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On the Brink of Meltdown: The Fukushima Nuclear Power Plant

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Global Research, March 12, 2011
Institute for Policy Studies 12 March 2011

Region: Asia
Theme: Environment

The devastating Japanese quake and its outcome could generate a political tsunami here in the United States.

In the aftermath of the largest earthquake to occur in Japan in recorded history, 5,800 residents living within five miles of six reactors at the Fukushima nuclear station have been advised to evacuate and people living within 15 miles of the plant are advised to remain indoors.

Plant operators haven't been able to cool down the core of one reactor containing enormous amounts of radioactivity because of failed back-up diesel generators required for the emergency cooling. In a race against time, the power company and the Japanese military are flying in nine emergency generators. Secretary of State Hillary Clinton announced today that the U.S. Air Force has provided cooling water for the troubled reactor. Complicating matters, Japan's Meteorological Agency has declared the area to be at high risk of being hit by a tsunami.

The plant was operating at full power when the quake hit and even though control rods were automatically inserted to halt the nuclear reaction, the reactor core remains very hot. Even with a fully functioning emergency core cooling system, it would take several hours for the reactor core to cool and stabilize. If emergency cooling isn't restored, the risks of a core melt, and release of radioactivity into the environment is significantly increased. Also, it's not clear if piping and electrically distribution systems inside the plant have been damaged. If so, that would interfere with reactor cooling.

A senior U.S. nuclear power technician tells me the window of time before serious problems arise is between 12 and 24 hours.

Early on, Japanese nuclear officials provided reassurances that no radiation had been released. However, because the reactor remains at a very high temperature, radiation levels are rising on the turbine building – forcing to plant operators to vent radioactive steam into the environment.

The devastating Japanese quake and its outcome could generate a political tsunami here in the United States. For instance, it may become impossible for the owners of the San Onofre and Diablo Canyon reactors to extend their operating.

These two California reactors are sitting in high seismic risk zones near earthquake faults. Each is designed to withstand a quake as great as 7.5 on the Richter scale. According to

many seismologists, the probability of a major earthquake in the California coastal zone in the foreseeable future is a near certainty. The U.S. Geological Survey reports the largest registering 8.3 on the Richter scale devastated San Francisco in 1906.

"There have been tremblers felt at U.S. plants over the past several years, but nothing approaching the need for emergency action," Scott Burnell, a spokesman at the Nuclear Regulatory Commission told Reuters.

As the 25th anniversary of the Chernobyl nuclear catastrophe approaches next month, Japan's earthquake serve as a reminder that the risks of nuclear power, when things go seriously wrong. The Chernobyl accident required nearly a million emergency responders and cleanup workers. More than 100,000 residents from 187 settlements were permanently evacuated because of radioactive contamination. And area an equal to half of the State of New Jersey was rendered uninhabitable.

Fortunately, U.S. and Japanese reactors have extra measures of protection that were lacking at Chernobyl, such as a secondary concrete containment structure over the reactor vessel to prevent escape of radioactivity. In 1979, the containment structure at the Three Mile Island reactor did prevent the escape of a catastrophic amount of radioactivity after the core melted. But people living nearby were exposed to higher levels of radiation from the accident and deliberate venting to stabilize the reactor. With one hour, the multi-billion dollar investment in that plant went down the drain.

Meanwhile, let's hope that the core of the Japanese reactor can be cooled in time. We shouldn't need yet another major nuclear power accident to wake up the public and decision-makers to the fact that there are better and much safer ways to make electricity.

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