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# Japan's nuclear emergency

Damage at a nuclear power plant has made leaking radiation the primary threat facing a country grappling with devastation from a 9.0-magnitude earthquake and tsunami. For a narrated animation of what happened, click here.

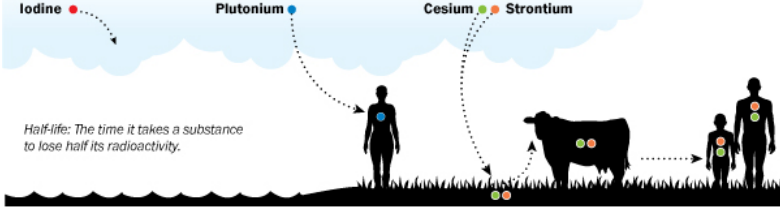
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## Radioactive contamination

Officials at the Fukushima Daiichi power plant said that highly contaminated water was found in tunnels outside the nuclear reactors, and they were concerned that it would spread to the soil or the surrounding seawater, where high radiation levels have been detected for days.

Of the hundreds of types of radioactive atoms that may have escaped the reactors, scientists are generally concerned about iodine, plutonium, cesium and strontium. Samples of vegetables and drinking water on March 26 and 27 detected iodine and cesium, but the majority of measurements remained below regulation values. Small amounts of plutonium were also found in the soil outside the plant, though not enough to pose a significant health risk.

- **IODINE-131**  
**Half-life:** 8 days  
 The thyroid slurps up iodine, including the radioactive kind, which immediately kills and mutates cells and can cause thyroid cancer. Its short half-life means that very little, if any, would make it across the Pacific.
- **PLUTONIUM-239**  
**Half-life:** 24,000 years  
 Plutonium is very toxic and dangerous if inhaled because lungs are particularly sensitive to radiation. (Oddly, it's not very harmful if you ingest it.) It appears likely that only small quantities of plutonium were released.
- **CESIUM-137**  
**Half-life:** 30 years  
 Radioactive cesium easily enters the food chain through milk and vegetables. If inhaled or ingested, it acts like potassium but continues to emit radiation inside the body. It can increase the risk of many forms of cancer.
- **STRONTIUM-90**  
**Half-life:** 29 years  
 Like cesium, this form of strontium stays in the environment and mimics calcium if it is ingested, becoming part of bones and teeth. It can increase the risk of bone cancer and leukemia.



GRAPHIC: Wilson Andrews, Alberto Cuadra, Bonnie Berkowitz, Patterson Clark, Laris Karklis, Nathaniel Vaughn Kelso, Todd Lindeman, Alicia Parlapiano, Jason Samenow, Laura Stanton, Gene Thorp, Bill Webster, Karen Yourish - The Washington Post. Updated March 25, 2011.



### Video: Inside Japan's nuclear emergency

Watch how the crisis at the Fukushima Daiichi power plant unfolded in this narrated animation.



### Map: A wave of destruction

See how the powerful tsunami barreled across the Pacific.



### Recent quakes in Japan

Japan is one of the most active seismic areas in the world. More than a thousand earthquakes of 4.0 magnitude or greater have struck in and around the country since 2009.

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SOURCES FOR "JAPAN'S NUCLEAR EMERGENCY": Tokyo Electric Power Company; Mitch Singer, Biff Bradley, Rod McCullum and Alex Marion, Nuclear Energy Institute; IAEA; The National Academies Press; "Power Plant Engineering;" "Nuclear Reactor Engineering; Reactor Systems Engineering;" Bulletin of the Atomic Scientists; Japan Ministry of Land, Infrastructure and Transport; Nuclear and Industrial Safety Agency of Japan; Nuclear Regulatory Commission; U.S. Food and Drug Administration; Kenneth D. Bergeron, Training Centre for Nuclear Technology; International Nuclear Safety Center; Argonne National Laboratory; U.S. Dept of Energy; Global Seismic Hazard Assessment Program; United Nations Population Division; World Health Organization, World Nuclear Association; NOAA Hysplit Model; U.S. Nuclear Regulatory Commission; Environmental Protection Agency; Japan Nuclear Energy Safety Organization; CDC; Health Physics Society; Physicians for Social Responsibility; Thomas McKone, senior staff scientist at the Lawrence Berkeley National Laboratory; General Electric.