

Worried about a radioactive ocean? A reality check

April 6 2011, By MALCOLM RITTER , AP Science Writer



A South Korean environmentalist with umbrellas march in a rally demanding South Korean government to stop expanding nuclear power plants in Seoul, South Korea, Wednesday, April 6, 2011. Fears over possible radiation contamination are growing in South Korea, the country closest to Japan, after Japanese nuclear power plants were damaged by earthquakes last month.(AP Photo/Ahn Young-joon)

(AP) -- This week, workers at the stricken Japanese nuclear plant dumped radioactive water into the ocean to make room for storing even more highly contaminated water on the site. The water dumping came after earlier leaks of radioactive water that had already raised concerns about its effects in the ocean, raising questions about health and safety. Here are answers to some of those questions.

Q. Can you see [radiation](#)?

A. No, you can't see, taste or smell it.

Q. How does radiation travel?

A. In the air, it moves as energy waves. That's how an X-ray machine looks inside you. At the Japanese [nuclear plant](#) complex, workers have been exposed to such waves, as well as radioactive particles. Over long distances, tiny radioactive particles on dust are blown by the wind. It can come back down to Earth with rain.

In the water, microscopic radioactive particles are carried along by the currents.

Q. How dangerous is radiation?

A. We live in a world of radiation. It is in the water we drink, the food we eat, the very air we breathe. Most of the radiation we are exposed to comes from outer space, the decaying of uranium in the earth, and medical procedures like X-rays and CT scans.

Q. How is radiation measured?

A. Radiation is often measured as a dose or exposure - the amount of radiation absorbed over a certain time. It's generally measured in millirems in the United States, and millisieverts elsewhere. The average place on Earth exposes people to about 300 millirems, or 3 millisieverts, every year. A chest X-ray exposes a patient to about 10 millirems, or 0.1 millisievert.

Q. How can radiation hurt us?

A. Too much radiation in a short time can cause deadly radiation sickness, with its signature symptoms of nausea, dizziness and hair loss.

High doses can also cause cancer decades later. It can lead to congenital defects in future children of exposed adults.

Q. So how much radiation is too much radiation?

A. Natural background radiation in the environment varies greatly at different places on Earth, depending on altitude, geology and other factors. In theory, any increase in radiation can lead to a higher risk of cancer. In practice, though, population studies find no apparent elevated risk of cancer even at the highest levels of background radiation. And the most respected radiation experts say people can tolerate at least 10,000 millirems (100 millisieverts) in a short period with no discernible harm. On the other hand, much larger doses - like 400,000 millirems or 4,000 millisieverts - will cause radiation sickness and cancer in many people. That would be the rough equivalent of 40,000 chest [X-rays](#).

Q. Can the radioactive water leaking from the Japanese nuclear plant eventually reach the U.S. and be hazardous?

A. It's hard to say how that water will move, because it will spread not only on the surface but downward in deep layers of the Pacific Ocean. If it does reach the West Coast, it would probably take at least 18 months to three years, by one estimate. In any case, nobody expects it would pose a radiation hazard upon arrival because of tremendous dilution along the way.

Airborne [radioactive particles](#) have already reached the United States, but federal authorities say the measured levels aren't dangerous.

Q. Weren't the workers at the nuclear plant treated for burns after coming into contact with radioactive water? What if someone swam in the ocean off the coast of Japan?

A. The kind of radiation levels the workers experienced cause sunburn-like burns in about a half-hour to an hour. But swimming near the plant is banned, and radiation levels of water dumped in the ocean decline quickly with distance from the complex.

Q. What radioactive elements are leaking and what are the risks?

A. Measurements so far have focused mostly on iodine and cesium, which were responsible for most of the radiation dose to the public at the Chernobyl disaster.

Radiation from iodine-131 dissipates quickly, falling by half every eight days, so that it's virtually gone in 80 days. Its danger is that if inhaled or swallowed, it can concentrate in the thyroid and cause cancer.

Cesium radiation sticks around much longer, taking 30 years to decline by half and 300 years to virtually disappear. Cesium can build up in the body and high levels are thought to be a risk for various other cancers. Still, researchers who studied Chernobyl could not find an increase in cancers that might be linked to cesium.

Q. Will ocean creatures be harmed by the discharges of the [radioactive water](#)?

A. Experts say animals very near the plant may face problems like higher rates of genetic mutations, but that this would probably happen within only maybe a half a mile or so.

More information:

Radiation readings at the nuclear complex: <http://bit.ly/dWZb8a>

Environmental readings in Japan: <http://bit.ly/eh1SxF>

Radiation readings off Japanese coast: <http://bit.ly/i7aPHR>

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