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"Long Since Passed the Level of Three Mile Island" – The Fukushima Crisis in Comparative Perspective

Between 2012 and 2014 we posted a number of articles on contemporary affairs without giving them volume and issue numbers or dates. Often the date can be determined from internal evidence in the article, but sometimes not. We have decided retrospectively to list all of them as Volume 10, Issue 54 with a date of 2012 with the understanding that all were published between 2012 and 2014.

「スリーマイル島をはるかに超えるレヴェル」――比較的観点から見た福島の危機

By the APJ Editors

UPDATED March 27 with JAPANESE TRANSLATION of IEER report.

As the crisis in Fukushima grows more serious (see reports here, here, and here), international scientific organizations have begun painting an increasingly dire picture of radiation releases from the plant.

The Austrian Central Institute for Meteorology and Geodynamics reports here on March 24 that the dispersion of certain radioactive compounds are approaching those emitted in the Chernobyl disaster. The data on cesium and iodine emissions are drawn from the Comprehensive Nuclear Test-Ban Treaty Organization in Vienna: "The three day emissions from Fukushima of Iodine-131 would be about 20% of the total Chernobyl emissions, while those of Cesium-137 would be between 20 and 60% of the total Chernobyl emissions, depending on whether one believes in the different Iodine to Caesium ratio measured in Japan." The Institute forecasts, moreover, that the winds, which have for the most part been taking the radioactivity out to sea, were predicted to shift to carry the poisoned air inland, as it has on a few earlier occasions.

These reports have been followed by a press release by the Institute for Energy and Environmental Research in the United States. IEER states that "Radioactive iodine releases from Japan's Fukushima Daiichi reactors may exceed those of Three Mile Island by over 100,000 times." It adds that "the three damaged reactors and four spent fuel pools at Fukushima Daiichi contain far more long-lived radioactivity, notably cesium-137, than the Chernobyl reactor."

The IEER release points out that The French radiation protection authority, Institut de Radioprotection et de Sûreté Nucléaire (IRSN), *estimates the radioactive releases of iodine-131 in Japan had reached about 2.4 million curies by March 22, 2011. That is about 160,000 times the best estimate of the amount released during the TMI accident in Pennsylvania (15 curies) and about 140,000 times the maximum estimate of 17 curies. It is about 10 percent of the estimated amount released during the Chernobyl accident,*

according to the IRSN.

"This accident has long since passed the level of Three Mile Island," said Dr. Arjun Makhijani, president of the Institute for Energy and Environmental Research (IEER). "While the releases are still considerably below Chernobyl, they have already reached a level that could affect the region around the site for a prolonged period. It is simply a fantasy and highly misleading for the official accident level to remain at level 5, given the estimated radioactivity releases and the extended evacuation, contamination of food and water, and other countermeasures that have already been ordered by the government."

They urge the Japanese government to prepare "more comprehensive contingency plans" and to approach the crisis with a due sense of urgency.

IEER head Arjun Makhijani has offered his assessment of this alarming data to the Asia Pacific Journal: "The ZAMG model is a very useful effort that provides an independent estimate of releases of iodine-131 and cesium-137. Very large amounts of these radioactive materials have been released that bear comparison with Chernobyl (20 percent for iodine 131 and 20 to 60 percent for cesium-137, according to ZAMG). The estimates made by the radiation protection authority in France (Institut de Radioprotection et de Sûreté Nucléaire, or IRSN) are somewhat lower but still very high. IRSN estimates the iodine-131 releases up to March 22 as 90 petabequerels (PBq), while ZAMG estimates them to be about 350 PBq, or almost four times higher. The differences in cesium-137 estimates are between 1.7 and 5 times. This may be due to use of measurements taken from different places and different meteorological models or possibly reporting of all cesium and iodine isotopes by ZAMG under the rubrics of iodine-131 and cesium-137. Moreover, the Austrian estimate is through March 16 only, while the IRSN estimate is up to March 22. Further, the IRSN states that iodine releases are about 10 percent of Chernobyl; apparently the IRSN is using different Chernobyl iodine-131 release estimates (900 PBq)than the ZAMG (1,780 PBq). It is true that there is some uncertainty in Chernobyl emissions, especially since the Soviet estimates of the time were considerable underestimates, but it would be helpful if the French and Austrian modelers share model results and reconcile the estimates of releases and also settle on a single value for Chernobyl comparisons to avoid confusion."

"Whatever the ultimate estimates, it is clear that the Fukushima accident is far beyond the U.S. Three Mile accident in 1979 in every respect, and much closer to the more terrible Chernobyl accident. Fortunately, much of the radioactivity has been blown over the Pacific Ocean and by the time it reached North America the plumes were very dilute. They were even more dilute by the time they reached Europe. Unfortunately, much of the radioactivity ahs also affected food and water in Japan. Sadly, the accident is not over and the situation is not yet under control. Seven major sources of radioactivity still pose a considerable threat to people in Japan. That is a completely unprecedented situation. I deeply appreciate the struggle of the workers to contain this terrible accident, for they have been able to prevent an even worse situation from developing."

TEPCO, the Japanese government, and other organizations have been getting more open with data, but many important documents are not being translated quickly and there is little

effort to bring the findings together in an easily understood way. See here for TEPCO's analysis of the radioactive water in the No. 3 reactor building. Satoko Norimatsu has provided English translations of the compounds being measured.

Cobalt 60

Technetium 99m

Iodine 131

Cesium 134

Cesium 136

Cesium 137

Barium 137

Lanthanum 140

Cerium 144

Total

Here is Japanese government (Nuclear Safety Commission) simulation data that estimates that some areas have already reached the threshold of internal radiation exposure at which iodine tablets become necessary to reduce cancer risk.

Spanning March 26 and 27 the Associated Press is reporting a new string of problems at the Fukushima reactors. In the No. 2 reactor complex, radiation readings in contaminated water are 10,000,000 times the norm for the reactor's cooling system. A TEPCO spokesman has placed airborne radiation at 1000 millisieverts, four times the government safety limit. Officials have stated that there is "almost certainly" a reactor core breach. TEPCO has since reported that the extremely high water reading is a mistake.

The Asahi is already reporting serious contamination to farmland as much as 40km away from the Fukushima plant. Contamination of seawater in the ocean area around the plant is also growing more serious. On the 25th, 1250 times the normal amount of radiation was detected and this increased to 1850 times on the 26th.

The Peace Philosophy Centre has prepared a JAPANESE VERSION of the IEER press release which establishes the potential for destructive radiation release into the environment and calls for the Japanese government to take stronger measures to protect public health.