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Snap analysis: Japan may have hours to prevent nuclear meltdown

9:55pm EST

By [Scott DiSavino](#)

NEW YORK (Reuters) - Japanese officials may only have hours to cool reactors that have been disabled by Friday's massive earthquake and tsunami or face a nuclear meltdown.

Tokyo Electric Power Co (TEPCO) (9501.T: [Quote](#), [Profile](#), [Research](#), [Stock Buzz](#)) is racing to cool down the reactor core after a highly unusual "station blackout" -- the total loss of power necessary to keep water circulating through the plant to prevent overheating.

Daiichi Units 1, 2 and 3 reactors shut down automatically at 2:46 p.m. local time due to the earthquake. But about an hour later, the on-site diesel back-up generators also shut, leaving the reactors without alternating current (AC) power.

That caused Tepco to declare an emergency and the government to evacuate thousands of people from near the plant. Such a blackout is "one of the most serious conditions that can affect a nuclear plant," according to experts at the Union of Concerned Scientists, a U.S. based nuclear watchdog group.

"If all AC power is lost, the options to cool the core are limited," the group warned.

TEPCO also said it has lost ability to control pressure at some of the reactors at its Daini plant nearby.

The reactors at Fukushima can operate without AC power because they are steam-driven and therefore do not require electric pumps, but the reactors do require direct current (DC) power from batteries for its valves and controls to function.

If battery power is depleted before AC power is restored, the plant would stop supplying water to the core and the cooling water level in the reactor core could drop.

RADIATION RELEASE

Officials are now considering releasing some radiation to relieve pressure in the containment at the Daiichi plant and are also considering releasing pressure at Daini, signs that difficulties are mounting. Such a release has only occurred once in U.S. history, at Three Mile Island.

"(It's) a sign that the Japanese are pulling out all the stops they can to prevent this accident from developing into a core melt and also prevent it from causing a breach of the containment (system) from the pressure that is building up inside the core because of excess heat," said Mark Hibbs, a nuclear expert at the Carnegie Endowment for International Peace.

While the restoration of power through additional generators should allow TEPCO to bring the situation back under control, left unchecked the coolant could boil off within hours. That would cause the core to overheat and damage the fuel, according to nuclear experts familiar with the Three Mile Island accident in Pennsylvania in 1979.

It could take hours more for the metal surrounding the ceramic uranium fuel pellets in the fuel rods to melt, which is what happened at Three Mile Island. That accident essentially froze the nuclear industry for three decades.

Seven years later the industry suffered another blow after the Chernobyl plant in Ukraine exploded due to an uncontrolled power surge that damaged the reactor core, releasing a radioactive cloud that blanketed Europe.

The metal on the fuel rods would not melt until temperatures far exceed 1,000 degrees F. The ceramic uranium pellets would not melt until temperatures reached about 2,000 degrees F, nuclear experts said.

If it occurred, that would ultimately cause a meltdown, with the core becoming a molten mass that would melt through the steel reactor vessel, releasing a large amount of radioactivity into the containment building that surrounds the vessel, the Union of Concerned Scientists said.

The main purpose of the building -- an air tight steel or reinforced concrete structure with walls between four to eight feet thick -- is to keep radioactivity from being released into the environment.

While there has not been any indication of damage that would undermine the building's ability to contain the pressure and allow radioactivity to leak out, there is a danger that if pressure builds too much then the walls could be breached.

(Reporting by Scott DiSavino; additional reporting by Fredrik Dahl in Vienna; Editing by [Jonathan Leff](#))



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