

The Fukushima Fish Story

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Reassuring the public about something dangerous is tricky

It's true that the most intensely radioactive part of the Pacific Ocean currently is the area closest to Fukushima, Japan, where the destroyed nuclear power plant continuously adds to the radiation burden in the aquatic food chain. It's equally true – and somewhat less scary – that Fukushima is but the most recent, best known source of radioactive pollution in a body of water that had a natural, low level of radioactivity long before any human started making it worse.

The Japanese <u>Nuclear Regulation Authority</u> (NRA) has an elaborate sea area monitoring program around Fukushima and publishes the results of its findings in <u>detailed charts</u> that are likely opaque to most people (and offer data that was collected months ago). Looks like the water has plenty of Cesium-134, Cesium-137, and Strontium-90, but not so much Plutonium-238, Plutonium-239, or Plutonium-240. How bad that is is hard to tell, in part because Fukushima's operator, TEPCO (Tokyo Electric Power Company), withheld 140 of their measurements of Strontium-90 and other radioactive substances for most of late 2013, <u>TEPCO admitted</u> in early January.

When the available information is either withheld or hard to understand, it's little wonder there's almost no public trust in the people in charge. When unofficial information is also unreliable, it gets harder and harder to get a handle on what's real, other than the fact it's not good.

"Fish with very high levels of Cesium"

Here's an example of the problem: A <u>story from Japan</u> on January 11 featured a worrisome headline: "Fish with very high levels of cesium found near Fukushima." Of course that's also reassuring for most of us: the fish was found, and it was near Fukushima, not California. But still, radioactive fish – that's scary isn't it? Yes and no, actually.

No, not so scary: Turns out the headline meant only "a fish," a black sea bream in fact, one of 37 black sea bream that scientific researchers caught in October-November 2013. Oh, but actually, the story mentions, there were two other fish with elevated radiation, while 34 "were within the safety limits, according to the Fisheries Research Agency." The story doesn't report the actual "safe" level, but says "the black sea bream had 12,400 becquerels per kilogram of radioactive cesium, 124 times the safety standards for foodstuffs," which supports a calculation that 100 Bq per kg is the "safe" level. The other two unsafe fish were measured with 426 and 197 Bq per kg respectively. The fish were caught within 22 miles of Fukushima, in water where commercial fishing is restricted.

Looked at from the official American perspective, this story gets even less scary. The black sea bream with 12,400 Bq per kg of radiation is still too hot to eat safely, but the other two over the Japanese limit are well within the <u>American safety</u> level of 1,200 Bq per kg. Equally casually, the U.S. Dept. of Energy website for "the <u>situation in Japan</u>" was last updated about a year ago.

Yes, it's a little scary, or at least cautionary: Any fish that radioactively hot certainly poses some small threat to its handlers, but the greater threat is the potential damage it could do to a diner. External exposure to even the highest of these levels of radiation for brief periods of time is pretty close to harmless under most circumstances, especially the older you are. But someone who eats a hot fish risks internal exposure for a much longer time, with a much greater risk of harm – though there might not be, for any given person, any consequential damage.

Looked at from the official <u>South Korean</u> perspective, this story gets even more scary. In September 2013, South Korea banned the import of all Japanese fish caught within about 200 miles of Fukushima. "The South Korean government made the move because of insufficient information from Tokyo about what steps will be taken to address the leakage of contaminated water from the Fukushima Dai-ichi nuclear power plant, according to a statement by the Ministry of Oceans and Fisheries," CBS News reported September 6.

A month later, the Japanese government appealed to the supra-national World Trade Organization (WTO) "to intervene on South Korea's atomic fish ban" (as headlined in the South China Morning Post). Japanese officials said that South Korea was the only country with such an expansive ban on Japanese fish. They said they were hoping that discussion in the WTO would persuade South Korea to withdraw the ban voluntarily, since a WTO lawsuit would likely take years to conclude. As of January 2014, the South Korean ban apparently remains in effect.

Is it a scare story if it's rational to be scared?

Despite its somewhat misleading headline, the story from Asahi Shimbun did not seem designed to be a scare story. It didn't even mention the danger from consuming radioactive food, or define a Becquerel of radiation.

The World Nuclear Association, an <u>industry group</u>, offers this definition: "Apart from the normal measures of mass and volume, the amount of radioactive material is given in becquerel (Bq), a measure which enables us to compare the typical radioactivity of some natural and other materials. A becquerel is one atomic decay per second, and each disintegration produces some ionising radiation."

A chart that follows this, which is apparently intended to be reassuring, compares the amount of radioactivity in a variety other substances (uranium ore, smoke detector, coal ash) with the amount of radioactivity in "1 adult human," which is pegged at 7,000 Bq, or 100 Bq per kg. That's also the "safe" limit for eating radioactive black sea bream in Japan – and it is enough to temporarily double a person's radiation load, which doesn't seem like a naturally good idea, but perhaps it's a better than multiplying your normal radiation load by 12 as allowed by American safe fish standards. Not surprisingly, those are questions that neither the newspaper nor the nuclear folks chose to explore.

That certainly seems to be the preference of Japanese prime minister Shinzo Abe, 59 - not

exploring nuclear questions. The prime minister, an avid nuclear booster, recently injected himself into the <u>current race</u> for Tokyo governor, suggesting that the candidates not focus on nuclear issues, but have a <u>"balanced" debate</u>.

The next day, January 14, a former prime minister and opponent of a nuclear Japan entered the race: Morihiro Hosokawa, 76, who announced that his candidacy would focus on creating a nuclear-free Japan. Hosokawa had resigned as prime minister in April 1994, after less than a year in office, amidst bribery charges that were never resolved. Hosokawa's candidacy was encouraged by another former prime minister, Junichiro Koizumi, who has emerged as one of Japan's leading nuclear-free advocates and who promises to campaign actively for Hosokawa.

The <u>Tokyo prefecture</u> includes the capital city as well as 39 other municipalities and a total population of 35 million people, all under the administration of the <u>Tokyo governor</u>. Tokyo's government is also the <u>biggest shareholder</u> in Tokyo Electric Power, operator of the <u>Fukushima plant</u>. The former <u>governor resigned</u> in December in the midst of a political funds scandal. The election campaign officially begins on January 23, with the election scheduled for February 9.

With the candidacy of Hosokawa, the race takes on increased <u>national significance</u> since, as Hosokawa said, "I have a sense of crisis myself that the country's various problems, especially nuclear power plants, are matters of survival for the country." Hosokawa and Koizumi are trying to make the Tokyo election a referendum on nuclear power for the country.

Meanwhile, the Fukushima site continues to leak radioactive groundwater into the Pacific, it continues to leak radioactive water from damaged containment tanks, Fukushima Unit #3 continues to belch radioactive steam periodically, and the <u>level of radioactivity</u> at the perimeter of the plant has <u>risen to 8 times</u> the officially "safe" level. The Nuclear Regulation Authority has increased the number of monitoring stations around Fukushima from 446 to 815. And the Japanese government is saying food produced in the Fukushima region <u>is safe</u> to eat, but neither consumers nor food producers trust the government's assurances.

And the <u>Fukushima Fish Story</u> continues to circulate <u>on the Internet</u>, getting a little scarier, if not more accurate, all the time.

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