

Result of estimation of the released amount of radioactive materials into the ocean (in the vicinity of a port) as a result of the accident in the Fukushima Daiichi Nuclear Power Station  
(Estimation made as of May 2012)

May 24, 2012  
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**1. Object of assessment**

Using the calculation code prepared by the Central Research Institute of Electric Power Industry, the released amount of radioactive materials into the ocean (in the vicinity of a port ) was estimated. The period for which the released amount was estimated is between March 26 and September 30, 2011.

**2. Method of estimation**

On the basis of the monitoring data on the concentration of radioactive materials in seawater taken near the south and north water discharge canals of the Fukushima Daiichi Nuclear Power Station, the released amount that reproduces the concentration of radioactive materials in seawater near the water discharge canals of the power station was estimated by means of a program, owned by the Central Research Institute of Electric Power Industry, to calculate the diffusion of radioactive materials in the ocean.

The concentration of radioactive materials in seawater near the south and north water discharge canals used in the estimation is affected by radioactive materials that have flowed in with rainwater or fallen from the atmosphere. Since it is impossible to remove such effects from the monitoring data by assessing them individually, however, the released amount based on the estimation includes these effects.

**3. Result of estimation**

The results of estimation of the released amount of radioactive materials into the ocean (in the vicinity of a port) are as shown in the table below. The method of assessment differs depending on the organization that carried out the estimation. The results obtained by the Japan Atomic Energy Agency, which estimated the released amount on the basis of the concentration in the water discharge canal in the same manner as that adopted by our company, show about the same values for both I-131 and Cs-137. In making an assessment on the released amount, IRSN draws a distribution map of radioactivity concentration on the basis of the monitoring data over the entire sea area concerned, uses the map to determine the total amount of radioactive materials existing in the ocean, and then estimates the released amount, which is totally different from our methods in terms of the concept of how to make an estimation. An approximate agreement in the result of simulation-based verification between the Japan Atomic Energy Agency and our company has been confirmed, but IRSN has not shown the results it obtained.

The results of estimation by the organizations include the released amounts due to direct leakage as well as to the influx of radioactive materials contained in rainwater and fallout from the atmosphere.

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

	Period of assessment	Released amount in PBq <sup>Note 1</sup>		
		I-131	Cs-134	Cs-137
Our company (Central Research Institute of Electric Power Industry)	March 26-September 30 <sup>Note2</sup>	11	3.5	3.6
Japan Atomic Energy Agency	March 21-April 30 <sup>Note3</sup>	11.4	—	3.6
IRSN (Institut de Radioprotection et de Sûreté Nucléaire)	March 21-mid-July	—	—	27

(Note 1) 1PBq (peta Becquerel)=1,000 trillion Bq=10<sup>15</sup> Bq

(Note 2) The released amount from March 21, when the measurement of the concentration of radioactive materials in seawater near the water discharge canals was started, to March 25 was calculated tentatively to be about 0.1 PBq for <sup>137</sup>Cs; the ratio of I-131 and Cs-137 suggests the predominance of release into the atmosphere.

(Note 3) Includes the release into the atmosphere.

**4. Future schedule**

This estimation is based on a simulation using a limited amount of monitoring data obtained at the south and north water discharge canals and is accompanied by uncertainty. We will make an effort in collecting and comparing information on the estimation of the released amount by other organizations, and when new findings are obtained, we will incorporate them into methods and results of estimation.

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