

Exposure dose of workers engaged in emergency work at Fukushima Daiichi Nuclear  
Power Station and related matters

1. Distribution of exposure dose

The internal exposure dose of workers who newly engaged in the emergency works in the power station in October 2011 is shown in Attachment 1.

2. Investigation of workers whose contact information is unknown for exposure dose control

Countermeasure for the workers whose contact information is unknown and who are engaged in the emergency works is shown in Attachment 2.

3. Measures for wearing “Respiratory protective equipment” used for restoration work at Fukushima Daiichi Nuclear Power Station

Result of review for the measures is shown in Attachment 3.

## Distribution of Exposure Dose

### 【 Scope of Coverage ( \* ) 】

Number of Emergency Workers	External Exposure	Internal Exposure			External + Internal Exposure	
		WBC before Nov.21				
Since March:3,745	3,745(March)	WBC before Nov.21	3,742(March)	1,115(August)	3,742(March)	1,115(August)
Since April:3,620	3,620(April)		3,609(April)	1,119(Sept.)	3,609(April)	1,119(Sept.)
Since May:3,027	3,027(May)		3,022(May)	809(Oct.)	3,022(May)	809(Oct.)
Since June:2,139	2,139(June)		2,126(June)	➡ Table 2	2,126(June)	➡ Table 3
Since July:2,132	2,132(July)		2,129(July)		2,129(July)	
Since August:1,117	1,117(August)	To be evaluated	3(March)	2(August)	3(March)	2(August)
Since September: 1,130	1,130 (September)		11(April)	11 (Sept.)	11(April)	11(September)
Since October: 870	870 (October)		5(May)	61 (Oct.)	5(May)	61(October)
			13(June)		13(June)	
			3(July)		3(July)	

( \* ) The results do not include those who worked outside Fukushima Daiichi Nuclear Power Station.

### 1. External Exposure Dose

Table 1 shows the distribution of external exposure dose until the end of October (March: from March 11 to 31, April: from April 1 to 30, May: from May 1 to 31, June: from June 1 to 30, July: from July 1 to 31, August: from August 1 to 31, September: from September 1 to 30, October : from October 1 to 31) of those who engaged in emergency works.

\*

**Table 1**

Classification (mSv)	March			April			May			June			July			August			September			October		
	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total
Over 250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 200 - 250 or less	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 150 - 200 or less	6	3	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 100 - 150 or less	20	8	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 50 - 100 or less	108	55	163	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 20 - 50 or less	275	146	421	6	50	56	2	16	18	0	18	18	0	6	6	0	0	0	0	7	7	0	2	2
Over 10 - 20 or less	561	322	883	25	251	276	9	122	131	3	95	98	0	69	69	0	21	21	0	28	28	1	2	3
10 or less	688	1,553	2,241	592	2,694	3,286	271	2,607	2,878	183	1,840	2,023	220	1,837	2,057	122	974	1,096	84	1,011	1,095	88	777	865
Total	1,658	2,087	3,745	623	2,997	3,620	282	2,745	3,027	186	1,953	2,139	220	1,912	2,132	122	995	1,117	84	1,046	1,130	89	781	870
Max. (mSv)	182.33	199.42	199.42	42.73	65.92	65.92	25.05	41.59	41.59	11.94	39.62	39.62	4.68	31.22	31.22	1.98	18.27	18.27	1.57	30.81	30.81	10.21	21.43	21.43
Ave. (mSv)	19.31	9.16	13.66	2.81	3.43	3.32	2.50	2.76	2.74	1.06	2.33	2.22	0.67	1.99	1.86	0.25	1.59	1.44	0.22	1.83	1.71	0.40	1.16	1.08

## 2. Internal exposure dose

Table 2 shows the distribution of internal exposure dose for workers who had WBC measurement by November 21, out of those who have once experienced emergency works.

**Table 2**

Classification (mSv)	March			April			May			June			July			August			September			October			
	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	
Over 250	5	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 200 - 250 or less	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 150 - 200 or less	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 100 - 150 or less	5	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 50 - 100 or less	36	42	78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 20 - 50 or less	182	78	260	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 10 - 20 or less	402	263	665	1	18	19	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 or less	1,026	1,701	2,727	622	2,966	3,588	282	2,739	3,021	186	1,940	2,126	220	1,909	2,129	122	993	1,115	84	1,035	1,119	89	720	809	
Total	1,658	2,084	3,742	623	2,986	3,609	282	2,740	3,022	186	1,940	2,126	220	1,909	2,129	122	993	1,115	84	1,035	1,119	89	720	809	
Max. (mSv)	590.00	98.53	590.00	18.81	41.80	41.80	0.24	10.12	10.12	0.08	0.76	0.76	0.21	1.90	1.90	1.13	0.20	1.13	0.04	1.22	1.22	0.13	0.06	0.13	
Ave. (mSv)	12.06	6.38	8.89	0.24	0.59	0.53	0.01	0.12	0.11	0.01	0.02	0.02	0.01	0.02	0.02	0.02	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	

### 3. Total dose of internal and external exposure

The total dose of internal and external exposure for workers who had evaluation of internal exposure dose is shown in Table 3.

**Table 3 .**

Classification (mSv)	March			April			May			June			July			August			September			October		
	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total	TEPC O	Contra ctor	Total
Over 250	6	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 200 - 250 or less	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 150 - 200 or less	12	2	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 100 - 150 or less	62	15	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 50 - 100 or less	196	112	308	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 20 - 50 or less	526	331	857	10	72	82	2	17	19	0	18	18	0	6	6	0	0	0	0	7	7	0	2	2
Over 10 - 20 or less	538	501	1,039	26	282	308	9	135	144	3	95	98	0	69	69	0	21	21	0	28	28	1	2	3
10 or less	318	1,121	1,439	587	2,629	3,216	271	2,588	2,859	183	1,827	2,010	220	1,834	2,054	122	972	1,094	84	1,000	1,084	88	716	804
Total	1,658	2,084	3,742	623	2,986	3,609	282	2,740	3,022	186	1,940	2,126	220	1,909	2,129	122	993	1,115	84	1,035	1,119	89	720	809
Max. (mSv)	670.36	238.42	670.36	45.55	69.28	69.28	25.21	41.61	41.61	11.94	39.62	39.62	4.73	31.24	31.24	1.99	18.27	18.27	1.57	30.81	30.81	10.24	21.43	21.43
Ave. (mSv)	31.37	15.55	22.56	3.05	4.03	3.86	2.51	2.88	2.85	1.06	2.36	2.25	0.68	2.01	1.87	0.27	1.59	1.45	0.22	1.85	1.73	0.40	1.20	1.11

#### 4. Total dose of internal and external exposure (the total dose of each month)

Table 4 shows the distribution of the total dose of internal and external exposure dose until the end of September (March: from March 11 to October 31, April: April 1 to October 31, May: from May 1 to October 31, July: from July 1 to October 31, August: from August 1 to October 31, September: from September 1 to October 31) of those who engaged in emergency works.

**Table 4 .**

Classification (mSv)	March			April			May			June			July			August			September			October		
	TEPCO	Contractor	Total	TEPCO	Contractor	Total	TEPCO	Contractor	Total	TEPCO	Contractor	Total	TEPCO	Contractor	Total	TEPCO	Contractor	Total	TEPCO	Contractor	Total	TEPCO	Contractor	Total
Over 250	6	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 200 - 250 or less	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 150 - 200 or less	19	2	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 100 - 150 or less	116	23	139	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Over 50 - 100 or less	340	262	602	10	41	51	3	3	6	0	0	0	1	2	3	0	0	0	0	0	0	0	0	0
Over 20 - 50 or less	544	633	1,177	61	515	576	14	255	269	7	117	124	1	104	105	0	37	37	0	23	23	0	2	2
Over 10 - 20 or less	391	470	861	61	583	644	20	517	537	6	288	294	14	258	272	0	89	89	0	113	113	1	2	3
10 or less	241	695	936	491	1,858	2,349	245	1,970	2,215	173	1,548	1,721	204	1,548	1,752	122	869	991	84	910	994	88	777	865
Total	1,658	2,087	3,745	623	2,997	3,620	282	2,745	3,027	186	1,953	2,139	220	1,912	2,132	122	995	1,117	84	1,046	1,130	89	781	870
Max. (mSv)	678.08	238.42	678.08	98.63	87.14	98.63	64.53	53.45	64.53	40.66	45.27	45.27	50.79	50.81	50.81	7.98	39.40	39.40	1.90	34.73	34.73	10.24	21.43	21.43
Ave. (mSv)	41.79	24.73	32.28	7.07	10.77	10.13	5.22	7.65	7.42	2.45	5.83	5.54	2.25	5.62	5.27	0.48	4.24	3.83	0.31	3.88	3.61	0.40	1.16	1.08

\*Correction (8:30 pm, December 13, 2011):

There were errors in the classification as well as data omitted in table 4. We apologize for any inconvenience.

END

**Investigation of workers whose contact information unknown  
for exposure dose control**

1. Result of investigation

The number of workers whose contact information was unknown as of the end of November was 16, and after the previous report (October 31), no additional contact information of such workers was identified.

There has been no worker whose contact information is unknown since July 2011.

2. Current status of investigation

For 16 workers whose contact information is unknown, we have conducted interview with cooperative companies, and 10 workers were categorized as "Not applicable" and 6 workers were categorized as "Not available to contact"

For 10 workers categorized as "Not applicable", the cooperative companies conducted investigation on the list of exposure dose records and APD circulation books, however, at this moment, the workers have not been identified.

In addition, 6 workers categorized as "Not available to contact", they were identified individually, however, it is impossible to contact them because their contact information is unknown due to change of residence after retirement, etc., therefore, the cooperative companies are continuously trying to identify the contact information.

We will continue to investigate the workers' information and implement new approach such as investigation by experts in order to identify the contact information of all the workers.

END

Measures for wearing “Respiratory protective equipment” used for restoration work at  
Fukushima Daiichi Nuclear Power Station

1. Introduction

In reaction to submit of report by the National Institute of Occupational Safety and Health, Japan, regarding study on mask fitness and proposal for improvement of masks used for restoration work at Fukushima Daiichi Nuclear Power Station, we received order from Ministry of Health, Labor and Welfare, to implement measures regarding the masks. We considered measures as follows.

2. Items studied and measures for them

We studied about five proposals below.

Based on “Measures for wearing “Respiratory protective equipment” used for restoration work at Fukushima Daiichi Nuclear Power Station”, in order to prevent leaking from full-face masks while conducting restoration work for accident of the nuclear power plant, the following 5 specific measures are proposed to TEPCO

- (1) Measures for workers wearing eyeglasses
- (2) Choice of appropriate masks
- (3) Enforcement of countermeasures for leaking from masks while wearing
- (4) Consideration of introduction of masks with electric fans
- (5) Improvement of training contents about respirators for new workers

(1) Measures for workers wearing eyeglasses

When eyeglasses wearing workers put on full-face masks, in order to prevent air intake due to decrease of adhesiveness, workers are subject to wear full-face masks with electric fans or hood masks, which keep positive pressure inside, depending on circumstance of each site. (Implemented from August 25, 2011)

In addition, in the report, when eyeglasses wearers used seal pieces for eyeglasses, percentage of leaking decreased, and certain effect by seal pieces were confirmed. Based on that, we will utilize seal pieces depending on working environment. Also, regarding the seal pieces, we will instruct workers in advance how to use and precautions. (To be introduced from late January 2012)



(2) Choice of appropriate masks

In order to prevent leaking due to mismatch of shape or size of each face to mask, we prepared various sizes of masks, and set them separately with display of sizes, so that workers can choose appropriate masks for them. (Implemented from September 27, 2011 at J-Village)

(3) Enforcement of countermeasures for leaking from masks while wearing

In order to enforce countermeasures such as prevention of taking hairs, beards, and sideburns between mask and face, adjustment of straps, conducting leak-test, we informed radiation protection managers, how to wear masks considering characteristics of each mask, and how to choose appropriate masks for each face, at meeting regarding wearing masks using tools such as fit-tester, aiming at improving awareness regarding fitness of masks for workers. (Implemented on September 20, 2011) .

(4) Consideration of introduction of masks with electric fans

Shape and weight of masks with electric fans differ depending on manufacturers, and air flow volume is larger and breakthrough time is shorter compared to chemical-cartridge masks. Therefore, we started categorizing masks by manufacturers to be used appropriately depending on works and purpose. (Implemented from August 25, 2011)

(5) Improvement of training contents about respirators for new workers

During the training for radiation protection, we conduct demonstration study using fit-testers, regarding contents such as choosing appropriate masks for their faces, or feeling the difference of leaking, depending the level of strength of tightening, aiming at improving awareness of participants regarding importance of fitness of masks.(Implemented from November 17, 2011)

END