Japan PM says Fukushima nuclear site finally stabilised



Prime Minister Yoshihiko Noda: "This is a challenge to not only our nation but also the whole of humanity"

The crippled nuclear reactors at Japan's Fukushima power plant have finally been stabilised, Prime Minister Yoshihiko Noda has announced.

An earthquake and tsunami in March knocked out vital cooling systems, triggering radiation leaks and forcing the evacuation of thousands of people.

Mr Noda's declaration of a "cold shutdown" condition marked the stabilisation of the plant.

The government says it will take decades to dismantle it completely.

The six-reactor Fukushima Daiichi nuclear plant was badly damaged by the 11 March earthquake and tsunami. Blasts occurred at four of the reactors after the cooling systems went offline.

Workers at the plant, which is operated by Tokyo Electric Power Company (Tepco), have been using sea water to cool the reactors. Waste water has built up and some contaminated liquid has been released into the sea.

A 20km (12m) exclusion zone remains in place around the plant.

'Battle not over'

"The nuclear reactors have reached a state of cold shutdown and therefore we can now confirm that we have come to the end of the accident phase of the actual reactors," Mr Noda told a news conference.

Reaction



Roland Buerk BBC News, Tokyo

Retired teachers Yuji and Tetsuko Takahashi are among the tens of thousands of people forced to abandon their homes around the Fukushima plant. They were planning to watch the prime minister's announcement on the television. The set was donated to them by well-wishers like everything else in their government-provided Tokyo apartment - even the clothes on their backs.

"Even when we are told it has been shut down I can't believe it," says Tetsuko. "From the start the government officials have lied to us. One of the top officials said on TV that there was no meltdown, but it happened. The actual situation is much, much worse than we were told from the beginning."

The couple's main goal now is to return home, to get out of the 26th floor apartment and back to the garden they love. The exclusion zone could remain in force for years, but they are willing to brave the contamination. "We are old, 67 and 61," says Tetsuko . "So maybe the radiation would make the risk of getting cancer higher, but it would take five or 10 years. We are going to die before we get seriously ill."

"We are now moving from trying to stabilise the nuclear reactors to decommissioning them.

"The Japanese government promises to clarify the roadmap from here and do our utmost, while ensuring we operate the nuclear reactors as safely as possible, to decommission them."

The "battle is not over", he said, adding that the next phase would focus on the clean-up operation, including decontaminating the ground around the plant.

With the reactors stable, Mr Noda said the government would review the evacuation zones established in the immediate aftermath of the incident.

Earlier this year, the government said it was aiming for a cold shutdown by the end of the year.

This is where water that cools nuclear fuel rods remains below boiling point, meaning that the fuel cannot reheat.

Tepco has also defined it as bringing the release of radioactive materials under control and reducing public radiation exposure to a level that does not exceed 1mSv/year at the site boundary.

Speaking to cabinet ministers of his nuclear task force earlier on Friday, Mr Noda said: "We can now maintain radiation exposure at the periphery of the plant at sufficiently low levels even in the event of another accident."

But some nuclear experts have said that the repairs made to the plant after the accident are makeshift and could break down without warning.

Forty years

More than 80,000 people had to leave the area, but radiation levels in some places remain too high for them to return home.

Earlier this week, the government said it could take up to 40 years to fully decommission the plant and clean up surrounding areas.

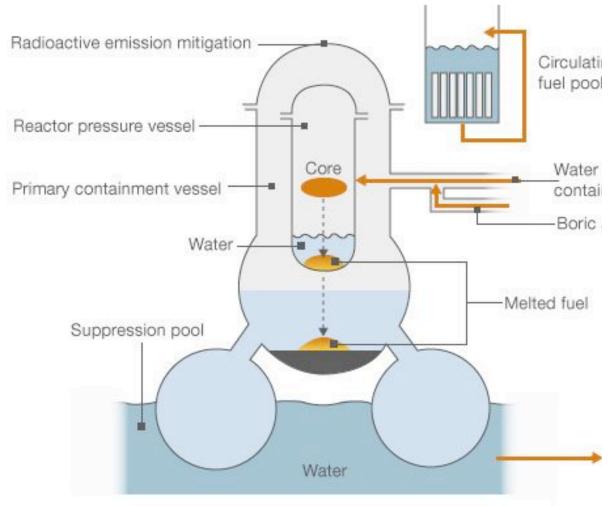
Spent fuel rods and melted fuel inside the reactors must be removed. Waste water must also be safely stored.

Contamination has been found in foodstuffs from the region including rice, beef and fish, while radioactive soil has also been found in some areas.

Some experts have also warned that the plant could be further damaged if a powerful aftershock were to strike.

Engineers are also continuing to encounter new problems - last week Tepco officials confirmed that 45 cu m (1,590 cu ft) of water had leaked into the sea from a crack in the foundation of a water treatment facility.

Processes ensuring Fukushima's 'cold shutdown condition'



Source: Japan Atomic Industrial Forum, Tepco

Rice containing radioactive caesium found in Japan





The rice came from an area outside the exclusion zone around Fukushima Daiichi nuclear plant

Radioactive caesium has been detected above the safety level in rice for the first time in Japan

since the nuclear crisis began at the Fukushima plant.

The sample came from a Fukushima city farm about 60km from the plant.

The government is considering banning shipments from the area it was found.

There have been a series of scares over radiation in food in Japan in recent months - in beef, mushrooms and green tea among other products - but never before in the country's staple, rice.

Now caesium in concentrations above the official safety limit has been detected in a sample from a farm in Fukushima city.

The rice was being prepared for market, but Chief Cabinet Secretary Osamu Fujimura said none had been sold.

The discovery highlights the difficulty of tracking the radiation which has been spread across eastern Japan by wind and rain.

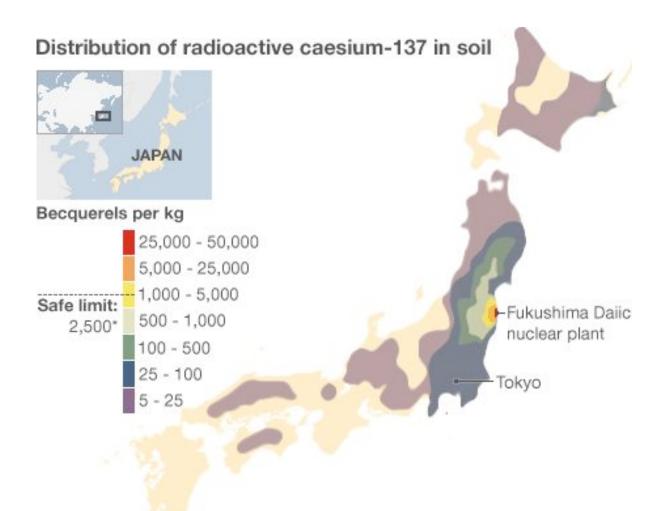
Local governments in rural areas have set up testing centres to try to ensure contaminated products do not get into the food chain.

Last week the Tokyo Metropolitan Government also began testing samples bought at shops in the capital in an attempt to further reassure anxious members of the public.

15 November 2011 Last updated at 11:31 GMT

Fukushima fallout fears over Japan farms

By Jennifer Carpenter Science reporter, BBC News



*Under Japanese Food Sanitation Law, 5,000 Bq/kg of total caesium is considered the safe limit in soil (about half of caesium is deposited as caesium-137)

Source: Teppel J. Yasunari / Universities Space Research Association in Columbia, US,

New research has found that radioactive material in parts of north-eastern Japan exceeds levels considered safe for farming.

The findings provide the first comprehensive estimates of contamination across Japan following the nuclear accident in 2011.

Food production is likely to be affected, the researchers suggest.

The results are reported in the Proceedings of National Academy of Sciences (PNAS) journal.

In the wake of the accident at Japan's Fukushima nuclear power plant, radioactive isotopes were blown over Japan and its coastal waters.

Fears that agricultural land would be contaminated prompted research into whether Japanese vegetables and meat were safe to eat.

An early study suggested that harvests contained levels of radiation well under the safety limit for human consumption.

Contaminated crops

Now, an international team of researchers suggests this result deserves a second look.

To estimate contamination levels, Teppei Yasunari, from the Universities Space Research Association in the US state of Maryland, and his colleagues, took measurements of the radioactive element caesium-137 in soil and grass from all but one of Japan's 47 regions and combined these results with simulations based on weather patterns following the meltdown.

Caesium-137 lingers in the environment for decades, and so is more of a concern than other radioactive elements released in the cloud of steam when the reactors' cooling systems failed, leading to explosions.

The team found that the area of eastern Fukushima had levels of the radioactive element that exceeded official government limits for arable land.

Becquerels and Sieverts

- A becquerel (Bq), named after French physicist Henri Becquerel, is a measure of radioactivity
- A quantity of radioactive material has an activity of 1Bq if one nucleus decays per second - and 1kBq if 1,000 nuclei decay per second
- A sievert (Sv) is a measure of radiation absorbed by a person, named after Swedish medical physicist Rolf Sievert
- A milli-sievert (mSv) is 1,000th of a Sievert

Under Japanese Food Sanitation Law, 5,000 becquerel per kg (Bq/kg) of caesium is considered the safe limit in soil (caesium-137 makes up about half of total radioactive caesium, and therefore its safe limit is 2,500 Bq/kg).

The researchers estimate that caesium-137 levels close to the nuclear plant were eight times the safety limit, while neighbouring regions were just under this limit.

The study showed that most of Japan was well below (average about 25 Bq/kg) the safety limit. Relatively low contamination levels in western Japan could be explained by mountain ranges sheltering those regions from the dispersal of radioactive material, the authors said.

Food production in the most contaminated regions, the researchers write, is likely to be "severely impaired", and that Fukishima's neighbouring regions, such as, Iwate, Miyagi, Yamagata, Niigata, Tochigi, Ibaraki, and Chiba are likely to also be affected.

"Some neighbouring prefectures... are partially close to the limit under our upper bound estimate and, therefore, local-scale exceedance is likely given the strong spatial variability of [caesium-137] deposition," the researchers explained in PNAS.

They urge the Japanese government to carry out a more thorough assessment of radioactive contamination across Japan before considering future decontamination plans.

A second study, published in the same edition of PNAS, collected over a hundred soil samples from within 70km of the Fukishima plant, and found similarly high caesium-137 levels across the Fukishima prefecture, and its neighbouring regions.

Radioecologist Nick Beresford from Centre of Ecology and Hydrology in Lancaster explained that once in soil, caesium will become bound to mineral components, which limits its uptake

into plants.

However, this process depends on the soil type. "Caesium stays mobile for longer in organic soils, hence why England and Wales still have some post-Chernobyl restrictions in upland areas," he told BBC News.

Ploughing, and some fertilisers can help farmers reduce plants' uptake of the dangerous elements, and binding agents can be added to animal feed to reduce their uptake from the gut, he added.

Local recordings

New figures on background radiation levels recorded 60km northwest of the Daiichi power plant have also been released this week by Japanese physicist Tsuneo Konayashi from Fukushima Medical University.

Dr Konayashi saw an initial spike reaching over nine times the usual levels hours after the explosions at the plant; five months later levels have dropped to one and a half times those expected.

He continues to monitor radiation levels and distribute his data around campus.

Radiation levels in Fukushima are lower than predicted

• 22:00 16 November 2011 by Chelsea Whyte

The fallout from the radiation leak at the Fukushima Daiichi nuclear reactor in Japan may be less severe than predicted.

Radiology researcher Ikuo Kashiwakura of Hirosaki University, Japan, and colleagues responded immediately to the disaster, travelling south to Fukushima prefecture to measure radiation levels in more than 5000 people there between 15 March and 20 June.

They found just 10 people with unusually high levels of radiation, but those levels were still below the threshold at which acute radiation syndrome sets in and destroys the gastrointestinal tract. Geiger-counter readings categorised all others in the area at a "no contamination level".

How did the population of Fukushima prefecture dodge the radioactivity? Gerry Thomas at Imperial College London, director of the Chernobyl Tissue Bank, says the answer is simple. "Not an awful lot [of radioactive material] got out of the plant – it was not Chernobyl." The Chernobyl nuclear disaster released 10 times as much radiation as Fukushima Daiichi.

Rapid response

Thomas says the quick and thorough response by the Japanese government limited radioactive exposure among the population. On 12 March, the same day as the first explosion at Fukushima Daiichi, the government ordered the evacuation of residents within 20 kilometres, and asked various institutions to begin monitoring contamination levels.

"They had no faxes, no emails, nothing was working," says Thomas, adding that other

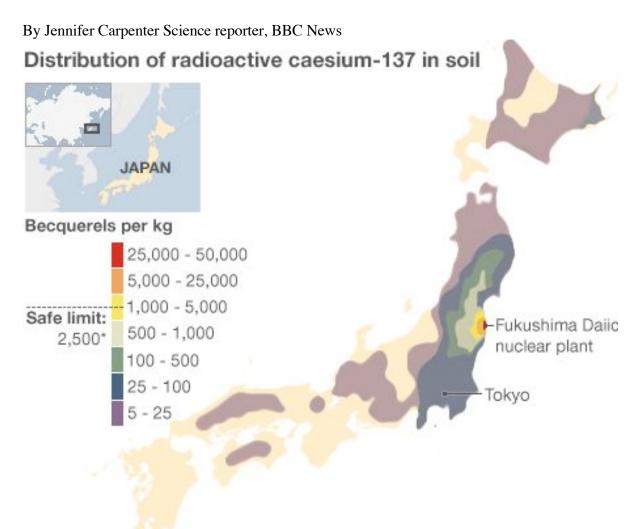
countries might not have coped as well with a combined earthquake, tsunami and nuclear plant malfunction. "Given the circumstances, they did phenomenally."

The Japanese authorities also removed contaminated food and gave iodine to those who were very young, she says. Radioactive iodine can contaminate the thyroid gland in the body, leading to radiation-induced cancer, but can be counteracted by introducing non-radioactive iodine into the body.

Health researchers will have to keep an eye on radiation levels, however. "There are many 'hotspot' areas where radioactivity has accumulated locally," says Kashiwakura. This is because rainfall deposited radioactivity unevenly. "The Japanese people have a responsibility to continue research on the effect of radioactivity in humans."

Journal reference: PLoS One, DOI: 10.1371/journal.pone.0027761

Japan farm radioactive levels probed



*Under Japanese Food Sanitation Law, 5,000 Bq/kg of total caesium is considered the safe limit in soil (about half of caesium is deposited as caesium-137)

Source: Teppel J. Yasunari / Universities Space Research Association in Columbia, US,

New research has found that radioactive material in parts of north-eastern Japan exceeds levels

considered safe for farming.

The findings provide the first comprehensive estimates of contamination across Japan following the nuclear accident in 2011.

Food production is likely to be affected, the researchers suggest.

The results are reported in the Proceedings of National Academy of Sciences (PNAS) journal.

In the wake of the accident at Japan's Fukushima nuclear power plant, radioactive isotopes were blown over Japan and its coastal waters.

Fears that agricultural land would be contaminated spurned research into whether Japanese vegetables and meat were safe to eat.

An early study suggested that harvests contained levels of radiation well under the safety limit for human consumption.

Contaminated crops

Now, an international team of researchers suggests this result deserves a second look.

To estimate contamination levels, Teppei Yasunari, from the Universities Space Research Association in the US state of Maryland, and his colleagues, took measurements of the radioactive element caesium-137 in soil and grass from all but one of Japan's 47 regions and combined these results with simulations based on weather patterns following the meltdown.

Caesium-137 lingers in the environment for decades, and so is more of a concern than other radioactive elements released in the cloud of steam when the reactors' cooling systems failed, leading to explosions.

The team found that the area of eastern Fukushima had levels of the radioactive element that exceeded official government limits for arable land.

The researchers estimate that caesium-137 levels close to the nuclear plant were eight times the safety limit, while neighbouring regions were just under this limit.

The study showed that most of Japan was well below (average about 25 Bq/kg) the safety limit. Relatively low contamination levels in western Japan could be explained by mountain ranges sheltering those regions from the dispersal of radioactive material, the authors said.

Food production in the most contaminated regions, the researchers write, is likely to be "severely impaired", and that Fukishima's neighbouring regions, such as, Iwate, Miyagi, Yamagata, Niigata, Tochigi, Ibaraki, and Chiba are likely to also be affected.

"Some neighboring prefectures... are partially close to the limit under our upper bound estimate and, therefore, local-scale exceedance is likely given the strong spatial variability of [caesium-137] deposition," the researchers explained in PNAS.

They urge the Japanese government to carry out a more thorough assessment of radioactive contamination across Japan before considering future decontamination plans.

A second study, published in the same edition of PNAS, collected over a hundred soil samples from within 70km of the Fukishima plant, and found similarly high caesium-137 levels across

the Fukishima prefecture, and its neighbouring regions.

Radioecologist Nick Beresford from Centre of Ecology and Hydrology in Lancaster explained that once in soil, caesium will become bound to mineral components, which limits its uptake into plants.

However, this process depends on the soil type. "Caesium stays mobile for longer in organic soils, hence why England and Wales still have some post-Chernobyl restrictions in upland areas," he told BBC News.

Ploughing, and some fertilisers can help farmers reduce plants' uptake of the dangerous elements, and binding agents can be added to animal feed to reduce their uptake from the gut, he added.

Map confirms high radiation levels across Japan

Updated 8:11 AM Tuesday Nov 15, 2011



A Japanese police man at a checkpoint near the edge of the contaminated exclusion zone around the crippled Fukushima Dai-ichi nuclear power station near Okuma, Fukushima prefecture, Japan Saturday, Nov. 12, 2011. Photo / AP

A map of radioactive contamination across Japan from the Fukushima power plant disaster confirms high levels in eastern and northeastern areas but finds much lower levels in the western part of the country, thanks to mountain ranges, researchers say.

The mountains sheltered northwestern and western parts of Japan as radioactive cesium-137 emerged from the power plant and blew downwind, the scientists said.

Cesium-137 is just one of the radioactive materials that came out of the plant, but researchers focused on that because it's particularly worrisome. It lasts for decades in soils, emitting radiation and potentially contaminating crops and other agricultural products.

The research, published online yesterday by the Proceedings of the National Academy of Sciences, shows estimated levels of contamination. It did not investigate implications for health.

The researchers, from Japan, Norway and the United States, said the levels they estimated would severely restrict food production in eastern Fukushima Prefecture and hinder agriculture in neighboring provinces. That outcome is already recognized in Japan, where regulators monitor food products from those areas for contamination before they are cleared for shipment.

The Fukushima Dai-ichi plant, 225 kilometres northeast of Tokyo, was heavily damaged in March when it was swamped by a tsunami triggered by an earthquake.

A second report, from a separate group of Japanese scientists, investigated levels of radioactive cesium, iodine and tellurium on the surface in east-central Japan. Such materials are airborne after a nuclear accident and fall to the ground when it rains. While the power plant incident began on March 11, the study linked ground contamination in the Fukushima prefecture to a March 15 rainfall, and contamination in Tokyo and some other areas to a March 21 rain.

Soil contamination in Tokyo has already made officials ban shipment of tea leaves grown there, and some elementary schools in Tokyo and nearby have taken decontamination steps like removing topsoil. In addition, there is growing concern about radioactive "hotspots" found in Tokyo and elsewhere outside Fukushima. The Japanese government has taken responsibility for decontamination.