truthout

Friday 8 April 2011

Radiation, Japan and the Marshall Islands

Friday 8 April 2011
by: Glenn Alcalay, Truthout

When the dangerous dust and gases settle and we discover just how much radiation escaped the damaged Fukushima reactors and spent fuel rods, we may never know how many people are being exposed to radiation from the burning fuel rods and reactor cores or how much exposure they will receive over time. Minute and above-background traces of iodine-131 are already showing up in Tokyo's water supply - 150 miles southwest of the leaking reactors - and in milk and
spinach (with a dash of cesium-137) from 75 miles away. The Japanese government has recently warned pregnant women and children to avoid drinking Tokyo tap water, and I-131 levels 1,200 above background levels were recorded in seawater near the reactors.

A nuclear test is detonated on the Enew etak Atoll, a segment of the Marshall Islands, on November 15, 1952. (Photo: United States Department of Energy)

Aside from sharing the dubious distinction of having been at the receiving end of America's nuclear weapons, Japan and the Marshall Islands now share another dubious distinction. The unleashed isotopes of concern from the damaged Japanese reactors - iodine-131, cesium-137, strontium-90 and plutonium-239 - are well known to the Marshall Islanders living downwind of the testing sites at Bikini and Enewetak atolls in the Central Pacific following 67 A- and H-bombs exploded there between 1946 and 1958. In fact, it is precisely these isotopes that continue to haunt the 80,000 Marshallese 53 years after the last thermonuclear test in the megaton range shook their pristine coral atolls and contaminated their fragile marine ecosystems.

In fact, it was the irradiated downwind Marshallese on Rongelap and Utrik in 1954 caught in the Bravo fallout - and I-131 - that taught the world about the thyroid effect from the uptake of radioactive iodine.

The United States' largest (fusion) hydrogen bomb, Bravo, was 1,000 times the Hiroshima atomic (fission) bomb and deposited a liberal sprinkling of these and a potent potpourri of 300 other radionuclides over a wide swath of the Central Pacific and the inhabited atolls in the Marshalls' archipelago in March 1954 during "Operation Castle."

The Rongelap islanders 120 miles downwind from Bikini received 190 rems, or 1.9 Sieverts (Sv) of whole-body gamma dose before being evacuated. The Utrik people 320 miles downwind received 15 rems (150 mSv) before their evacuation. [1]Many of the on-site nuclear workers at Fukushima have already exceeded the Utrik dose in multiples.

Also entrapped within the thermonuclear maelstrom from Bravo was the not-so-Lucky Dragon (Fukuryu Maru) Japanese fishing trawler, with its crew of 23, fishing for tuna near Bikini.[2]

As the heavily exposed fishermen's health quickly deteriorated after Bravo, the radio operator Aikichi Kuboyama died of a liver illness six months after his exposure; his is now a household name in Japan and is associated with the "Bikini bomb."[3]

Meanwhile, the Japanese fishing industry was rocked when Geiger counters registered "talking fish" (what the Japanese called the clicking sound of the contaminated fish being monitored) among the 800 pounds of tuna catch of the Lucky Dragon in Yaizu and in local fish markets. Much of the Japanese tuna at the time was caught by a fleet of 1,000 fishing boats operating in the fertile tuna waters near the United States' Pacific Proving Ground in the Marshalls.[4]

In response to the plight and symbolism of the Lucky Dragon, Japanese women collected 34 million signatures (representing about one-third of the population) on petitions advocating the immediate abolition of both atomic and hydrogen bombs in 1955. Pugwash, the Nobel Peace Prize-winning anti-nuclear organization, was founded in 1955 by Bertrand Russell and Albert Einstein in response to Bravo. The dangers of radioactive fallout from Bravo inspired Nevil Shute's

classic nuclear dystopia "On the Beach," as well as "Godzilla."

To quell the diplomatic furor - whereby the Japanese representative to the UN accused the United States in March 1954 of "once again using nuclear weapons against the Japanese people"[5]- the United States paid $2 million to the fishing company that owned the Lucky Dragon; each of the 23 fishermen ended up with the princely sum of $5,000 in 1956 and the tuna company kept the rest.[6]

The Atomic Energy Commission (AEC) chair Lewis Strauss (who originally proposed nuclear energy "too cheap to meter" in the post-war Atoms for Peace program) told President Eisenhower's press secretary James Hagerty in April 1954 that the Lucky Dragon was not a fishing boat at all - it was a "Red spy outfit" snooping on the American nuclear tests.[7]

The legacy of latent radiogenic diseases from hydrogen-bomb testing in the Marshall Islands provides some clues about what ill-health mysteries lie ahead for the affected Japanese in the coming decades. Also, the Marshall Islands provide insight about ecosystem contamination by these dangerous radioactive isotopes and what this means for the affected Japanese.

Profiles of the Four Isotopes
•Iodine-131(radioactive iodine) has a half-life of eight days and concentrates in the thyroid gland about 5,000 times more efficiently than in other parts of the body. Traces of I-131 have been discovered in Tokyo drinking water and in seawater offshore from the reactors. It took nine years for the first thyroid tumor to appear among the exposed Marshallese, and hypothyroidism and cancer continued to appear decades later.[8]

•Cesium-137has a half-life of 30 years and is a chemical analog of potassium; Cs-137 concentrates in muscle and other parts of the body. Rongelap Island has a new layer of topsoil containing potassium to help neutralize the Cs-137 left over from the H-bomb tests, but the Marshallese residents remain unconvinced and suspicious about the habitability of their long-abandoned home atoll. Meanwhile, the US is pressuring hard for their repatriation, despite the fact that most islands at Rongelap will remain off limits for many decades, with strict dietary restrictions on local foods.

•Strontium-90has a half-life of 28 years, is a chemical analog of calcium and is known as a "bone seeker"; Rongelap and the other downwind atolls have residual Sr-90 in their soils, groundwater and marine ecosystems.

•Plutonium-239has a half-life of 24,000 years, is considered one of the most toxic substances on earth and, if absorbed, is a potent alpha emitter that can induce cancer. This isotope, too, is found in the soils and groundwater of the downwind atolls from the Bikini and Enewetak H-bomb tests.

Lessons from the Marshall Islands
It tooknine yearsafter exposure to the 1954 Bravo fallout for the first thyroid tumor and hypothyroidism to occur in an exposed Utrik woman from the I-131. Several more tumors (and other radiogenic disorders) among the exposed people appeared the following year and every year thereafter.The latency period for thyroid abnormalities and other radiogenic disorders (see below) endures for several decades.

Because a child's thyroid gland is much smaller than an adult's thyroid, it receives a higher concentration of I-131 than an adult dose. Also, because a child's thyroid gland is growing more quickly than an adult's, it requires and absorbs more iodine (and I-131) than an adult thyroid gland. That is, the thyroid effect is age-related.

The Majuro-based Nuclear Claims Tribunal (NCT) was established in 1988 to settle all past and future claims against the US for health injury and property loss damages from the nuclear tests. As of 2006, the NCT had paid out $73 million (of the $91 million awarded) for 1,999 Marshallese claimants.There are 36 medical conditions that are presumed to be caused by the nuclear tests; eligibility for Marshallese citizens consists of having been in the Marshall Islands during the testing period (1946-58) and having at least one of the presumptive medical disorders.

The sociocultural and psychological effects (such as post-traumatic stress disorder) of the Fukushima nuclear disaster will be long-lasting given the uncertainty surrounding the contamination of its prefecture and beyond. Psychiatrist Robert Jay Lifton eloquently detailed this uncertain future and fears about "invisible contamination" concerning the Hiroshima and Nagasaki "hibakusha" (or A-bomb survivors) in his award-winning 1968 magnum opus, "Death in Life."

Noted radiation experts John Gofman, co-discoverer of U-232 and U-233 and author of "Radiation and Human Health," Karl Z. Morgan, a founder of health physics, and Edward Radford, chair of the National Academy of Sciences' Biological Effects of Ionizing Radiation (BEIR) III and adviser to the NCT, stated that there isno threshold for low-level ionizing radiation. Any amount of radiation - which is cumulative - can pose a health threat for certain individuals.

1. Robert Conard, "March 1957 medical survey of Rongelap and Utrik people three years after exposure to radioactive fallout," Upton, N.Y. Brookhaven National Laboratory, BNL 501, June 1958, p. 22.
2. Ralph Lapp, "The Voyage of the Lucky Dragon," Harper & Brothers Publishers, 1958, p. 83.
3. Stephen Salaff, "The Lucky Dragon," Bulletin of the Atomic Scientists, May 1978, p. 22.
4. Lapp, p. 83.
5. Robert Divine, "Blowing on the Wind: The Nuclear Test Ban Debate," 1954-1960, New York: Oxford Univ. Press, 1978,

p. 6.
6. Congress of Micronesia: "Interim Report by the Special Joint Committee Concerning Rongelap and Utrik Atolls," May 16, 1972, pp. 1-2. Saipan, Mariana Islands. 5-16-72.
7. Robert Divine, op. cit., p. 11.
8. Robert Conard, "Fallout," Brookhaven National Laboratory, Informal Report, BNL 46444, September 1992, p. 23.