954

SUBJECT: Transmittal of Report

04246

TO: Commanding Officer
U. S. Naval Radiological Defense Laboratory
San Francisco 24, California
ATTN: Dr. E. R. Tompkins

Inclosed for your information and retention is a copy of letter, hq DEF7, J-3/370.05, 1 May 1954, subject: "Miscellaneous Reports Related to the Atomic Detonation on 1 March 1954."

FOR THE COMMANDING GENERAL:

Paul F. Preuss

PAUL F. PREUSS
Colonel, USAF
Director, Weapons Effects Tests

1 Incl:
a/s

Contains no U.S. Navy Classified Information
IAW OPNAVINST5513.16.
Signature: James C Voter CAPT USN
Code: N312Q Date: 8 Feb 95

When separated from inclosures, this document may be downgraded to Unclassified [redacted]

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729

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HEADQUARTERS
JOINT TASK FORCE SEVEN
APO 187 (HOW), c/o Postmaster
San Francisco, California

J-3/370.05 1 May 1954

SUBJECT: Miscellaneous Reports Related to the Atomic Detonation on 1 March 1954

TO: See Distribution

1. References:

a. JTF SEVEN letter, J-3/729.3, subject: Radiological Surveys of Several Marshall Island Atolls, dated 18 March 1954 (SECRET - RESTRICTED DATA).

b. JTF SEVEN letter, J-3/370.05, subject: Reports on Evacuation of Natives and Surveys of Several Marshall Island Atolls, dated 9 April 1954 (CONFIDENTIAL).

2. Attached herewith for your information and retention are copies of additional material pertaining to the above references. The limited number of contact prints available permits distribution of sets to the following only: C/S USA (ExAgt), DMA (AEC), DBM (AEC), HICOMTERPACIS, CINCPAC, CINCPACFLT, ChAFSWP, COMNAVSTAKWAJ. Additional prints may be obtained as indicated in reference 1b.

P. W. Clarkson

P. W. CLARKSON
Major General, U.S. Army
Commander

4 Incl
1. Preliminary Report (Eisenbud) to DBM (AEC) (Bugher) on Contamination of the Fukuryu Maru and Associated Problems in Japan (undated).
2. Chart: The Route or Position of Fukuryu Maru V.
3. M/R: Additional Ground and Air Radsafe Survey Data During Period BRAVO to BRAVO plus 5 days.
4. Black and White Contact Prints (247 separate prints) Relative to Surveys, Evacuation and Care of Rongelap and Utirik Natives (1 set to each command or agency indicated above)

[redacted]

[redacted]

J-3/370.05 1 May 1954

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JOHN C. BUGHER, MD

MERRIL EISENBUD

CONTAMINATION OF THE FUKURYU MARU AND ASSOCIATED PROBLEMS IN JAPAN: PRELIMINARY REPORT

I have recorded some of the observations made during my visit to Japan to assist in the various problems arising out of the mishap to the Fukuryu Maru. I am sending this along to you at this time because you will no doubt want a preliminary report prior to my return to the states in about 2 weeks.

This memorandum is intended to augment the report that Dr. Morton will submit to you. I have attempted to limit myself to factors other than those associated with the clinical phases of the problem, with which Dr. Morton's group are concerned.

THE INCIDENT

The mishap which befell the Fukuryu Maru became known to the Embassy and the world on March 16 through reports in the Japanese press. This was two days after the 100-ton fishing vessel had returned to its home port of Yaizu. The facts of the incident, as determined by the Japanese Foreign Office and communicated (1) to the Ambassador, are as follows:

(1) The course of the vessel from its departure on January 27 to its return to Yaizu on March 14 is plotted in Figure No. 1. At 0412 hours on March 1 a streak of light reported by the crew is believed to identify the time of detonation. The vessel's position was approximately 11° 53¼' north and 166° 34¼' east. This position is only a few miles from the easternmost limit of the Marshall Islands danger area in effect at that time.

(2) Two blasts in succession were heard about 7 or 8 minutes after the light had been seen. The crew is reported to have become apprehensive and began at that time to haul in their fishing lines, an operation which continued until 1030 hours, at which time the vessel headed north "to get out of the area".

(3) At about 0700 on March 1, ashes began to fall, turning the deck white. The position of the vessel at this time is given at 11° 56 3/4' north and 166° 42½' east. The ashes kept falling until noon at which time the position of the vessel was estimated at 12° 14' north and 166° 53' east.

(1) Aide Memoire of March 27

Incl 1

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its home port of Yaizu, where it arrived at 0600 on March 14.

(5) In the following two or three days, all the crew reported slight headaches and some of them were nauseous. In 7 or 8 days, evidence of burns on exposed parts of the body began to appear.

In response to certain questions which the Ambassador asked the Foreign Service, the following information was received. It sheds some light on the sequence of events during the 2 days following the return of the Fukuryu Maru to Yaizu, but before the mishap had come to the attention of the Embassy.

(1) The crew first contacted the ship's owner, and the director of the Fisherman's union. On the day of their return crew members who were seriously affected consulted a physician of the Kyoritsu Hospital.

(2) Two of the fishermen, Yamamoto and Masuda, who were in more serious condition left the Kyoritsu on March 15 for Tokyo where they visited Doctor Shimizu at the Tokyo University Hospital.

(3) Professor Shiokawa made radiation measurements of the ship on March 16 and on the basis of his findings all of the crew members consulted a physician who recommended that the men be hospitalized.

THE ROLE OF THE JAPANESE SCIENTISTS

During the latter half of March the Japanese press was fed continually with sensational statements from Japanese Scientists. The motivations of the Japanese were never quite understood by us but the following factors may be enumerated as pertinent to our lack of progress in dealing with them:

(1) In a long private conversation that I had with Dr. Tsuzuki at his home on the evening of March 24, he was frank in stating his apprehension that the American scientists would deny him and his associates professional recognition due them for their accomplishments in the diagnosis and treatment of the fishermen. He referred frequently to his experience in 1945 when he lead the teams of Japanese investigators into Hiroshima and Nagasaki only to have his work interrupted by the Occupation investigators who undertook their own studies. Dr. Tsuzuki seemed to accept my assurances that in the present situation it was the intent of the American scientists to assist the Japanese and that all of our findings would be available to them and could be used as they saw fit in their own publications.

Dr. Tsuzuki was outwardly friendly to both Dr. Morton and myself until the time of his departure for Geneva on March 31. Despite this, the lack of cooperation continued to be manifest on the part of the Japanese investigators. I do not know whether this was because we misjudged Dr. Tsuzuki's friendliness, or because he lacked influence on his japanese colleagues.

(2) There was much evidence of rivalry among various Japanese medical groups. In particular, the staff at Tokyo University headed by Dr. Tsuzuki, were initially at odds with the group at the National Institute of Health, headed by Dr. Kobayashi. Moreover, the local physicians at Yaizu, where all but two of the patients were hospitalized until March 29, were anxious for various reasons that the patients remain there. Their lack of cooperation with the American scientists may have been motivated by their knowledge that the Americans advised that the patients be transferred to Tokyo.

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(3) Many of the accepted procedures of modern American medical practice seemed strange to the Japanese, and their concepts are strange to Us. For example, access to patients by any physicians was denied for several days because the Japanese physicians found their patients to be in a highly excited state and preferred not to disturb them. Japanese physicians indicated on several occassions that the taking of duplicate blood smears by Japanese and American investigators was an unnessary duplication, and an ordeal that the patients should not be expected to undergo.

In my initial conference with the Japanese scientists I was forced to the conclusion that they were not well equipped to deal properly with the radiological aspects of the problem. For example:

(1) Some of the top scientists took the position that because a new kind of bomb was involved, the problem itself was a new one, and that unless they know all about the bomb, they could evaluate neither the injury to the fishermen nor the aspect of long-range contamination of Japan and its fishing crews throughout the Pacific.

(2) The were quick to identify qualitatively some of the radioactive isotopes in the ash and immediately concluded that deposition of these radio-isotopes in the tissues of the men was the prime factor in their medical status. This decision was reached without benefit of radio-chemical urine analyses of the patients. This procedure which was beyond the capability of their laboratories is of course a prerequisite to understanding the amount and kind of fission product absorption that actually occured.

(3) The University of Tokyo group administered parentally a massive dose of ash to one mouse, and following sacrifice 12 hours later, determined by radiography that radioactivity was present in the mouse skeleton. The activity of the dose was not measured. The fact that the radioactivity was detected by the scientists in the skeleton of the mouse was widely publicized as evidence for their conclusion that the patients were carrying dangerous internal deposits of radioactive isotopes.

As individuals, the scientists seemed anxious to cooperate. In my initial conversations with them they freely asked for help and seemed gratified at some of the things that we could do for them. My participation on the American team was limited to the radiological aspects of the case and only incidentally to the patients themselves. Unfortunately the nature of Dr. Morton's participation required that he be given direct access to the patients and this the Japanese consistently refused to grant. As the days went by and the Japanese became more resolute in their decision to deny access to the patients, other areas of the problem became infected by the uncooperative atmosphere. This will become apparent in subsequent portions of the report.

OFFERS OF ASSISTANCE TO THE JAPANESE

When I arrived in Tokyo on March 22 Dr. Morton had already offered to the Japanese the full facilities of the Atomic Bomb Casuality Commission. General Hull had likewise offered the facilities of the Far East Command. These offers were accompanied by a spirit of sympathy and the desire to assist the Japanese investigators in their efforts to evaluate the incident and to restore the health of the fishermen. At a meeting with top

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Japanese scientists and government officials on March 24, I made a further offer, in behalf of the Atomic Energy Commission, to provide whatever facilities were available for evaluation of the radiological factors involved in the incident. I repeated the assurances repeated earlier by Dr. Morton that we wished sincerely to be of assistance, that our participation was not motivated (as some Japanese suggested) by the opportunities for scientific studies, and that whatever data we obtained would be turned over to the Japanese investigators to be used by them in any way they saw fit.

At this point it would be desirable to list the radiological studies which had been already made by the Japanese. These studies are of interest because they indicate the extent of Japanese capabilities in this field, and define the extent to which our facilities would be helpful to the Japanese.

(1) Using a Cutie Pie, they measured the radioactivity of the Fukuryu Maru. These data appear completely satisfactory and prove to be in good agreement with measurements made with American calibrated equipment.

(2) They measured radioactivity of the fish and fishermen, using portable survey equipment. However, their equipment was not calibrated and their data were given in counts per minute as determined by the original factory calibration.

(3) They determined that the ash recovered from the vessel was radioactive using an end window GM tube and scaler. Their counting system was not calibrated and they reported counts per minute with no knowledge of the factor required to convert their data to standard units.

(4) They completed a qualitative radiochemical analysis of the ash and reported the following: Sr 89, Y91, Zr95, Nb95m, Nb95, Ru103, Ru106, Rh106, Sb127, Te132, I131, I132, Ba140, La140, Ce141, Ce144. (More recently they have completed a semi-quantitave analysis for a few isotopes).

(5) They had scanned the bodies of the fishermen with a GM probe.

(6) They had administered a dose of ash to 1 mouse, as described earlier.

(7) Using an imersion type GM tube, they had demonstrated radioactivity in the urine of 3 fishermen. As before, their equipment was not calibrated and the absolute activity could not be determined.

With this as the status of their investigation at the time of my arrival, and following several hours during which I acquainted the Japanese with our experience in this field, I offered the following services to them:

(1) Complete radiochemical analysis of 24 hour urine collections from all patients. In view of the importance of this analysis in evaluating the status of the patients, I urged that these samples be furnished immediately and assured them that in one week it would be possible to give them a report for the constituents of principal biological importance. I explained the need for serial samples and suggested that collections be made at weekly intervals. They seemed anxious to accept this service.

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ACTION: This offer was made on March 24. On March 26 we obtained urine from two patients. On April 1 we obtained urine from 5 more. We have not obtained urine from the remaining 16 patients despite our repeated attempts to do so.

(2) I offered to scan the fishermen for radiation, using two Scintimeters that I had available.

ACTION: I have been unable to do this because they have not permitted the American team to have access to the patients.

(3) In response to the Japanese request I offered to provide a report on the biologically significant radio-isotopes present in the ash.

ACTION: Dr. Nakaizumi gave me a small amount of deck sweepings from the Fukuryu Maru. This I have sent to the Health and Safety Laboratory for future study. The composition of the ash was actually known to the Commission from analysis performed by the Air Force on the material obtained from the Fukuryu Maru Prior to my visit. Authorization for transmission of this information to the Japanese was communicated to me in telegram No. 2199 from the Secretary of State to the Ambassador. I transmitted this information to Dr. Kobayoshi on April 7.

(4) I offered to arrange for animal studies which would provide useful information on absorption and metabolism of the various radiochemical components of the ash.

ACTION: The Japanese reported the extent of the total amount of ash recovered as 50 millocuries. They now deny that this much is available and have no inventory of the material. Except for the small amount of ash turned over to me by Dr. Nakaizumi and a similar amount which I recovered on a subsequent visit to the Fukuryu Maru, no ash has been made available to us.

(5) In response to Japanese requests, I agreed to recommend monitoring procedures for the tuna inspectors.

ACTION: Monitoring procedures was devised but I deferred the question of maximum permissable contamination until more information became available on the extent and type of contamination. I agreed to stand by until the first contaminated tuna were found by inspection, at which time I would go to the scene of inspection and recommend specifically on the basis of my own observations whether the catch should be accepted or rejected. As noted elsewhere in some detail, the Japanese never permitted me to examine tuna which was alledgely contaminated.

SPECIAL PROBLEMS ARISING OUT OF THE INCIDENT

The mishap to the Fukuryu Maru created a number of separate, but interrelated problems. Of these, the most urgent was the clinical status of the 23 fishermen, a subject with which Dr. Morton is exclusively concerned and about which he will report separately. Other problems which required attention were:

[redacted]

ing grounds.

(3) Radiological factors affecting the fishermen:

(a) Estimating the whole body dose.

(b) Estimated dose from internal emitters.

Contaminated Tuna

Some of the Japanese Government officials are already referring to the latter half of March as the "great tuna panic". The origin of this panic both in the United States and Japan is worthy of careful study. the extent of the tuna consumption in the United States and Japan declined during the second half of March is now known to me at this time. For a day prior to my departure from New York on March 19, and for 2 weeks following my arrival in Tokyo on March 22 the subject of radioactive tuna was a subject of popular conversation. When one considers the reaction of the informed American public to the possibilites of contamination of tuna it is not surprising that the Japanese were stampeded into apprehension over the immediate prospects of their eating radioactive tuna and the long-range prospects of their fishing grounds being ruined.

(A) Tuna Fishing Industry of Japan L/

The Japanese fishing fleet at the present time consists of about 1,000 vessels operating out of ten major ports. The annual value of the tuna catch approximates $26 million. The principal export species is albacor. Sixty percent of the landed albacor catch went to Japanese canners and forty percent was shipped abroad in freezers. Sixty percent of the albacor are caught in the summer season which extends from May through July. During this season, the fishing grounds are located relatively close to the Asiatic coast.

During the winter months, January through March, the Japanese vessels range far out to sea. The winter season accounts for forty percent of the annual catch.

(B) Contaminated Tuna in Japan

The Fukuryu Maru landed at Yaizu with a catch of 28,000 pounds of tuna. We must accept the fact that these tuna were excessively contaminated and that the decision of the Japanese to dispose of those

L. An excellent report of technical information about the Japanese tuna fisheries in Japan is report No. 104 issued by the Natural Resources Section of SCAP in March, 1948.

[redacted]

fish was a wise [illegible]
fined to the surface of the fish and occured when the radioactive ashes fell and entered the ships hold.

With the decision of the United States Food and Drug Administration to monitor incoming shipments of tuna, the shipping companies operating out of Japan initiated a requirement that the Japanese certify export shipments as being free of radioactivity.

When I arrived in Japan on March 22, the Japanese had already monitored their first outgoing shipment of frozen tuna. The Ministry of Welfare undertook to have its sanitation inspectors trained in the use of geiger counters and began the routine inspection of both incoming and outgoing tuna at five ports. All vessels were instructed to return to one of these ports. Five geiger counters were obtained from the Far East Command and loaned to the Japanese. In addition, they mustered approximately the same number from various sources in Japan.

On March 24, at a conference with the Japanese Government officials, they asked for my recommendation for maximum permissible contamination. They also asked that I recommend the kind of examination that should be made of the fish.

Because of my unfamiliarity with the mechanical details of handling tuna shipments, I suggested that I be permitted to study tuna loading operations scheduled for the following day. Thereupon it was arranged that I should accompany Japanese officials to Yokohama where the Batan was being loaded with frozen albacor.

Tuna shipments involve many fish and it is not an easy matter to monitor properly with inexperienced personnel and only a few survey instruments. Based on my inspection of the Batan, I suggested that every tenth fish be monitored for about 1 minute by passing an open window GM probe over the surface of the fish, paying particular attention to the gills. I also instructed them to insert the probe into the mouth of the tuna and into the abdominal incision through the fish.

There remained the question of criteria for rejection of fish found to be contaminated. Again it is not a simple matter to evaluate the risk to a consumer of tuna from measurements made in this way. I informed the Japanese that I was unable to propose a realistic figure without some study. On the other hand it was my belief that significantly contaminated fish were not likely to be found. Low level fall out to the skins of the fish was, of course, a possibility. This seemed to be of little significance in view of existing cannery practices which strips the skins from the fish when processing begins. I told the Japanese I would be standing by in Tokyo, that they should continue to monitor the fish by the method I proposed, and that when and if contaminated fish were found I should be advised and given the opportunity immediately to make a first hand inspection of the fish. My recommendations would depend on what I found.

No contaminated tuna have been brought to my attention. Newspapers have occasionally reported incoming shipment of contaminated fish but the Japanese had not requested that I make an examination of them.

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(1) On March 31 we read in one of the Tokyo English language newspapers of two fishing vessels that were contaminated. The Embassy called the Ministry of Foreign Affairs who reported the following information by telephone:

(a) The Koei Maru, then at the port of Misaki, was at 9 degrees, 22 minutes north, 178 degrees, 19 minutes east on March 1. The surface of the ship was re ading 2443 counts per minute, the catch 155 counts per minute and the men 500 counts per minute. The fish had been impounded awaiting a decision as to their safety.

(b) The Myojiim Maru was at Shiogone. On March 1 it was at 29 degrees, 8 minutes north, 177 degrees, 19 minutes east. The surface of the ship was reading 50 to 400 counts per minute, the fish 56 to 84 counts per minute, and the crew 40 to 90 counts per minute.

(2) The Embassy informed the Ministry of Welfare of my interest in seeing the ships and fish and told them a special plane would be available to fly me to the two ports. The Foreign office was requested to arrange for access to the vessels and was invited to send whoever they wished to designate with me on this trip. A flight was scheduled for early on the morning of April 2.

(3) Around noon on April 1 the Foreign Ministry called the Embassy and advised that the Myojiim Maru had left Shiogone that morning, that its destination was not known, and that the fish had been disposed of in an unknown manner. The Embassy informed the Foreign Ministry that, this being the case, we would limit our trip to Misaki.

(4) At 4 PM on the afternoon of April 1 the Foreign Ministry again called to inform the Embassy that the Koei Maru had left the port of Misaki one hour before to dump its contaminated catch at sea. The Embassy asked the Foreign Ministry to call the vessel back inasmuch as it was only one hour off port but the Japanese stated this could not be accomplished.

To summarise the tuna situation, it is my belief that no significantly contaminated tuna have arrived in Japan except for the catch from the Fukuryu Maru. Rigerous inspections procedures will undoubtedly disclose certain amounts of low level radioactivity on the surface of the tuna but the significance of this is minimized by the practice of skinning tuna prior to canning. In the meantime the tuna market has stabilized and tuna representatives of American tuna interests have informed me that their companies are no longer concerned over the problem.

[redacted]

Apprehension of Long Range Contamination of Japan and its Fishing Grounds

Japenese apprehensions over the posibility of long range radiological contamination were very similar to those we encountered in the United States as a result of NPG operations.

A difference in Japan is due to the fact that none, if any, of the counting equipment is calibrated, GM tubes are used without shields, and under conditions where the background count is apt to be highly variable. This, coupled with the fact that they do not know the background activities of such things as soil and biological materials, makes it very difficult to evaluate the reports. Many of the reports of "ash" falling in various parts of Japan are undoubtedly dust or soot falls that occur normally in any industrial area from time to time. Reputable scientists have examined samples of potassium-rich soil and have reported their date is gross counts without any reference to normal soil background. For this reason I find it very difficult to take serious the frequent public report of 50 to 100 counts per minute for the unspecified size of samples reported from time to time.

At my conference with the Japan scientists and government officials on March 24, I explained the procedures we use in the States for measuring fallout. I urged them to use similar procedures for the sake of uniformity and offered to loan them the equipment we used. They seemed eager to accept and I requested 4 sets of equipment which has since arrived from the States. However, since the arrival of this equipment, I have delayed giving it to the Japanese because in their present state of mind little good could come of it. I do believe, however, that when the present confusion subsides, it will be useful for the Japanese to maintain a fallout monitoring network and I think we should cooperate with them to the fullest extent.

In a conference with Dr. Kobayoshi on March 26, I informed him of my conversation with Dr. Bugher and his offer in behalf of the Atomic Energy Commission to provide financial support for marine biological studies directed at the long range contamination of the Pacific. Dr. Kobayoshi, through his interpretor, expressed his appreciation for this offer but did not pursue the matter further and has not approached me since.

With regard to fallout on the Japanese islands themselves, it is to be remembered that the position of those islands in relation to possible sites of weapons testing is such that the Russian testing program is apt to produce more fallout than events in the Marshalls or Nevada.

Estimating the Whole Body Dose

I doubt that it will be possible to make a satisfactory estimate of either the Beta or Gamma dose the fishermen received. We know that the ash fell in such quantities that the deck of the ship became white, and there was sufficient material to develop visible footprints. Unfortunately, this is the limit of our information on how much ash fell and how long it remained on the ship. The fishermen washed the decks in order to remove the ash and according to their reports their washing was effective. When the vessel arrived in Yaizu much of what remained was removed.

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Measurements made by various investigators during the period between March 20-26 are in agreement. It is curious that the Beta-Gamma ratio is about 1. This would indicate that the bulk of the ash had by this time penetrated to the porous wood structure of the deck, thus absorbing the Betas. The Gamma radiation over most of the ship was approximately 40 m.r. per hour when the ship arrived in port. If we extrapolate this back to H + 3 hours, the time the ash began to fall, the integrated Gamma dose is about 100 R. Of course, the ash was falling from H plus 3 hours to about H plus 9 hours. If we take the mid-point of this period as the start of exposure we find the exposure is about 70 R. This, however, estimates the whole body Gamma radiation from residual debris still on the ship when the first measurements were made. The actual dose could have been 2, 10, or even 100 times higher depending on how much ash was washed off the ship and at what time.

We have made a number of discreet inquiries in the hopes that photographic film might have been available aboard the ship and might possibly be used as a dosimeter. All efforts to date have been negative.

Deposition of Internal Emitters

There was an urgent requirement to evaluate the extent to which fission products had been absorbed into the tissues of the fishermen. As mentioned earlier, Dr. Nakaidzumi had concluded from his mouse experiment that the prognosis for the fishermen was adversely affected by the probability of excessive deposition of long-lived bone-seeking isotopes. The Japanese scientists were desperately looking for an agent to mobilize these isotopes and Dr. Lewis believes that they had administered EDTA to the patients, despite the fact that urine analysis was beyond their capability and they were therefore unable to determine either the need for EDTA or the effect produced by it. Apart from the fact that they were unable to undertake urine analysis at that time, it is also evident that they did not understand the dynamics of fission product metabolism and were not used to thinking in terms of urinary excretion levels as an index of absorption and deposition.

They were anxious to provide me with samples of urine for State-side analysis. Two samples were delivered on March 26 and five more on March 30. As yet we have not received samples from the remaining 16 patients. The samples received were properly forwarded to the Health and Safety Laboratory and I have had the results of gross analysis of the first two samples. I communicated these results to Dr. Kobayashi in the attached letter which is self-explanatory.

[redacted]

THE FOREIGN SERVICE
OF THE
UNITED STATES OF AMERICA

6 April 1954

Dr. Rokuzo Kobayashi
National Institute of Health
Welfare Ministry
TOKYO

Dear Dr. Kobayashi:

On March 26 we received two samples of urine from patients at the Tokyo Univeristy Hospital. I am happy to be able to report at this time that the radioactivity of these samples is so low that the deposits of fission products in the tissues of the two patients can be accepted as well within the limits of safety. The results follow:

MASUDA, Sanjiro - 720 disintegrations per minute per liter
YAMAMOTO, Tadashi - 510 " " " " "

Data on the individual radio-isotopes will be telegraphed to me in another few days. It will then be possible for me to be more quantitative in estimating the dose from absorbed fission products. However, it is most certain that the storage of long-lived radio-isotopes is insignificant in these men.

As you know, the rate of excretion of fission products at any given time after absorption bears a relationship to the quantities deposited in the various tissues. The principal radiochemical constituents at this time are due to Sr 89, La140 and the Rare Earths. These are isotopes which have relatively short half-lives and are eliminated from the body with comparative rapidity either by radioactive decay or excretion. In the case of these patients, Sr90 is most certainly an insignificant fraction of the total absorbed radioactivity. The permissible urinary excretion, considering the isotopes involved, would be greater, by a large factor, than the values reported above.

I note that the newspapers continue to carry occasional statements of the Japanese investigators to the effect that the prognosis for the fishermen is adversely affected by the fact that long-life bone-seeking isotopes are deposited in their tissues. It is regrettable that the public continues to be misinformed in this respect. Certainly the results reported above argue convincingly that only minimal, medically insignificant amounts of fission products have been absorbed into the tissues of the two patients for whom results are available.

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I regret that I am unable to give you the results of analysis of urine from the 21 other patients. Knowing that those data would be highly important to your committee in its evaluations of the medical status of these patients, we have offered to undertake radiochemical urine analysis of all 23 patients. The urine from only two patients has been delivered to us in time to permit shipment to the States and analysis by this date. More recently, samples from five additional patients from the Tokyo University Hospital were delivered to us, but we have not as yet received samples from the 16 patients now hospitalized at the Daiichi Hospital.

Respectfully yours,

Merril Eisenbud
Director, Health and Safety Laboratory
United States Atomic Energy Commission

ME/ams/hcc

CC: Dr. Nakaidzumi
Dr. Kakehi

[redacted]

[redacted]