

# Mishaps Underscore Weaknesses of Japanese Nuclear Plant

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TOKYO — More than two years after multiple meltdowns at the Fukushima Daiichi nuclear power plant, a series of recent mishaps — including a blackout set off by a dead rat and the discovery of leaks of thousands of gallons of radioactive water — have underscored just how vulnerable the plant remains.



Increasingly, experts are arguing that the plant's operator, the Tokyo Electric Power Company, or Tepco, cannot be trusted to lead what is expected to be decades of cleanup and the decommissioning of the plant's reactors without putting the public, and the environment, at risk.

At the same time, the country's new nuclear regulator remains woefully understaffed. It announced Wednesday that it would send a ninth official to the site — to monitor the work of about 3,000 laborers.

"The Fukushima Daiichi plant remains in an unstable condition, and there is concern that we cannot prevent another accident," Shunichi Tanaka, chairman of the Nuclear Regulation Authority, said at a news conference. "We have instructed Tepco to work on reducing some of the biggest risks, and we as regulators will step up monitoring."

The biggest scare at the plant in recent days has been the discovery that at least three of seven underground storage pools are seeping thousands of gallons of radioactive water into the soil. On Wednesday, Tepco acknowledged that the lack of adequate storage space for contaminated water had

become a "crisis," and said it would begin emptying the pools. But the company said that the leaks will continue over the several weeks that it will likely take to transfer the water to other containers.

Plant workers dug these underground ponds about six months ago to store the ever-growing amount of contaminated water at the plant. There is about 400 tons daily from two sources: runoff from a makeshift cooling system rigged together after the site's regular cooling equipment was knocked out by the earthquake and tsunami in March 2011, and a steady stream of groundwater seeping into damaged reactors.

Tepco stores more than a quarter-million tons of radioactive water at the site and says the amount could double within three years.

But as outside experts have discovered with horror, the company had lined the pits for the underground pools with only two layers of plastic each 1.5 millimeters thick, and a third,

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clay-based layer just 6.5 millimeters thick. And because the pools require many sheets hemmed together, leaks could be springing at the seams, Tepco has said.

“No wonder the water is leaking,” said Hideo Komine, a professor in civil engineering at Ibaraki University, just south of Fukushima. He said that the outer protective lining should have been hundreds of times thicker.

Tepco’s president, Naomi Hirose, traveled to Fukushima on Wednesday to apologize for the leaks, which he said had caused further distress to local residents. About 160,000 fled their homes in the wake of the disaster, and large areas around the plant remain off-limits.

Mr. Hirose said that Tepco would stop using the underground pits, and would pump the water out into more aboveground tanks. But Tepco says it is likely to take until at least the end of May to empty the pools. Mr. Hirose said that he did not think any water would reach the Pacific Ocean, because the pools lie at least half a mile inland.

“We’re going to get the water out of these underground pits and into tanks as soon as we can,” he said. “We’re aware that this is a crisis that we must attend to with urgency.”

But Muneo Morokuzu, a nuclear safety expert at the Tokyo University Graduate School of Public Policy, said that the plant required a more permanent solution that would reduce the flood of contaminated water into the plant in the first place, and that Tepco was simply unable to manage the situation. “It’s become obvious that Tepco is not at all capable of leading the cleanup,” he said. “It just doesn’t have the expertise, and because Fukushima Daiichi is never going to generate electricity again, every yen it spends on the decommissioning is thrown away.”

“That creates an incentive to cut corners, which is very dangerous,” he said. “The government needs to step in, take charge and assemble experts and technology from around the world to handle the decommissioning instead.”

Tepco, which was essentially nationalized after the disaster, is strapped and has made painful cutbacks, forcing subcontractors to slash jobs, wages and benefits, according to doctors, lawyers and labor union workers who have assisted or represented former plant workers.

The harsh conditions workers face is visible at J-Village, a former sports park about 10 miles south of the Daiichi site, where workers don protective suits and masks before being bused to the plant. Tired workers take naps on flimsy mats in temporary sleeping rooms; low-ranking workers are not afforded this luxury, they said, and must pass free time roaming the grounds or huddling around vending machines.

Jun Shigemura, a psychiatry specialist at the National Defense Medical College who offers pro bono mental care sessions at the Fukushima Daiichi plant, said workers there showed signs of post-traumatic stress and depression, raising the risk of making errors at work, and leaving them vulnerable to substance abuse and even suicide.

“Something needs to be done to help these workers,” he said. “For their sake, and for the sake of the plant’s safety.”

Some experts say that contaminated water has continued to reach the Pacific. Jota Kanda, an oceanographer at the Tokyo University of Marine Science and Technology, said last month in a discussion paper posted on the Web site of the journal *Biogeosciences* that Tepco’s own readings of radiation levels in waters off the plant suggest a continued leak of radioactive cesium into the ocean.

“This suggests that water might be leaking out from the plant through damaged pipes or drains or other routes,” he said.

Meanwhile, the plant has been fraught with other scares. Last month, pools storing used fuel at the plant went without fresh cooling water for two days after a power failure.

Engineers later traced the blackout to a rat that may have gnawed on power cables, causing an electrical short.

Just a week later, workers sent out to plug holes through which rodents might enter and gnaw at important equipment inadvertently tripped up the power, causing cooling to stop again.

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