

# Lucky Dragon Incident

## About TED Categories and Clusters

CASE NUMBER: 310  
CASE MNEMONIC: LUCKY  
CASE NAME: Lucky Dragon Radiation

### A. IDENTIFICATION

#### 1. The Issue

At 6:45 on the morning of 1 March 1954, eight years after testing in the Marshall Island began, the US detonated a bomb codenamed "Bravo" on the island of Bikini. The bomb was equivalent to 17 megatons of TNT, 1,300 times the destructive force of the bomb dropped on Hiroshima, and was specifically designed to create a vast amount of lethal fallout. That morning wind was blowing in the direction of two inhabited atolls, Rongelap and Utrik, roughly 100 and 300 miles from Bikini. A Japanese tuna fishing boat, the Lucky Dragon, was caught in the path of Bravo's fallout. It was 100 miles east of Bikini when the bomb was detonated. The crew members suffered from radiation sickness, and one of the them died of liver and blood damage on 23 September. The Lucky Dragon Incident touched several sensitive issues in Japan: the atomic legacy of World War II; disruption in the supply of fish; a principal food item; curtailment of fishing rights on the high sea; and a deep-rooted concern that the United States was insensitive to the feelings and sufferings of the Japanese people and unduly preoccupied with the development of weapons for mass destruction.

#### 2. Description

The nuclear incident that sparked a massive outcry in Japan against the U.S.'s testing of nuclear weapons. On 1 March 1954 a 90.7-ton Japanese fishing boat, the Daigo Fukuryu maru (Lucky Dragon V), while operating in the central Pacific, was sprayed by a cloud of radio active ash. This accident was caused by a US thermonuclear weapon test on Bikini Island ( part of the Marshall Islands ), 135 kilometer (85 mi) to the west of the boat. Earlier that year, US authorities had issued a general warning defining a danger zone around Bikini, but no specific warning had been given regarding the timing or location of the various tests. The Japanese crew apparently knew of the warning and assumed that they were operating outside the danger area. Their tuna trawler was in fact about 32 kilometers (20 mi ) outside the zone.

Early that morning, several members of the crew had noticed a bright light in the sky to the west, and about six to seven minutes later they heard a loud explosion, which they speculated might have been caused by a "pikadon", as the atomic bomb was called popularly called. For nearly three hours sandy ash rained down on the boat. Soon, most of the 23 crew members has began to suffer nausea, pain, and skin inflammation, but they did not associate these symptom with the explosion and had made no radio report of the incident.

After running to their home port of Yaizu in Shizuoka prefecture on 14 March, they reported their ailments to a local doctor. An observant student passed the news to Yomiuri Shinbun reporter; as a result, the Tokyo office of the newspaper scored a major scoop with its report of the incident and of the treatment of the two crew members who had been sent to Tokyo University Hospital for examination.

The condition of the crew members and the circumstances of their injuries became matters of worldwide interest and intense concern in Japan for months to come. All of the crew members were hospitalized in Tokyo. Several were in poor condition for some time, and one, Kuboyama Aikichi, the radio telegraph operator, died on September 1954. The precise cause of his death was disputed, some experts claiming that it was due primarily to radioactive damage to the liver and others arguing that the prime cause was infectious hepatitis brought on by frequent blood transfusions.

The United State donated 1 million yen ( US \$ 2,800 ) to the widow as a gesture of sympathy. The remaining crew members all recovered with no apparent after effects despite their exposure to powerful doses of radiation aboard ship while returning to Japan.

Following extended negotiation, United States made a payment of \$ 2 million to the Japanese government on January 1955, without legal liability, to compensate for all injuries and damages caused as a result of the five nuclear tests it has conducted in the Marshall Island, including damage and injuries sustained by the crew of the Daigo Fukuryo maru. Each crew member got an average of \$ 5,000; the remainder went to pay their medical expenses and the damage done to the tuna industry. The Lucky Dragon itself, stripped down and decontaminated, was purchased by the government. Renamed the Hayabusa-Maru ( Dark Falcon), it became a training vessel for the University of Tokyo's Fisheries School. In a statement made on 31 March 1954, the chairman of the United State Atomic Energy Commission noted the power of the 1 March test had been about double that calculated. Experts estimate that the actual yield was the equivalent of about 15 megatons of TNT, one thousand times the power of the atomic bombs exploded at Hiroshima on 6 August 1945, and that this bomb had been of a new type combining fission and fusion process.

The Detail about the crisis mounts

Yashushi Nishiwaki, a young biophysics professor at the city university who had read about the Lucky Dragon in Yomiuri Shinbun, called the city health office to see if any fish from Yaizu had been shipped there. Soon he was summoned to the Osaka central market where he found tuna, to his astonishment, that rattled his Geiger counter at 60,000 counts per minute. City officials, discovering from the scales and paper wrappings, that contained fish had already been eaten by about a hundred people, pleaded with him for advice. Fear swept through the city when the evening papers carries the story. The reaction was immediate and desperate-people stopped buying fish.

The doctors who examine crew members and the young biophysicist had similar problems. They could not tell how badly the men had been hurt, and Nishiwaki could not set a level of permissible contamination for fish, without knowing how strong the source of original radiation had been. Even after he had made a trip to Yaizu to inspect the ship and its crew he knew days would pass before his analysis of the ash be completed. Nishiwaki therefore wrote the US Atomic Energy Commission, asking that Japanese scientists be told what elements had been in the H-bomb. He gave the letter to a representative of an American press service, thinking that would be the fastest way to reach the United States.

However, the letter was never transmitted. It was blocked by the chief of wire service's Tokyo bureau. Later Nishiwaki learned that the decision had been made on the grounds that he was an alarmist who was obviously seeking publicity. This attitude, on the part of some Americans puzzled and irritated and eventually alienated Japanese scientists and laymen alike. The incident marked the beginning of a wide and unnecessary rift between the two nations.

The doctors in Tokyo and a team from the same hospital that had now examined the men in Yaizu were also fighting against time to learn the content of the ash. In handling the victims of the ash, they could draw on the wealth of medical information gained by systematic study of the survivors of Hiroshima and Nagasaki. This had been carried out by the Atomic Bomb Casualty Commission, a cooperative research facility that had been established at Hiroshima, where thousands of individuals had been carefully examined and reexamined. But what confused the situation now was the presence of residual radioactivity. Even after hair cuts, nail-clippings, and a throughout scrubbing, the fishermen retained some radioactivity on their skin. This was something with which the Japanese doctors had no practice experience, and they were in the dark about how deep-seated the injury to the men might be.

Officials of University of Tokyo had requested assistance from the Atomic Bomb Casualty and, in response Dr, John Morton arrived in Tokyo on March 18. He visited the two patients at the university hospital and discussed the condition with attending physicians. He assured the Japanese doctors that the United States would be ready to assist and offer to have antibiotics delivered to

the hospital. Before leaving for Yaizu, Dr. Morton stated that he had found fishermen in better shape than he had expected and that the twenty-three fishermen would recover in two or three weeks, a month at the most.

It was at this time that Senator John Pastore of Rhode Island passed through Tokyo on a brief visit and presumably was briefed by authorities there on the condition of the Lucky Dragon crew. Senator Pastore, a member of the joint Congressional Committee on Atomic Energy, returned to the United States and gave an interview to the press in which he made a very optimistic statement about the fishermen's recovery. This was but one of a series of semi-official opinions voiced in America which aggravated the delicate relations between Americans and Japanese in Japan.

News from America continued to be featured in the Japanese press. For the first time semi-official information about the huge explosion came out into the open. Representative James Van Zandt, a Republican Congressman from Pennsylvania and a member of the Joint Committee, stated that March 1 H-bomb explosion had equaled the blast of twelve to fourteen million tons of TNT. The new Bikini bomb was of incredible destructiveness. That led Japanese newspapers to run editorials urging that the danger area around the Eniwetok Proving Grounds be enlarged; and the U.S. government promptly issued a notice doing precisely this. The new danger area encompassed about 400,000 square miles of territory, or about eight times the area formed by the previous designated zone. On March 19 the Maritime Safety Board in Japan announced the new limits. All boats fishing in this area, or taking passage through it, were required to put in at five designated ports and be inspected for radioactivity. The ports specified were Shiogama, Shimizu on the island of Shikoku, Yaizu, Tokyo, and Misaki, the great tuna center near Tokyo.

Establishing the official inspection stations was a step which the Japanese government took to stem the rising hysteria over the contamination of the fish supply. There was no doubt something drastic had to be done to assure the Japanese people that they were not being poisoned. Fish-dealers were having a hard time convincing customers that their wares were not radioactive. But wary purchasers shied away. 750 tons of tuna were stored in the warehouses in the great port of Misaki.

The Misaki market was closed on March 19, precipitating a panic among the fish dealers. The hysteria spread to nearby Yokohama and then to Tokyo itself. The great Tokyo Central Wholesale Market closed for the first time since the cholera epidemic of 1935. None of these measures worked well. When it became known that fish had been banned from the Emperor's diet, people became even more worried. Prices plummeted to still lower depths and some fish dealers were forced into bankruptcy.

Public resentment over the Bikini accident spread throughout Japan and news papers ran editorials highly critical of the United States. They criticized Dr. Morton for failing to treat the Yaizu fishermen (despite the illegally such a treatment by an American doctor). They expressed fear that the patients would be used as a "guinea pigs" and they demanded reparation for the damages incurred. Ambassador John M. Allison sought to take some of the sting out of the criticisms by issuing a press release on March 19, in which he said that he was "authorized to make clear that the United States is prepared to take such steps as may be necessary to insure fair and just compensation if the facts so warrant." A US congressman, Melvin Price from Illinois, commented that the presence of the Japanese fishing boat so close to the blast indicated that a Soviet submarine could have come even closer. At this point, Representative W. Sterling Cole, chairman of the Joint Atomic Committee, was interpreted in the Japanese press as suggesting that the Lucky Dragon may have been on a spying mission. This suggestion infuriated the Japanese.

Meanwhile Mr. Merrill Eisenbud, director of the AEC's Health and Safety Laboratory, had arrived at Tokyo's Haneda Airport and been whisked away in an Embassy sedan before correspondents could question him. Eisenbud was making a hurried flight to Japan in order to check on the levels of radioactivity and to see what assistance his laboratory could render for the crewmen. A short time later he, an expert on fallout, flew to Yaizu and lugged an armful of instruments aboard the Lucky Dragon. He disdained gloves, mask, or protective clothing and rather horrified some of the Japanese scientists by his nonchalance. However, at the

hospital he was given a cool reception by Japanese doctors, who made a point of emphasizing that he had neither a Ph.D. nor a M.D. degree. It was quite evident that a distinct note of hostility had arisen between the Americans and Japanese.

News of what had happened to the Lucky Dragon was played up on the front pages of American newspapers on March 17. But the question of the radioactive tuna fish was subsequently given little space in the American press, and the injuries to the fishermen were mainly mentioned through comments by U.S. politicians. The New York Times ran photos of an injured crewman and printed a chart showing that the Lucky Dragon had been well outside the danger zone around the Eniwetok-Bikini Proving grounds. But the reporting of the incident in American newspapers gave no concept of its importance to the Japanese. President Eisenhower replied to a question from a reporter of the Columbia Broadcasting system. "It was quite clear that this time something must have happened which we had never experienced before, and must have surprised and astonished the scientists. And very properly, the United States had to take precautions that had never occurred to them before."

After the President's press conference the Atomic Energy Commission released a detailed statement which included: "The opinion of the American Energy Commission scientific staff based on long-term studies of fish in the presence of radioactivity is that there is negligible hazard, if any, in the consumption of fish caught in the Pacific Ocean outside the immediate test area subsequent to tests...Any radioactivity collected in the test area would become harmless within a few miles...and completely undetectable within 500 miles or less...."

In Japan, the American Ambassador, John M. Allison, issued a similar statement. It evoked angry comment from leading Japanese scientists. One professor made a radio broadcast in which he stated: "the radioactivity we have detected was certainly not negligible." The other professor snapped: "Let's send the highly contaminated fish to Mr. Allison and have him eat it."

The official AEC reassurance that fish could be eaten safely did not stem the rising tide of fish contaminations in Japan, nor did it restore confidence among buyers in fish markets. On March 27 the Koei Maru ( Radiant Glory) put into the thriving port of Mastic with thirty-seven tons of tuna which was found to be radioactive above the level established by the Ministry of Health and Welfare. Japanese officials had issued a temporary " danger level corresponding to 100 counts per minute for a Geiger counter held four inches away from the fish. So far as the Japanese people were concerned, the numerical value of 100 was not too important. They looked upon the situation in that either the fish was radioactive or it was non-radioactive.

Shortly after the contamination of fish became news that American dealers asked the Japanese to observe restrictions of a rather technical nature, calling for the fish to be examined closer than four inches and for detailed inspection around the gills. Apparently importers did not want every 100 counts per minute. This distressed the Japanese tuna men, who felt that Americans were setting up a double standard. On one hand Americans asserted that there was no danger and strongly implied that Japanese were unrealistic about radioactivity contamination of fish. On the other hand, they rejected even slightly contaminated tuna for their consumption.

The US West Coasts tuna canneries, most of which are concentrated in California, were alerted. Records of the food and Drug Administration show that two radioactive fish were picked up at one cannery. No details other than that the " radioactivity was insignificant" are available, but it is known that secret meeting took place between representatives of tuna industry, the Food and Drug Administration, the Atomic Energy Commission, and the State Department. An acceptable level of radioactivity was agreed upon at this meeting but the level was classified as " confidential" and not released to the public.

### 3. Relevant Cases

[ARCTIC](#) case  
[CHERNOBY](#) case  
[BENIN](#) case  
[MURUROA](#) case  
[JAPANSEA](#) case

TEMELIN case  
JAPANPUL case

Key words  
 Nuclear Testing  
 Bio-geography=Ocean  
 Environmental and Human Right Problem

- 4. Draft author: Atsuko Toi (May 1996)
- B. Legal Cluster
- 5. Discourse and Status: AGR and COMPLETE
- 6. Forum and Scope: Japan and US
- 7. Decision Breadth: 2 (Japan and US)

However, Bikini Radiation injuries are not only Japanese. This issue of nuclear testing is a global concern.

- 8. Legal Standing: COMPENSATION
- C. Geographic Cluster
- 9. Geographic Location
  - a. Continental Domain: Pacific
  - b. Geographic Site: West Pacific
  - c. Bikini
- 10. Sub-national Factors: NO
- 11. Type of habitat: OCEAN
- D. Trade Clusters
- 12. Type of Measure: Regulatory Standard
- 13. Direct v.s. Indirect: DIR
- 14. Relation of Measure to Impact
  - a. Directly Related: Yes Fish
  - b. Indirectly Related to Product: No
  - c. Not Related to Product: No
  - d. Related to Process: Yes RADIOactive
- 15. Trade Product Identification: MEAT (fish)
- 16. Economic Data

Affected by a decrease in domestic haul, the scale of supply-demand of fish has continued to decrease. However, the fish markets still provide most of the protein for Japan's diet. They provide a daily supply of 18.4g animal protein per capita in 1991, accounting for 40% of the total protein supply. In those days of the Lucky Dragon Incident, demand and supply of fish, selfish are as follows: (Unit: 1,000t)

TABLE	(Demand and Supply of Fish)
	Total Supply...5,903
	Domestic Production... 5,803
	Imports... 100
	Total Demand... 5,903
	Domestic Consumption...5,383
	For Food... 4,400
	For Livestock Feed... 983
	Export...520

- 17. Degree of Competitive and Impact: HIGH

Many tuna from the Pacific were found to be radioactive by the testing of American atomic bomb. As noted in the description, this caused Japanese people to stop buying and prices to drop disastrously. It resulted in a large loss of revenue and employment for the industry.

- 18. Industry Sector: FOOD
- 19. Exporter and Importer: Many and Japan

E. Environmental Cluster

20. Environmental Problem Type: Pollution Sea

When the crew of the Daigo fukuryu maru, a tuna-fishing boat, witnessed a gigantic fireball over the western horizon and heard dull sounds about eight minutes later, their boat was located approximately 190 kilometers (118 mi) east northeast of the explosion site. White dust began to fall with a light rain around 7:00 AM and continued until around 11:30 AM. The shower was so heavy at one point that the crewmen could not open their eyes or mouths; the dust left on the deck was thick enough to create their footprints. Two weeks later, they returned to their home port in Japan and were eventually sent to a hospital and treated for radiation injuries for about a year. One of them died 206 days after his exposure. No mechanical or burn injuries were involved; the injuries sustained were from radiation alone. (American authorities disputed the cause of this one death.)

Exposure mode.

The fallout on the boat contained 26 nuclides. The presence of uranium 237 suggested that the bomb was of the type which used natural uranium as its outer component. The radiative intensity of the fallout at 7:00 AM, 1 March, is estimated at 1.4Ci/g. The fishing-boat crew received external gamma ray irradiation, internal irradiation from fallout intake, and beta ray irradiation from fallout on naked skin. External gamma ray irradiation is considered to have been the main cause of acute symptoms. The two-week doses of gamma ray varied but are estimated to have ranged from 170 to 600 rads. Radiochemical analysis of urine and external measurement of thyroid gland radioactivity showed internal irradiation. However, there were no cases of long-term presence of radioactive material in the men examined. The degree of skin injuries led to estimates that local skin exposure doses were roughly 1,000 rads or higher.

Clinical course.

The initial general symptoms appearing in the crew included fatigue, nausea, vomiting, and anorexia. Conjunctivitis was observed in all cases. Leukopenia, thrombopenia, and moderate or mild anemia also occurred. The minimum counts of leukocytes were all less than normal: 5 cases at a level of 3,000 per cubic millimeter, 13 cases at a level of 2,000 per cubic millimeter, and 5 cases at a level of 1,000 per millimeter. The minimum count of blood platelet was at a level of 1,000 per cubic millimeter. A few cases showed mild hemorrhagic tendencies. These findings correlated with the condition of the bone marrow. The affected bone marrow ran a course from aplasia to hypoplasia to partial recovery to normalization. As the bone marrow recovered, peripheral blood-cell counts approached normal levels. A temporary decrease in the number of spermatozoa was found, but signs of recovery appeared two years after exposure, and there was no permanent exposure-related sterility.

The main site of injury was the exposed areas of the skin. Working clothes, gloves, and shoes played an unexpected role in protecting the crew from beta ray exposure. Skin injuries developed in this sequence: erythema, edema, bulla, and erosion. Ulceration and recovered after a few months in most instances. Some individuals showed depigmentation, pigmentation, telangiectasia, or atrophy of the skin without, however, signs of carcinogenesis for many years.

Thyroid nodules were observed in the major of the Marshall Islanders who were 10 years or younger at the time of nuclear test. One of these cases died from acute myelogenous leukemia 18 years after exposure.

21. Species Information

Name of Species: Many ( including human beings, fish, etc)  
Type: Many  
Diversity: Many

22. Impact and Effect: HIGH and PRODUCT

23. Urgency and Lifetime: Low and 1000s of years

They depends on a degree of the destructive power of nuclear bomb and the distance from the testing place.

24. Substitutes: LIKE

As for fish, the industry could change the fishing-place to safer areas, or turn to fish-farm in the safer water.

F. Other Factors

25. Culture: NO

26. Human Right: YES

Radioactive fallout inflicted radiation injuries on 23 Japanese fishermen ( One of them died 206 days after his exposure), 239 Marshall Islander (This is a reported number, however; there could be more on them), and 28 Americans, who were all at a great distance from the test site. In addition, in Japan, as contaminated fish was found, Japanese people were exposed to the menace of secondary contamination by eating contaminated fish. The fish industry was tremendously damaged. Thus , human-right must be seemed as a factor in this case.

27. Trans-Border: YES

As mentioned above, this case of nuclear testing affected not only 23 crew members of Daigo fukuryu maru, but also Marshall Islanders, Americans and other Japanese people.

28. Relevant Literature.

Lapp, Ralph E., "The Voyage of the Lucky Dragon", Haper & Brothers Publishers, New York, 1958.

Dibblin, Jane, " Day of Two Suns, US Nuclear Testing and the Pacific Islanders", New Amsterdam Book, New York, 1990.

#### References

1. Ralph E. Lapp, "The voyage of the Lucky Dragon," (Haper & Brothers Publishers, 1958), pp. 126.
2. Ralph E. Lapp, "The voyage of the Lucky Dragon," (Haper & Brothers Publishers, 1958), pp. 126.

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