

Estimation of the released amount of radioactive materials into the atmosphere as a result of the  
accident in the Fukushima Daiichi Nuclear Power Station  
(Estimation made as of May 2012)

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**1. Object of assessment**

The released amount of radioactive materials resulting from the accident in the Fukushima Daiichi Nuclear Power Station was estimated.

Since the amount of radioactive materials that has been released into the atmosphere from April on is less than 1% of the amount released in March, the period for which the amount released into the atmosphere is estimated is set between March 12 and March 31, 2011.

**2. Method of estimation**

With the observation and measurement beginning immediately after the accident, the values of the air dose rate measured by tools such as the monitoring cars in the power station, the wind directions and speed observed by the monitoring cars, and the observation values by the Japan Meteorological Agency were inputted to a program for calculating the released amount of radioactive materials into the atmosphere to estimate the released amount of radioactive materials into the atmosphere. The method of estimation is accompanied by uncertainty resulting from the use of air dose rate data obtained in the limited area of the power station and the use of an assumed ratio for easiness of emission of radioactive nuclides.

**3. Result of estimation**

The table below shows estimated amounts of radioactive materials released into the atmosphere. Although the cited organizations differ in the methods they used in estimating the released amounts, the results obtained on Cs-137 by our company are about the same as those obtained by the other organizations. On the other hand, the results obtained on I-131 by our company show values about 3 times those obtained by the other organizations, which requires possible causes for such differences to be clarified.

Table Results of our company's estimation and values estimated by the other organizations

	Released amount in: PBq <sup>Note 1</sup>				
	Rare gas	I-131	Cs-134	Cs-137	INES- assessment <sup>Note 3</sup>
Our company <sup>Note 2</sup>	About 500	About 500	About 10	About 10	About 900
Japan Atomic Energy Agency Nuclear Safety Commission (Apr./12/2011-May/12/2011)	-	150	-	13	670
Japan Atomic Energy Agency Nuclear Safety Commission (Aug./22/2011)	-	130	-	11	570
Japan Atomic Energy Agency (Mar./6/2012)	-	120	-	9	480
Nuclear & Industrial Safety Agency (Apr./12/2011)	-	130	-	6.1	370
Nuclear & Industrial Safety Agency (Jun./6/2011)	-	160	18	15	770
Nuclear & Industrial Safety Agency (Feb./16/2012)	-	150	-	8.2	480
IRSN (Institut de Radioprotection et de Sûreté Nucléaire)	2000	200	30		-
[Reference] Accident at Chernobyl Nuclear Power Plant	6500	1800	-	85	5200

(Note 1) 1 PBq (peta Becquerel) = 1,000 trillion Bq =  $10^{15}$  Bq

(Note 2) The value estimated by our company is rounded off to one decimal place, being a figure in Bq at the time of being released. The value for a rare gas is one equivalent to 0.5 MeV

(Note 3) The INES-based assessment (International Nuclear Event Scale) is a value obtained by converting an amount of radioactivity into an iodine equivalent. For comparison with the values obtained by the other organizations, I-131 and Cs-137 alone are taken up here. (Example: Approx. 500 PBq + approx. 10 PBq × 40 (a conversion factor) = approx. 900 PBq)

**4. Future schedule**

With a limitation imposed to the air dose rate data and an assumption made in the easiness of emission of radioactive nuclides, the results of this estimation are accompanied by uncertainty. We will exchange information with outside research organizations continuing effort to collect further information, and when new findings are obtained, we will incorporate them into methods and results of estimation.

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