UPDATED May 1, 2011

Status of the Nuclear Reactors at the Fukushima Daiichi Power Plant

None of the six reactors at the plant have operated since the earthquake. But explosions have damaged four of the buildings, and fuel in the reactors and spent fuel stored in the buildings has partially melted, releasing radioactive materials. Updated as of April 29, 4 p.m. EDT. All reactor status updates are listed in Japan time.

Reactor 1

APRIL 29, 11:36 AMA remote-controlled robot goes into the reactor building and finds no significant water leakage from the primary containment vessel.

APRIL 29, 10:14 AMThe water injection rate in the reactor is reduced to about 1,600 gallons an hour from 2,600 gallons.

APRIL 28, 9:00 AMThe water injection rate in the reactor is set at about 2,600 gallons an hour.

APRIL 27, 10:02 AMIn an effort to determine the proper water injection rate into the reactor to cool it, operators gradually increase the rate to about 3,700 gallons an hour from about 1,600 gallons an hour.

APRIL 26, 11:35 AMRadiation readings taken by a romote-control robot inside the reactor building are substantially the same as several days earlier and still too high for workers. The robot finds that there is no significant water leakage from the primary containment vessel.

APRIL 17, 4:00 PMA remote-control robot finds radiation levels inside the reactor building are as high as 49 millisieverts per hour, which is too high to allow people to work inside it. (The limit for American workers is 50 per year.)

APRIL 17, 11:15 AMSandbags containing a radioactive absorption material (zeolite) are put in the screen pump rooms between reactors No. 1 and 2.

APRIL 14, 12:20 PMTo prevent run-off of radioactive water to the sea, workers install a silt fence in front of a screen going to the reactor building.

APRIL 13The temperature at a nozzle near the top of the reactor that is injecting water into it continues to improve; the temperature is 403 degrees Fahrenheit. But that is still well above the normal temperature (203 degrees) if the reactor were in cold shut down.

APRIL 11, 5:16 PMAn earthquake of 7.1 magnitude cuts the off-site power and water injection into the reactor stops. Power is restored and water injection resumes at 6:04 PM. Injection of nitrogen to prevent a hydrogen explosion resumes at 11:34 PM.

APRIL 11, 10:45 AMWorkers install a 120-meter wide fence around a breakwater to the South of the plant (which is near Reactor No. 1) to prevent radioactive water from spilling into the sea.

APRIL 10The temperature at a nozzle near the top of the reactor that is injecting water into it is 455 degrees Fahrenheit.

APRIL 10, 9:30 AMFinish transferring water from the condenser to a storage tank, freeing up the condenser to process radioactive water.

APRIL 7, 1:31 AMBegin injecting nitrogen into the reactor containment vessel to reduce the risks of an explosion from hydrogen that might be building up in the reactor.

APRIL 6, 11:30 AMHighly levels of radioactivity are found in water in the basement of the turbine building.

APRIL 6, 9:00 AMConcerns rise that hydrogen, which is highly explosive when it combines with oxygen, is building up in the reactor containment vessel. Operators begin to consider injecting nitrogen, which is an inert gas that can displace oxygen, reducing the risk of an explosion.

APRIL 5, 11:00 PMThe temperature at a water nozzle injecting water into the reactor is 453 degrees Fahrenheit. Though the reactor is still warmer than if it were in a cold shut down, the temperature has fallen steadily over the last few days.

APRIL 4, 9:15 PMThe temperature at a nozzle that injects water into the reactor is 469 degrees Fahrenheit.

APRIL 3, 1:55 PMBegin transferring water from the condenser's storage tanks to storage tanks connected to the water suppression pool.

APRIL 3, 12:02 PMBegin injecting water from a motor-driven pump that is powered by electricity from a source outside the plant.

APRIL 2, 3:30 PMOperators finish pumping water from the condenser's storage tanks to storage tanks of the suppression water pool.

APRIL 2, 2:00 PMThe temperature at a nozzle that injects water into the reactor is 499 degrees Fahrenheit, up from 491 degrees the day before.

APRIL 1, 6:00 AMThe temperature at a nozzle that injects water into the reactor is 491 degrees Fahrenheit, which is below the operating temperature of the reactor, but much warmer than if the reactor was shut down.

MARCH 31, 1:03 PMBegin injecting water into the reactor using a concrete pumping vehicle.

MARCH 31, 12:00 PMWater is pumped from the condenser's storage tanks to storage tanks connected to the suppression pool in order to create more space to drain water from the turbine building.

MARCH 31, 9:20 AMWater accumulated in the vertical shaft of the reactor is transferred to a reservoir in the centralized environmental facility of the power plant. The transfer take two hours.

MARCH 30, 2:00 PMTemperature at a nozzle feeding water to the reactor has dropped to 518 degrees Fahrenheit, which remains higher than the normal operating temperature of the reactor.

MARCH 29Traces of niobium, tellurium, ruthenium, iodine and cesium — all products of fission — are found in the water trench under the reactor.

MARCH 29, 12:00 PMTemperature at a nozzle feeding water to the reactor is 589 degrees Fahrenheit.

MARCH 29, 8:20 AMPlant workers switch from fire engines to an electrical pump to inject fresh water into the reactor.

MARCH 29, 7:30 AMAfter draining water for more than four days into the condenser from the basement of the turbine buildings, the operation is suspended as the storage tank on the condenser nears capacity.

MARCH 29, 6:00 AMTemperature at a nozzle feeding water to the reactor has risen to 614 degrees Fahrenheit, which is more than 100 degrees above the regular operating temperature of the reactor.

MARCH 28, 11:30 PMPumping of contaminated water from the basement of the turbine building to the main condenser is underway.

MARCH 28Radioactive materials are found in puddles in the turbine building.

MARCH 27, 10:30 PMTemperature at the bottom of the reactor is 288 degrees Fahrenheit, which is warm for a reactor that has shut down.

MARCH 27, 6:00 PMAs part of the efforts to restore power, workers begin to pump water from the turbine building to the main condenser.

MARCH 27, 3:30 PMWater contaminated with low-levels of radioactivity is found in a tunnel leading from the reactor.

MARCH 27High levels of radioactive iodine and cesium are found in pools of stagnant water on the floor of the turbine building.

MARCH 27, 9:00 AMTemperature at a nozzle feeding water to the reactor has risen to 437 degrees Fahrenheit, which is within the zone of regular operating temperatures, but very warm for a reactor that has shut down.

MARCH 27, 6:00 AMTemperature at a nozzle feeding water to the reactor is 415 degrees Fahrenheit.

MARCH 26, 11:30 PMTemperature within the reactor has dropped to 291 degrees Fahrenheit, which is still above "cold" shutdown temperatures of less than 100 degrees.

MARCH 26, 8:00 AMFreshwater injection continues. White smoke continues to emanate from the building.

MARCH 25, 3:37 PMFreshwater is now being injected into the reactor. There have been reports that the use of saltwater in Reactor 3 may be dislodging highly radioactive cobalt and molybdenum.

MARCH 25, 6:20 AMWhite smoke being emitted continuously.

MARCH 24, 6:05 PMTemperature within the reactor has dropped to 424 degrees. White smoke continues to rise from the unit.

MARCH 24, 11:30 AMLights in the main control room are restored, which is an important step in restoring power to the building.

MARCH 24, 10:50 AMWhite, fog-like steam is seen rising from the reactor building.

MARCH 24, 1:00 AMTemperature within the reactor has dropped to 469 degrees Fahrenheit, but remains well above temperature if it was in "cold" shut down.

MARCH 23, 6:00 PMThe reactor temperature is approximately 580 degrees Fahrenheit (normal is around 500 degrees, if it were operating; shut down temperature is cooler).

MARCH 23, 2:33 AMTemperature in the reactor is about 750 degrees Fahrenheit. The amount of injected water is increased.

MARCH 22, 11:00 PMLike the day before, radioactive isotopes of cobalt, iodine and cesium are found in seawater near the discharge canal of the reactor.

MARCH 22, 7:30 AMSeawater continues to be injected into the reactor to cool it.

MARCH 21, 9:40 PMRadioactive isotopes of cobalt, iodine and cesium are found in seawater near the discharge canal of the reactor.

MARCH 19, 1:30 PMPressure within the reactor containment vessel appears to be stable.

MARCH 18, 9:45 PMJapanese authorities raise the assessment of severity of the accident to a 5 out of 7 on the international nuclear event scale.

MARCH 18The plant expects to run a power cable to the reactor by Saturday to restart water pumps needed to cool fuel rods.

March 12, 8:20 PMWorkers start flooding the reactor with seawater in a desperate effort to cool it.

MARCH 12, 5:00 PMRadioactive materials, including an isotope of iodine, are detected.

March 12, 3:36 PMAn explosion blows the roof and top walls off the reactor building. The reactor containment vessel is not significantly damaged.

March 12, 5:22 AMThe pressure-suppression pool stops working properly.

March 12, 3:48 AMOperators start injecting water into the reactor to cool it.

March 11, 3:41 PMBackup diesel generators for running the plant's cooling systems fail.

March 11, 2:46 PMAn earthquake sparks a tsunami. The reactor shuts down automatically, though its fuel continues to produce large amounts of heat.

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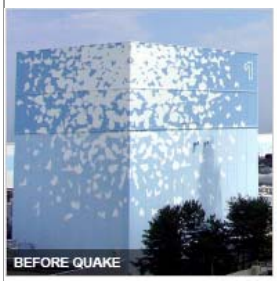
There was a partial meltdown of the reactor's fuel assemblies (about 55 percent of the fuel was damaged, according to latest estimates) and radioactive materials have leaked into the environment, in large but unknown quantities. The steel reactor core may have been breached by molten fuel.



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Reactor 2

APRI 28, 10:15 AMWater is injected into the spent fuel pool until 11:28 AM.

APRIL 25, 10:12 AMFresh water is injected in the spent fuel pool for just over an hour.

APRIL 21Workers finish putting grout in a crack in a pit where cables are stored. Highly radioactive water had poured from the crack for several days earlier in the month. Though the leak had been plugged, the crack had continued to be a concern. The pit continues to be filled with highly radioactive water.

APRIL 19, 4:08 PMWater is sprayed on the spent fuel pool for 80 minutes.

APRIL 19About 1,850 gallons of liquid glass are injected into the power cable trench that leaked radioactive water earlier in the month.

APRIL 19, 10:08 AMWorkers begin to pump 10,000 tons of highly contaminated wastewater water from the turbine building to a radiation treatment facility in another part of the plant.

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There was a partial meltdown of the reactor's fuel assemblies (about 35 percent was damaged, according to the latest estimates) and molten fuel may have breached the reactor's steel core. An explosion has damaged part of the primary containment vessel around the core, allowing large amounts of highly radioactive water used to cool the reactor to leak out.

Reuters

Digital Globe

Reactor 3

APRIL 27To prevent the spread of radioactive material, dust inhibitor is sprayed over almost 81,000 square feet of ground near the sea.

APRIL 26, 12:25 PMWater is sprayed on the spent fuel pool. The spraying ends at 2:02 PM

APRIL 22, 2:19 PMWater is sprayed on the spent fuel pool. The spraying ends at 3:40 PM

APRIL 22, 1:40 PMFresh water is injected into the spent fuel pool for 20 minutes.

APRIL 18, 2:17 PMWater is sprayed on the spent fuel pool for 45 minutes.

APRIL 17, 11:30 AMA remote-control robot finds radiation levels inside the reactor building are as high as 57 millisieverts per hour, which is too high to allow people to work inside it. (The limit for American workers is 50 per year.)

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The reactor used uranium and plutonium, which produces more toxic radioactivity. There was a partial meltdown of the reactor's fuel assemblies (about 30 percent was damaged, according to the latest estimates) and the reactor containment vessel may have been damaged. The spent fuel pool may also have become uncovered.

Reuters

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Reactor 4

APRIL 27, 12:18 PMWater is sprayed on the spent fuel pool until 3:15 PM.

APRIL 26, 4:50 PMWater is sprayed on the spent fuel pool until 8:35 PM.

APRIL 25, 6:15 PMWater is sprayed on the spent fuel pool for more than six hours.

APRIL 24, 12:25 PMWater is sprayed on the spent fuel pool. The spraying ends at 5:07 PM.

APRIL 23, 12:30 PMWater is sprayed on the spent fuel pool. The spraying ends at 4:44 PM.

APRIL 21, 5:14 PMWater is sprayed on the spent fuel pool. The spraying ends at 9:20 PM.

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The reactor was empty at the time of the earthquake, but the fuel was in a spent fuel pool that may have been uncovered, causing a partial meltdown and the release of radioactive materials. An explosion and fire have damaged the building.

Reuters

TEPCO

Reactor 5

APRIL 28To prevent the spread of radioactive material, dust inhibitor is sprayed over almost 49,000 square feet of ground near the reactor.

APRIL 25, 10:30 AMDust inhibitor is sprayed on the ground, around the administration building and near other buildings to prevent diffusion of radioactive materials. In total, about 41,000 square feet is covered.

APRIL 24, 11:30 AMDust inhibitor is sprayed on the ground over more than 9,200 square feet to prevent diffusion of radioactive materials.

APRIL 9, 6:52 PMAfter five days, the discharge of slightly radioactive water from the sub-drain pits of Reactors 5 and 6 is completed. The discharge is 1,320 tons, instead of 1,500 tons, as the original estimate said it would be.

APRIL 4, 9:00 PMIn order to prevent equipment from being damaged, the plant's operator begins releasing into the ocean 1,500 tons of water contaminated with low levels of radioactive waste that has accumulated in the sub-drain pits of Reactors 5 and 6.

APRIL 2, 2:00 PMTemperature in the spent fuel pool is 99 degrees Fahrenheit (normal is 77 degrees).

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The reactor is shut down and the building is not damaged. As power has been restored, concern about that this part of the facility has abated.

Associated Press

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Reactor 6

APRIL 19, 11:00 AMWastewater that has accumulated in the basement of the turbine building is pumped to a condenser. The operation takes four hours.

APRIL 9, 6:52 PMAfter five days, the discharge of slightly radioactive water from the sub-drain pits of Reactors 5 and 6 is completed. The discharge is 1,320 tons, instead of 1,500 tons, as the original estimate said it would be.

APRIL 4, 9:00 PMIn order to prevent equipment from being damaged, the plant's operator begins releasing into the ocean 1,500 tons of water contaminated with low levels of radioactive waste that has accumulated in the sub-drain pits of Reactors 5 and 6.

APRIL 2, 2:00 PMTemperature in the spent fuel pool is 78 degrees Fahrenheit (normal is 77 degrees).

MARCH 25, 3:40 PMPower for the unit's cooling system is switched from temporary to permanent.

MARCH 22, 7:17 PMPower, which had been supplied from an emergency diesel generator, is now coming from an external source.

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The reactor is shut down and the building is not damaged. As power has been restored, concern about that this part of the facility has abated.

Associated Press

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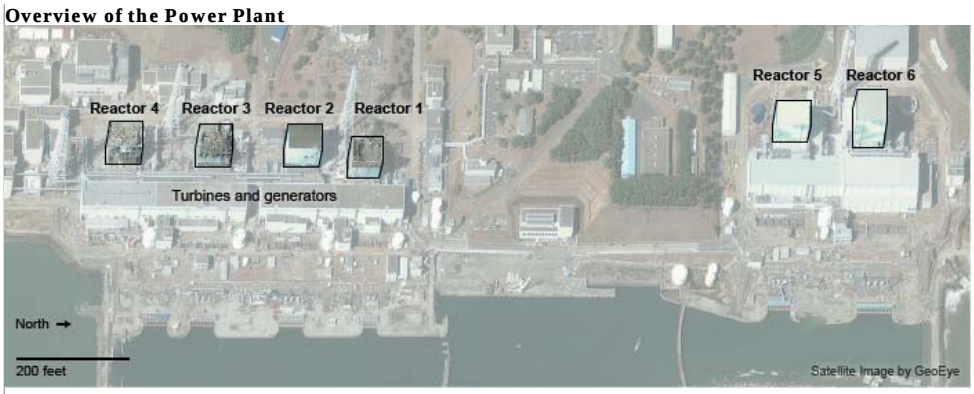
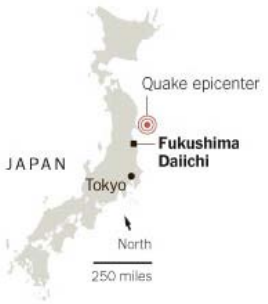
Overview of the Power Plant





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