

Early Radiation Data From Near Plant Ease Health Fears

by Richard Knox and Andrew Prince

March 18, 2011



Credit: Stephanie d'Otreppe/NPR

The first radiation measurements from within a 37-mile radius of the disabled Fukushima Dai-ichi power plant do not reveal any immediate health threat — and perhaps not even any health problems measurable decades from now, if levels stay where they are.

This may surprise people who assume that radioactivity in the vicinity of the plant must be dangerous, since radiation levels inside the plant are so high that workers can stay outside for only minutes at a time.

"This is very important information," says Hiroshima-based researcher Evan Douple, who has been studying the health of atomic bomb survivors for decades.

Douple says the new radiation levels, shown to him by NPR, "should be reassuring. At these levels so far, I don't think a study would be able to measure that there would be any health effects" — even years from now.

The radiation levels come from 46 monitoring posts scattered around the vicinity of the devastated power plant, from 12 miles to about 37 miles away. The readings were taken at two or three time points on Thursday and Friday and posted on the website of the Ministry of Education, Culture, Sports, Science and Technology. They're the first systematic, ground-level measurements to be made public since the crisis began last weekend.

The general picture is that radiation levels in the vicinity of the power plant are close to "background" levels at some locations. A background level is ever-present, low-level radiation given off by rocks, cosmic rays, fossil fuels and other natural sources. It accounts for about half the radiation exposure everyone gets, with medical tests accounting for the other half.

"Readings 10 times above background I don't think one would bat an eyelash at, really," says David Brenner, director of Columbia University's Center for Radiation Research.

The only exception to the generally low-level radiation measurements are from three monitoring posts northwest of the power plant that have measured levels 50 to 170 times higher than the other posts.

These three posts are clustered together at a point about 18 miles from the power plant.

It's not clear, experts said, that these higher levels have anything to do with emissions from the nuclear power plant. Radiation levels are affected by natural circumstances, such as rock outcroppings. Human activities can also raise local radiation levels, such as what appears to be a large strip-mining operation 13 miles northwest of the Fukushima power plant.

Douple, head of research at the Radiation Effects Research Foundation, a 60-year-old project funded jointly by the U.S. and Japan, calculates that if someone spent three weeks at the spot with the highest current radiation levels in this area of Fukushima prefecture, that individual would get 100 millisieverts of radiation.

That's about the same as having 10 abdominal CT scans. Douple calculates that, over decades, a 100 millisievert dose would result in one additional case of cancer among a group of 100 people with the age profile of the U.S. population. That is, instead of 42 cancers normally expected among these 100 people by the age of 70, there would be 43 cases.

"There are no health risks here," Brenner agrees. "If these numbers were to continue for the next week or two, there's still no immediate health risk."

As for the long term, he says, "whenever you get any increase in radiation dose, there will be a small elevation in cancer risk, but it would be very small."

Looking at it another way, a person could spend an entire year at this Fukushima "hot spot" and still not receive a lethal dose of radiation, although he might suffer some radiation symptoms, such as nausea.

Both Douple and Brenner raise a number of caveats about the new data.

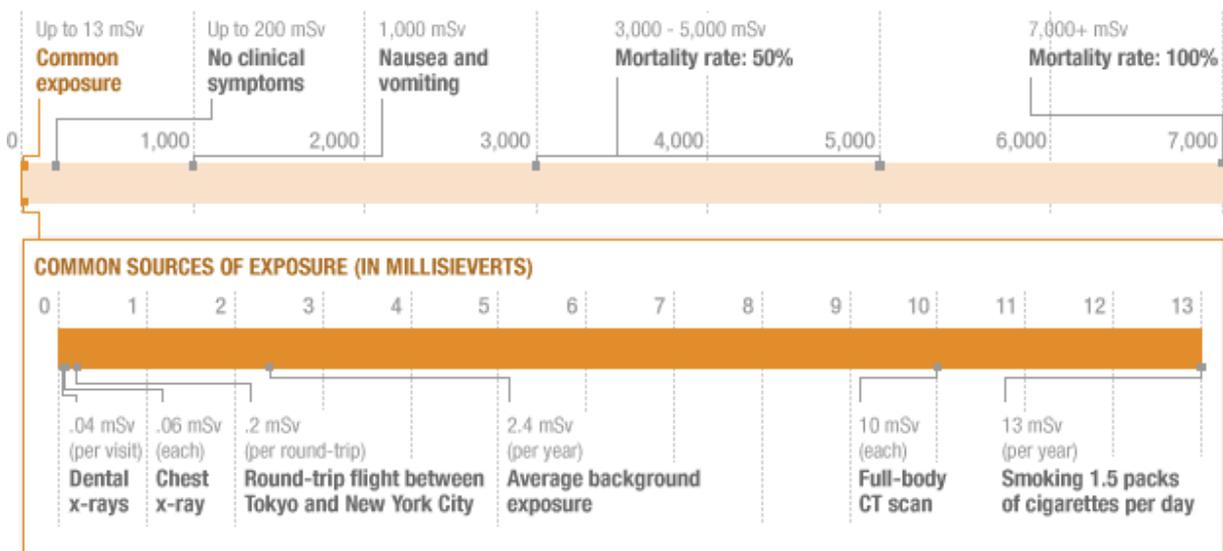
- It's not clear what the natural background levels of radiation are in this part of Fukushima prefecture. This would be necessary to know in judging whether the levels recorded this week are likely to be due to emissions from the power plant.
- There is no information so far on the types of radiation at these measuring posts. This could indicate whether the radioactivity is from radioisotopes such as iodine-131 or cesium-137 emanating from nuclear fuel rods in damaged reactor cores or spent fuel pools.
- None of the measurements so far are from monitoring posts located between the power plant's perimeter and a 12-mile radius from the plant — an area from which 170,000 residents have been evacuated. If levels are higher within this ring, that could be a clue that plant emissions are responsible.

Still, Brenner says, "this is good stuff. If we had a map like this every day for the next week — and maybe we will — I think we will really start to see trends. We need this information, and we need it over time."

Although it's too soon to call it a trend, there is a difference in the measurements at the three hot spot posts between Thursday and Friday. They went down over that 24-hour period. For instance, at monitoring post No. 31, levels went down from around 0.06 millisieverts per hour on Thursday to around 0.045 on Friday. At post No. 32, readings went down from as high as 0.17 on Thursday to 0.15 on Friday.

But at this point, it's impossible to say whether that's due to the instruments or the methods of measurement — or to true fluctuations in the radiation level.

Medical effects of exposure to radiation (in millisieverts)



Credit: Alyson Hurt and Andrew Prince/NPR

For comparison, an airline passenger on a flight from New York to Los Angeles would get 0.2 millisieverts of radiation from high-altitude cosmic rays.

By contrast, newly released radiation levels at the power plant were vastly higher — 3.6 millisieverts on Thursday morning in the middle of the plant, and 0.647 millisieverts per hour at the plant's main gate.