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Japan Considers Raising Nuclear Disaster from Level 5 to 7 Based on Extremely High Radiation Readings

By Washington's Blog
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As I wrote on March 29th, radioactive cesium levels from Fukushima already rival Chernobyl, and a study conducted by a team of experts from Kyoto University and Hiroshima University found extremely high levels of cesium outside of the 30 kilometer evacuation zone:

> [A] study was conducted by a team of experts from Kyoto University and Hiroshima University ... found cesium-137 at levels between about 590,000 and 2.19 million becquerels per cubic meter [outside the 30 kilometer evacuation zone].
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> After the Chernobyl nuclear accident in the former Soviet Union in 1986, residents who lived in areas where cesium-137 levels exceeded 555,000 becquerels were forced to move elsewhere. After the Chernobyl nuclear accident in the former Soviet Union in 1986, residents who lived in areas where cesium-137 levels exceeded 555,000 becquerels were forced to move elsewhere.
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> The amounts of cesium-137 found in Iitate were at most four times the figure from Chernobyl.
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> If more radioactive materials are emitted from the crippled Fukushima plant, the level of cesium-137 could rise even further. If more radioactive materials are emitted from the crippled Fukushima plant, the level of cesium-137 could rise even further.

Today, In the department of the obvious, Kyodo News is reporting that – due to extremely high radiation levels – the Japanese government is considering raising the nuclear crisis from a 5 to a 7 – the highest possible level of disaster:

> The Nuclear Safety Commission of Japan released a preliminary calculation Monday saying that the crippled Fukushima Daiichi nuclear plant had been releasing up to 10,000 terabecquerels of radioactive materials per hour at some point after a massive quake and tsunami hit northeastern Japan on March 11.
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> The disclosure prompted the government to consider raising the accident's severity level to 7, the worst on an international scale, from the current 5, government sources said. The level 7 on the International Nuclear Event Scale has only been applied to the 1986 Chernobyl catastrophe.
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> According to an evaluation by the INES, level 7 accidents correspond with a release into the external environment radioactive materials equal to more than tens of thousands terabecquerels of radioactive iodine 131. One terabecquerel equals 1 trillion becquerels.
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> Haruki Madarame, chairman of the commission, which is a government panel, said it has estimated that the release of 10,000 terabecquerels of radioactive materials per hour continued for several hours.
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> The commission says the release has since come down to under 1 terabecquerel per hour and said that it is still examining the total amount of radioactive materials released.

As I noted yesterday:

> The Japanese government reports radiation levels in the number 1 reactor of at least 100 sieverts per hour:
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> In contrast, radiation levels were apparently about 300 sieverts per hour – 3 times higher – right after Chernobyl exploded.

As MIT explains, the reason that different units for measuring radiation are so confusing is that the U.S. uses a different system from metric countries and different units measure different things:

> There are a number of reasons for the confusion. In part, it's the usual disparity between standard metric units and the less-standard units favored in the United States, added to the general confusion of reporters dealing with a fast-changing situation (for example, some early reports mixed up microsieverts with millisieverts — a thousandfold difference in dose). Others are more subtle: The difference between the raw physical units describing radiation emitted by a radioactive material (measured in units like curies and becquerels), versus measurements designed to reflect the different amounts of radiation energy absorbed by a mass of material (measured in rad or gray), and those that measure the relative biological damage in the human body (using rem and sieverts), which depends on the type of radiation. (Rem, rad and gray are all used as the plural as well as the singular form for those units).

In other words, becquerels measure radiation emitted while sieverts measure biologic damage to the human body. That is why one measure can't be converted into the other ... they measure different things.

Figures on Chernobyl radiation are a little harder to come by in becquerels. But New Scientist noted last month:

> In the 10 days it burned, Chernobyl put out 1.76 × 1018 becquerels of iodine-131, which amounts to only 50 per cent more per day than has been calculated for Fukushima Daiichi....
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> Similarly, says [Gerhard Wotawa of Austria's Central Institute for Meteorology and Geodynamics in Vienna], caesium-137 emissions are on the same order of

> magnitude as at Chernobyl. The Sacramento readings suggest it has emitted 5 × 1015 becquerels of caesium-137 per day; Chernobyl put out 8.5 × 1016 in total – around 70 per cent more per day.

1.76 × 1018 becquerels of radioactive iodine over 10 days equals 7.33 × 1015 becquerels per hour during the fire at Chernobyl.

Similarly, 8.5 × 1016 becquerels of radioactive cesium over 10 days equals 3.54 × 1014 becquerels per hour during the fire at Chernobyl.

7.33 × 1015 plus 3.54 × 1014 equals 7684000000000000. In other words, Chernyobyl put out an average of 7.684 times 1015 becquerels per hour of radioactive iodine and cesium during the fire.

In contrast, Fukushima put out 10,000 terabecquerels per hour of radioactivity for at least a couple of hours. 10,000 terabecquerels equals 1 x 1016 becquerels.

Granted, there were other types of radioactivity emitted by Chernobyl – such as radioactive strontium – just as there are other types being released from Fukushima. So the above back-of-the-envelope calculation is not complete.

But the bottom line is that – as even the Japanese government is now reluctantly being forced to admit – the amount of radioactivity being released from Fukushima appears to rival those Chernobyl.

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