

Exposure Dose Distribution

1. External Exposure Dose of Radiation Workers at the Fukushima Daiichi Nuclear Power Station (Effective Dose)

Table 1 shows what levels of external radiation exposure the workers who were involved in radiation work at the Fukushima Daiichi Nuclear Power Station from September 2015 to November 2015 received.

Table 1

Dose Ranges (mSv)	September 2015			October 2015			November 2015		
	TEPCO's Employees	Contractors	Total	TEPCO's Employees	Contractors	Total	TEPCO's Employees	Contractors	Total
Above 100	0	0	0	0	0	0	0	0	0
75-100	0	0	0	0	0	0	0	0	0
50-75	0	0	0	0	0	0	0	0	0
20-50	0	0	0	0	0	0	0	0	0
10-20	0	16	16	0	9	9	0	7	7
5-10	1	140	141	0	145	145	0	76	76
1-5	51	1590	1641	52	1699	1751	44	1399	1443
1 or less	1144	8034	9178	1130	7864	8994	998	7852	8850
Total	1196	9780	10976	1182	9717	10899	1042	9334	10376
Max. (mSv)	5.60	15.30	15.30	3.20	14.42	14.42	4.96	13.88	13.88
Ave. (mSv)	0.24	0.67	0.63	0.22	0.70	0.64	0.20	0.55	0.52

• The values of the exposure dose and the number of the workers in the table above are subject to change, because there are times when APD data are replaced with monthly dose data measured by integral dosimeters. Or dose data of workers who wore only an integral dosimeter (ex., workers who entered only the Main Anti-earthquake Building) need to be updated in the table after the publication of the data.

2. External and Internal Exposure Doses of Radiation Workers at the Fukushima Daiichi Nuclear Power Station (Effective Dose)

Table 2 shows what levels of both external and internal radiation exposure the workers who were involved in radiation work at the Fukushima Daiichi Nuclear Power Station received during the two different periods of time, from March 11, 2011 to October 31, 2015 and from March 11, 2011 to November 30, 2015, comparing the data figures of the two periods to indicate whether they increased, decreased or were the same. Table 3 shows data on the radiation exposure dose of the workers who were engaged in radiation work at the station during the different periods of time, from April to October in 2015 and from April to November in 2015, and the comparison results of the data figures between those periods are indicated in the table, as well.

Table 2

Dose Ranges (mSv)	March 2011 - October 2015			March 2011 - November 2015			Difference		
	TEPCO's Employees	Contractors	Total	TEPCO's Employees	Contractors	Total	TEPCO's Employees	Contractors	Total
Above 250	6	0	6	6	0	6	0	0	0
200-250	1	2	3	1	2	3	0	0	0
150-200	26	2	28	26	2	28	0	0	0
100-150	117	20	137	117	20	137	0	0	0
75-100	308	246	554	311	259	570	3	13	16
50-75	331	1659	1990	330	1690	2020	-1	31	30
20-50	632	6247	6879	631	6301	6932	-1	54	53
10-20	616	5594	6210	620	5628	6248	4	34	38
5-10	495	5300	5795	495	5327	5822	0	27	27
1-5	860	9461	10321	871	9518	10389	11	57	68
1 or less	1257	12399	13656	1255	12481	13736	-2	82	80
Total	4649	40930	45579	4663	41228	45891	14	298	312
Max. (mSv)	678.80	238.42	678.80	678.80	238.42	678.80	-	-	-
Ave. (mSv)	22.48	11.48	12.60	22.45	11.52	12.63	-	-	-

- The values of the exposure dose and the number of the workers in the table above are subject to change, because there are times when APD data are replaced with monthly dose data measured by integral dosimeters. Or dose data of workers who wore only an integral dosimeter (ex., workers who entered only the Main Anti-earthquake Building) need to be updated in the table after the publication of the data.
- No significant internal radiation exposure dose has been reported since October 2011.

Table 3

Dose Ranges (mSv)	April 2015 - October 2015			April 2015 - November 2015			Difference		
	TEPCO's Employees	Contractors	Total	TEPCO's Employees	Contractors	Total	TEPCO's Employees	Contractors	Total
Above 100	0	0	0	0	0	0	0	0	0
75-100	0	0	0	0	0	0	0	0	0
50-75	0	0	0	0	0	0	0	0	0
20-50	0	259	259	1	328	329	1	69	70
10-20	16	1068	1084	24	1261	1285	8	193	201
5-10	75	1698	1773	83	1796	1879	8	98	106
1-5	359	4908	5267	389	5030	5419	30	122	152
1 or less	1136	6631	7767	1114	6579	7693	-22	-52	-74
Total	1586	14564	16150	1611	14994	16605	25	430	455
Max. (mSv)	18.63	37.68	37.68	20.09	37.68	37.68	-	-	-
Ave. (mSv)	1.22	3.26	3.06	1.33	3.51	3.30	-	-	-

- The values of the exposure dose and the number of the workers in the table above are subject to change, because there are times when APD data are replaced with monthly dose data measured by integral dosimeters. Or dose data of workers who wore only an integral dosimeter (ex., workers who entered only the Main Anti-earthquake Building) need to be updated in the table after the publication of the data.

3. External and Internal Exposure Doses of “Workers Exposed to Especially High Radiation” (Effective Dose)

Table 4 shows what levels of both external and internal radiation exposure “workers exposed to especially high radiation”^{*1} received.^{*2}

Table 4

Dose Ranges (mSv)	September 2015	October 2015	November 2015	March 2011 - November 2015
Above 100	0	0	0	1
75-100	0	0	0	191
50-75	0	0	0	233
20-50	0	0	0	267
10-20	0	0	0	186
5-10	1	0	0	129
1-5	43	0	0	145
1 or less	523	0	0	51
Total	567	0	0	1203
Max. (mSv)	5.60	-	-	102.69
Ave. (mSv)	0.35	-	-	36.50

(Since October 2015, TEPCO has opted not to report to the Labour Standards Inspection Office on “workers exposed to especially high radiation.”)

1. “Workers exposed to especially high radiation” means workers who are involved in operations in which they could be exposed to the emergency exposure dose limit (100mSv), which is stipulated in “Ordinance on Prevention of Ionizing Radiation Hazards, Chapter 7.” In more detail, they are workers engaged in the work to maintain the function of the cooling facility to cool down the reactor facility or the spent fuel tank in the reactor facility, the steam turbine and its related facilities or the surrounding area where the radiation doses exceed 0.1mSv/h. Or they are workers who would engage in keeping running the function to control or prevent the release of a large number of radioactive materials should it be likely to occur due to malfunction or damage of the reactor facility.

So far workers who have worked as “workers exposed to especially high radiation” are all TEPCO employees.

2. The number of “workers exposed to especially high radiation” each month is the number of the workers who reported working as such workers in a given month and were engaged in that work. The figures in the cumulative data during the period from March 2011 to November 2015 in Table 4 above include the numbers of workers who have been reported to work as “workers exposed to especially high radiation” at least once.

- The values of the exposure dose and the number of the workers in the table above are subject to change, because there are times when APD data are replaced with monthly dose data measured by integral dosimeters. Or the dose data of workers who wore only an integral dosimeter (ex., workers who entered only the Main Anti-earthquake Building) need to be updated in the table after the publication of the data.
- The figure shown in the dose range ,“Above 100mSv,” in the cumulative data during the period from March 2011 to November 2015 is the figure when the March 2011 data of the internal exposure dose were reevaluated in July 2013.

4. Equivalent Dose

Table 5 and Table 6 show equivalent doses to the skin and the lens of the eye of the workers, respectively, who were involved in radiation work at the Fukushima Daiichi Nuclear Power Station from September to November 2015.

Table 5 (Equivalent dose to the skin)

Dose Ranges (mSv)	September 2015			October 2015			November 2015		
	TEPCO's Employees	Contractors	Total	TEPCO's Employees	Contractors	Total	TEPCO's Employees	Contractors	Total
Above 500	0	0	0	0	0	0	0	0	0
300-500	0	0	0	0	0	0	0	0	0
250-300	0	0	0	0	0	0	0	0	0
200-250	0	0	0	0	0	0	0	0	0
150-200	0	0	0	0	0	0	0	0	0
100-150	0	0	0	0	0	0	0	0	0
75-100	0	0	0	0	0	0	0	0	0
50-75	0	0	0	0	0	0	0	0	0
20-50	0	12	12	0	2	2	0	0	0
10-20	0	73	73	0	74	74	0	18	18
5-10	5	320	325	3	369	372	0	121	121
1-5	59	1826	1885	61	1925	1986	48	1548	1596
1 or less	1132	7549	8681	1118	7347	8465	994	7647	8641
Total	1196	9780	10976	1182	9717	10899	1042	9334	10376
Max. (mSv)	7.70	31.50	31.50	7.10	47.70	47.70	4.96	14.21	14.21
Ave. (mSv)	0.29	0.97	0.89	0.26	1.02	0.94	0.21	0.64	0.59

- The values of the exposure dose and the number of the workers in the table above are subject to change, because there are times when APD data are replaced with monthly dose data measured by integral dosimeters. Or the dose data of workers who wore only an integral dosimeter (ex., workers who entered only the Main Anti-earthquake Building) need to be updated in the table after the publication of the data.
- Equivalent dose is a measure of the radiation dose to organs and tissues, and the equivalent dose limit to the skin is 500mSv/year (the emergency exposure dose limit is 1Sv).
- Equivalent dose to the skin is measured at a depth of 70 micrometers from the skin surface. When the equivalent dose is measured with a dosimeter other than the one put on around the chest and the abdomen, for example, a finger dosimeter, the maximum measurement value is counted as the equivalent dose.

Table 6 (Equivalent dose to the lens of the eye)

Dose Ranges (mSv)	September 2015			October 2015			November 2015		
	TEPCO's Employees	Contractors	Total	TEPCO's Employees	Contractors	Total	TEPCO's Employees	Contractors	Total
Above 150	0	0	0	0	0	0	0	0	0
100-150	0	0	0	0	0	0	0	0	0
75-100	0	0	0	0	0	0	0	0	0
50-75	0	0	0	0	0	0	0	0	0
20-50	0	1	1	0	0	0	0	0	0
10-20	0	30	30	0	27	27	0	18	18
5-10	1	237	238	1	236	237	0	121	121
1-5	56	1700	1756	52	1848	1900	48	1548	1596
1or less	1139	7812	8951	1129	7606	8735	994	7647	8641
Total	1196	9780	10976	1182	9717	10899	1042	9334	10376
Max. (mSv)	5.90	26.50	26.50	5.30	19.70	19.70	4.96	14.21	14.21
Ave. (mSv)	0.25	0.79	0.73	0.22	0.84	0.77	0.21	0.64	0.59

• The values of the exposure dose and the number of the workers in the table above are subject to change, because there are times when APD data are replaced with monthly dose data measured by integral dosimeters. Or the dose data of workers who wore only an integral dosimeter (ex., workers who entered only the Main Anti-earthquake Building) need to be updated in the table after the publication of the data.

• Equivalent dose is a measure of the radiation dose to organs and tissues, and the equivalent dose limit to the lens of the eye is 150mSv/year (the emergency exposure dose limit is 300mSv).

• The equivalent dose to the lens of the eye is measured at a depth of 70 micrometers from the skin surface using a dosimeter put on around the chest or the abdomen, and thus the shielding effect face masks have does not affect the measurement results.

5. Cumulative Data of Equivalent Dose

Table 7 and Table 8 show the cumulative data (during the two different periods of time, from April to October, 2015 and from April to November, 2015) of equivalent doses to the skin and the lens of the eyes of the workers, respectively, who were engaged in radiation work at the Fukushima Daiichi Nuclear Power Station.

Table 7 (Equivalent dose to the skin)

Dose Ranges (mSv)	April 2015 - October 2015			April 2015 - November 2015			Difference		
	TEPCO's Employees	Contractors	Total	TEPCO's Employees	Contractors	Total	TEPCO's Employees	Contractors	Total
Above 500	0	0	0	0	0	0	0	0	0
300-500	0	0	0	0	0	0	0	0	0
250-300	0	0	0	0	0	0	0	0	0
200-250	0	0	0	0	0	0	0	0	0
150-200	0	0	0	0	0	0	0	0	0
100-150	0	4	4	0	5	5	0	1	1
75-100	0	2	2	0	1	1	0	-1	-1
50-75	0	14	14	0	19	19	0	5	5
20-50	5	725	730	7	813	820	2	88	90
10-20	19	1393	1412	29	1527	1556	10	134	144
5-10	82	1669	1751	90	1784	1874	8	115	123
1-5	368	4349	4717	393	4449	4842	25	100	125
1or less	1112	6408	7520	1092	6396	7488	-20	-12	-32
Total	1586	14564	16150	1611	14994	16605	25	430	455
Max. (mSv)	29.50	142.71	142.71	32.41	142.77	142.77	-	-	-
Ave. (mSv)	1.39	4.54	4.23	1.51	4.80	4.48	-	-	-

• The values of the exposure dose and the number of the workers in the table above are subject to change, because there are times when APD data are replaced with monthly dose data measured by integral dosimeters. Or the dose data of workers who wore only an integral dosimeter (ex., workers who entered only the Main Anti-earthquake Building) need to be updated in the table after the publication of the data.

Table 8 (Equivalent dose to the lens of the eye)

Dose Ranges (mSv)	April 2015 - October 2015			April 2015 - November 2015			Difference		
	TEPCO's Employees	Contractors	Total	TEPCO's Employees	Contractors	Total	TEPCO's Employees	Contractors	Total
Above 150	0	0	0	0	0	0	0	0	0
100-150	0	0	0	0	0	0	0	0	0
75-100	0	0	0	0	0	0	0	0	0
50-75	0	6	6	0	11	11	0	5	5
20-50	1	439	440	2	522	524	1	83	84
10-20	16	1230	1246	28	1404	1432	12	174	186
5-10	81	1746	1827	85	1859	1944	4	113	117
1-5	357	4590	4947	387	4702	5089	30	112	142
1 or less	1131	6553	7684	1109	6496	7605	-22	-57	-79
Total	1586	14564	16150	1611	14994	16605	25	430	455
Max. (mSv)	21.23	60.90	60.90	21.41	69.98	69.98	-	-	-
Ave. (mSv)	1.26	3.81	3.56	1.37	4.10	3.83	-	-	-

• The values of the exposure dose and the number of the workers in the table above are subject to change, because there are times when APD data are replaced with monthly dose data measured by integral dosimeters. Or the dose data of workers who wore only an integral dosimeter (ex., workers who entered only the Main Anti-earthquake Building) need to be updated in the table after the publication of the data.