

# Japan: at Fukushima, the (radioactive) “water crisis” far from solved

Monday 2 September 2013, by [AOKI Mizuho](#), [Bloomberg](#), [Japan Times](#), [Kyodo News](#), [Mainichi Shimbun](#), [NAGATA Kazuaki](#)  
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## **Tepco bolsters tank team but leak eludes — Storage patrols beefed up while replacement scheme pends**

Tokyo Electric has a plan to better monitor the 930 radioactive water tanks at its Fukushima No. 1 plant, but it is unclear whether it will be able to lock down the storage problem before the trickle turns into a flood.

The tainted water generated by the makeshift cooling apparatus set up after the nuclear meltdowns has become the second stage of the nuclear crisis for beleaguered Tokyo Electric Power Co., which is unable to protect the Pacific Ocean from its radioactive waste and is coming under increasing pressure to seek outside help.

The immense volume of the water forced Tepco, as the utility is known, to build storage tanks at a rapid pace, but some are dangerously prone to leaks, as well as major quakes, and the safer ones can’t be built in time to help, experts say.

Compounding the problem is Tepco’s inability to quickly confirm the amount of water in the tanks or determine where it is leaking from.

To attack the water crisis, Tepco President Naomi Hirose announced Monday that a new team for the tank issue will be formed and put directly under his control.

“We will spend the necessary resources and equipment to firmly deal with the issue of the tanks . . . We recognize this as an extremely important issue for the company’s management,” Hirose said in Fukushima.

The measures include increasing the number of workers used to patrol the storage areas, installing water gauges in the tanks, and eventually replacing the leakier flange-type tanks with welded ones that are more watertight.

Tepco's monitoring of the tanks has drawn fire from experts and regulators alike. Its patrols had consisted of two people conducting visual checks of the 930 tanks set up for the water so far in just two to three hours, twice a day. Since the estimated 300 tons of tainted water lost in the most recent leak probably escaped over a month before it was discovered on Aug. 19, the Nuclear Regulation Authority put the patrols under intense scrutiny.

Starting next Monday, Tepco said it will conduct three patrols of 30 people each during the day but only use four people at night.

The tanks, however, are a different problem. At the moment, Tepco has no choice but to continue using flange-type tanks, which have been involved in at least three other leaks, for the immediate future.

About 300 of the 930 tanks on site are flange-type units consisting of steel plates bolted together and sealed with waterproof packing at the seams. The tanks, about 10 meters high and 12 meters in diameter, are less watertight than those made with welded seams because of the multitude of bolted parts, which could turn into leak points.

Tepco has no idea how the water in the 300-ton leak escaped, but on Friday it said that any hole in it is probably somewhere in the bottom and about 25 mm long by 1 mm wide, based on the 5 cm the water level dropped within six hours on Aug. 20. No holes have been found yet.

"I don't know if this is because of corrosion or deterioration, something needs to be done to the bottom part, otherwise it is possible the water will leak from other spots," said senior NRA official Masaya Yasui during a meeting on the issue Tuesday.

Corrosion is a possibility because the tainted water contains salt from seawater used to cool the reactors and spent-fuel pools in the early stages of the crisis. It also ruined the reactors.

Tepco plans to transfer the tainted water from the flange-type tanks to welded tanks but has not developed a schedule yet because of complex logistic issues.

One of these issues is the lengthy assembly time required for a welded tank, which take about six months to put together and set up. There are 300 hundred tanks to replace.

Another issue is the salt.

"Salt is a problem. The tanks are not made of stainless steel but just steel, so they will get rusty," said metals expert Hiromitsu Ino, professor emeritus at the University of Tokyo. Ino said, however, that it will take years for the tanks to rust out, making that more of a long-term issue.

Kazunari Yoshimura, a water expert who runs the consultancy Global Water Japan, said the salt issue will force Tepco to apply a protective coating to the tanks, which will lengthen the build time.

In addition, if the welded tanks are built hastily, and shortcuts taken, poor welds could lead to more leaks.

Meanwhile, there is the looming question of whether the storage tanks can survive major earthquakes.

Tepco said it is “debatable” whether the tanks can withstand a quake as strong as the one on March 11, 2011, but they are designated as having class-B quake resistance, which is the second-highest rating under Japanese regulations and means they can weather relatively large quakes.

The utility said the flange-type tanks were set up on concrete foundations unanchored because installing anchors would cause a quake’s power to focus on those spots, which it claimed would be dangerous.

**Kazuaki Nagata and Mizuho Aoki**, *Japan Times* Staff Writers, August 31, 2013

[http://www.japantimes.co.jp/news/2013/08/31/national/tepcobolsters-tank-team-but-leak-eludes/#.UjP\\_Bn9jbRY](http://www.japantimes.co.jp/news/2013/08/31/national/tepcobolsters-tank-team-but-leak-eludes/#.UjP_Bn9jbRY)

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## **Tepco fixes leaky pipe but finds hot spots, jump in radiation — Toxic drip sealed with tape amid lethal radiation at Fukushima No. 1**

Tokyo Electric Power Co., manager of the stricken Fukushima nuclear plant, said Sunday it halted a slow leak from a pipe connecting two water storage tanks by patching it with tape just hours after stumbling upon a potentially lethal radioactive hot spot.

Tepco has been unable to safely contain the growing volume of water used to cool the three reactors hit by meltdowns triggered by the March 2011 earthquake and tsunami, and the government is in the process of taking over the cleanup.

The discovery of the dripping pipe came just after Tepco said late Saturday it had found hot spots at four sites near the water tanks, with one giving off 1.8 sieverts per hour – enough to kill a human being in four hours.

The other three hot spots were not detailed.

The pipe, which was leaking a drop about every 90 seconds, was sealed using absorption material and plastic tape. A puddle of giving off 230 millisieverts per hour was found below it, Tepco said.

“We have to suspect that the high radiation levels were caused by the toxic water oozing from the flange connections,” a Tepco spokesman said, adding that no conclusions had been reached.

The beleaguered utility also said it recorded 900 becquerels of tritium per liter in a groundwater interdiction well, compared with 450 becquerels per liter in February.

Since the well is near the H4 area, where a tank lost 300 tons of radioactive water last month without anyone noticing, Tepco is looking into whether the rise in tritium is related to that incident. Tritium is one of the elements Tepco’s makeshift filtering system, which is partially offline, can’t remove.

On Sunday, the utility said it logged 920 becquerels of strontium-90 per liter of liquid emitting beta rays in the drainage ditch south of H4 that leads from the tanks to the Pacific. Tepco logged 580 becquerels in the ditch on Aug. 22.

Last week, Tepco revealed that 300 tons of toxic water had disappeared from a huge tank – one of

930 on site - before anyone noticed. The spill sparked fears that the toxic water may have escaped into the ocean or seeped into the ground, and was categorized - by Japan's Nuclear Regulatory Agency - as a Level 3 event on the International Nuclear Radiological Event Scale (INES), the most serious incident since the meltdown itself, which was rated Level 7.

The hot spots were discovered during daily inspections Saturday near three tanks and a pipe connecting them to the crippled plant.

Although it was unclear whether the hot spots indicated that a fresh spill had taken place, traces of water reading 230 millisieverts per hour were found below the pipe.

In response to growing domestic and international pressure on Tepco to stop tainting the ocean and to seek outside help, Prime Minister Shinzo Abe on Thursday promised the world that his government will play a greater role in solving the water crisis.

Abe's pledge came as the world's nuclear watchdog urged Japan to explain more clearly what is happening at Fukushima and avoid sending "confusing messages" about the disaster, including the Level 3 rating.

The International Atomic Energy Agency recently questioned why last week's 300-ton leak of radioactive water prompted the NRA to rate the event on its INES scale, when no other incident since the meltdowns had.

**AFP-Jiji Press, Kyodo News, September 1, 2013**

<http://www.japantimes.co.jp/news/2013/09/01/national/tepc-reports-leaking-pipe-four-hot-spots/#.UiQHAn9jbRY>

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## **TEPCO's sloppy oversight of radioactive water tanks continued even after advice**

Tokyo Electric Power Co. (TEPCO) continued conducting sloppy oversight of tanks containing highly radioactive water at the Fukushima No. 1 Nuclear Power Plant even after advice was offered by the Nuclear Regulation Authority's secretariat from around a year ago, it has been learned.

Had TEPCO improved its oversight according to the secretariat's advice, it may have been able to reduce the severity of the massive leak of contaminated water at the plant.

According to the secretariat, TEPCO has been conducting twice daily patrols of around 930 tanks holding radioactive water, sending two of nine workers at a time to carry out the inspections. Each worker checks over 450 tanks over the course of two to three hours, and the secretariat is worried that these patrols are insufficient for promptly discovering if one of the tanks is leaking.

From July 2012 to June this year, secretariat officials on site made recommendations or issued instructions around 10 times to beef up patrols and to install more observation cameras and water gauges, among other measures.

TEPCO replied to the secretariat that it had made improvements, but it only upped its patrols from

an original once a day to twice a day, without stationing more personnel, and installed more cameras, while still leaving blind spots.

There was also an instance in which a secretariat inspection found a crack in a barrier that was meant to stop contaminated water that had leaked from the tanks from escaping outside the plant.

The leak of radioactive water from the tanks is thought to have started in early July, but it took time to be noticed and as much as around 300 tons of contaminated water escaped.

This month, the Nuclear Regulation Authority also instructed TEPCO to make improvements at the plant. The utility has indicated it will increase its patrol staff by 50 people, boost the number of daily patrols to four and install water gauges in the tanks.

A TEPCO official declined to comment on the matter, saying they did not know enough about the secretariat's instructions.

*Mainichi Shimbun*, August 29, 2013

<http://mainichi.jp/english/english/newsselect/news/20130829p2a00m0na006000c.html>

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## **Radioactive water should be diluted, released into ocean: experts**

A panel to the Atomic Energy Society of Japan (AESJ) has suggested diluting and releasing radioactive water from the crippled Fukushima No. 1 nuclear power plant into the ocean rather than keeping it in aboveground tanks.

The accident investigation board under the AESJ, which has been examining the Fukushima nuclear disaster, compiled its view on the radioactive water leaks from the Fukushima No. 1 nuclear plant, which states: "It would be realistic to dilute the contaminated water to levels found in the natural world and release it into the ocean after removing radioactive materials other than tritium."

The panel argues that tritium is generated in the natural world by cosmic rays and is also included in seawater in small amounts. The panel also says the substance is easily discharged from fish and other creatures and is hardly concentrated in their bodies. Therefore, the panel claims, diluting and releasing contaminated water into the ocean would reduce the risk of radiation exposure and environmental pollution through incidental leaks, rather than keeping it in aboveground tanks.

However, such an ocean release is unlikely to take place right away, because TEPCO's water decontamination system called the Multi-nuclide Removal Equipment (ALPS) — which could remove up to 62 kinds of radioactive substances apart from tritium from up to 500 tons of water each day — has yet to be put into full operation, while understanding from local residents and neighboring countries would also be necessary.

*Mainichi Shimbun*, August 29, 2013

<http://mainichi.jp/english/english/newsselect/news/20130829p2a00m0na005000c.html>

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## **Japan nuclear regulator raps Tepco's monitoring of toxic water tank**

Tokyo Electric Power Co.'s inexact monitoring of contaminated water stored at Fukushima No. 1 may have led the company to overstate last week's storage tank leak, according to the Nuclear Regulation Authority.

The loss of 300 metric tons that Tepco reported was based on an assumption that the tank had been full before the leak, Shunichi Tanaka, chairman of the NRA said Wednesday in Tokyo. That assumption may not have been reliable because there was no gauge measuring the tank's water level, he said.

"We have no idea whether it's actually 300 tons that leaked," Tanaka said. "We need to look into this issue more."

Tepco's management of the contaminated water at the crippled nuclear plant has already drawn fire from Shinji Kinjo, leader of a disaster task force at the NRA, who has said the utility was careless in its monitoring of the storage tanks and failed to keep records of its inspections.

Managing the water, which is increasing at a rate of 400 tons a day, is a fundamental challenge for Tepco as it struggles with cleaning up the catastrophe, a process that could take as long as 40 years.

Tanaka's remarks came hours after the NRA said it had finalized its ranking of the leak, based on Tepco's reckoning, as a level 3 "serious incident" on the International Nuclear and Radiological Event Scale, or INES, in which level 7 is the most severe rating.

Tepco characterized the leak as small before determining, because of the change in the tank's water level, that 300 tons of contaminated water had escaped. The leak may have started in July, Mayumi Yoshida, a Tepco spokeswoman, said Wednesday.

The NRA may reconsider its INES ranking should further studies show different amounts of water loss than those provided by Tepco, Tanaka said.

"It's up to us to provide accurate data to the nation," he said.

Another of Tepco's challenges was highlighted Wednesday when Niigata Gov. Hirohiko Izumida said he would continue to resist the restart of the company's Kashiwazaki-Kariwa nuclear power plant, which is located in his prefecture.

"There remain concerns about whether safe operations are possible or not," said Izumida, who also accused the NRA of adopting too narrow a mission that neglects the safety of local residents.

Izumida's approval is critical before Tepco can go ahead with plans for restarting some of the reactors at Kashiwazaki-Kariwa, the world's largest nuclear power station by generating capacity.

Fukushima Gov. Yuhei Sato, who was also in Tokyo on Wednesday to meet with Minister of Economy, Trade and Industry Toshimitsu Motegi, asked that Tepco be strictly monitored by the central government as it pursues the cleanup. Sato also asked for a review of ocean monitoring conducted by Tepco and the government.

Bloomberg, Kyodo News, August 29, 2013

<http://www.japantimes.co.jp/news/2013/08/29/national/japan-nuclear-regulator-raps-tepcos-monitoring-of-toxic-water-tank/#.UiPpdn9jbRY>

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## **Gov't decides to put off target date for decontaminating area near Fukushima plant**

The government has decided to push back the target date for completing its decontamination work in seven of the 11 municipalities around the crippled Fukushima No. 1 Nuclear Power Plant from the end of fiscal 2013 to sometime after fiscal 2014.

While making the decision to postpone the target schedule for decontamination work, which is under the jurisdiction of the central government, the government also demonstrated its stance to “speed up decontamination,” by revealing plans to implement such measures as doing decontamination work again in some areas if deemed necessary. But it is certain that the government will not incorporate a new target date for completing decontamination work into a revised operation schedule to be released on Aug. 30, reinforcing a sense of distrust among the local communities in the central government.

Areas in the 11 municipalities near the crippled nuclear plant that were first designated as “evacuation zones” or “planned evacuation zones” in the wake of the outbreak of the nuclear crisis are subject to the decontamination work under the jurisdiction of the central government. The government has decided to push back the target date for the decontamination work in seven municipalities — Iitate, Katsurao, Kawamata, Minamisoma, Namie, Tomioka, and Futaba.

The decontamination work in Tamura has already been finished, and all of the decontamination work, including that for residential lots, farm land and forests, is expected for completion in the three municipalities of Naraha, Kawauchi and Okuma by March next year.

Under the operation schedule released in January 2012 by the Ministry of the Environment, the decontamination work in the “areas on stand-by for lifting of evacuation orders,” (with annual radiation exposure of up to 20 millisieverts) for which evacuation orders were to be lifted in stages, and “restricted residential areas” (with annual radiation exposure of more than 20 millisieverts to up to 50 millisieverts), had been scheduled to be completed in two years from fiscal 2012 to fiscal 2013. The rezoning of evacuation areas in the 11 municipalities finished this month, but the delay in the decontamination work will affect local residents’ schedules to return home.

At a meeting of experts held on Aug. 27, meanwhile, the Ministry of the Environment unveiled a plan to conduct decontamination work again in spots where radiation levels rise after the first round of decontamination work. On its original plan to limit decontamination work for forests to within 20 meters of residential areas, the ministry said it would be able to expand the limit only in the case of mountainous areas where radioactive substances can be easily carried through the atmosphere by the wind.

The ministry decided to change the plan because some officials in the ruling coalition and the government said the review of the operation schedule should not only announce the postponement of the decontamination work but also send a positive message such as “acceleration of



decontamination.”

But although the ministry is showing its stance to take into account requests from municipalities, it remains cautious.

At the meeting of experts, the ministry said, “As for the model projects conducted in 14 districts in Fukushima Prefecture, effects of the decontamination are maintained.” Thus it said there was no need to do decontamination work again in those districts. But it did not show specific radiation levels that would require the government to conduct decontamination work again.

On the issue of whether to expand the scope of decontamination work for forests, the ministry said the limit would be extended in “exceptional cases.” Therefore, most of the forests in Fukushima Prefecture are expected to remain untouched. An official in charge of a decontamination team said, “If we accept exceptions here and there carelessly, we will not be able to secure storage sites for contaminated soil as well as workers on time.”

There is also a cost-effective issue involved. The government is supposed to ask Tokyo Electric Power Co. (TEPCO), the operator of the crippled nuclear power station, to pay the bills for decontamination. But as of the end of May, TEPCO had paid only 6.7 billion yen out of 21.2 billion yen the central government told the utility to pay. TEPCO has apparently been making decisions whether to pay the costs while strictly examining the effectiveness of the decontamination work. Therefore, the government apparently is hesitant to put pressure on TEPCO over decontamination projects that are not clearly deemed effective in reducing radiation levels. If TEPCO’s business conditions worsen, there is a possibility of the government shouldering the costs.

The Ministry of the Environment wants to work out a new operation schedule for decontamination by the end of this year after holding talks with local municipalities in Fukushima Prefecture. The ministry plans to have separate talks with each of the municipalities on a new decontamination schedule and the scope of areas that need to be decontaminated again. A senior ministry official said, “We will no longer be allowed to postpone the plan.”

*Mainichi Shimbun*, August 28, 2013

<http://mainichi.jp/english/english/newsselect/news/20130828p2a00m0na012000c.html>

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## **TEPCO didn’t take measurements of problem tank after ground sank**

Tokyo Electric Power Co. (TEPCO) performed only one check to make sure new storage tanks that were built to hold highly radioactive water at its Fukushima No. 1 Nuclear Power Plant were in the right position and weren’t on a lean, it has been learned.

The finding comes after 300 tons of highly radioactive water leaked from one of the tanks in what the Nuclear Regulation Authority deemed to be on par with a Level 3 (serious incident) on the International Nuclear and Radiological Event Scale.

It is believed that the leak occurred as a result of the ground beneath the tank sinking, warping its steel body, but TEPCO didn’t take any new measurements after this — a fact highlighting the sloppy management of contaminated water at the plant.



In July 2011, TEPCO noticed that the concrete base for new tanks that were being tested had sunk about 20 centimeters into the ground. The utility disassembled the tanks and moved them to another location, but this month one tank was found to be leaking.

In a probe after the leak was detected, TEPCO learned that the leaking tank was built about one month before the ground was found to be sinking. However, detailed measurements including those to check whether the tank was leaning even slightly were conducted only once, before it was put into use. It also emerged that the reason TEPCO realized the ground was sinking was because there was a visible crack in the concrete base.

There are currently about 1,000 tanks on the premises of the crippled nuclear plant, including 350 of the same type as the one which leaked, but measurements were taken only once for each tank.

TEPCO is aware that the ground at the nuclear plant sank as a result of the March 2011 earthquake. When asked why the company was not more thorough when it came to checks, a representative explained, "The tanks were built in a rush and we couldn't handle all the work." In light of the possibility of similar problems occurring with other tanks, TEPCO set up a headquarters handling measures on contaminated water and storage tanks on Aug. 26, and will consider how to approach the situation.

Yuzo Onishi, a member of the government committee managing contaminated water who is versed in civil engineering work, said that when handling highly contaminated water, it is advisable to take measurements regularly to reduce risks.

At a Nuclear Regulation Authority (NRA) working group meeting on Aug. 27, TEPCO expressed the view that the radioactively contaminated water began leaking from the tank in early July, as radiation dosages of workers near the tanks started rising around July 9. Furthermore, based on the rate at which water was leaking, it had been previously calculated that the water started leaking about one month before the leak was detected on Aug. 19.

The NRA has cited the possibility of the leaking section being located at the bottom of the tank, and had instructed TEPCO to conduct a focused inspection. It says that if TEPCO does not adopt an appropriate response, it will consider issuing an order to TEPCO to take action.

*Mainichi Shimbun*, August 28, 2013

<http://mainichi.jp/english/english/newsselect/news/20130828p2a00m0na010000c.html>

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### **Japan raises severity of toxic water leak at Fukushima plant to level 3**

TOKYO (Kyodo) — Japan's Nuclear Regulation Authority decided Wednesday to raise its assessment of the severity of a recent toxic water leak at the crippled Fukushima Daiichi nuclear power plant to level 3 on an eight-point international scale.

The NRA decided to rate the incident two notches higher than its initial assessment after plant operator Tokyo Electric Power Co. said the leak of highly radioactive water from a huge steel storage tank was estimated at 300 tons, making it the worst leak from the containers at the complex.

Level 3 on the International Nuclear and Radiological Event Scale is defined as a “serious incident.” The Fukushima nuclear accident, triggered by the huge earthquake and tsunami in March 2011, was rated at the maximum level 7, on a par with the 1986 Chernobyl disaster.

Based on data provided by TEPCO, regulators have said the radioactive release totaled several thousand terabecquerels in line with INES criteria. One terabecquerel is equal to 1 trillion becquerels.

The NRA reached its latest decision after confirming with the International Atomic Energy Agency that the so-called INES scale is applicable to incidents involving facilities that were built to contain the nuclear crisis.

The IAEA, however, noted that frequent changes of rating will not help to communicate the actual situation in a clear manner, according to an IAEA answer sheet provided by the NRA.

“It is important that the information required to properly determine the INES rating against all relevant criteria is collated, and that a defensible rating is determined,” the IAEA said.

**Kyodo News**, August 28, 2013

<http://mainichi.jp/english/english/newsselect/news/20130828p2g00m0dm066000c.html>

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## **Fukushima water leaks overwhelming utility — “Whack-a-mole” Tepco can’t cut it, so state steps in**

The government will lead “emergency measures” to combat the radioactive water leaks at the wrecked Fukushima No. 1 nuclear plant, wresting control of the disaster recovery from the besieged Tokyo Electric Power Co.

“We’ve allowed Tepco to deal with the contaminated water situation on its own and they’ve essentially turned it into a game of ‘whack-a-mole,’” Industry minister Toshimitsu Motegi told reporters Monday night in Fukushima. “From now on, the government will move to the forefront.”

The Ministry of Economy, Trade and Industry, which is led by Motegi, “is working to draw up, sometime in September, both emergency measures and more fundamental steps to eliminate the roots of the contaminated water problem, as well as measures to be carried out going forward,” the prime minister’s office said in a response to written questions.

More than two years after the March 2011 nuclear disaster started, Tepco’s recovery effort has taken a turn for the worse. The Nuclear Regulation Authority last week questioned the utility’s ability to deal with the crisis, echoing comments earlier in the month by Prime Minister Shinzo Abe.

Motegi’s visit to the plant comes a week after a storage tank leaked 300 tons of highly radioactive water, which the NRA labeled a “serious incident” in its worst assessment of the problems at Fukushima since the earthquake and tsunami of 2011 caused three reactor meltdowns.

It’s now up to the government to manage the radioactive water building up in tanks at the plant at a rate of 400 tons a day, and leaking from underground tunnels into the ocean, Motegi said.

He told Tepco to monitor its storage tanks more frequently and replace the type that leaked.

“Mr. Motegi said that this leak was caused by human error,” Tepco President Naomi Hirose said in a separate news conference Monday night in Fukushima. “We are very grateful that we are getting government support.”

In its response to questions, the prime minister’s office said METI will pump more “liquid glass” or sodium silicate into the ground as one measure to block radioactive groundwater from spreading and reaching the sea.

In addition to the leaky tank, Tepco has admitted that radioactive groundwater is flowing into the Pacific. The government estimates the flow at 300 tons a day.

Other steps listed under the government’s emergency measures include using a subterranean bypass to stop groundwater from reaching the reactor building basements, according to the prime minister’s office.

Measures under consideration for the next one to two years include fencing off the reactor building basements with what would be the world’s longest underground “ice walls.”

These comprise coolant pipes, sunk as deep as 40 meters underground, to turn soil into permafrost. One wall would prevent water flowing from nearby mountains from coming into contact with radioactive coolant water leaking into the basements of the buildings housing the three melted reactors, the other would block radioactive water from reaching the ocean. The government is still working out how much this would cost, according to the prime minister’s office.

Tepco initially floated the sunken wall system.

Motegi also gave Tepco until mid-September to restart the advanced liquid processing system to filter radioactive isotopes out of the coolant water. ALPS was taken offline Aug. 8 due to corrosion. The loss of ALPS, one of two systems for filtering water used to cool the reactors, adds to the contamination levels of water in the plant’s storage tanks. ALPS is designed to strip out radiation such as strontium, which has been linked to bone cancer.

**Bloomberg**, August 27, 2013

<http://www.japantimes.co.jp/news/2013/08/27/national/tepcos-whack-a-mole-prompts-government-take-over-in-fukushima/#.UiPRkX9jbRY>

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## **Fukushima-No. 1 ALPS filter off till at least September**

Tokyo Electric Power Co. said Monday that one of two radioactive water filters will be shut until at least September at its stricken Fukushima No. 1 nuclear plant, even as it searches for the cause of a leak that prompted the biggest escalation in the crisis since it started in March 2011.

The loss of the advanced liquid processing system, taken offline Aug. 8 due to corrosion, compounds concerns that the utility is losing its battle, now raging for two years, to manage the buildup of radioactive water. The lost layer of filtration adds to the contamination levels of water in the plant’s storage tanks, hundreds of which may be susceptible to leaks.

Tepco said Monday it will set up a special unit to deal with the storage of highly radioactive water, most of which had been used to keep its three melted reactors cool and is increasing at a rate of 400 metric tons a day. The step comes a week after a storage tank leaked 300 tons of highly radioactive water, an event the Nuclear Regulation Authority labeled a "severe incident" in its worst assessment of the problems at Fukushima since the earthquake and tsunami of 2011 led to the three meltdowns.

"We are inspecting all the parts now,"h Tepco spokeswoman Mayumi Yoshida said of the idled ALPS unit, which was made by Toshiba Corp. "We are aiming for September," she said regarding the ALPS restart.

ALPS, which began operating in March, was taken offline after the radioactive water it was designed to filter was found corroding its pipes and basins, Yoshida said. It's being treated with a protective coating.

ALPS is used to filter strontium and other radioactive elements from water after it's used to cool the melted reactor fuel. Water is pumped through the system after being first treated via a separate filtration unit for removing cesium. That system remains in operation.

After the two layers of filtration, only tritium should remain in the water when it is added to the hundreds of thousands of tons already in storage at the site.

The tank that leaked had levels of beta radiation of 80 million becquerels per liter, including strontium, Tepco said Aug. 20. That's 8 million times the safety limit for drinking water under health ministry guidelines. Strontium has been linked to bone cancers.

There are about 300 tanks with designs similar to the leaky unit. Two others have had radioactive hot spots detected on their seams. The NRA said the chance of other tanks leaking is the biggest concern at Fukushima No. 1.

An inspection of the leaky tank, which can hold 1,000 metric tons of radioactive water, was inconclusive, Tepco official Noriyuki Imaizumi said Saturday. He said the tank had been built in a different location before earth subsidence forced it to be disassembled and moved to its current site. He said it isn't known if this contributed to the leak.

The tanks were installed by a joint venture of Shimizu Corp., Taisei Corp. and Hazama Ando Corp., Yoshida said.

The NRA rated the leak as a 3 on the 7-stage International Nuclear and Radiological Event Scale, or INES, denoting a "serious incident." That was the highest-level accident since the March 2011 start of the crisis, which received a level 7, the same as Chernobyl.

**Bloomberg**, August 26, 2013

<http://www.japantimes.co.jp/news/2013/08/26/national/alps-filter-off-till-at-least-september/#.UiPOu39jbRY>

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## **Tank where toxic water leaked may have been deformed: TEPCO**

TOKYO (Kyodo) — A huge storage tank from which about 300 tons of highly radioactive water leaked at the crisis-ridden Fukushima Daiichi nuclear power plant may have deteriorated and become deformed as a result of being moved and reassembled, plant operator said Saturday.

Tokyo Electric Power Co. said the tank was first installed at a different location in June 2011, after the Fukushima nuclear disaster was triggered by a huge earthquake and tsunami in March 2011.

But after its foundation was found to have cracked after the tank sank in the ground, it was dismantled and reassembled at its current location where the leak occurred, the utility said.

TEPCO is investigating whether partial damage or deterioration in the tank, whose foundation sank about 20 centimeters, had anything to do with the leakage.

The tank was one of three tanks that had to be dismantled and relocated because their foundations sank, the utility said. The tanks were relocated in September 2011.

The contaminated water in the two other tanks, which are also at risk of leaking, will be transferred to other tanks on Sunday.

TEPCO said workers, before reusing the tanks after reassembly, confirmed with their naked eyes that there were no leaks when they filled them with water.

On Monday TEPCO first noticed puddles with high radiation levels — about 100 millisieverts per hour — near where many storage tanks stand.

Some of the radioactive water might have flowed into the adjacent Pacific Ocean via drainage channels, data provided by TEPCO showed Wednesday. The same day, the Nuclear Regulation Authority said it is considering raising the severity assessment of the event to level 3 on an eight-point international scale from level 1.

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<http://mainichi.jp/english/english/newsselect/news/20130825p2g00m0dm006000c.html>

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