Report on Earthquake Damage to Japan's Kashiwazaki-Kariwa Nuclear Power Facility

In the early hours following the July 16 earthquake in Japan's Niigata Prefecture, when Tokyo Electric Power (TEPCO) was reporting only a transformer fire and spill of 1.5 liters of radioactive water, NIRS criticized TEPCO for being slow to report information and told the Associated Press that we were waiting "for the other shoe to drop."

That sound you hear is the rumble of an entire shoe factory tumbling to the ground.

It is now clear that the damage to the world's largest nuclear power facility was far greater than initially reported and that radiation releases were also far greater than reported. Indeed, it appears that radiation releases are continuing today (July 19, 2007). According to a report from Bloomberg News (http://www.bloomberg.com/apps/news?pid=20601087&sid=aCWh.1vTk3_Y&refer=home), 402 million Becquerels of radioactivity already have been released, although this government-supplied figure likely understates the reality, as radiation apparently continues to be released into the environment.

According to the Associated Press (http://www.pr-inside.com/a-look-at-problems-found-at-r174712.htm) on July 17, damage to the reactors was extensive. The AP found the following problems listed at that time:

A list of malfunctions at the seven-reactor Kashiwazaki-Kariya nuclear power plant in northwestern Japan following a powerful earthquake this week

* Fire at an electrical transformer facility.
* 1,200 liters of water containing radioactive material leaked into sea.
* About 100 barrels of radioactive waste knocked over in storage facility.
* Duct knocked out of place in major vent; possible leak of radioactive cobalt-60 and chromium-51 from five of the plant's reactors.
* Water leak inside buildings housing all seven reactors.
* Malfunctioning of water intake screening pump at two reactors.
* Blowout panel knocked down at turbine buildings at two reactors.
* Oil leak from low-activation transformer waste oil pipes at two reactors.
* Loss in water-tight seal at reactor core cooling system.
* Water leaks from diesel generator facility, burst extinguisher pipe, burst condenser valve and filtration tank.
* Broken connections and broken bolt at electric transformer.
* Loss of power at control center for liquid waste disposal facility.
* Oil leaks from damaged transformer and magnetic transformer facility.
* Oil leak at reactor water supply pump facility.
* Disrupted electrical connection at magnetic transformer facility.
* Cracks in embankment of water intake facility.
* Air and oil leaks at switching stations.
* Land under parts of plant turned to mud in quake-caused process known as liquefaction.

However, as of July 19, we now know that some 400, not 100, barrels of radioactive waste were knocked over, and about 40 lost their lids. At least some of the waste was liquid, and leaked into the building, according to Citizens Nuclear Information Center (CNIC) in Japan (for more information on nuclear power in Japan, visit their website at http://cnic.jp/english/). It is not known whether radiation from these spills has leaked outside the building.

The 1200 liters (about 317 gallons) of radioactive water spilled into the Sea of Japan apparently came from the irradiated fuel pool at Unit 6 at the site. This is one of the two newer units: it is a 1315 MW General Electric/Toshiba Boiling Water Reactor that came online in November 1996. According to Japanese officials, the newest reactor at the site, a 1315 MW GE/Hitachi Boiling Water Reactor that came online in July 1997, has been venting radioactive steam into the air since the earthquake began, and continues to do so today (July 19). We have been unable to determine radiation levels of these releases.

The earthquake exceeded the design basis for the reactors, and the facility does not meet new Japanese earthquake standards put in place in September 2006. Moreover, the fault that caused the quake is apparently directly underneath the facility site, and was not discovered prior to construction. It is not yet known whether this fault is capable of an even larger earthquake than the 6.8 measured on July 16.

In a July 17 statement, CNIC said, “In just two years three earthquakes (off the coast of Miyagi Prefecture on 16 August 2005, off the Noto Peninsula in Ishikawa Prefecture on 25 March 2007, and now this one) have exceeded the "extreme design earthquake" assumed at the time the plants were built. In September 2006, for the first time in 28 years, the Nuclear Safety Commission revised Japan's earthquake guidelines. Japan's nuclear power companies are now carrying out earthquake safety checks on the basis of the new guidelines. By rights, all nuclear power plants should be shut down until these checks have been completed.”

All of the reactors at Kashiwasaki Kariwa currently are shutdown and likely will be so for a long time to come as additional damage comes to light and its ability to withstand future earthquakes comes further into question. Initial projections are that the reactors will be closed for at least a year, and it is highly possible they will never reopen. Already, the earthquake has caused TEPCO to lose $4.3 Billion of its market value, according to Bloomberg. A lengthy shutdown of the world’s largest nuclear facility will undoubtedly cause far greater cost to the utility.

Ironically, TEPCO’s website touts its nuclear program, and states as its number one priority in restoring public confidence in that program, **“**Promoting disclosure of information and ensuring transparency of nuclear operations.” Clearly, TEPCO’s commitment to transparency is no more than a slogan and it is unlikely public confidence will ever be regained.

For the United States, the lesson is unmistakable: the earthquake reminds us of the fragility and danger of nuclear power and its ability to withstand the acts of Mother Nature. Nuclear reactors and earthquake faults simply don’t mix. An immediate need is to permanently end any further discussion of installation of dry cask radioactive waste storage units at the Diablo Canyon site on California’s earthquake-prone Pacific coast.

NIRS will attempt to update this report as events warrant.

The Kashiwasaki Kariwa facility consists of seven Boiling Water Reactors. Three are of Toshiba design and are 1067 MW each. Unit 1 came online in September 1985, Unit 2 in September 1990 and Unit 3 in August 1993. Two are Hitachi reactors of 1067 MW each: Unit 4 came online in August 1994 and Unit 5 in April 1990. Unit 6, a GE/Toshiba BWR of 1315 MW, came online in November 1996 and Unit 7, a 1315 MW GE/Hitachi BWR came online in July 1997. Taken together, until July 16, 2007, these represented the world's largest nuclear power facility.

Michael Mariotte, July 19, 2007

Nuclear Information and Resource Service
6930 Carroll Avenue, Suite 340
Takoma Park, MD 20912
301-270-6477
nirsnet@nirs.org, www.nirs.org