

ANALYSIS

## **Fukushima: Probe poised to take Tepco to task - Utility tardy in venting reactor pressure, lacked plan for multiple crises, ignored historical data**

Tuesday 7 June 2011, by [YOSHIDA Reiji](#) (Date first published: 7 June 2011).

Shortly after 7 a.m. on March 12, Prime Minister Naoto Kan confronted Masao Yoshida, director of the Fukushima No. 1 nuclear plant, at the compound in Okuma, Fukushima Prefecture.

Kan flew from Tokyo by chopper to the crippled nuclear plant, desperately wanting to ask one critical question: Why can't Tokyo Electric Power Co. still open valves to release rising steam inside reactor No. 1 to avoid a looming meltdown?

The March 11 megaquake and monster tsunami had already knocked out all the power supply and critical cooling systems of the plant, pushing temperatures and pressure inside reactor 1 to an acutely dangerous level.

Tepco had been unable to open the electric valves because the station had suffered a total blackout. Radiation in the reactor building had already risen to dangerous levels, making Tepco hesitant to send in workers to manually open the valves.

"Yoshida told Kan (Tepco) would decide whether to open the valves manually within about one hour," said Manabu Terada, a close aide to Kan who also attended the meeting, during a recent interview with The Japan Times.

But Tepco's decision turned out to be too late. It started manual ventilation procedures after sending workers in at 9:15 a.m., but the high radiation hindered the work and the valves weren't opened until around 2:30 p.m.

Then hydrogen, generated from already melting nuclear fuel, exploded and blew up the Unit 1 building at 3:36 p.m., severely crippling reactor 1.

An investigation that will draw world attention gets under way Tuesday to find answers to the critical question: Was there any way to avoid the meltdowns at the Fukushima No. 1 nuclear plant, and were any people to blame?

The 10-member panel, headed by Yotaro Hatamura, professor emeritus at the University of Tokyo, will investigate the cause of the nuclear crisis and possible crisis management errors by the government and Tepco. The panel will compile an interim report in December.

Experts, lawmakers and an examination of records by The Japan Times have already found a number of apparent shortcomings in Tepco's crisis management, including delays in critical decisions and the lack of emergency plans for dealing with multiple reactor failures.

“Hardware (to cope with crises) has been ready, but software was not,” said Keiji Miyazaki, professor emeritus at Osaka University and an expert on reactors.

Miyazaki and other experts emphatically pointed out that Tepco was way too late in deciding to release steam from reactors 1, 2 and 3.

The high pressure made it difficult for Tepco to inject coolant water from outside to forestall an explosion and the subsequent high release of radiation not to mention the core meltdown, experts said.

The failure to ease the rising pressure and temperatures also triggered hydrogen explosions in the buildings for reactors 1 and 3.

At Unit 2, increased pressure destroyed part of the suppression chamber, the lower part of the primary containment vessel the last line of defense to contain radiation inside the reactor.

“Tepco should have carried out the ventilation process much earlier. Once the reactor’s core is damaged and radiation soars, any ventilation would become very difficult,” Miyazaki said.

Nuclear experts are well aware, based on computer simulations, that if all power supply is lost, the rapidly rising temperatures would start damaging the fuel rods inside the reactors in hours. To prevent core meltdowns, pressure must be lowered first so coolant water can be injected from outside.

Miyazaki said Tepco should have started ventilation preparations right after the tsunami knocked out the power supply and the backup generators for reactors 1, 2 and 3.

“They should have made the decision within three or four hours (after the power was knocked out) and started preparing before the reactors’ cores were damaged.”

If the reactor cores had not been damaged, neither the radiation nor the hydrogen would not have come out. The situation would have been much easier to cope with if ventilation had been conducted earlier, Miyazaki said.

Tepco officials, however, have argued that the total blackout and high radiation made it too dangerous to start manual ventilation procedures at an early stage.

“(Workers) had no choice but to work in turns because radiation levels were too high. They needed to work in total darkness and they couldn’t communicate with each other because communication devices were dead,” Tepco President Masataka Shimizu told an Upper House session on April 25.

“It took much time to launch the operations,” Shimizu said.

Whether Tepco could have conducted the ventilation earlier will be a focus of discussions by the investigation panel.

However, the delayed ventilation process is apparently not Tepco’s only preparedness shortcoming.

The utility compiled its key report on nuclear crisis management for the Fukushima plant reactors in 1994. In line with the report, the utility finished preparing all equipment and emergency operation manuals by 2002.

But the report’s crisis management strategy was deficient. It only assumed a problem with one

reactor, not the simultaneous failure of three at the six-reactor complex. Reactors 4, 5, and 6 were already shut down at the time the disaster struck.

Under the plan, to keep the critical cooling systems running in an emergency, Tepco would take advantage of the plant's interconnectability and extend a power supply line to a reactor in trouble from an adjacent reactor if all power supply is lost.

But the March 11 tsunami knocked out all the power and backup diesel generators at the four reactors in one blow, triggering four separate crises at the three reactors and the spent nuclear fuel pool for Unit 4 simultaneously.

"In a case where all AC power sources are lost, the pace of event development should be slow and there should be ample time" to cope with the situation, says another Tepco report written in 2002, based on the 1994 crisis strategy. It says there would have been plenty of time for the utility to repair the diesel backup generators.

The tsunami, however, damaged the diesel generators beyond repair.

Some experts, including economist Kenichi Ohmae, a former reactor designer who obtained a Ph.D. in nuclear engineering at Massachusetts Institute of Technology, have underscored the dangers of building multiple reactors at one power plant.

But Tepco and other electric utilities were in the habit of adding reactors to running plants, given the political difficulty in finding new locations for nuclear complexes.

Tepco built six reactors at the Fukushima No. 1 plant, and had a plan to add two more. It canceled the expansion plan on May 20.

Tepco officials have said they simply could not foresee such a massive tsunami ever hitting the nuclear plant and knocking out all its power supply at once.

The March 11 earthquake, at 9.0-magnitude, was one of the largest quakes in history, and the tsunami topped 14 meters at the power plant, according to Tepco. The plant was designed to withstand tsunami up to 5.7 meters.

On March 25, Tepco Senior Vice President Sakae Muto admitted the utility had never thought waves the size of those on March 11 were possible.

But seismologists had already sounded the alarm, saying historical records have shown giant tsunami have hit the Tohoku region's coast and Tepco should have been aware of this threat.

During a June 2009 expert meeting to review the Fukushima No. 1 plant's quake defenses, Yukinobu Okamura, head of the Active Fault and Earthquake Research Center of the National Institute of Advanced Industrial Science and Technology, specifically pointed out that a massive earthquake on the scale of one that hit Tohoku in 869 could strike in the future and devastate nuclear reactors.

The 869 temblor was believed to be 8.3-magnitude, with tsunami that went up to 4 km inland.

During the meeting organized by the industry ministry, Okamura argued that the Fukushima No. 1's safety features should be redesigned to withstand tsunami of that size, but Tepco did not take any measures, according to media reports.

"Japan's nuclear power plants are designed to withstand any earthquake imaginable and not to

release radioactive materials to the surrounding area even if its facilities are damaged," Tepco said on its website accessed on March 27.

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