Evaluation of the exposure dose of workers engaged in radiation work at the Fukushima Daiichi Nuclear Power Station

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TEPCO has been evaluating the exposure dose of workers who engaged in radiation work at the Fukushima Daiichi Nuclear Power Station under two types, internal and external exposure to radiation, and has submitted the evaluation results to the Ministry of Health, Labour and Welfare regularly.

TEPCO today submitted to the Ministry of Health, Labour and Welfare a report on the exposure dose evaluation the data of which are those we collected until the end of February 2025. Here is part of the report: the maximum value of the external exposure dose among the workers who engaged in the work at the power station in February was 11.83 mSv, and regarding the internal exposure dose, no significant value was measured.

Attachment

Exposure Dose Distribution

1. Effective Dose from External Exposure

Table 1 shows the distribution of external exposure dose of workers who were involved in radiation work at the Fukushima Daiichi Nuclear Power Station for the past three months.

Table 1. External Exposure Dose

Dose Ranges (mSv)	December 2024			January 2025			February 2025		
	TEPCO Employees	Contractors	Total	TEPCO Employees	Contractors	Total	TEPCO 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	0	0	0	0	0	0	5	5
5-10	0	58	58	0	34	34	0	95	95
1-5	19	412	431	13	481	494	12	638	650
1 or less	997	6489	7486	985	6391	7376	976	6305	7281
Total	1016	6959	7975	998	6906	7904	988	7043	8031
Maximum (mSv)	2.2	9.3	9.3	4.5	10.0	10.0	3.22	11.83	11.83
Average (mSv)	0.08	0.28	0.25	0.08	0.28	0.25	0.07	0.39	0.35

・The values of the exposure dose and the number of the workers in the table above are subject to change, because there are cases that 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 Seismic Isolation Building) need to be updated in the table after the publication of the data.

2. Sum of External and Internal Exposure Dose (Effective Dose)

Table 2 shows the distribution of cumulative exposure dose of workers who are involved in radiation work at Fukushima Daiichi for five years, starting on April 1, 2021. Table 3 shows the distribution of cumulative exposure dose in the fiscal year of 2024. Two different periods of time are shown in the Table 2: from April 1, 2021 to January 31, 2025 and from April 1, 2021 to February 28, 2025, and Table 3: from April 1, 2024 to January 31, 2025 and from April 1, 2024 to February 28, 2025 for comparison.

Table 2. Cumulative Exposure Dose for Five Years

Dose Ranges (mSv)	April 2021 - January 2025			April 2021 - February 2025			Difference		
	TEPCO Employees	Contractors	Total	TEPCO Employees	Contractors	Total	TEPCO 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	102	102	0	109	109	0	7	7
20-50	31	1257	1288	33	1301	1334	2	44	46
10-20	69	1910	1979	71	1950	2021	2	40	42
5-10	136	1721	1857	136	1770	1906	0	49	49
1-5	383	2909	3292	389	2918	3307	6	9	15
1 or less	1292	8881	10173	1292	8930	10222	0	49	49
Total	1911	16780	18691	1921	16978	18899	10	198	208
Maximum (mSv)	34.62	65.32	65.32	34.85	66.34	66.34	-	-	-
Average (mSv)	2.05	5.45	5.10	2.08	5.55	5.20	-	-	-

・The values of the exposure dose and the number of the workers in the table above are subject to change, because there are cases that 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 Seismic Isolation Building) need to be updated in the table after the publication of the data.

・No significant internal exposure has been reported since October 2011.

Table 3. Cumulative Exposure Dose in the Fiscal Year of 2024

Dose Ranges (mSv)	April 2024 - January 2025			April 2024 - February 2025			Difference		
	TEPCO Employees	Contractors	Total	TEPCO Employees	Contractors	Total	TEPCO 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	2	508	510	4	653	657	2	145	147
5-10	35	868	903	35	1002	1037	0	134	134
1-5	159	1921	2080	172	2008	2180	13	87	100
1 or less	1188	6722	7910	1185	6635	7820	-3	-87	-90
Total	1384	10019	11403	1396	10298	11694	12	279	291
Maximum (mSv)	11.0	16.5	16.5	11.23	16.52	16.52	-	-	-
Average (mSv)	0.57	1.86	1.70	0.61	2.08	1.90	-	-	-

・The values of the exposure dose and the number of the workers in the table above are subject to change, because there are cases that 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 Seismic Isolation Building) need to be updated in the table after the publication of the data.

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

Table 4 shows the distribution of cumulative exposure dose of workers exposed to especially high radiation.*1

Table 4. Cumulative Exposure Dose (workers exposed to especially high radiation)

Dose Ranges (mSv)	March 2011 - September 2015
Above 100	1
75-100	191
50-75	233
20-50	267
10-20	186
5-10	129
1-5	145
1 or less	51
Total	1203
Maximum (mSv)	102.69
Average (mSv)	36.49

(Since October 2015, TEPCO Holdings has opted not to report to the Labour Standards Inspection Office about 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 (100 mSv), 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 0.1 mSv/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 figures in the cumulative data during the period from March 2011 to September 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.

*3. The values of the exposure dose and the number of the workers in the table above are subject to change, because there are cases that 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 Seismic Isolation Building) need to be updated in the table after the publication of the data.

*4. The figure shown in the dose range, “Above 100mSv,” in the cumulative data during the period from March 2011 to September 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 dose 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 for the past three months.

Table 5. Equivalent Dose to the Skin

Dose Ranges (mSv)	December 2024			January 2025			February 2025		
	TEPCO Employees	Contractors	Total	TEPCO Employees	Contractors	Total	TEPCO 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	0	0	0	1	1	0	0	0
10-20	0	5	5	0	9	9	0	5	5
5-10	0	70	70	0	60	60	0	99	99
1-5	23	531	554	17	562	579	12	682	694
1 or less	993	6353	7346	981	6274	7255	976	6257	7233
Total	1016	6959	7975	998	6906	7904	988	7043	8031
Maximum (mSv)	3.0	15.0	15.0	4.5	21.7	21.7	3.22	11.83	11.83
Average (mSv)	0.09	0.35	0.31	0.08	0.36	0.33	0.07	0.41	0.37

・The values of the exposure dose and the number of the workers in the table above are subject to change, because there are cases that 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 Seismic Isolation 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 500 mSv/year (the emergency exposure dose limit is 1 Sv).

・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, and the maximum measurement value is counted as the equivalent dose.

Table 6. Equivalent Dose to the Lens of the Eye

Dose Ranges (mSv)	December 2024			January 2025			February 2025		
	TEPCO Employees	Contractors	Total	TEPCO Employees	Contractors	Total	TEPCO 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	0	0	0	0	0	0	0	0
10-20	0	3	3	0	4	4	0	5	5
5-10	0	64	64	0	33	33	0	98	98
1-5	20	426	446	14	493	507	12	675	687
1 or less	996	6466	7462	984	6376	7360	976	6265	7241
Total	1016	6959	7975	998	6906	7904	988	7043	8031
Maximum (mSv)	2.3	11.5	11.5	4.5	13.5	13.5	3.22	11.83	11.83
Average (mSv)	0.08	0.30	0.27	0.08	0.30	0.27	0.07	0.41	0.37

・The values of the exposure dose and the number of the workers in the table above are subject to change, because there are cases that 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 Seismic Isolation 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 50 mSv/year and 100 mSv/5 years (the emergency exposure dose limit is 300 mSv). The equivalent dose limit to the lens of the eye before April 1, 2021 was 150mSv/year (the emergency exposure dose limit was 300 mSv).

・The equivalent dose to the lens of the eye is measured at a depth of 1 centimeter for neutron ray, 3 millimeters for X-ray, gamma ray and beta ray from the skin surface. However, as for X-ray, gamma ray and beta ray, it is measured at a depth of 1 centimeter or 70 micrometer when deemed appropriate with consideration for radiation type and energy type (since April, 2021).

5. Cumulative Equivalent Dose

Table 7 and Table 8 show the distribution of cumulative equivalent dose to the skins and the lens of the eye of the workers, respectively, who were involved in radiation work at the Fukushima Daiichi Nuclear Power Station during two different periods of time, from April 1, 2024 to January 31, 2025 and from April 1, 2024 to February 28, 2025 for comparison.

Table 9 shows the distribution of cumulative exposure dose for five years, starting on April 1, 2021: from April 1, 2021 to January 31, 2025 and from April 1, 2021 to February 28, 2025 for comparison.

Table 7. Equivalent Dose to the Skin

Dose Ranges (mSv)	April 2024 - January 2025			April 2024 - February 2025			Difference		
	TEPCO Employees	Contractors	Total	TEPCO Employees	Contractors	Total	TEPCO 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	2	2	0	2	2	0	0	0
20-50	0	33	33	0	38	38	0	5	5
10-20	5	675	680	6	843	849	1	168	169
5-10	39	873	912	39	964	1003	0	91	91
1-5	162	1894	2056	176	1975	2151	14	81	95
1 or less	1178	6542	7720	1175	6476	7651	-3	-66	-69
Total	1384	10019	11403	1396	10298	11694	12	279	291
Maximum (mSv)	12.5	59.9	59.9	12.73	61.96	61.96	-	-	-
Average (mSv)	0.62	2.20	2.01	0.67	2.42	2.21	-	-	-

・The values of the exposure dose and the number of the workers in the table above are subject to change, because there are cases that 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 Seismic Isolation 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 500 mSv/year (the emergency exposure dose limit is 1 Sv).

・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, and the maximum measurement value is counted as the equivalent dose.

Table 8. Equivalent Dose to the Lens of the Eye

Dose Ranges (mSv)	April 2024 - January 2025			April 2024 - February 2025			Difference		
	TEPCO Employees	Contractors	Total	TEPCO Employees	Contractors	Total	TEPCO 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	0	0	0	0	0	0	0	0
10-20	2	631	633	4	765	769	2	134	136
5-10	36	807	843	36	954	990	0	147	147
1-5	163	1890	2053	176	1995	2171	13	105	118
1 or less	1183	6691	7874	1180	6584	7764	-3	-107	-110
Total	1384	10019	11403	1396	10298	11694	12	279	291
Maximum (mSv)	11.1	17.2	17.2	11.33	17.2	17.2	-	-	-
Average (mSv)	0.58	2.00	1.83	0.63	2.22	2.03	-	-	-

・The values of the exposure dose and the number of the workers in the table above are subject to change, because there are cases that 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 Seismic Isolation 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 50 mSv/year and 100 mSv/5 years (the emergency exposure dose limit is 300 mSv).

・The equivalent dose to the lens of the eye is measured at a depth of 1 centimeter for neutron ray, 3 millimeters for X-ray, gamma ray and beta ray from the skin surface. However, as for X-ray, gamma ray and beta ray, it is measured at a depth of 1 centimeter or 70 micrometer when deemed appropriate with consideration for radiation type and energy type.

Table 9. Equivalent Dose to the Lens of the Eye: Cumulative Exposure Dose for Five Years

Dose Ranges (mSv)	April 2021 - January 2025			April 2021 - February 2025			Difference		
	TEPCO Employees	Contractors	Total	TEPCO Employees	Contractors	Total	TEPCO 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	109	109	0	122	122	0	13	13
20-50	33	1354	1387	34	1394	1428	1	40	41
10-20	69	1934	2003	71	1967	2038	2	33	35
5-10	138	1650	1788	141	1714	1855	3	64	67
1-5	385	2878	3263	388	2879	3267	3	1	4
1 or less	1286	8855	10141	1287	8902	10189	1	47	48
Total	1911	16780	18691	1921	16978	18899	10	198	208
Maximum (mSv)	34.88	65.07	65.07	35.25	65.09	65.09	-	-	-
Average (mSv)	2.09	5.72	5.35	2.11	5.82	5.44	-	-	-

・The values of the exposure dose and the number of the workers in the table above are subject to change, because there are cases that 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 Seismic Isolation 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 50 mSv/year and 100 mSv/5 years (the emergency exposure dose limit is 300 mSv).

・The equivalent dose to the lens of the eye is measured at a depth of 1 centimeter for neutron ray, 3 millimeters for X-ray, gamma ray and beta ray from the skin surface. However, as for X-ray, gamma ray and beta ray, it is measured at a depth of 1 centimeter or 70 micrometer when deemed appropriate with consideration for radiation type and energy type.