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What are the Consequences of the Fukushima Nuclear Power Plant Meltdown? Japanese Press Assessments 福島原発炉心溶融のもたらす結果は？--日本の諸新聞記事による評価

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Asia-Pacific Journal Feature

In a September 21 editorial, the *Mainichi Shimbun* called into question statements of government spokesmen suggesting that the Fukushima Daiichi reactors are well on their way to stabilization. They point out that a rise in temperature in one of the cores is still possible, calling into question the optimistic forecasts of officialdom. The *Mainichi* editors also remind readers that the location of melted core materials cannot be precisely determined, making any claims of a sustainable cool down premature. Another Mainichi piece has drawn attention to a different facet of Fukushima Daiichi instability – cracks in the containment structures. It is estimated that between 200 and 500 cubic meters of contaminated water is leaking out daily. The *Tokyo Shimbun* has also picked up the contaminated water story and argues that TEPCO simply does not know for sure how much water is being released per day.

An *Asahi Shimbun* article by staff writer Ishizuka Hiroshi puts forward the newspaper's calculations that an area of over 8000 square kilometers has cesium 137 levels of 30,000 becquerels per square meter or more. This is, of course, an extremely serious situation for the people of Fukushima. But the *Asahi* puts it into comparative perspective, estimating that "The affected area is one-18th of about 145,000 square kilometers contaminated with cesium 137 levels of 37,000 becquerels per square meter or more following the 1986 Chernobyl accident in the former Soviet Union." In other words, the area is barely five percent of the comparably affected Chernobyl disaster area.

Fukushima Prefecture has been the hardest hit: "The contaminated area includes about 6,000 square kilometers in Fukushima Prefecture, or nearly half of the prefecture." Other comparisons with Chernobyl are offered: "The no-entry zone and the planned evacuation zone around the Fukushima No. 1 plant total about 1,100 square kilometers, affecting about 85,000 residents. In the planned evacuation zone, the government has called on residents to leave on the grounds that radiation levels will exceed 20 millisieverts a year." This is a high level of exposure, equivalent to the maximum allowable yearly exposure for power plant workers in the German nuclear energy system. According to the International Commission on Radiological Protection, the maximum level of yearly exposure in a "post emergency situation" is between 1 and 20 millisieverts. The Japanese government has chosen the higher number as a suggested evacuation threshold.

The *Asahi* continues "After the Chernobyl accident, a highly contaminated area with cesium 137 levels exceeding 550,000 becquerels per square meter was designated as a forced migration zone. It stretched over about 10,300 square kilometers in the current Belarus, Russia and Ukraine, and an estimated 400,000 residents evacuated, including those outside the zone. According to the science ministry's distribution map, about 600 square kilometers around the Fukushima No. 1 plant was contaminated with cesium 137 levels of 600,000 becquerels or more. The area is one-17th the forced migration zone around the Chernobyl plant." The data presented by the *Asahi*, however, shows that there is a sizable area directly around the Fukushima Daiichi plant with a contamination level of 1,000,000 becquerels or more, raising the specter of extremely long-term contamination and calling into question the feasibility of resettlement.

The radiation data were not explicitly released by the Japanese government. Rather, "The Asahi Shimbun calculated the size of the contaminated area based on a distribution map of accumulated cesium 137 levels measured from aircraft, which was released by the science ministry on Sept. 8. The estimated size may increase in the future because the distribution map will be subject to corrections and because it currently covers only five prefectures."

The accidents at the Fukushima No. 1 plant and the Chernobyl plant are both rated the worst level 7 on the International Nuclear Event Scale because the quantities of radioactive materials released exceeded several tens of thousands of terabecquerels. The amount of radioactive materials released into the atmosphere from the No. 1 to 3 reactors at the Fukushima No. 1 plant is estimated to be 770,000 terabecquerels.

Also in the *Asahi Shimbun*, writer Mori Harufumi outlines how the Fukushima cleanup may require the removal of 100 million cubic meters of soil. The amount of soil that may have to be removed is "enough to fill the 55,000-seat capacity Tokyo Dome, home of the Yomiuri Giants baseball team and a popular concert venue, 80 times." Moriguchi Yuichi, a Tokyo University engineer, estimates "that radioactive materials must be removed from up to 2,000 square kilometers of land, or one-seventh of Fukushima Prefecture. The area includes the no-entry zone and the planned evacuation zone, where residents have been advised to evacuate, totaling 1,100 square kilometers." "The estimates are based on the assumption that areas with radiation levels of 1 microsievert or more per hour need to be decontaminated to contain an additional radiation dose to 1 millisievert or less a year."

Moriguchi and other scientists working with the government estimate that the majority of the radioactive cesium deposited in Fukushima can be removed by stripping five centimeters of topsoil. This will be a massive undertaking and, even if only the most densely populated areas are cleansed, it is estimated that construction storage facilities will cost over 1 billion USD.

The scale and potential cost are cast in another perspective by an earlier disposal operation involving a small fraction of the estimated soil removal: "It cost about 160 billion yen ($2 billion) to build the Low-level Radioactive Waste Disposal Center in Rokkasho, Aomori Prefecture, a final disposal site for 200,000 cubic meters of contaminated metal parts and working uniforms from nuclear power plants. If the planned temporary storage facility has the same structure as the Rokkasho facility, the construction cost will reach about 80 trillion yen."

Where the *Asahi* focuses on contamination in Japan, the *Mainichi Shimbun* has run an article that highlights the extent of ocean contamination and the potential long-term implications of the fallout. Researchers at the Japanese government's Meteorological Research Institute and the Central Research Institute of Electric Power Industry suggest another long-term disaster in the making, one not limited to Japan. They describe how "Radioactive cesium that was released into the ocean in the nuclear accident at the Fukushima Daiichi power plant is likely to flow back to Japan's coast in 20 to 30 years after circulating in the northern Pacific Ocean in a clockwise pattern."

The article highlights the serious nature of this contamination: "The researchers estimated that the amount of radioactive cesium-137 that was directly released into the sea came to 3,500 terabecquerels over the period from March to the end of May, while estimating that roughly 10,000 terabecquerels fell into the ocean after it was released into the air. One terabecquerel equals 1 trillion becquerels. Cesium-137, which has a relatively long half life of about 30 years, can accumulate in the muscles once it is in the body and can cause cancer."

The *Mainichi* article offers another important comparative perspective on radiation, noting that while the amount of radiation released into the ocean since March is very high, it is a but a small fraction of the cesium that has been introduced into the environment by decades of nuclear tests: "A total of 13,500 terabecquerels of radioactive cesium-137 is slightly more than 10 percent of that of the residual substance left in the northern Pacific after previous nuclear tests, according to the researchers."

American news outlets have been quick to jump on the potential threat of Fukushima radiation making its way to the US East Coast, but there has been far less discussion of the amount of radiation released into the environment as a result of decades of nuclear testing by the United States, the Soviet Union, France, Britain, China and other nuclear powers. The University of California Berkeley Department of Nuclear Engineering, which has been testing for Fukushima fallout, has detected large amounts of fallout from atmospheric nuclear weapons tests as well.

The presence of fallout from nuclear weapons tests, many of which took place before 1963, further underscores the fact that Japan's cleanup process will be in the headlines for decades to come.

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- Gavan McCormack, Hubris Punished: Japan as a Nuclear State
- Chris Busby, Norimatsu Satoko and Narusawa Muneo, Fukushima is Worse than Chernobyl – on Global Contamination
- Yuki Tanaka and Peter Kuznick, Japan, the Atomic Bomb, and the "Peaceful Uses of Nuclear Power"
- Say-Peace Project and Norimatsu Satoko, Protecting Children Against Radiation: Japanese Citizens Take Radiation Protection into Their Own Hands

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